



# **Taking account of societal concerns about risk**

## **Framing the problem**

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for the Health and Safety Executive 2002

## **RESEARCH REPORT 035**

Available online at <http://www.hse.gov.uk/research/rrpdf/rr035.pdf>



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Risk is subjective. It is a word that refers to a future that exists only in the imagination. The Health and Safety Executive (HSE), as Britain's pre-eminent risk manager, has the challenging task of taking into account societal concerns about risk. The task is challenging, and often thankless, because society and its concerns are heterogeneous - "society" consists of diverse groups of stakeholders or social solidarities, and their concerns are commonly in conflict with each other. In this report we

- characterise risk management as a balancing act involving uncertain rewards and costs,
- describe the different groups with which the HSE must contend in performing its balancing act,
- note the significance of the different types of risk about which they are concerned, and
- conclude that attempts to manage risk that a) ignore the rewards of risk taking, and/or b) exclude significant stakeholders, and/or c) fail to appreciate the type of risk it is sought to manage, are unlikely to succeed.

We have, we hope, brought a modicum of order to a large amount of chaos.

This report and the work it describes were funded by the HSE. Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

**HSE BOOKS**

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First published 2002

ISBN 0 7176 2153 7

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# EXECUTIVE SUMMARY

## 1. THREE FRAMING DEVICES

- It is important to understand the *type of risk* one is seeking to manage. There are three types of risk that can helpfully be distinguished: *directly perceptible*, *perceived with the help of science*, and *virtual* – risks about which scientists disagree or confess ignorance. These three types of risk can be further subdivided into risks that are *voluntary* and those that are *imposed*.
- Risk management is a *balancing act* in which the potential rewards of getting it right are weighed against the potential costs of getting it wrong. Risk management that pursues only the objective of reducing the costs of getting it wrong will be oblivious to significant opportunity costs.
- The rewards and costs of risk taking are viewed through *perceptual filters*. A typology of filters is presented: *individualist*, *egalitarian*, *fatalist* and *hierarchist*. The HSE is characterised as a statutory hierarchist and cautioned, in the exercise of its duties, against excluding the other three perspectives from its deliberations.

## 2. ROBUST RISK MANAGEMENT

- An insightful institutional risk manager will seek to take into account, to the maximum extent possible, the perspectives of all the stakeholders concerned with the risk he seeks to manage.
- The process by which this is done should be integral to the management process, and not merely bolted on to traditional forms of risk management.
- This will involve the adoption of *constructivism* and the abandonment of *objectivism*.
- This will rule out the use of *single-metric methods* such as cost-benefit analysis and require the adoption of *typology-based discourse analysis*.
- If it is to take account of societal concerns about risk the HSE must transform itself into a “clumsy institution” – i.e. one that abandons the goal of optimality (which can serve only one perspective at the cost of excluding and alienating the others) and listens intently to all the stakeholders.

## 3. THEREFORE – the HSE should

- be clear about the nature of the risks it seeks to manage
- hesitate to seek to manage voluntary risks taken by adults
- avoid the costs of excessive risk aversion
- eschew optimising, single-metric methods; they cannot embrace all stakeholders
- be aware of, and seek to accommodate, diverse societal concerns about risk.



# 1 THREE FRAMING DEVICES

*“We all realise intuitively that the safety we seek must in some way be balanced against the benefits we forego.”*

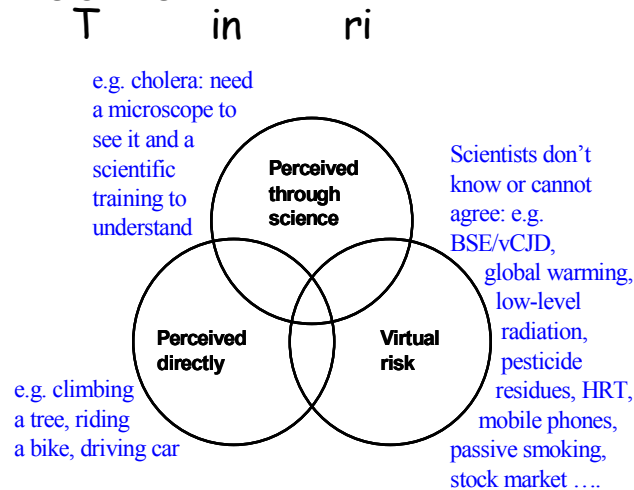
*“the law [which the HSE is enjoined to uphold] imposes a general duty that health and safety be secured at all times, subject only to the qualification that measures should be adopted ‘so far as is reasonably practicable’.”* J. Bacon in Preface (HSE 1999)

*“What we must do is reflect society’s values at large.”* J. McQuaid in Foreword (HSE 1999)

These quotations convey, in highly general terms, the essence of the Health and Safety Executive’s remit. Few would quarrel with the assertions they contain. The challenge lies in their implementation. How is the *risk-benefit balancing act* to be performed? How are *reasonable* and *practicable* to be defined? And how can *society’s diverse and often conflicting values* be reflected in the exercise?

This chapter puts forward three framing devices which have proved useful in addressing these questions. To begin with it is important to be clear about the type of risk one is seeking to manage.

## 1.1 THREE TYPES OF RISK



**Figure 1.1** distinguishes three types of risk that require very different approaches to management

*Directly perceptible risks*, such as climbing a tree, riding a bike, driving a car, or crossing the road, are examples of risks that we deal with *instinctively* – the ability to manage risk effectively is an attribute that is rewarded by evolution - and *intuitively* - we do not undertake a formal risk assessment before we cross the road. As will be seen below, these risks are very difficult to manage by regulators such as the HSE.

*Risks perceived through science* are risks that cannot be seen by the naked eye. Cholera, for example, can only be seen through a microscope by someone with a scientific training that enables them to understand what they are looking at. A wide range of sciences, pure and applied, is involved in the perception and management of risks in this category. Epidemiology and actuarial science assist both in the identification of probable causes of disease and accidents, and in devising strategies for containing them. Astronomers, meteorologists, mathematicians, geneticists, statisticians, engineers and general practitioners are amongst the many science-based professions that have played a significant role in risk detection and management. They have considerable achievements to their credit. The HSE relies upon them heavily.

*Virtual risks* are risks about which scientists are ignorant or in dispute. They range from unconfirmed scientific hypotheses derived within conventional science (e.g. a link between BSE and vCJD, or the causes and consequences of climate change), through speculations by “alternative” specialists (e.g. various dietary theories of illness), popular fears (e.g. living under powerlines causes cancer), superstitions (e.g. ladders and black cats), to theological speculations (e.g. misfortune is punishment for sin). A few of these perceived risks persist in the face of refutation by conventional science, but it is the risks that conventional science cannot convincingly confirm or refute that cause the greatest difficulties for regulators such as the HSE. These risks are *liberating* in the sense that, if science cannot settle the issue, people are freed to argue from their established beliefs, convictions, prejudices and superstitions. Virtual risks are products of the imagination that work upon the imagination. They may or may not be real, but they have real consequences.

