

Perceptions of risk in cyberspace

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While the Office of Science and Technology commissioned this review, the views are those of the authors, are independent of Government and do not constitute Government policy.

1 INTRODUCTION

This paper reviews the social scientific literature on public perception of risk. We begin with a discussion of the concept of risk and its place in the social sciences. Then we outline psychological research on cognition and emotion and how laypersons appraise uncertainty. This highlights the different ways in which experts and the public often approach risk. After this discussion we turn to the issue of trust and risk perception – a concept particularly apposite for the consideration of cyber crime.

An important issue is the role of the social meaning of a given hazard, and how citizens approach, make sense of and respond to it. Group and cultural identities shape how individuals define risks – we review the pioneering cultural theory work of Mary Douglas and Aaron Wildavsky. But, more than this, people receive information about risks primarily from the mass media. Representations, imagery and symbols circulate in society, transmitted and transformed by multiple actors with a wide array of effects. We discuss the rich set of concepts contained in the Social Amplification of Risk Framework, along with the notion of stigma and how the media frame and anchor issues and events.

Overall, the literature suggests that the social meaning of a risk determines its salience – whether an individual focuses on one rather than another, and why – and how uncertainty is judged, interacting with cognitive and affective processes at an individual level. Concerns about risks also express underlying values and attitudes regarding blame, morality and the value placed on the outcome of an event.

We finish with some thoughts on cyber trust and crime prevention and, particularly, the applicability of key concepts to public confidence and perceptions of risk regarding information and communication technologies (ICTs) and cyber crime.

2 RISK: AN ISSUE FOR SOCIAL SCIENCE

Risk has become something of a buzzword for the social sciences in recent times. Ulrich Beck's (1992) *Risk Society* has received much attention, and this places notions of man-made risk in the foreground in an understanding of what Anthony Giddens (1991) referred to as 'high modernity'. In this view:

To live in the universe of high modernity is to live in an environment of chance and risk, the inevitable concomitants of a system geared to the domination of nature and the reflexive making of history. Fate and destiny have no formal part to play in such a system ... (Beck 1992).

High modernity is characterized by the production and distribution of risks from an increasingly complex techno-scientific system. It is one where every citizen is exposed, to some degree, to technological dangers such as radioactivity, airborne and waterborne pollution, and hazards from mass transportation such as airline, automobile or train crashes. The nature of modern societies is such that risks multiply with the increasing 'complexification' of societal systems of production, consumption, governance and technological control.

Implicit also is the notion that more knowledge leads to more risk. Now, how can this be? As Douglas and Wildavsky (1982, p. 3) note: "The advance of science increases human understanding of the natural world. By opening up new realms of knowledge, however, science simultaneously can increase the gap between what is known and what it is desirable to know".

This hints at what underlies nearly all the social scientific interest in risk as a concept: whatever else risk may refer to outside technical definitions it is to some degree a social and psychological

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construct. A risk must be identified and appraised. Without human attention it is not a risk in the modern sense of the word. Risk is a *measurement*, an estimation of exposure, likelihood and extent of loss (Garland 2003). Attention and judgement create a risk in this sense; modern systems of risk assessment, that classify, select and respond, bring attention to bear on a danger and give the newly formed risk meaning and technical precision.

Just as science and technology open up new worlds of possibility, so science and technology reveal new risks. Many risks in late modern society conform to what Beck considers to be an ideal type (Beck 1992). Firstly, they are invisible and the consequences are likely to be irreversible. Secondly, risks are based on 'causal interpretations' meaning that, initially at least, they depend upon scientific knowledge claims that are in principle open and contested. They are thus particularly prone to construction and redefinition by the most important social actor groups – the mass media, the scientific and legal professions, and regulatory authorities – as well as by individuals. This phenomenon is amply visible in new media tags such as 'blame culture', used to describe the political wrangling and media interest that inevitably follow in the wake of what might formerly have been considered unavoidable accidents. *Daily Telegraph* columnist W.F. Deedes (2001), commenting on a recent spate of train crashes in Britain characterized this view succinctly enough:

The blame culture has grown stronger since [the 1950s]. There is no such thing as an accident or mishap these days. Someone must have blundered, and so heads must roll ... Our own inner philosophy has undergone a change. We find it harder to take in our stride the blows that life suddenly delivers. Science replacing religion has something to do with it. In our homes, in the air, on road and rail, we expect modern devices to afford us protection against life's hazards.

A risk by definition has consequences for humans and what humans value. As Douglas (1990, p. 10) says: "risk is not only the probability of an event but also the probable magnitude of its outcome, and everything depends on the value that is set on the outcome. The evaluation is a political, aesthetic and moral matter". Different individuals and different communities might judge a risk more or less seriously because they value the consequences differently – they value differentially what is being harmed and who is doing the harm. In this way, the identification of a threat or danger, and the appraisal of its possible consequences, is inherently moral. And this has wider consequences. The production of such knowledge creates a capacity to act according to principles, responsibility and accountabilities; more and more, risk carries connotations of accountability and blame (Douglas 1990, 1992).

Risk research within the social sciences, then, is 'alive and kicking'. Later we will discuss competing definitions and conceptions of risk. First, though, it will be useful to briefly outline the history of the usage of the word, its denotations and connotations up to the present.

3 ORIGINS OF 'RISK'

The word risk derives from the early Italian word *risicare*, which means 'to dare'. It speaks to the idea of choices, decisions that may carry downsides, but are made in order to reap a possible gain. Bernstein (1996, p. 2) regards the connection between 'daring' behaviour and rational analysis as a central feature of modernity:

The ability to define what may happen in the future and to choose among alternatives lies at the heart of contemporary societies ... the capacity to manage risk, and with it the appetite to take risk and make forward-looking choices, are key elements of the energy that drives the economic system forward.

In his account of the origin of modern understandings of risk, Bernstein focuses on the development of probability theory. This he sees as the means by which social and individual decision-making has become more rational. He does not equate this with the idea that we as people are becoming more rational – rather, that "our understanding of risk enables us to make decisions in a rational mode" (Bernstein 1996, p. 4).

By the middle of the 18th century, with probability theory developing, a flourishing insurance market had sprung up in London. In order to make money from insuring a vessel and its cargo, insurance underwriters needed a workable estimate of the probability that it would reach its destination intact. The realization that 'fate' and 'chance' were not entirely capricious was not lost on Leibniz, who wrote to Bernoulli that "Nature has established patterns originating in the return of events, but only for the most part" (Bernstein 1996, p. 4). During the past 200 years, from Bernoulli's Law of Large Numbers to Bayes's theorem, Galton's regression to the mean and Markowitz's portfolio theory,

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this account of risk is synonymous with the development of techniques for rational decision-making in the face of uncertain futures. As such, it is an account of the harnessing of 'upside' risk for economic and social gain.

A complementary story is told by Judith Green (1995). She traces 'the accident' as it has been constructed through history. Green defines accidents as misfortunes that satisfy two criteria. Firstly, the event must have been unmotivated (or, at least seen as such). In other words, no person or agency willed the event to take place. Secondly, it must be unpredictable. If it were predictable and were also not intended, the accident would most likely have been prevented or the conditions for its existence would not come about.

So, while Bernstein characterizes risk chiefly as opportunity, Green looks at risk from the perspective of accidental losses. She traces a parallel story of risk that centres on historical discourses of accidents. The accident is not only a pivotal category of misfortune in contemporary times; it is also a blank slate on which various cultural concerns about uncertainty, responsibility and culpability are inscribed (Green 1995, p. 196).

Green follows Hacking's (1987) interpretation of the development of probability or 'chance'. Prior to 1650, in the west, the accident, as we might understand the term today, simply did not exist. There was no room for chance in a universe governed by an omnipotent God. Indeed, its absence in the cosmologies of 'primitives' like those studied by Levy-Bruhl (Levy-Bruhl and Clare 1923) or Evans-Pritchard (1937) was seen as one of the defining points of difference between the 'primitive' and the 'modern' mind. For the primitive mind, every 'accidental' event is invested with ulterior meaning. Causes of misfortune are ascribed to angry Gods, witchcraft or some such. Mere coincidence is not an admissible category.

After this time, Enlightenment thinking and its discourse of science transformed the notion of the accident. New ways of explaining the world, through deduction, evidence and, increasingly, statistical reasoning, meant that accidents came to mark the boundary of rational explanation. They represented, in some sense, a residual category of event, or, as Green (1995, p. 197) puts it, "Rationality ... produced a space for accidental events at the margin of its explanatory reach". By the end of the 19th century, the idea that some events like train crashes or being struck down by illness were inexplicable or, at least, random and unpredictably distributed, was a marker of modernity.

During the middle of the 20th century, again there is a shift. Green suggests, again following Hacking (1987), that there was a probabilistic revolution in science and in the philosophy of science that filtered into other forms of discourse – business, governmental, legal. In this view, deterministic laws and ways of understanding the world are replaced by "autonomous laws of chance" (Green 1995, p. 198). In this climate, discourses of risk management and containment flourish. Accidents become reconfigured as the outcome of complex sets of risk factors. The regulation of mass transport, energy and public health, for example, can all now be technically oriented around (among other things) the prevention of accidents. This is the point at which the accounts of Bernstein and Green converge. For Bernstein, profits and economic growth can be maximized through the use of quantitative models and probabilistic models. The same logic underpins the present state of risk management, where the 'accident' is coming to be seen as a failure of systems or individuals to take the necessary steps to prevent misfortune.

4 EMPIRICAL RESEARCH ON PUBLIC PERCEPTION OF RISK

Risk has thus become a fundamental aspect of modern life in the west. And, interestingly, if the analyses of Green and Bernstein hold, the present situation has almost led us back to Levy-Bruhl's primitive cosmology, superimposed on contemporary western societies. In harnessing the power of probabilistic ways of viewing the world, we return to a state where all misfortunes have 'causes' where some person or agency is culpable. Add the factor of extensive media coverage of accidents, health scares, crime and the like, and one can clearly see why risk *qua* problem is a prominent political issue. This is reason enough for it also to be an issue for social scientists.

Having considered the concept of risk, we now begin the review of empirical and theoretical work on the public perception of risk. But before we do this, it is worth saying a few words about terms and definitions.

Research on risk is seen in economics, in political science, in psychology and in anthropology,

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among other social sciences. Many different definitions (implicit and explicit) have informed this work and Thompson and Dean (1996), to whom we will return, offer a useful framework in this regard. On the one hand, we have a probabilistic conception that broadly maps onto the scientific/quantitative approach. Risk comprises quantitative assessments of likelihood and consequence. Often research looks at how public perceptions differ from more technical estimates, which raises the unhelpful and evaluative notion of 'misperception'. On the other hand, there is a contextualist formulation of risk. This opens the door to a wide range of other questions that colour public understanding and response, including control, the cultural resonance of a risk and its consequences and aspects of trust and blame. All these may contribute to the definition and salience of a particular hazard.

Much of the work on risk refers to the 'perception of risk' by the public and by experts. The analogy of perception of an object (in this case an 'objective risk') is not always appropriate. However, in much of the literature, and especially in the early years, this phrase is used. For now, we note its inappropriateness, but for simplicity's sake risk perception will be used in the widest possible sense, to cover all possible connotations of 'risk'.

Let us turn to the literature review. The first port of call is psychological study into cognitive processes in judgements under uncertainty. As such, we begin with a narrower definition of risk as probability and consequence.

4.1 The Contribution of Cognitive Psychology

The following literature engages with uncertainty; it deals with how individuals approach probabilities of possible outcomes. Risk perception, thus conceived, is a matter of perception or judgement concerning an uncertain event – its likelihood and its consequences.

4.1.1 Heuristics and biases

The most complete summary of the approach of two influential psychologists, Tversky and Kahneman, is contained in the collection of articles reprinted in book form in 1982 (Kahneman et al. 1982). The main contention is that people do not follow the principles of probability theory when judging the likelihood of uncertain events. They rather employ heuristics or rules of thumb. Often these heuristics lead to fairly good estimates of the probability of an event. Often, though, they do not.

The procedure followed by Tversky and Kahneman is to use very simple examples where the statistical properties of the distribution are well known – for example, tosses of a coin, the distribution of people's heights within the population – and compare subjects' estimations with those made according to the principles of probability theory. The heuristics and biases observed under these conditions are also thought to apply to the way people estimate the probability of events that cannot be statistically estimated. The most significant of these empirically observed heuristics and biases are now summarized.

4.1.2 Representativeness

People tend to evaluate the chance of X as originating from Y to the extent that X resembles Y. This tendency appears to act as a means by which probabilities are evaluated to the extent that other relevant information is overlooked. In one study (Kahneman et al. 1982) subjects were asked which of two sequences of births of girls and boys in a family is more likely – BBBGGG or GBBGBG. Subjects viewed the former as significantly less likely than the latter. The suggestion is that the latter sequence appears to be more representative of randomness, and this is why people judge it as the more likely sequence even though both are, in fact, equally likely. People have also been shown to ignore so-called 'base-rate information'. In one experiment subjects were asked to judge the likelihood that several individuals were lawyers or engineers, given a brief description of their personality. One group was told that the individuals whom they were asked to assess had been sampled from a pool of 70 lawyers and 30 engineers; for the other group the proportions were reversed. This information had little or no effect on the way subjects made judgements. The only substantial criterion employed appeared to be the extent to which the descriptions of the individuals resembled the stereotypes associated with lawyers and engineers. Even when given a neutral description that bore no relation to characteristics that might distinguish the two professions, people in both experiment groups judged it equally likely that the individual was an engineer or lawyer, ignoring the prior probabilities of 0.7 and 0.3 arising from the stated

distributions of the sample population.

4.1.3 Availability

The size of a class tends to be judged by the ease with which instances of it can be retrieved from memory. This means that those events that are easily retrieved, that are vivid instances, are judged more numerous or more likely than those that are more difficult to retrieve. For example, an experiment was carried out in which lists of well-known personalities were read out. In some lists the male personalities were relatively more famous than the women; in others, the women were more famous. There were equal numbers of men and women in all lists. Subjects asked to judge whether there were more men or women in each list incorrectly judged that there were a greater number of the sex that included the more famous personalities (Kahneman et al. 1982). A similar phenomenon is observed when people try to imagine hypothetical risks. Where a particular danger is easy to imagine, perhaps because it has been discussed in the press in great detail, its probability of occurrence tends to be judged as higher than one that cannot be conceptualized so easily.

4.1.4 Prospect theory

Kahneman and Tversky's (1979) 'Prospect Theory' elaborated a general framework for understanding why people's actual behaviour, in relation to risky decision-making, departs from the predictions of rational choice theory. Prospect Theory includes both a probability weighting function and a weighting function for utilities. The probability function captures the findings on systematic biases of estimates of fatalities. We tend to over estimate (weight) low probability events and under estimate those with a high probability, essentially a regression to the mean effect. Although the availability or vividness bias is one possible explanation, in Prospect Theory it is proposed that over weighting of low probability events occurs regardless. That something is conceivable appears to be sufficient to give it a reality beyond its objective probability. The value function is defined in terms of gains and losses from a reference point or adaptation level. For gains, the function is concave and, while the same holds for losses, in this context the slope of the curve is much steeper. In other words, the utility weighting leads to an asymmetry between 'objectively' equivalent gains and losses. The pain from a small loss from one's current position will far outweigh the pleasure from an equivalent small gain.

4.2 The Psychometric Paradigm

During the period when Kahneman and Tversky's research programme was developing, Chauncey Starr (1969) published what became a seminal paper in the history of risk research, setting the terms of reference for what became known as the psychometric approach to the study of risk perception (Slovic et al. 1979). Early work by the Decision Research Group at the University of Oregon in 1978 showed that people's ideas of what is meant by risk and, consequently, what could be described as 'acceptable risk', were complex and multi-faceted. The simple expedient of measuring risk magnitudes in terms of the number of fatalities per year was shown to be inadequate (Royal Society for the Prevention of Accidents 1992; Slovic 1987) as it failed to capture the way people – both experts and the lay public – actually understood the term. It was, during the late 1970s, (and still is) possible to argue, as Kahneman and Tversky had originally done, that lay perceptions of risk are subject to biases akin to making systematic errors in estimating knowable probability distributions. However, the most important result of the psychometric programme of risk perception research has been "to demonstrate that the public's viewpoint must be considered not as error but as an essential datum" (Royal Society for the Prevention of Accidents 1992, p. 91). There now follows a review of the important findings of this research, its methods and its scope.