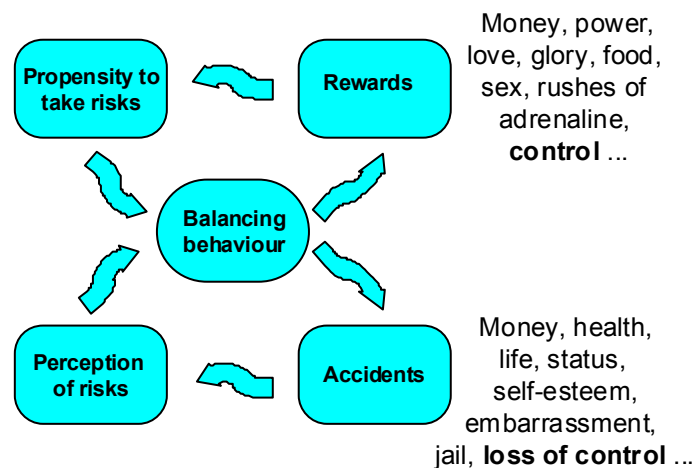
Each of the above three categories of risk can be further subdivided in two. The approach to their management will be powerfully influenced by whether they are perceived as *voluntary* or *imposed*.

## **1.2 THE BALANCING ACT**

### **1.2.1 The Risk Thermostat**

Figure 1.2 presents a model of the risk-management balancing act referred to by Bacon at the beginning of this chapter. The model postulates that:

- everyone has a propensity to take risks
- this propensity varies from one individual to another
- this propensity is influenced by the potential rewards of risk taking
- perceptions of risk are influenced by the experience of accident losses - one's own and others'
- individual risk taking decisions represent a balancing act in which perceptions of risk are weighed against propensity to take risk
- accident losses are, *by definition*, a consequence of taking risks; to take a risk is to do something that has a probability of an adverse outcome; the more risks an individual takes, the greater, on average, will be both the rewards and losses he or she incurs.

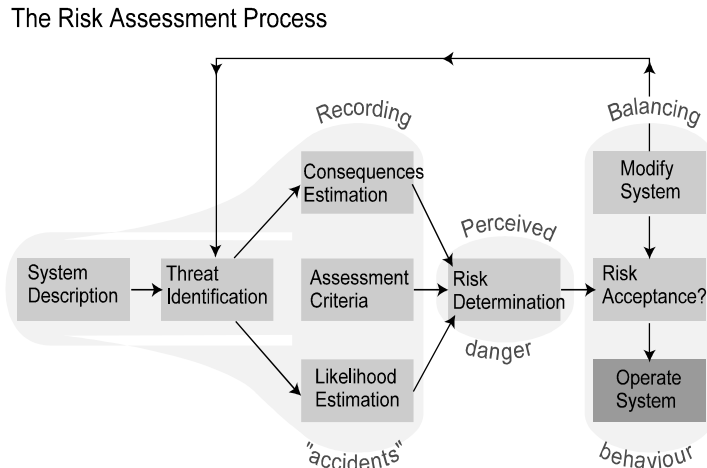


**Figure 1.2** The Risk Thermostat

The model characterises risk-taking behaviour as governed by a risk thermostat, with propensity to take risks representing the setting of the thermostat. Some like it hot – racing-car drivers, dangerous sports enthusiasts - and some like it cool – a timid and cautious little old lady named Prudence – but it is doubtful, for risks voluntarily assumed, that anyone aspires to absolute zero – acknowledging both reality and the fact that a life without risk would be unutterably boring. Risk management, as represented by this model, is a form of cost-benefit analysis without the £ signs. Both rewards and accidents come in a wide range of incommensurable variables that resist reduction to a common denominator.

*Institutions*, however, also have risk thermostats, and their settings are frequently in conflict with those of the people they seek to regulate. Figure 1.3 illustrates a common feature of institutional risk management. It is a pharmaceutical company’s own description of the way it manages risk. The shaded overlays (labelled “recording accidents”, “perceived danger,” and “balancing behaviour”) illustrate the way in which this model of risk management can be reduced to the bottom loop of the risk thermostat model in Figure 1.2. The “assessment criteria” make no reference to the rewards of risk taking - the top loop, the rewards loop, is missing. Formal risk management in this company is devoted to the reduction of the number of accidents, without reference to the opportunity costs in the form of rewards foregone. Whenever risk management loses sight of the reasons that people have for taking risks it is likely to try to introduce safety measures that will be resisted as excessively cautious. Imposed safety can be resented as strongly as imposed risk.

Figure 1.2 makes the point that money is only one of the potential rewards or losses of risk taking. There are numerous other incommensurable outcomes that defy reduction to a common denominator. Amongst them, highlighted in bold type are *control* and *loss of control*. Judgements about risks are very powerfully influenced by whether they are seen as voluntary or imposed. The commonly observed discrepancy between the views of experts and lay publics about the magnitude of risks can often be attributed to this factor. Expert judgements about the “small” risks of nuclear power, for example, usually emanate from experts working for the imposers of the risk. Judgements about the acceptability of the same risk made by resentful “imposees” are likely to reflect their resentment.

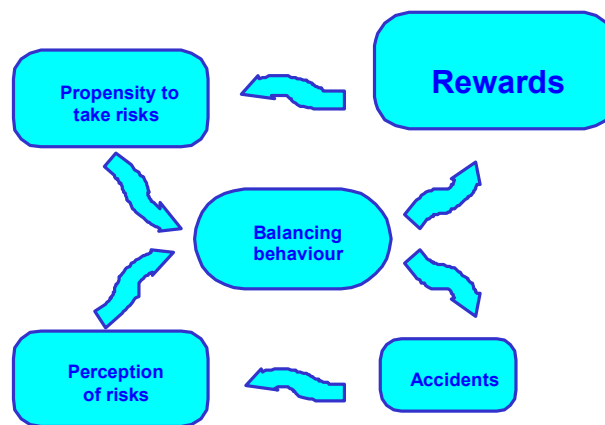


**Figure 1.3** The risk assessment process

The HSE has a similar problem. The Health and Safety at Work Act, which spells out the HSE's obligations, constrains it to enforce a level of risk which is also in conflict with the risk levels that govern societal concerns or the behaviour of most people. Its guiding principle, ALARP (As Low As Reasonably Practicable), has been enshrined in numerous legal precedents as follows:

“ ‘Reasonably practicable’ is a narrower term than ‘physically possible’, and implies that a computation must be made in which the *quantum* of risk is placed in one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that, if it be shown that there is a gross disproportion between them – the risk being insignificant in relation to the sacrifice – the defendants discharge the onus upon them. Moreover, this computation falls to be made by the owner (i.e. defendant) at a point in time anterior to the accident.” (Judgement of Asquith LJ in *Edwards vs National Coal Board*, 1949, quoted in (Barret & Howells 1993))

This judgement, with its reference to the placing of risk and sacrifice in scales, suggests that for risk management to comply with the law it must pursue a judicious balance. But the legal requirement that the sacrifice, or the “benefits foregone” referred to in the quotation at the beginning of this chapter, must be *grossly disproportionate* to the quantum of risk incurred, is difficult to reconcile with the idea of risk management as a balancing act. This interpretation appears to require Figure 1.2 to be redrawn so that the potential rewards of any risky behaviour be shown to be very large relative to the possible adverse outcomes (Figure 1.4). This does not appear to be a principle that governs the behaviour of Formula 1 drivers, or even ordinary motorists, or pedestrians trying to cross the road.