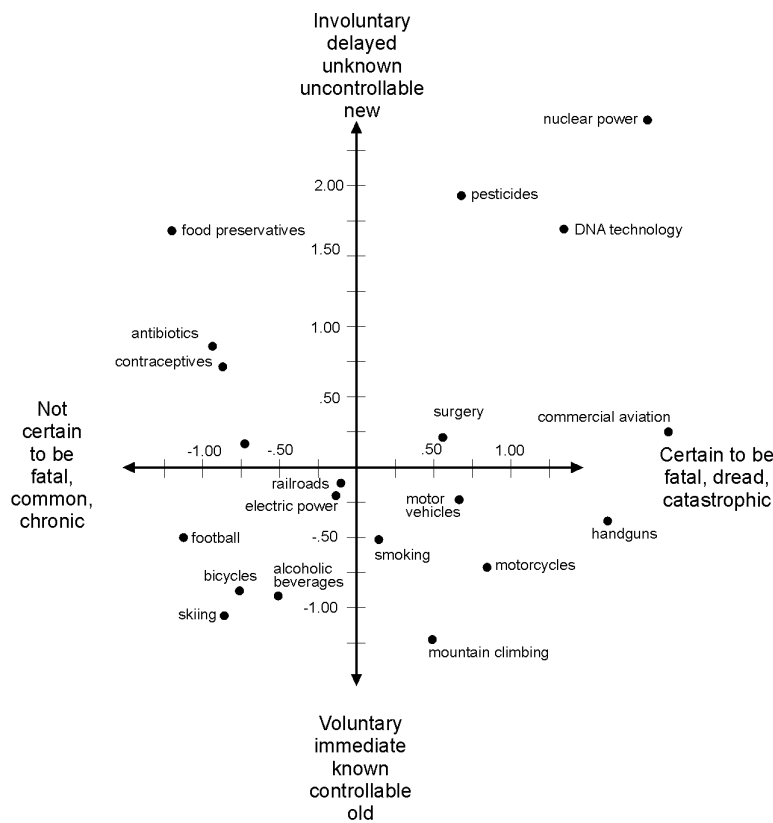
The psychometric approach to risk perception research is an individual-based approach. It is a research paradigm that aims to elicit judgements about risks from individuals who are confronted by risk stimuli. In fact it is more appropriate to refer to these stimuli as hazard stimuli because one of the main objectives of risk perception research using this approach is to measure not only the quantitative judgements of persons about risks – for example, how likely is the risk to lead to an undesirable outcome – but also the qualitative dimensions of what is subjectively understood by the term 'risk' in relation to one or more hazards.

In an empirical review, Rohrmann (1999) sees the psychometric approach as having four principal intentions:

- to establish 'risk' as a subjective concept, not an objective entity;
- to include technical/physical and social/psychological aspects in risk criteria;
- to accept opinions of 'the public' (that is, laypeople, not experts) as the matter of interest; and,
- to analyze the cognitive structure of risk judgements, usually employing multivariate statistical procedures such as factor analysis, multi-dimensional scaling or multiple regression.

Hazards that have been rated vary according to the focus of the study. As already mentioned, the classic, and rather general, investigation of Slovic et al. (1980) presented respondents with 90 hazards. As can be seen from Figure 1, hazards included large-scale technologies whose risks might be perceived at the societal, environmental and personal level, such as nuclear power (this was a very 'hot topic' at the time when psychometric risk research was becoming established), fossil electric power and space exploration. Transport hazards included motor vehicles, railways, jumbo jets and recreational boating. As well as technological hazards, risks associated with personal behaviours were included, for example, downhill skiing, smoking and sunbathing. Antisocial activities, such as crime and terrorism, were rated, as were various drugs and foodstuffs. Many of these hazards or risk sources have been used in later studies (for example, Bastide et al. 1989; Brun 1992; Sjoberg 1996).

Figure 1 Qualitative dimensions of risk perception



Source: Adapted from Slovic et al. (1980)

The figure depicts the range of hazards rated across different risk characteristics, shown at the

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base. Each hazard is mapped onto the space demarcated by the two factors that are derived from the collection of risk characteristics that were rated using factor analysis (a statistical technique that identifies underlying dimensions of data). What this diagrammatic representation clearly shows is that different types of risks are judged according to quite a complex set of qualitative dimensions. Clearly, the concept of risk means more to people than an estimate of its probability of occurrence. Starr (1969) had already noted that whether exposure to a risk is voluntary or involuntary is related to its acceptability. Here it can be seen that a much wider range of risk qualities is significant. The two factors shown have been labelled as 'dread' risk and 'unknown' risk by Slovic et al. A third, 'exposure to risk', is not shown.

'Dread' risk is characterized by the perception of uncontrollability and the idea that the danger might be of a global catastrophic nature, fatal, a high risk to future generations, an involuntary risk and one that is perceived as affecting the perceiver. Also significant for this factor is whether or not the risk is seen as increasing, not easily reduced and inequitable. Hazards that score highly on this factor are, among others, nerve gas, nuclear weapons and terrorism; those at the other end of the scale include home appliances, sunbathing and cosmetics. The second factor, 'unknown' risk, is composed of qualities such as observability, whether a risk is known to those exposed to it or to science and whether the effect of a hazard is delayed or immediate. DNA research and space exploration are high on this factor, while handguns and fire fighting are low. The characteristics used to rate risks here have subsequently been widely used in psychometric risk studies. A number of these risk characteristics relate to whether the threat is to the individual or to many people simultaneously. This distinction is explicitly utilized in some studies where hazards are rated according to the risks they pose for the respondent personally, for people in general and for society as a whole.

From the large number of empirical studies carried out using this paradigmatic approach, some relatively common results emerge. The factor structure shown in Figure 1 shows two dimensions – 'dread' and 'unknown' risk. This correlational structure is found in many studies, although there are exceptions (Brun 1992; Johnson and Tversky 1984). Ratings about the magnitude of risks are systematically related to this structure. Higher ratings of risk magnitudes are associated with the top right quadrant of Figure 1.

It is possible to see that one or both of two super-ordinate classes of hazards are involved in most psychometric studies. One is the class of hazards involving personal or societal exposure to dangers to health and well-being, and to financial and physical assets. The other concerns environmental dangers that do not necessarily physically threaten people directly but threaten the state of the environment, possibly with consequences for future generations (Rohrmann 1999). In general, what constitutes an acceptable level of risk is higher for natural than for technologically induced risks. Personal, private risk taking activities, such as driving or smoking, which are undertaken voluntarily and are more familiar, are still seen as less risky and more acceptable. Risks that are seen to have catastrophic potential, that are thought to impact unfairly on certain people and are unfamiliar to the public and scientists, all tend to be rated as 'riskier', more probable and more serious than others. People typically overestimate the dangerousness of air or rail travel and underestimate the dangerousness of cigarette smoking relative to the actual fatalities reported year on year.

4.3 Emotion and Risk Perception

The psychometric paradigm raises the issue of 'dread' – an affective appraisal of a risk. But these accounts lack theoretical underpinning. Analysis of the role of emotion in risk perception, which has received a good deal of attention recently, should therefore be welcomed.

The starting point of this work is the distinction between two modes of information processing. On the one hand, is a formal, logical and numeric style of reasoning; on the other, a type of thinking that Epstein (1994, p. 710) calls "intuitive, automatic, natural, non-verbal, narrative, and experiential". For Slovic et al. (in press, p. 16), this second system, which they term 'experiential', is affect-laden rather than formally logical like the 'analytic system'. It involves more rapid processing and the encoding of reality in images and metaphors rather than abstract symbols and numbers. And, as Sloman (1996) suggests in an influential article, such associative processing probably operates by using more rapid pathways based on context and similarity rather than the conscious use of logic and evidence.

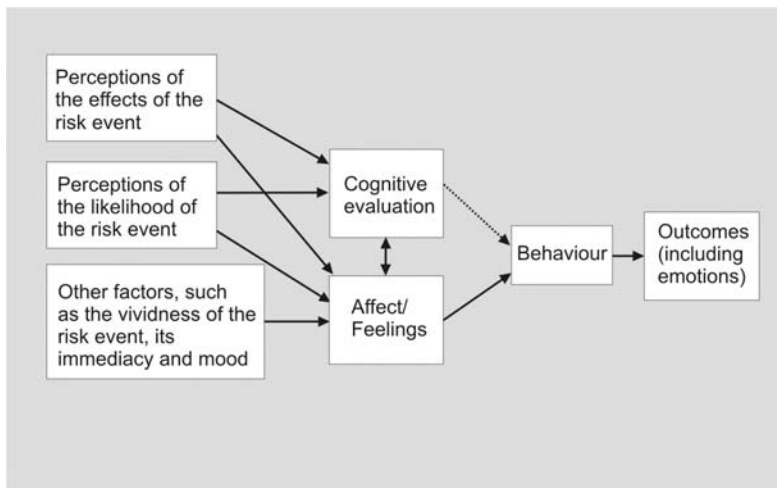
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It is also important to note that psychological research has shown there to be much interplay between emotion and cognition. As Damasio (1994) demonstrates, good decision-making often requires affect to direct reason and to provide basic motivation; a loss of emotional capability in patients who have suffered brain damage can reduce judgemental efficiency and accuracy. Affective reactions help us navigate a complex world, pointing out things we should quickly focus on in order to speed up action (Zajonc 1980; Bargh 1984). Emotions can also create and shape beliefs, amplifying or altering them and making them resistant to change (Frijda et al. 2000). They may provide information and guide attention, just as beliefs backed up by emotion direct attention towards belief-relevant information (Clore and Gasper 2000).

Paul Slovic has termed the role of emotion in risk perception the 'affect heuristic' (for example, Slovic et al. 2002). A stimulus can evoke images that have affective and cognitive dimensions. When a representation becomes tagged with affect, giving it a good or bad quality, the overall affective impression can be more influential than more cognitive assessments. Furthermore, the affect heuristic, or short cut, may shape numeric assessments of risk and benefit. Readily available images of genetically modified (GM) food that are tagged with 'badness', for example, are more likely to increase judgements of riskiness and decrease the perceived level of benefit (Finucane et al. 2000). Similarly, a more immediate sense of danger shapes attention and increases likely threat assessment (Armony et al. 1997).

Strong emotions may have a greater impact. Borkovec (1994, p. 29) argues that long-term worrying can inhibit emotional processing and maintain "anxious meanings", or negative thoughts and images. Worriers can be preoccupied with negative information and future unpleasant outcomes, be hyper-vigilant in scanning for salient material relating to threat (Mathews 1990), see ambiguous events as threatening (Butler and Mathews 1983, 1987; Russell and Davey 1993) and over estimate risk (Butler and Mathews 1983, 1987; MacLeod et al. 1991; Vasey and Borkovec 1993).

Figure 2 Risk as feeling model



Source: Adapted from Loewenstein et al. (2001)

So, feelings about a risk object seem to infuse more formal and numeric appraisals. But the two systems can also diverge. Affective reactions may also be shaped by different things and may arise without cognitive mediation (Loewenstein et al. 2001) (see Figure 2). According to this model, cognitive evaluations tend to be composed of assessments of likelihood and cost, but emotional reactions also constitute factors such as the vividness with which consequences can be imagined, mood and prior experience with the event. Emotions can then directly influence judgement or behaviour. Furthermore, when cognition and affect diverge there is a tendency for feelings to hold sway; our evolutionary makeup strongly influences fear responses and threat appraisal.

4.4 Competing Conceptions of Risk: Contrasting Expert and Lay Representations

In the following we consider the competing conceptions of risk that are found in the literature.

4.4.1 Debates about 'objective' and 'subjective' risk

So far we have considered research on risk as appraisal of an object or a potential event. Including subjective likelihood estimates, and consequences, familiarity and control, these appraisals have affective and cognitive components that can interact and diverge. Research has thus showed the complex and multi-faceted ways the public gauge a risk event. As Slovic (1987) argues, risk means different things to lay people than it does to scientists: familiarity attenuates perceived risk; dread amplifies it.

Public opinion has often been contrasted with expert assessments of risk, with rather unproductive outcomes in many cases. In the area of crime, for example, survey data over the past two decades show that significant proportions of the UK population feel unsafe walking alone in their area after dark – more than have actually experienced crime (or a proportion higher than the average number of people who do fall victim in a given year). Indeed, women and the elderly feel least safe, on average. Yet at the same time, young males are most at risk of personal crime. During the 1980s these findings gave rise to what became known as the 'risk-fear paradox'.

This precipitated a response from the government of the day (for more details, see Jackson, in press, a). The early 1980s saw the Home Office deprecate the public concerns to which these survey findings attested, reflecting the orthodoxy that public fears were misplaced and exaggerated. It was: "a serious problem which needs to be tackled separately from the incidence of crime itself" (Hough and Mayhew 1983, p. 26). The authors continued that "excessive anxiety about crime not only impoverishes people's lives, but also makes it difficult to secure rational discussion of criminal policy" (pp. 33-34). If fear of crime exceeded reality then re-education and public involvement in community safety would become a serious and important objective. To downplay public concern could also be to downplay embarrassing levels of concern by a government proud of its 'Law and Order' image; it may be politically expedient to partly displace the problem of crime onto the fear of crime. But the deprecation was also partly a function of frustration that uninformed public opinion might deleteriously affect more reasoned Home Office policy, coupled with a sense that crime was not as serious a problem as public opinion might have it.

This dynamic has been evident in many high profile debates. The philosopher Paul Thompson addresses the mismatch of perceptions between public and experts. He claims that at the root of this is serious dispute and confusion over "competing conceptions of risk" (Thompson and Dean 1996, p. 1). The precondition for this type of dispute is, paradoxically, that when experts analyze risk, they appeal to what they assume are differences in interpretation that:

take the form of principled and reasoned disputes as opposed to simple misunderstandings. The claim that there are competing conceptions of risk implies that the concept of risk is like contested concepts such as "causality", "reality", "justice" and "truth", in that competing interpretations reflect philosophical differences that are long-standing and systematically linked. Such differences will not be settled merely by stipulating definitions for the disputed terms.

These differences, moreover, are highly relevant for understanding political disputes about risk in the public sphere. They are also significant for understanding how the communication of risk information can either clarify or confuse matters. The way risk is defined in the public sphere and within scholarship constitutes two related problems and, in response to this state of affairs, Thompson offers a framework for clarifying the risk concept.

4.4.2 The probabilist/contextualist dimension

At one end of this dimension, Thompson and Dean (1996) write, is the probabilist view of risk. From this standpoint, risk is purely a matter of the probability of an event or its consequences. The hazard that gives rise to the possibility of this possible event is real, independent of our perception of it. Any particular risk will be laden with other characteristics, for example, GM food may engender fears about infection and illness, nuclear power risks may invite horror of environmental catastrophe. However, just as the colour of an eye plays no part in deciding whether something is or is not an eye, these 'accidental' attributes of a risk do not provide criteria in themselves for deciding whether something is, or is not, a risk.

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From a purely contextualist perspective, at the opposite extreme of the dimension, risk has no single determining criterion. A risk will always be associated with a number of characteristics such as whether it is voluntarily undertaken, whether it is familiar or unfamiliar or whether it involves societal or personal danger. Probability, in this view, is simply one among other risk attributes, none of which is singularly a necessary condition for something to be classified as a risk. According to Thompson and Dean (1996: 1), the distinction between these poles is most apparent in informal discussion. When a probabilist talks of the “risk of an earthquake” occurring, he or she really speaks of the probability of the event occurring. By contrast, a contextualist would speak of the risk of an earthquake according to the particular danger relevant from a given perspective. For example, the risk would be different for someone who had no choice but to live in the hazardous area compared to the risk as seen by a geologist who chose to move to the area in order to study it. The implication of the strong contextualist position is that probability estimation may be irrelevant to determining the existence of a risk, much less for understanding it or communicating related information to others.

The practical result of these competing conceptions of risk is that misunderstandings and disputes occur that are difficult to resolve. Within a more contextualist understanding of risk, it is apparent that people who raise questions about particular risks, for instance, of violent crime or antisocial behaviours, may be using risk language to articulate all kinds of legitimate claims dependent on the context in which these claims are made (Thompson and Dean 1996). For the probabilist, such claims will likely as not make little sense because probability is the single essential component of any discussion about risk: that is, how probable is it that one will become a victim of such crime? Furthermore, it is generally experts that incline towards the probabilist pole. The communication of quantified probability estimates as input to public deliberations on such risks may sometimes, as a result, be simply irrelevant.

Thompson (1999) suggests that the language of risk has been adopted by scientists doing risk assessment and is, in general, functionally equivalent to the language of probability. The practical use for such language is in the field of decision-making. Risk analysis utilizes mathematical and scientific techniques to arrive at the best estimate of likely costs and benefits to any course of action. This process is highly deliberative, in the sense that people are engaged explicitly in evaluating and weighing the options.

But much human behaviour and cognition is not deliberative. It is habitual, even unconscious that any particular course of action is being adopted. Risk in lay or everyday usage, Thompson argues, “functions as a cognitive gatekeeper between the deliberative and the non-deliberative dimensions of practice ... in this respect, the concept of risk functions as a category for organizing or prioritizing the expenditure of deliberative resources” (Thompson 1999, p. 499). In this account, in the practice of risk assessment, once something is categorized as being a risk, the deliberative process of determining probabilities and weighing costs and benefits begins. Where risk or risk language enters lay discourse, it can be dysfunctional in the sense that once something is categorized as risky, the layperson no longer acts as if there is zero or negligible risk, but often has neither the resources, nor the information to arrive at a more ‘rational’ judgement.