**Figure 1.4** Gross Disproportion

### 1.2.2 The Balancing Act and Directly Perceptible Risks

Attempts to regulate *directly perceptible risks voluntarily* undertaken commonly encounter resistance from those whose behaviour they seek to regulate. Attempts to compel people to be safer than they voluntarily choose to be by criminalising self-risk can provoke a variety of responses – e.g. resentment, widespread flouting of the law, or risk transfer. Seat belt laws provide examples of all three. They have infuriated civil libertarians, been widely ignored in many jurisdictions, and in Britain, which has one of the highest compliance rates in the world, shifted the risk of accidents from motorists to cyclists and pedestrians. (Adams 1995) This is a most unpromising area for regulation.

*Directly perceptible involuntary risks* present a different problem. Motorists speeding through residential areas clearly create a directly perceptible danger. Risk, however, is a reflexive phenomenon. People living in such areas *respond* to the danger. In these areas children are forbidden to cross the street, old people are afraid to cross the street, and fit adults cross it quickly and carefully. The result is that these streets often have good accident records – purchased at the cost of community severance. People on one side of the road do not know their neighbours on the other. And the good accident records are still interpreted by many road safety regulators as evidence that the roads are safe, and therefore in need of no measures to calm the traffic. The reaction of local residents can often be described as impotent rage.

Societal concerns about directly perceptible risks such as traffic are often highly polarised – the freedom of motorists to drive as fast as they want is in direct conflict with the freedom of children to play safely in the neighbourhoods where they live. The freedom to *control* events in one's life is itself a jealously guarded reward. Impositions that infringe this freedom – whether in the form of regulations (imposed on the motorists) or risks (imposed on children) are likely to encounter opposition.

In the workplace, the distinction between voluntary and involuntary risk is frequently blurred, especially in intrinsically hazardous occupations such as fishing, scaffolding, deep-sea diving, or construction. The job can be seen to impose risks, but except in conditions of slavery or dire economic necessity, the job is voluntarily chosen, and within the job there is a

certain amount of choice about how best to meet its requirements. A further complication is that hazardous jobs acquire a *macho* image and attract risk-seeking, or certainly not risk-averse, personalities. Understanding risk-taking behaviour in such circumstances requires the deconstruction of the “safety cultures” of all the participants – workers, employers, and regulators.

### 1.2.3 The Balancing Act and Risks Perceived Through Science

Science can be brought to bear on problems of risk in two different ways: directly, by seeking to explain the connections between cause and adverse effect, and actuarially, by projecting past accident histories into the future. Both have their limitations.

Where science is completely successful it removes issues from debates about *risk* by converting probabilities into certainties. Genetic counsellors, for example, currently inform prospective parents about the probabilities of their progeny having certain genetic defects. Further progress in genetic science appears likely to turn many of these probabilities into certitudes. It can also shift risks into the directly perceptible category; if science discovers that a well is contaminated by cholera, it becomes possible to place a warning notice on it.

Where the best that science can do is estimate the probabilities attaching to future events, risk managers are still left with the job of converting them into judgements about what to do, and judgements involve values. Being informed that there is a 1 in X probability of some complication arising if a pregnancy continues will lead some to choose abortion and others to continue. At the time of the BSE-beef-on-the-bone crisis the Government’s decision to ban the sale of beef on the bone was accompanied by calculations that the ban would reduce the risk of vCJD by one in many billions. The ban provoked vehement public debate.

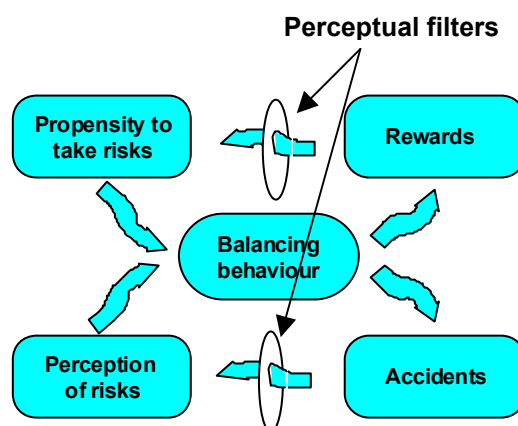
The actuarial approach, while useful to insurance companies calculating next year’s car insurance premiums, also settles few policy arguments. Dose-response studies of the effect of toxins are a type of actuarial exercise in which evidence is gathered about the effects of different levels of exposure and projected as estimates of the effects of similar doses in the future. In societies that can afford clean water this kind of evidence is used to set water purity standards. But water with zero impurities piped to every home *and garden* would be unaffordable, and in poor societies standards are lower. Science permits better informed debates about values, but is not a substitute for them.

Disputes amongst scientists about “safe” levels of everything from vitamins to radiation are common. Most remedies sold by modern pharmacies are therapeutic at some low level and toxic at much higher levels, and some scientists argue that this *hormesis* effect even applies to radiation. Whenever we encounter such disputes amongst scientists we enter the realm of virtual risk.

### 1.2.4 The Balancing Act and Virtual Risk

We do not respond blankly to uncertainty; we impose meanings upon it. These meanings are virtual risks. Whenever scientists disagree or confess their ignorance, the lay public is confronted with uncertainty. We all, scientists included, view risks through perceptual filters. Even when uncertainty can be plausibly bounded by probabilities and error bands, different people will perceive the probable consequences (the potential rewards and accidents resulting

from their choices) differently. The greater the degree of uncertainty, the more influential become the filters (Figure 1.5).



**Figure 1.5** The risk thermostat with perceptual filters

These filters are the product of all previous experience. In science, virtual risks are often referred to as unconfirmed hypotheses, and the perceptual filters are sometimes called paradigms. The delayed discovery of the Antarctic ozone hole provides an example of the effect of such filters. The existence of the hole was masked by a computerized perceptual filter. US satellites failed to pick up early indications of the hole because programmers had instructed the satellite computers to reject data outside a specified range as errors. As a result, evidence of the hole was discarded as untrustworthy data (Benedick 1991). What people, scientists and non-scientists alike, believe about virtual risks depends on whom they believe and whom they believe depends on whom they trust.