4.5 Trust and Risk Perception

So far we have reviewed studies into cognitive and affective appraisals of uncertainty. The mismatch between public and expert perceptions has been discussed. We go on to explore how public perceptions often encompass wider social attitudes and values. But, first, we argue that how the public see experts and regulators might also be relevant to how risks are variously interpreted.

Work on risk perception has focused increasingly on the role of trust. In part this is due to the relative failure of risk communication strategies in relation to technological risks, most notably civil nuclear power, based on 20 years of research in the field (Cvetkovich and Lofstedt 1999). It is also a consequence of the gradual widening over time of the scope of explanations of perceptions of risk in the literature. Alongside the rather specialized academic field of risk perception research, the concept of trust has found its way into political and academic agendas in some more general contexts. For instance, Putnam’s (2000) work on declining trust and social capital in the US and in Italy has been influential inside and outside academic circles. Putnam’s thesis mainly concerns declining interpersonal trust, while trust in institutions is the prime focus of research on trust and technological risk. Public anxieties in the UK about GM food, BSE, rail safety, mobile phone transmitter masts and a host of other risks could be explained not so much by the particular

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characteristics of the hazards themselves but by a lack of trust or confidence in those responsible (Poortinga and Pidgeon 2003). In some cases, it appears the relevant authorities have lost their very legitimacy in addition to being simply distrusted.

Empirical research on the role of trust in risk perception has been on the increase since the early 1990s. An early article by William Freudenburg (1993) looked at the effect of trust on the concerns of local citizens about the proposed siting of a nuclear waste facility in Nevada. Freudenburg additionally coined the term 'recreancy' as a specific form of mistrust relevant in cases of potential risk within complex technological systems. The concept of recreancy is intended to capture the idea that people in positions of responsibility with respect to potentially hazardous situations can sometimes fail to "carry out their responsibilities with the degree of vigour necessary to merit the societal trust they enjoy" (Freudenburg 1993, p. 909). The idea is not necessarily that individual actors are incompetent, self-interested or villainous, but that the complex division of labour that characterizes modern systems of technological control makes disastrous outcomes possible even where no individual can be held fully culpable.

Slovic (1993) investigated the asymmetrical effects of trust building and trust destroying information. He notes that although the risks associated with medicines and X-rays are real, people tend typically not to have concerns about them because doctors and the medical professions are generally trusted. In the case of government and industry officials managing such industrial technologies as pesticides and nuclear power, there is little trust. Risks are concomitantly a greater source of concern (Slovic 1993, p. 676). Using questionnaire experiments, Slovic shows that the effect of negative information on trust "destruction" is much greater than positive information on "trust building". The conclusion is that trust is difficult to earn, but easy to lose.

The empirical research points to trust as an important variable in relation to risk perception. Trust relates to beliefs and expectations that some possibly remote institution or actor will act in a particular way in a particular context. Luhmann has suggested that, from a functionalist perspective, social trust enables societies to tolerate increasing uncertainty due to progressive technological 'complexification'. Thus he states that trust "reduces social complexity by going beyond available information and generalizing expectations of behaviour in that it replaces information with an internally guaranteed security" (Luhmann 1979, p. 93). Although Luhmann is writing about social systems, the idea that trust reduces the need for information can be just as relevant at a social psychological level too. By trusting someone else to make decisions on the basis of relevant information in situations of potential risk, one reduces one's own cognitive load.

Bernard Barber shares Luhmann's perspective on trust concerning its function – the reduction of complexity – but distinguishes between three types of expectation that comprise social trust. In his framework, trust, as a general concept, has more than one dimension. The first is value compatibility. The second is the expectation that actors or institutions will perform their role in a technically competent manner. The third is that actors or institutions will demonstrate "fiduciary responsibility" (Barber 1983, p. 14). That is to say they are expected to act with special concern for other's interests above their own. In relation to risk perception, a lack of trust that leads people to see risks as greater could be based on expectations about risk managers' competencies or their fiduciary responsibility. It remains an empirical matter as to the relationship between these three attributes, both as public perceptions and in reality.

Another conception of trust has been proposed and tested empirically in a number of studies. Earle and Cvetkovitch (1995) share the general assumption of Luhmann and Barber that the function of trust is to reduce complexity. However, they point out that in Barber's conception of trust, people actually require rather a lot of information about actors and institutions in order to decide whether or not to grant trust. So, while the function of such trust may be a reduction of cognitive complexity, the basis on which it would be granted would itself require considerable cognitive effort. Earle and Cvetkovitch claim that social trust is based on what they call Salient Value Similarity (SVS). This is a groundless trust, needing no justification. Rather than deducing trustworthiness from direct evidence, people infer it from value-bearing narratives. These could be information shortcuts, available images, schema and the like. Essentially, people trust institutions that tell stories expressing salient values that are similar to their own. Salient values consist of "the individual's sense of what are the important goals (ends) and/or processes (means) that should be followed in a particular situation" (Siegrist et al. 2000, p. 355). This yields a general basis for trust only to the extent that situations are perceived as being similar. Hence, one might think that equal sharing is a salient value in relationships with family members, but that competitiveness is important in

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business situations. Similarity of values between trustor and trustee is inferred from the trustee's words, actions and perceived cultural/social group membership.

The key point is that trust is conferred not on the basis of a detailed appraisal of the likely competence and fiduciary responsibility of the actor but on the perception of shared salient values. Interestingly, the SVS theory of trust is consistent with affective understandings of risk, as discussed earlier in this paper. The perception of shared values and affective, emotionally tagged representations and associations both rely more for their transmission on cues and shortcuts than on in-depth cognitive processing.

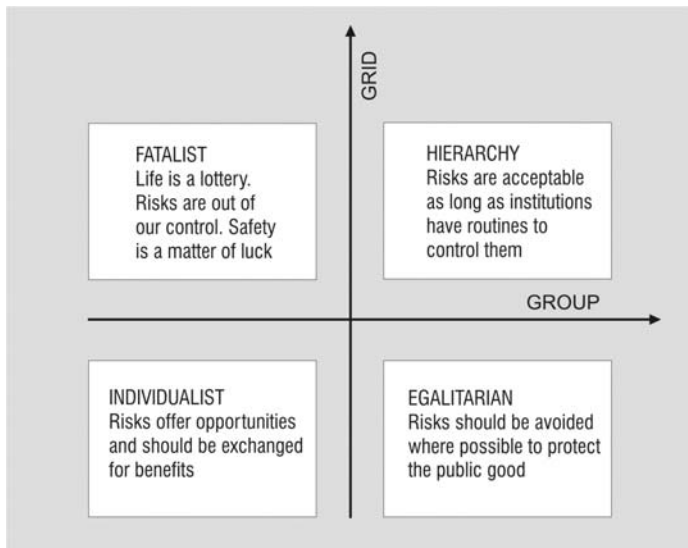
4.6 Cultural Theory

Recall Thompson and Dean's (1996) assertion that the public use risk to articulate a range of connecting attitudes and values. Conceivably, risk might also express a lack of confidence and trust in the organizations supposedly regulating a risk, protecting certain groups from harm. This general idea was pioneered by the anthropologist, Mary Douglas, and colleagues.

Mary Douglas offers an explanation for why different social groups have different attitudes towards technological and natural dangers. In earlier work, Douglas claims that the content of beliefs about purity, danger and taboo in any given culture are essentially arbitrary. Within a particular culture these arbitrary beliefs become fixed and henceforth serve to organize and reinforce social relations according to hierarchies of power. In her book, *Purity and Danger*, (Douglas 1966), she advances the idea that different cultures denote certain activities as taboo not because of objective harm that may arise from carrying out these activities, but as a way of maintaining and reinforcing the moral, political, religious or social order that binds members of that culture. She cites the example of the ancient Israelites who, on the command of Leviticus, prohibited the consumption of pork. Pork was not, in fact, dangerous to eat, but its prohibition served as means of reinforcing and maintaining a monotheistic society against the polytheistic nomadic culture that surrounded it (Douglas 1966; Rayner 1992). Douglas and Wildavsky (1982) cite the example of the Hima of Africa who think that it is risky for women to come into contact with cattle. This belief functions to maintain a set of hierarchical relations in that culture regarding the role of women, rather than reflecting any objective risks. In western societies the picture is necessarily more complex but, according to Douglas and Wildavsky, the same principles apply. An individual's beliefs about what constitutes an important risk are, in part, indicative of their place in society.