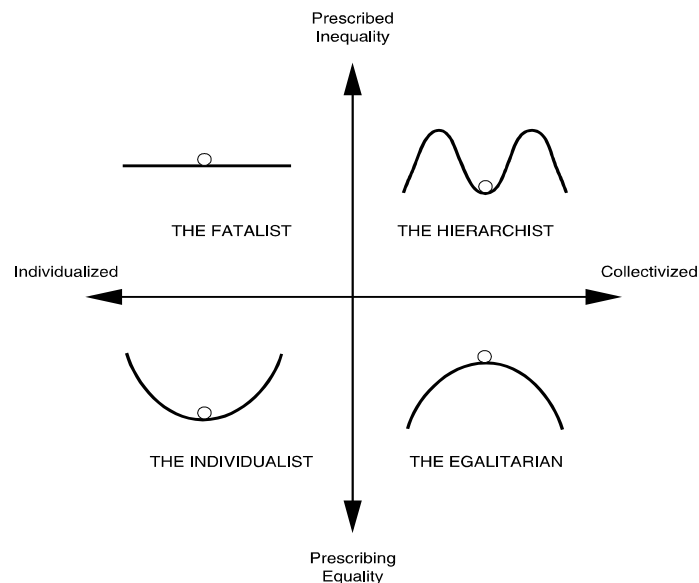
Our filters help us make sense of the world by reducing its uncertainty and complexity to manageable proportions. The construction and operation of our filters are influenced by psychology (personalities vary in the amount of risk they seek or tolerate), by economics (monetary costs and benefits can be powerful motivators), by ideology (conceptions of fairness influence judgements about risk), by biology (hormones are often invoked to explain male/female differences in risk aversion), and by culture (the influence exerted on your beliefs by the people with whom you associate). In our attempt to understand *societal* concerns about risk we will focus on the role of culture in the shaping of perceptual filters.<sup>1</sup>

### 1.3 A TYPOLOGY OF PERCEPTUAL FILTERS

Figure 1.6 presents a typology of perceptual filters. This typology brings a degree of order and understanding to debates about risk which otherwise appear to be incoherent

<sup>1</sup> *Culture* is arguably the broadest and most comprehensive of these categories. While the significance of biology is not denied in explaining the behaviour of young men, for example, young-male culture exerts a powerful influence on the way in which biological impulses are expressed. It is also the category that addresses most directly the interest of the HSE in understanding *societal* concerns about risk.

shouting matches. It captures the essence of public debates about risk, especially those about virtual risks.



**Figure 1.6** A typology of perceptual filters <sup>2</sup>

Firstly Figure 1.6 presents a typology of four “myths of nature” that encapsulates various preconceptions about the world that guide decisions made in the face of uncertainty. Each of the four myths is illustrated by the behaviour of a ball in a landscape; and each myth is associated with a distinctive risk-management style.

- *Nature benign* is represented by a ball in a cup: nature, according to this myth, is predictable, bountiful, robust, stable, and forgiving of any insults humankind might inflict upon it; however violently it might be shaken the ball comes safely to rest in the bottom of the basin. Nature is the benign context of human activity; it is resilient and able to recover from human exploitation, not something that needs to be carefully managed. The risk-management style associated with this myth is relaxed, exploitative, laissez-faire.
- *Nature ephemeral* is represented by a ball balanced precariously on an over-turned cup: here nature is fragile, precarious and unforgiving. It is in danger of being provoked by human greed or carelessness into catastrophic collapse. The objective of management is the protection of nature from Man. People, the myth insists, must tread lightly on the earth. The guiding risk-management rule is the precautionary principle.
- *Nature perverse/tolerant*: this is a combination of modified versions of the first two myths. Within limits nature can be relied upon to behave predictably. It is forgiving of modest shocks to the system, but care must be taken not to knock the ball over the rim. It needs scientific expertise to determine where the limits are, and regulation to ensure that they are not exceeded, while leaving the system to look after itself in minor matters. This

<sup>2</sup> Much fuller descriptions of this typology can be found in (Thompson, Ellis, & Wildavsky 1990) and (Adams 1995).

is the ecologist's equivalent of a mixed-economy model. The risk-manager's style is interventionist.

- *Nature capricious*: nature is unpredictable. The appropriate management strategy is again laissez-faire, in the sense that there is no point to management. Where adherents to the myth of nature benign trust nature to be kind and generous the believer in nature capricious is agnostic; the future may turn out well or badly, but in any event, it is beyond his control. The non-manager's motto is *que sera sera*.

The myths of nature presented in Figure 1.6 represent partial truths; nature, depending on time, place and circumstances, is capable of behaving in any of these ways.<sup>3</sup> These myths of nature, together with the distinctive management styles they justify and render “rational”, are supportive of characteristic *social solidarities*.

- *Individualists* are enterprising “self-made” people, relatively free from control by others, and who strive to exert control over their environment and the people in it. Their success is often measured by their wealth and the number of followers they command. They are enthusiasts for equality of opportunity and, should they feel the need for moral justification of their activities, they appeal to Adam Smith's Invisible Hand that ensures that selfish behaviour in a free market operates to the benefit of all. The self-made Victorian mill owner or present-day venture capitalist would make good representatives of this category. They oppose regulation and favour free markets. Nature, according to this perspective, is to be *commanded* for human benefit.
- *Egalitarians* have strong group loyalties but little respect for externally imposed rules, other than those imposed by nature. Human nature is – or should be – cooperative, caring and sharing. Trust and fairness are guiding precepts and equality of outcome is an important objective. Group decisions are arrived at by direct participation of all members, and leaders rule by the force of their arguments. The solution to the world's environmental problems is to be found in voluntary simplicity. Members of religious sects, communards, and environmental pressure groups all belong to this category. Nature is to be *obeyed*.
- *Hierarchists* inhabit a world with strong group boundaries and binding prescriptions. Social relationships in this world are hierarchical with everyone knowing his or her place. Members of caste-bound Hindu society, soldiers of all ranks and civil servants are exemplars of this category. The hierarchy certifies and employs the scientists whose intellectual authority is used to justify its actions. Nature is to be *managed*.
- *Fatalists* have minimal control over their own lives. They belong to no groups responsible for the decisions that rule their lives. They are non-unionised employees, outcasts, refugees, untouchables. They are resigned to their fate and see no point in attempting to change it. Nature is to be *endured* and, when it's your lucky day, *enjoyed*.

Appendix A applies the cultural theory typology to a number of different debates about virtual risks. Figure A.1 captures the social solidarities that have formed about the BSE/vCJD controversy. This is a classic virtual risk. There remains doubt about whether BSE is the cause of vCJD – Stanley Prusiner who won his Nobel Prize for his discovery of prions is

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<sup>3</sup> Thompson *et al* (1990) associated these myths with distinctive perceptual biases or “rationalities”, and these, in turn, with distinctive strategies for coping with risk.

among the doubters.<sup>4</sup> And for those scientists who are persuaded of the connection between vCJD and BSE-infected meat there remains huge uncertainty about dose-response relationships, incubation periods and the eventual ultimate number of those who might be infected. At the time of writing it is proposed that surgical instruments should be discarded after single use because of a remote chance of passing the infection to subsequent patients. Along with the beef-on-the-bone ban and the prohibition on the reuse of test contact lenses, this can be characterized as an application of the egalitarian's precautionary principle.

But each of the other solidarities has its own version of the precautionary principle. The individualist objects that the unfettered application of the egalitarian's version of the precautionary principle would quickly bankrupt any imaginative government and that excessive and ineffective spending to reduce tiny/unproven risks diverts resources from more effective solutions to societal problems. For the individualist, the best defence against the hazards of an uncertain world is to be as rich and powerful as possible; anything therefore that impedes the development of this power, i.e. anything that impedes economic growth, is dangerous. For the hierarchist, precaution consists of doing everything possible to buttress the authority of the hierarchy – society's defence against chaos and anarchy. The hierarchist is extremely uncomfortable in the presence of virtual risk. His authority as governor and regulator rests on science and, in the absence of any clear direction from science, his actions are in danger of being seen as arbitrary. In the case of BSE/vCJD the ball has gone over the rim of the hierarchist icon in Figure 1.6. In Appendix A.1 it is apparent that the ball has become a hot potato that no one wishes to be left in charge of. The fatalist continues to dine on junk food of unknown origin, buy lottery tickets, and duck if he sees something about to hit him.

Effective regulation requires gaining and maintaining the trust of the regulated. They must believe in the rightness of what is required of them. When there is no unambiguous right course of action – as is particularly the case with virtual risks and directly perceptible voluntary risks – the task of the regulator is to hold the ring in such a way as to permit the maximum of constructive dialogue amongst the contending rationalities. How this might be done is the subject of the next chapter.

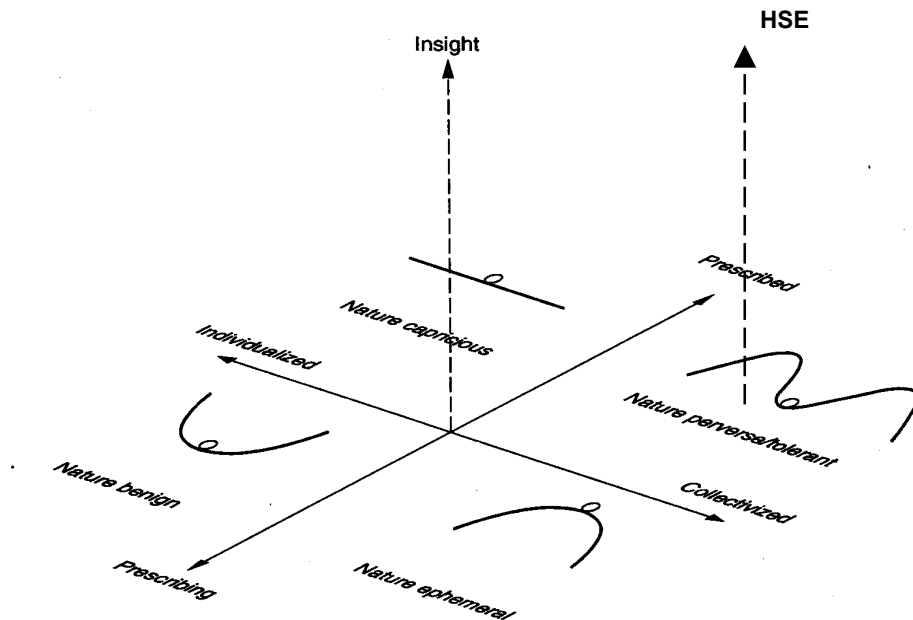
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<sup>4</sup> Evidence to BSE inquiry, June 6, 1998, [www.bse.org.uk](http://www.bse.org.uk).

## 2 ROBUST RISK MANAGEMENT

### 2.1 THE INSIGHTFUL HIERARCHIST

The HSE, by statutory definition, plays the role of hierarchist in the typology set out in Chapter 1. It is charged with safeguarding the collective welfare, and its behaviour is prescribed by legislation. But this prescription gives it considerable discretion. The legislation does not define the words in its central mantra "As Low As Reasonably Practicable" (ALARP). In the exercise of its prescribed duties it must cope with the other perspectives. It must deal with groups and individuals who define these words in very different ways. If it were to behave in a rigidly autocratic and top-down fashion it would antagonise these other perspectives. If it were to ally itself to only one, to the exclusion of the others, the antagonism of those excluded would be likely to be even stronger. The HSE cannot escape its hierarchical obligations, but if it is to exercise them effectively and efficiently it must seek to maximize the goodwill and co-operation of all whose activities it is charged with overseeing.



**Figure 2.1.** The insight axis

It must, in graphic terms, rise as high as possible on the insight axis of Figure 2.1. On the surface of this diagram, especially in the presence of *virtual* risks, one encounters mutually uncomprehending dogma. The higher participants in a risk debate can rise above the fray on the ground, the better understanding they will have of the beliefs and convictions of the other participants, and the better equipped they will be to engage in a mutually comprehending discussion.

In this chapter we will explore what is entailed in this ascent, particularly the constructive possibilities of the "mutually comprehending discussion" that it makes possible.

## 2.2 INCORPORATING SOCIETAL CONCERNS INTO RISK MANAGEMENT

The HSE's interest in "societal concerns" -- what they are, and how they can be taken into account -- parallels the growing consensus that public perceptions should be included in the assessment of risk.<sup>5</sup> This is a major (indeed, paradigmatic) shift. It signals the prospect of a reconciliation, after 30 or so years of mutual repulsion, between two schools of risk thought: the objectivists and the constructivists. Each school used to keep itself pure and united by its steadfast rejection of the other (the prime example being the embarrassing Royal Society Report -- *Risk: Analysis, Perception and Management* -- in 1992<sup>6</sup>). Now both face a quite different challenge: to understand just what is entailed in the "growing consensus" to which they are increasingly committing themselves.

There have been two responses to the proposition that public perceptions should be included in the assessment of risk. The first response suggests elements of the old debate linger on. It argues that "societal concerns", once understood, can somehow be "factored in" or "bolted on" to existing methodologies and policy practices (by the introduction of various "weighting factors", for instance). This hope was expressed by some of those who participated in the Royal Society's 1997 meeting. For instance, John Krebs (then chief executive of the National Environment Research Council, now head of the Food Standards Agency) argued "for the position in which individual values and perceptions are subjected to scientific analysis in the same way as any other element of risk assessment," suggesting that, once that had been done, the social and technical sciences, seamlessly integrated, would be able to arrive at a numerically quantifiable measurement of risk. This, in effect, is a proposal to *objectivise* perceptions of risk and carry on with traditional quantitative risk assessment.<sup>7</sup>

The second response maintains that this sort of integration simply is not possible, and that a completely different set of policy tools, and precepts - rooted in the constructionist tradition - is needed. This is the response of this report.

### 2.2.1 The Required Change of Approach

A new consensus about how to manage risks will require the abandonment of *objectivism* -- the idea that we can clearly distinguish between what the risks really are and what people variously and erroneously believe them to be. It will have to give way to constructivism -- the idea that risk is inherently subjective: something that we project onto whatever it is that is "out there". *Risk* is a word that refers to the future. It exists only in our imaginations -- informed of course by experience. Sometimes there may be little divergence between projections of past experience and actual outcomes -- in which case actuarial or science-based approaches to risk management can be helpful. But always judgements about the magnitude of risks and whether they are worth taking will be influenced by the variously perceived

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<sup>5</sup> This was the central theme of a Royal Society conference on the subject in 1997 and is a view that has been gaining influential adherents ever since (Royal Society 1997).