Others, such as Rayner (1992), have argued that this phenomenon is true not only at the societal level, but can also be observed within smaller organizations such as firms, political parties and non-governmental organizations. The implication of this for the social study of risk is rather important because it shifts the emphasis away from individual differences or biases in perception of objective risks towards more fundamental types of inter-group cleavages. In the cultural theory view, people's conception of what constitutes danger, or a risk, varies according to the way their social relations are organized. People select risks as being important or trivial because in so doing they reinforce the established social relations within the culture in which they are located. Douglas and Wildavsky proposed four prototypical cultural types within modern industrialized societies. These are located along two dimensions that describe, firstly, the degree of social incorporation constituted within the culture and, secondly, the nature of these social interactions. This analytic framework is known as grid/group, where grid is defined as a measure of the constraining classifications that bear upon members of any social grouping and group as the degree of social interaction and the extent to which people rely on social networks (Rayner 1992). The four cultural biases or stereotypes are summarized in Figure 3.

At high grid and high group, the modal form of organization is hierarchical, where all individuals are strongly reliant on others, but where movement between levels of authority is strongly constrained. In terms of risk perception, the key concern is for control and management. Rules and procedures are favoured responses to risk. For the egalitarian, there is an emphasis on strong cooperative relations and equality. The response to risk is highly precautionary, concerned to minimize possible harms by avoidance of risky activities rather than control and management.

Figure 3 Cultural theory's four stereotypes

Source: Adapted from Douglas and Wildavsky (1982)

At low group and grid, the individualist sees risks as opportunities for gain. Market mechanisms are favoured, rather than bureaucratic regulation. Potential losses can be mitigated by insurance. Finally, the fatalist perspective is that of the atomized individual. Risks are seen as inevitable and whether or not one can avoid harm is simply a matter of luck.

Most of the empirical work that has been carried out using cultural theory has followed the example of Karl Dake who developed a set of questionnaire items designed to tap the four cultural biases (Brenot et al. 1998; Dake 1991, 1992; Langford et al. 2000; Marris et al. 1998; Sjoberg 1996). These have been used in many studies as independent variables, or as a way of classifying people into one of cultural theory's stereotypes. In most of these studies, people's scores on the scales designed to measure the four cultural biases tend to correlate weakly with perception of risks of various hazards. In general, environmental hazards are seen by egalitarians as more serious and more likely to cause damage.

Crime-related risks are seen as greater by hierarchists. Unfortunately, individualists and hierarchists are often empirically barely distinguishable, which calls into question the classificatory value of the theory. In fact, classification is never really achieved in these investigations, as most people exhibit some degree of concordance with all the beliefs expressed in the four scales.

So, while it is clear that the values expressed in the cultural theory inspired scales do tap into attitudes or values related to perception of technological and other risks, it is not clear what are the advantages or, indeed, the veracity of the four-way classificatory system proposed. There is a certain circularity of argument. For instance, egalitarians might perceive GM crops as more risky than individualists because they see nature as fragile (Adams 1995). But, if one's worldview is that nature is fragile, it is almost tautologous to say that cultural theory predicts that such people will perceive more risk in tampering with nature. The prediction is at least partially entailed by the premise. In quantitative operationalizations it is difficult to avoid some semantic overlap between concepts. For an excellent review of these conceptual and methodological difficulties, see Boholm (1996).

4.7 Constructing and Communicating Risk: Social Amplification, Stigma and the Mass Media

It seems trivial to say that people get their information about risk and risk events from somewhere – most likely from the mass media, interpersonal interaction and through personal experience.

However, it is important to take account of the transmission mechanisms through which representations, beliefs and attitudes about societal risks are propagated in different social and

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cultural contexts. Social meaning infuses appraisals of a perceived threat or an uncertain event, and places risk objects within a cultural context. And, as Douglas reminds us, group and cultural identities shape what people value and so permeate what they see as threatening.

4.7.1 *The social amplification of risk framework*

The collection of (loosely related) concepts best placed to encompass such cultural significance, and how information and images circulate through society, can be found in the Social Amplification of Risk Framework (SARF). This was proposed in the late 1980s (Kasperson et al. 1988) partly to integrate aspects of the psychometric and cultural theory paradigms, and work is continuing. For Pidgeon et al. (2003, p. 2),

[it] aims to examine broadly, and in social and historical context, how risk and risk events interact with psychology, social, institutional, and cultural processes in ways that amplify and attenuate risk perceptions and concerns, and thereby shape risk behavior, influence institutional processes, and affect risk consequences.

In the most recent formulations (Kasperson et al. 2003; Rosa 2003), the starting point is this. Risks have ontological status; they are events that occur that have consequences for humans and for what humans value. But they are uncertain – they must be appraised. It is our attention and scrutiny that bring them into focus, with attempts to identify and measure risks being necessarily imperfect, even with the most precise analytical tools at hand. They thus have, in Rosa's words, "epistemological lability" (Rosa 2003, p. 50). Moreover, what the public and experts decide to concern themselves with is shaped by social and political factors. And, of course, in the public sphere, risks would be irrelevant unless they were communicated.

Heated debates between experts and laypersons are inevitable perhaps, given the uncertainty surrounding a risk, and varying judgements about what is at stake, with outcomes that are themselves uncertain. Debates between paradigms in the risk field are essentially debates about knowledge claims. But, rather than propounding a relativistic stance, the assumption is what Rosa (2003, p. 62) calls a "hierarchical epistemology", where some claims to knowledge are valued more highly than others, but none offers direct access to reality.

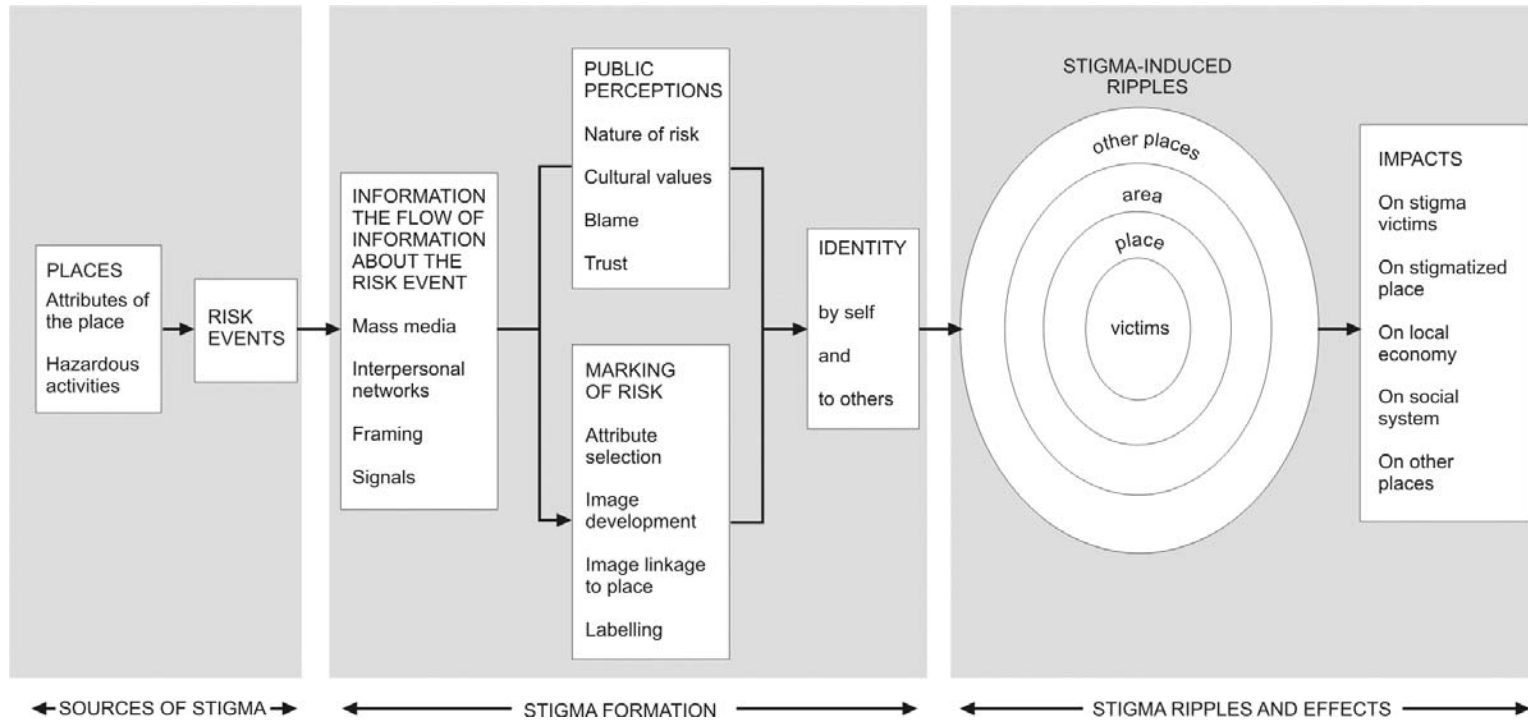
Kasperson et al. (2003, p. 15) describe SARF thus, and it is difficult to improve their summary:

as a key part of [the] communication process, risk, risk events, and the characteristics of both become portrayed through various risk signals (images, signs, and symbols), which in turn interact with a wide range of psychological, social, institutional, or cultural processes in ways that intensify or attenuate perceptions of risk and its manageability The experience of risk therefore is not only an experience of physical harm but the result of processes by which groups and individuals learn to acquire or create interpretations of risk. These interpretations provide rules of how to select, order, and explain signals emanating from the physical world (Renn, Burns, Kasperson et al. 1993, p. 140). With this framework, risk experience can be properly assessed only through the interaction among the physical harms attached to a risk event and the social and cultural processes that shape interpretations of that event, secondary and tertiary consequences that emerge, and the actions taken by managers and publics.