<sup>6</sup> In its 1983 report, *Risk Assessment*, the Royal Society's tone was confident, authoritative and purposeful. By 1992 it was sufficiently embarrassed by the failure of its working party to reach a consensus that the preface to the report that it published proclaimed that it was "not a report of the Society", that "the views expressed are those of the authors alone", and that it was merely "a contribution to the ongoing debate". The debate at the publication of the report was entertainingly acrimonious -- see Mary Douglas for an account (Douglas 1997).

<sup>7</sup> The principal specialists in estimating the values required for such an approach are the cost-benefit analysts. See Appendix B for our objections to their methods.

contents of the "rewards" and "accident" boxes in Figure 1.2. So how do we achieve this abandonment of objectivism? Two careful steps are involved.

- First, we need to recognize that the imposition of a single definition of what the problem *is*, which is what so much of policy analysis and science-for-public-policy does, is to exclude all those who happen not to share that way of framing things. Since people are unlikely to be whole-heartedly in favour of a policy that is aimed at solving what they do not see to be the problem, approaches that insist on singularity will inevitably be low on consent, surprise-prone, trust-sapping, brittle, erosive of technological flexibility, undemocratic, and unreflexive <sup>8</sup>.
- Second, we need to recognize that to embrace constructivism is not to reject science. Indeed, the proponents of each diagnosis would soon lose credibility if they did not support their arguments with good science, or, in the case of virtual risks, with plausible, scientifically-framed hypotheses. Nor does this embracing of constructivism lead us into the relativistic morass of post-modernism in which anything goes (and in which anything that goes can go with anything else that goes). <sup>9</sup>

Each of the four perceptual filters in Figure 1.6 is supportive of a particular form of social solidarity and, at the same time, undermining of the other three<sup>10</sup>. Put another way, those solidarities are self-organising, in the sense that each is all the time defining itself

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<sup>8</sup> Reflexivity here involves the self-conscious examination of the assumptions (such as the various myths of nature) that underlie any analytical approach and a reaction to them. Such examination, since it entails the ascent of the "insight axis", is not easily achieved. It is, however, easily prevented: for instance, by the policy orthodoxy that insists on a single, agreed definition of the problem.

<sup>9</sup> Post-modernism rests on three commitments: *anti-essentialism* (there is nothing out there, in physical or human nature, that makes some "scripts" more popular than others), *symmetry* (all truth claims – the theory of quantum gravity, for instance, and the assertion that the moon is made of green cheese – are of equal validity) and *contingency* (where we go next will be determined by what we happen to bump into, and where we are now is the result of similarly haphazard collisions: in other words, all is *process*; there is no *structure*). Hence the "central dogma" in post-modernism – "there are no meta-narratives" (Lyotard 1979) – which, paradoxically, is about as meta a narrative as one could have!

<sup>10</sup> Forms of social solidarity, introduced in Chapter 1, are the various ways in which we bind ourselves to one another and, in so doing, determine our relationship with nature. Forms of solidarity are foundational to social science: Durkheim's distinction between mechanical and organic solidarity (Durkheim 1893), Tönnies' contrasting of *Gemeinschaft* and *Gesellschaft* (Tönnies 1887), and Sir Henry Maine's historical transition from status to contract (Maine 1861), to mention but three. Nowadays, the most favoured distinction is between markets and hierarchies (e.g. (Williamson 1975); (Lindblom 1977)), the former being sustained by free-standing actors (individualists) bidding and bargaining with whomsoever it pleases them, and the latter (hierarchists) monitoring this anarchic process (with the help of its certified experts) and intervening, where necessary, to curb excesses by means of legal sanctions.

However, though each of the old masters of social thought clearly got hold of something of great and lasting importance, their dichotomous schemes will not all map onto each other without serious distortions. This is because Durkheim contrasted mechanical (egalitarian) solidarity with organic (a merger of our hierarchical and individualist solidarities), while Tönnies and Maine contrasted the individualist solidarity (*Gesellschaft*/contract) with a merging of our egalitarian and hierarchical solidarities (*Gemeinschaft*/status). The more modern formulations usually contrast two "pure" types – individualism and hierarchy – while ignoring egalitarianism. They all ignore the fatalists, whose cause was championed by Marx in his writings about alienation, marginalisation etc (Marx 1967). Not the least of cultural theory's attractions is that its fourfold scheme accommodates all of the partial schemes without any Procrustean amputations (Thompson, Ellis, & Wildavsky 1990; Thompson, Rayner, & Ney 1998).

against the others. Where, for instance, would Greenpeace be (over the Brent Spar) without Shell and the British Government (see Appendix A.2)?

### 2.3 TYPOLOGY-BASED DISCOURSE ANALYSES

If people were to be unresponsive to risk-management measures, when a policy intervention is made, they would simply carry on as before, with the intervention modifying the ex ante outcomes. This assumption of unresponsiveness underlay, for instance, the now notorious claim prior to the introduction of seat-belt legislation in Britain that the measure would save "1,000 lives a year". The risk compensation phenomenon introduced in the last chapter suggests that we should expect a behavioural response to any measure that alters either the costs or the benefits of risk-taking decisions. The field of road safety abounds with examples – when bends in the road are straightened and sight-lines lengthened traffic goes faster – and yet the phenomenon routinely surprises the advocates of new safety measures. When anti-lock brake systems (ABS) first appeared insurance companies acknowledged their superior stopping power with reduced premiums. But as the claims experience accumulated the reduction in accidents expected by the underwriters failed to materialize and the discounts were withdrawn. Wilde (1994) offers an explanation. In two experiments – one with a fleet of taxis in Munich and another for the Canadian Ministry of Transport – the cars fitted with ABS brakes were driven not as safer cars, but as higher-performance cars.<sup>11</sup>

The risk-compensation hypothesis suggests that, in the absence of a change in risk-taking propensity, everyone will modify their behaviour in response to a measure that reduces the severity of the consequences of a crash in a way that restores the risk-benefit balance that they were previously content with. However the parliamentary debate that preceded the passage of Britain's seatbelt law shows that people reacted very differently to the proposed legislation – in ways neatly captured by the cultural theory typology. In other words they were *plurally* responsive.

Prior to the passage of the law in 1981 there had been numerous debates in parliament. The principal protagonists were *individualists* who opposed the criminalization of self-risk and saw the proposed law as an infringement of personal freedoms, and *hierarchists* who argued that preservation of life should take precedence over the preservation of freedom. The hierarchists dubbed their opponents "loony libertarians" and they returned the compliment by referring to their opponents collectively as "the Nanny State." The *egalitarians* did not see an issue that interested them until, rather late in the day, evidence emerged that after the passage of seatbelt laws in a number of countries more pedestrians and cyclists were being killed; the extra protection that seatbelts afforded motorists was producing a change in driving behaviour that was shifting the burden of risk from the well protected motorist onto the most vulnerable road users. Belatedly – too late to make a difference to the legislative outcome – cycling and pedestrian lobbies joined the debate on the side of the libertarians (Adams 1995).

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<sup>11</sup> The underachievement of much-vaunted safety measures is by no means confined to road safety. Similar disappointments have been reported, for example, in the cases of cycle helmets (Schuffham & Langley 1997), (Adams & Hillman 2001) and playground safety measures (Ball 2001). Studies of childhood injuries in general note that "Very few of our present interventions, intended to prevent these injuries, are actually known to work" (Jarvis, Towner, & Walsh 1995). Graham and Wiener likewise illustrate by means of a whole host of health interventions the potential dangers of risk transfer and risk substitution (Graham & Wiener 1995).

Plural responsiveness to risk requires one to set aside the economist's objective functions and search for optimisation, and focus instead on discourses and on negotiation between the inherently incompatible sets of values and beliefs that are part-and-parcel of those discourses. The Brent Spar saga provides another example.

Shell (the individualist actor) left to its own devices, would simply have weighed the different options and then gone ahead with the oil storage structure's burial at sea, the assumption being that the deep ocean can take pretty well anything we throw at it: the myth of *Nature Benign*. But Shell was subject to regulation and had first to satisfy the British government (playing the hierarchist) that this option did not threaten to push the ocean ecosystem beyond its stability limits: *Nature Perverse/Tolerant*. In the event, both actors were able to agree that this option was innocuous, only to be met, at the eleventh hour, by Greenpeace (acting the part of the egalitarian) which saw this ecosystem as much more precarious than did either Shell or the British government, and was therefore unwilling to allow any safe limits: *Nature Ephemeral*. Those – the fatalists – who found themselves marginalized by all three of the other forms of solidarity (totally convinced by whoever they happened to last see arguing the case on television), were not able to take up any position. And, anyway, what would have been the point if nature operates without rhyme or reason: *Nature Capricious*?

Nature, in consequence, is not something neutral "out there" that science steadily uncovers for us all. Rather, it is a moral resource that each solidarity both constructs and exploits. And each of the Brent Spar actors (apart from the fatalists, who had better things to do) was supported by its serried ranks of PhDs, each platoon uncovering a different nature and publishing their findings in the respectable, peer-reviewed journals (see <http://www.greenpeace.to/pdfs/publications.pdf> for a 26 page list of Greenpeace-sponsored contributions to the scientific literature). The British government, caught off balance by the vehemence of the environmentalist protest, sought to re-impose its authority by conceding that its original scientific advice had been flawed (in not taking account of the subsequent deep-sea disposals that this initial decision had opened the way for) thereby bringing the reality (Shell had cancelled the agreed-on disposal plans once motorists, in Germany in particular, had stopped buying its petrol) back into line with its model of stability and change in nature (the subsequent disposals, it argued, would have pushed things beyond the limits). And, in the subsequent negotiations between Shell and Greenpeace (which ultimately resulted in their agreeing to the Brent Spar being cut up into cylindrical sections to form a pier extension in Norway), each clung ferociously to its myth of nature: Shell insisting that deep-sea disposal be included in the list of options to be negotiated and Greenpeace insisting that it not be entertained at all.

With myths of nature linked to forms of social solidarity in this way, all sorts of other crucial (and moral) concerns – harm, blame, consent, discount rate, to mention but a few – shape up very differently: pitting the solidarities against one another and ensuring that, even when agreement is reached (as it was with the Brent Spar), disagreement does not disappear.<sup>12</sup> And nowhere is this disagreement more evident than in the definitions of what is fair.

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<sup>12</sup> Shell and Greenpeace agreed on the pier extension option but still disagreed on whether the rejected deep ocean disposal *was* an option. The British government came into line with Shell and Greenpeace (on the pier extension) by admitting that its original decision had been "flawed" (Nicholas Schoon, *The Independent*, 23 May, 1996).

Market actors believe in equality of opportunity (which distances them from hierarchical actors, who are anxious that status differences not be equalized) but then insist, like the little red hen, that it is only fair that those who put most in should get most out (which distances them from the egalitarian actors, who believe in equality of outcome: fair shares are equal shares). "Not on this earth!" – the fatalistic response to voiced concern about fairness – helps to ensure that solidarity's voicelessness and, at the same time, distances it from the three active solidarities, each of which is exasperated by this refusal to be roused to the pursuit of justice (as defined by that solidarity).

With each solidarity insisting on its model of stability and change in nature, and with each crying 'unfair' to arguments that the others see as being suffused with justice, the deeply political debate is set to run and run. Specific events – the Brent Spar's disposal, for instance – may crop up and be sorted out but the discourses, each shaped in response to the viability requirements of the form of solidarity that generates it, and each honed by its daily contention with the others, are always with us.

Discourse, therefore, is the key, and the policy challenge is, first, to understand its underpinnings in the complex dynamics of the contending forms of social solidarity and, second, to harness that essential plurality into the design and redesign of our institutions. Two new and crucial questions now arise.<sup>13</sup> First, what happens to our understanding of policy, and to our conventional and much relied-upon policy tool-kit, once we realize that it is discourse (and not the long-espoused single-metric rationality) that is the key? Second, what sort of design criteria do we use in the harnessing of the plurality of rationalities that is revealed by our discourse analysis? The first question leads us to what is called the "argumentative turn"; the second brings us to "clumsy institutions".

## 2.4 THE ARGUMENTATIVE TURN

The *Argumentative Turn* (Fischer & Forester 1993) is the title of a book which describes the re-orientation of policy analysis and design required to make it "open to a variety of solutions and scenarios that would give more weight to social priorities and local potentials" (Hajer & Fischer 1999). Modest though this aim might seem, it presents a serious challenge to the orthodox approach. This challenge would be strengthened if it were possible to specify the variety of solutions and scenarios that must be entertained, and this is precisely what our approach seeks to do.

Conventional models of the policy-process would have us believe that policy-making is a rational activity. Policy-makers identify and select issues, filter out some and promote others to the agenda, review all possible solutions, decide on the most efficient policy response and, finally, implement this response. Such a model (usually referred to as the 'synoptically rational' approach<sup>14</sup>) tells us very little about the overt and covert conflicts, the shifting alliances, and the creative uses of knowledge and facts - about the politics we observe in real-life policy-making.

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<sup>13</sup> This plurality is called "essential" because its absence would be socially disastrous. An unrestrained bureaucracy would be a Kafkaesque nightmare. Unchecked egalitarianism would produce a timid grey conformity. Unbridled individualism would allow the powerful few to overrun both nature and the many. And if we were all fatalists, life would be nasty, brutish and short.

<sup>14</sup> See chapter 4 of {Schwarz & Thompson 1990} for a critical summary of the conventional approach.