Figure 4 replicates the SARF from Kasperson et al. (2003, p. 14). The goal then, is to understand why some hazards and events come to be of social and political relevance, even while experts judge them to be relatively unimportant (risk amplification). Conversely, why do other events (to experts, more serious) induce comparatively low levels of concern and activity (risk attenuation)? But this should make one pause. For what indeed is being amplified or attenuated? Rayner (1988) argues that the framework implies there is a baseline of objective risk portrayed by experts which then gets distorted in the public sphere. And Petts et al. (2001, p. 2) argue that,

in policy circles, social amplification is often alluded to in traditional technocentric language – i.e. it is seen as giving credence to the perceived irrationality of lay public responses to risk issues, providing a means of explaining behaviour and identifying what communication is required, as opposed to a means of understanding the reasons for responses and perceptions.

Figure 4 The social amplification of risk framework



Source: Adapted from Kasperson et al. (2003).

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But Kaspersen et al. (2003, p. 37) reply that there is no such intention. Rather, they emphasize that all perspectives on risk entail some degree of judgement and approximation:

the observation that experts and public sometimes disagree about risks is compatible with the claim that different groups may filter and attach salience to different aspects of a risk or a risk event. Amplification and attenuation, then, refer to the processes of signal interpretation, transformation, intensification, and dampening as the dynamics of risk consideration proceed iteratively in society.

Perhaps the greatest strength of the SARF is its attention to processes of communication, and we will return to this issue. The framework states that risk signals are received, interpreted and passed on at a series of 'amplifier' stations and diffused through different channels. While the media are primary amplifiers, stations can also include individuals, groups and organizations, such as activist groups of government agencies, driven by their interests and functions. The results are signals that are increased or decreased in intensity and transformed in their cultural content.

The framework distinguishes between social and individual stations. The first consists of opinion leaders, cultural and social groups, government agencies, voluntary organizations and news media. While these groups consist of individuals, the institutional structure and function will direct how risks are dealt with. At the second class of individual and station, the social processing of risk will be more affected by risk heuristics, qualitative aspects of risk documented by the psychometric paradigm, and attitudes, values and beliefs specific to cultural affiliations that are non-organizational. Here, the set of behaviours that responds to perceived risk might include a whole host of secondary and tertiary ripple effects, including public outrage, demands for regulatory action, stigmatization and economic consequences.

4.7.2 Technological stigma

In the preface to their edited volume, Flynn et al. (2001: xi) state that: "technological stigmatization is a powerful component of public opposition to many technologies, products, and facilities and an increasingly significant factor in the acceptance of scientific and technological innovations". For these scholars then, stigma is about public concerns about human health and ecological risk that have been amplified by the mass media. In this way, laypersons come to have knowledge about a risk. But they also come to see certain places, products and technologies as hazardous or unduly dangerous. Stigma is something:

that is to be shunned or avoided not just because it is dangerous but because it overturns or destroys a positive condition; what was or should be something good is now marked as blemished or tainted . . . A critical aspect of stigma is that a standard of what is right and natural has been violated or overturned because of the abnormal nature of the precipitating event (crude oil on pristine beaches and the destruction of valued wildlife) or the discrediting nature of the consequences (innocent people are injured or killed). As a result, management of the hazard is brought into question with concerns about competence, conflicts of interest or a failure to apply proper values and precautions. (Gregory et al. 1995, p. 220; reprinted in Gregory et al. 2001, p. 3-4).

The impetus for stigmatization is often some signal event, where "negative imagery and negative emotional reactions become closely linked with the mere thought of the product, place, or technology, motivating avoidance behavior" (Gregory et al. 2001, p. 3). Stigmatized things tend to share features. They have 'dreaded' consequences and involuntary exposure (which, in general, tend to contribute to high perceptions of risk). They have impacts that are inequitably distributed across groups or geographical areas. And they have impacts that are unbounded (magnitude or persistence over time is not known).

The process of marking refers to how the label of deviant on a person, place or technology can have devastating effects. This mark need not be physical, of course – symbolically designating devalued status can arouse strong feelings in observers and interpreters and also become linked to attribution and responsibility. The imagery and label can become embedded and intrinsic to that person, place or technology – and, indeed, autonomous from the event that generated it. As such, it helps form a narrative, condensing and typifying the story around the event.

4.7.3 Representations of risk and the mass media: framing and anchoring

Murdock et al. (2003, but see also Petts et al. 2001), develop the account of the mass media's role in risk communication. To mix metaphors slightly, they remind us that the media are not a single black box and that messages are not magic bullets. Rather, a plural set of media can amplify or attenuate risks if they resonate with public feelings and mood – if the symbols and representations

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deployed capture existing public concerns and frames of reference. Furthermore, many consumers are sophisticated readers of multiple media messages. They understand hype and drama. Laypersons try to make sense of things by “integrating the media’s diverse and divergent arguments and anchors with their own interpretive grids underpinned by direct and local knowledge, experience and formal education” (Petts et al. 2001, p. 94).

The mass media are important agenda setters and providers of information though, especially when the public has little direct experience of an issue. A key concept here is framing. Issues are more likely to receive media attention if they can be easily integrated into a narrative that motivates interlinked processes: (i) connecting; (ii) contextualizing; and (iii) anchoring. In the first, links are made between new events and already familiar instances and narratives, providing a readily available frame within which to understand novel phenomena. In the second, links are made to more abstract, but still resonant, contemporary issues; in the third, the imagery and connotations of an event are placed within popular anxieties and fears.

In this type of account, symbols are important in shaping and reproducing the social meanings attached to risks. One interpretive account of lay perceptions can be found in Horlick-Jones et al. (2003). They are interested in the thick descriptions (Geertz 1973) that communicate, for them, so much of the meaning and interpretation present in how people make sense of risk. Qualitative methodologies elicit stories involving symbols and images, which are situated accounts of the risk. For example, a risk issue might stimulate a set of concerns and debates quite apart from a narrowly conceived idea of the risk object itself. This is because the issue might involve a set of “symbolic tangles” (Horlick-Jones et al. 2003, p. 284).

Wiedemann et al. (2003) adopt a similar approach, but this time stressing the narrative structure. They argue that experts see risks as chains of cause and effect and are interested in the nature of the hazard, the dose needed to induce harm, the exposure to that dosage and the extent of the potential damage caused. By contrast, laypersons see risks “primarily in a social and relationship-oriented context ... based on common patterns for interpreting events, which are heavily influenced by the media, such as scandal stories, investigative exposés, tragedies, and disaster reports” (Wiedemann et al. 2003, p. 289). At the heart of such narratives is a range of regularities, they argue. These include: the designation of heroes and villains to actors; the assignation of intentions and motives; dramatizing the conflict by filling out a logic to its build-up; drawing out a moral of the story, particularly around the consequences; and, bringing in other instances that strengthen and clarify the ‘moral of the story’.

Using the notion of risk signatures, Petts et al. (2001) show how patterns of talk and structures of accounts are at the heart of lay interpretations of a risk. These draw upon both the interpretive work of individuals and the information and imagery received from the mass media and direct experience. Risk signatures can be more or less grounded in everyday experience and, the more they are grounded, the more they are seen as a personal and credible threat. But they also see trust to be a key underpinning of a particular risk signature. Not only does a lack of trust raise issues of vested interests – for example, that companies or industries are only chasing things that profit them and their interests. A lack of trust also creates discord between the values and interpretive practices of the public (what a risk means and symbolizes for them) and the information they receive from the mass media, government and industry.

5 RISK, CYBER TRUST AND CRIME PREVENTION RESEARCH

In this final section, we suggest some implications of the risk perception literature for crime and, particularly, for the less researched area of public perception of cyber-crime.

5.1 Risk and the Individual

5.1.1 *Judgemental biases: crime and risk perception*

Available research on judgemental biases and risk perception suggests several fruitful possibilities for future research into cyber crime.

Judgements based on availability – a well-publicized, dramatic instance of crime or cyber crime may engender vivid images that are easy to retrieve in public minds. This would then elevate estimates of the probability of that event occurring. Mass media reporting of just one particularly dramatic and resonant episode might have extensive consequences for public assessments of

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threat. For example, a case involving paedophilia and chat rooms might instil the sense that such incidents are widespread. Policy makers must be sensitive to such possibilities, understanding why the effects can be so wide-ranging, and stress the unusual nature of episodes if this be the case.

Judgements based on representativeness – because of the importance of individual events, people are less persuaded by expert assessments of probability or likelihood. The individual experience of various forms of cyber crime, as well as stereotyping of perpetrators, contexts and places, will have a greater impact on people's perception of cyber crime than any expert reassurance that on average people are very safe. And, it may be noted that it is thus very difficult to change public perceptions.

Judgements of gains and losses – Prospect Theory shows that losses and gains are asymmetric. The pain from a loss is far more than the satisfaction from an equivalent amount of gain. The imagined instance of falling victim, of losing property or experiencing psychological or physical pain, is weighted as extremely serious. For cyber crime, there are benefits to using information and communication technologies (ICTs). However, perceived losses will affect the overall evaluation more keenly than perceived benefits. This may influence the extent of people's trust in cyberspace supported by a wide variety of digital technologies and applications.

5.1.2 The 'qualities' of the risk of crime

There seem to be individual differences regarding feelings of control over the risk of criminal victimization. Some people may be more familiar with particular environments, feel more able to avoid dangerous situations and more physically suited to conflict. They may feel that the risks are voluntary, in the sense that they can avoid certain areas and situations. Others may have a more emotional sense of risk, having felt anxious or worried in the past. These differences may impact on where certain crimes appear on the factor space of the psychometric paradigm and, thus, shape how individuals define particular risks. The notion of outrage has been barely explored, yet seems a promising line of enquiry. Crime is most often a deliberate act to deprive someone of something – individuals are thus directly to blame and the act is intentional. This raises issues of blame – the 'how dare they' factor – and responsibility, which may raise the salience of a particular risk.

In the case of ICT and cyber crime, many intensive users of ICTs might have a sense of familiarity, of control and clear benefits. Such competence might act as a hurdle, inoculating against a sense of risk. For these people, ICT is a familiar technology: it has been absorbed into everyday life. But there may also be a sense of complacency that criminals may take advantage of. Other ICT users might be less familiar, less confident and have lower trust in the system. They may be more open to a set of negative connotations, images and representations of the technology.

Cyberspace is disembodied – a space in which we come to 'know' unknown people and make judgements about their motives and intentions. Once one opens up the sense of risk, there are many uncertainties and limitless aspects and these need to become the subject of research which, in turn, would inform strategies of crime prevention.

5.1.3 Emotion and risk perception

A number of studies have examined emotion and risk perception in the context of the fear of crime, using some of the same ideas contained within the psychometric paradigm. While these studies have not considered cyber crime, the results are likely to be transferable. It is worth summarizing the key points in order to highlight which ideas might transfer.

Worry about crime is shaped by the perceived likelihood of victimization, the perceived consequences of victimization and feelings of control over its possibility (Jackson 2003). Perceived control shapes subjective probabilities of crime. Someone who feels in control worries less because they perceive the chances of victimization to be lower. Moreover, being familiar with one's environment – feeling able to spot potential signs of trouble, in essence being able to 'read the environment' – shapes perceived self-efficacy.

Similarly, judging the consequences to be serious also increases the perceived likelihood of the event, because such a judgement is likely to include emotional, vivid and easily accessible representations of the event and its aftermath. Indeed, encounters with disorderly aspects of the social and physical environment also seem to increase the vividness of the image of oneself becoming a victim of personal crime, which then raises the perceived probability of victimization

High levels of anxiety can lead individuals to attend to threat-related stimuli in the environment, increase the tendency to regard ambiguous stimuli as threatening and retrieve threat-related information from memory more readily. The implication is that an anxious person walking through a particular area after dark is more likely to scan for certain threat-related information based on cues defined by an existing set of cognitive representations. They are also more likely to interpret such symbols as indicating a threat of victimization. Thus, emotional and cognitive appraisals might themselves be critical to the upkeep of a sense of threat that directs attention and interpretation of relevant stimuli.

These observations may apply in the case of cyberspace and suggest the need for research on people's attentiveness to threat-related stimuli in these environments. Firstly, worry and anxiety are shaped by issues of control, consequences and perceived likelihood. Among other things, this raises the issue of how feelings of control arise. Experience and the ease of system use are likely to be at the heart of this with regard to ICTs. Secondly, once an individual is worried or anxious, the emotion colours their perceptions and interpretations. Not only do they see things as more threatening; but emotion can also amplify estimates of likelihood and the severity of perceived consequences, as well as attenuating a sense of self-efficacy.

5.2 Risk and Society

5.2.1 *The expressive function of risk*

Research into public perceptions of crime has begun to explore how fear and anxiety express a range of social, moral and political attitudes related to the issue of crime and articulate underlying values regarding society and law and order (Girling et al. 2000; Jackson in press, b; Farrall et al. in press). What has been called expressive fear serves to articulate more generalized, broader attitudes and values. Crime acts as a lightning rod, a metaphor for social changes and problems that are both specific to the local community and to wider society.

Attitudes toward crime thus constitute and express a range of complex and subtle lay understandings of the social world – broader social values and attitudes about the nature and make-up of society and community, the value placed on crime in its symbol of deterioration, and all the implications that flow from both its prevalence and its impact, including social cohesion and stability, a predatory, uncaring and fractured society.

These issues need investigation in the context of concerns about cyber crime. For example, the perceptions of the risk of the Internet with regard to sexual offences may serve to express a range of underpinning values and attitudes about the vulnerability of children, the lack of protection and what these dangers say about the society – the “symbolic tangles” of Horlick-Jones et al. (2003, p. 284). The cultural resonance or significance of a particular risk raises its salience – the expression of concern about that risk then articulates values that underpin interpretations of cultural significance. Relevant research might use qualitative methodologies in order to produce stories that are situated accounts of the risk, a set of concerns and debates quite apart from a narrowly conceived idea of the risk object itself.

5.2.2 *Trust and crime*

Trust is a means for alleviating risks. But on what bases are we prepared to trust others? There are many cues and preconditions that indicate that we can trust the other. For example, familiarity, the person having the appropriate credentials, competence, dress and manner of speaking and the existence of sanctions for misdemeanours. Theorists of trust, such as Barber or Earle and Cvetkovitch, capture the basic expectations that underlie trust – value similarity or compatibility, competence and public, or fiduciary, responsibility. In other words, does an organization/system accord with our values? Are those running it competent to enact their roles in the system, and in their actions are they motivated to take the public interest into account?

In terms of trust, the cyber user confronts a system independent of the provider of a particular service. Hence, trust is predicated on the establishment of preconditions regarding the technology and the other – the service provider. System trust is a prerequisite, for without this even the most trustworthy service provider cannot offer basic protection. Many contingencies of the system may act to obstruct trust building – hearing about hackers, experience of viruses and worms, etc. And even if the system is believed to be watertight, what assumptions are made about the service

provider?

Since low trust implies high risk perception, the key to reducing risk perception may not be risk communication strategies, but rather trust building. And, trust is not built by strategic communication directed toward the other, or the demanding of trust. On the contrary, trust is built in the other by working on oneself, as an individual or organization. Individuals and organization have to demonstrate by their actions that they merit the other's trust. These observations raise issues of reciprocity in cyberspace, identity and certification procedures and the way they may or may not facilitate trust in the other.

5.2.3. Social amplification of risk and crime

SARF is a very inclusive set of rather loosely related concepts. In many ways it brings together all the other work within risk perception. But this ambition is tempered somewhat by the lack of specificity in content and process. In particular, it is unclear whether SARF can be used as a successful tool of prediction; perhaps it is too fuzzy a framework for this, its value being more as a way of explaining something after it has occurred.

Yet, despite these problems, a SARF approach to crime and cyber crime would seem to offer much. At the least it would provide an overarching framework within which to position particular studies on risk perception. But, more ambitiously, the use of cyber crime as a case study of SARF might have clear value for public policy-making. Research could elucidate an account of the communication of the risk of cyber crime, attending to how symbols and imagery shape public perception and how various institutions handle and disseminate risk information. In particular, research might lead to the identification of signal events, for example, an instance of cyber crime comes into the public domain, is transformed as it is communicated through mass media channels and shapes public perception of risk.

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