- Policy processes, apart from being rational approaches to solution design, are also social processes. As such, politics and policy-making are also about the purposive manipulation and deployment of symbols, claiming and blaming, persuasion and communication.
- Policy-making does not take place in a social vacuum but rather emerges from a highly complex web of social relations. Regardless of whether these are the relationships between individual politicians, within interest groups, between party members, or across party divisions, policy actors are situated in a trellis of social ties that make up the political system. The social networks both constrain and facilitate political action. On the one hand, policy actors are limited by the formal and informal rules (e.g. the 'whips'); on the other hand, it is precisely these social structures that make policy action possible.
- Policy-making, then, is a process based on shared values and norms that emerge from the social interaction of policy actors. These systematically and symbolically structured sets of ideas provide policy actors with the means to understand and make sense of policy events: policy actors evaluate political events by referring to these shared ideas, values and symbols. Perception of policy issues is thus filtered through the different perceptual lenses – our "cultural filters" – that are provided by social relations. What is to count as political or non-political, as fact or value, as a key issue or a non-issue, is not an objective reality out there. Rather, the significance of any political event, any particular issue, or even any political structure, emerges from policy actors' interpretations of political reality. In short, policy actors socially construct the political world in which they operate: running the maze and building it (in contrast to the behaviourist's rats that simply run the maze they are put in). What is more, policy actors will use these social constructions to exhort, cajole, and persuade potential allies as well as to antagonize, scandalize, and intimidate political rivals.

On this politics-accepting view, policy-making is an inherently communicative endeavour that follows a different logic to the synoptic rationality models. Communicative and symbolic resources are thus important elements of the policy process, and this realization poses the question: how can we go about analyzing them?

#### **2.4.1 What Is a Policy Argument?**

If communication, persuasion and the use of symbolism are integral parts of the policy process, understanding policy-making implies looking at its argumentative aspects. There is now a substantial literature on this subject; contemporary theorists of the policy process, such as (Dryzek 1997), (Majone 1985), (Fischer & Forester 1993), have pointed to the argumentative, rhetorical and justificatory content of much of policy-making. Policy formulation, policy planning, and even policy implementation, they maintain, emerge from argumentative processes that conventional policy analysis has thus far ignored. Paying attention to these communicative processes means taking seriously "the actual performances of argumentation and the practical rhetorical work of framing analyses, articulating them, [and] constructing senses of value and significance" (Fischer & Forester 1993). And this, we are arguing, is what we will have to do if we are to understand, and take adequate account of, "societal concerns".

- Rather than understanding policy-makers as problem-solvers who apply objective, scientific, and value-free methods to cure society's ills, advocates of the

argumentative turn suggest we think of policy-makers as performers who seek to persuade an audience. In order to convince other policy-makers and the public, participants in the policy process use political symbols to construct credible and persuasive policy arguments.

- A policy argument, in consequence, tells a story: it provides a setting, points to the heroes and villains, follows a plot, suggests a solution, and, most importantly, is guided by a moral. Since policy arguments are designed to persuade, they are necessarily value-oriented. Yet this does not mean that policy arguments are mere opinion. Policy arguments explicate problems by recourse to rational methods: logic, consistency, and objectivity in terms of argumentative performance. Policy arguments are successful, not because they are based on an objective standard, but because they persuade. Of course, the fact that some policy arguments are based on a method that is widely viewed as credible may itself be compelling: economic forecasts based on sophisticated econometric models are at present more plausible than financial predictions based on astrological star-charts.<sup>15</sup>
- The policy argument approach looks at the effects of discourse on policy-making. In doing so, it introduces both a reflexive and a critical element into policy analysis. Focusing on the rhetorical performance of the policy argument enables the analyst to step back from substantial policy-issues – to move up the insight axis (see Figure 2.1) and discern how and why a policy argument accrues credibility. It allows us to understand why certain types of policy argument are marginalized and why others achieve dominance: a policy argument that can muster sufficient levels of credibility will be able to dominate a policy debate.
- Once the notion of credibility is thematised, the analyst can raise issues of political legitimacy: this is the element of criticism in argumentative analysis. The argumentative approach recognizes that credible policy arguments are not necessarily legitimate: rationality and objectivity are not sufficient conditions for a policy argument to secure credibility, nor are they always necessary. Credibility is not an absolute quality of a policy argument; it depends on the rhetorical performance of policy-actors, the internal logic of the policy storyline, the normative orientations of the policy audience, and actual power relations in the public sphere.

By teasing out policy arguments we are able to scrutinize both the cognitively rational (objective) and the communicatively rational (normative) components of policy debates. The policy argument approach implies that every policy story not only gives us an interpretation of the "facts" concerning any given issue complex but is also guided, implicitly or explicitly, by a particular vision of the world: policy arguments always follow a moral agenda, a set of "societal concerns".

## **2.5 A TYPICAL EXAMPLE: GLOBAL CLIMATE CHANGE**

An analysis of the global climate change policy debate in the mid-1990s reveals three policy stories. Each policy story provides a setting (the basic assumptions), villains (the policy problem), heroes (policy protagonists), and, of course, a moral (the policy solution). Depending on the socio-institutional context of the particular policy actor, each

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<sup>15</sup> But only slightly. Economists are notoriously unable to predict economic turning points with any useful degree of accuracy, and astrologers are consulted by world leaders.

story emphasized different aspects of the climate change issue. What is more, each story defined itself in contradistinction to the other policy stories.

- *Profligacy: an egalitarian story.* This story begins by pointing to the profligate consumption and production patterns of the North as the fundamental cause of global climate change. Rich industrialized countries, so the argument goes, are recklessly pillaging the world's resources with little regard to the well-being of either the planet or the peoples of its poorer regions. Global climate change is more than an issue that is amenable to quick technical fixes; it is a fundamentally moral and ethical issue.

The setting for this story is a world in which everything is intricately connected with everything else: Nature Ephemeral. Whether this concerns human society or the natural world, this story urges us to think of Planet Earth as a single living entity. Environmental degradation, then, is also an attack on human well-being. Humans, so the argument goes, have, until now, successfully deluded themselves that they can live apart from the natural environment. In reality, however, there is no place for humans outside nature and thus no particular reason for considering humans as superior to nature. In short, this story is set in an ecocentric world.

The villain in the profligacy story, is the fundamentally inequitable structure of advanced industrial society. In particular, the profit motive and the obsession with economic growth – the driving forces of global capitalism – have not only brought us to the brink of ecological disaster; they have also distorted our understanding of both the natural and the social world. Global commerce and the advertising industry lead us to desire environmentally unsustainable products (bottled water, fast cars, or high protein foods, for example) while our real human needs (living in harmony with nature and with each other) go unfulfilled. What is more, advanced capitalism distributes the spoils of global commerce highly inequitably. This is true within countries (the increasing gap between the rich classes and the poor classes) and among countries (the increasing gap between the affluent countries of the North and the destitute countries of the South). In short, prevailing structural inequalities have led to increasingly unsustainable patterns of consumption and production.

Since everything is connected to everything else, this story continues, we cannot properly understand environmental degradation unless we see it as a symptom of this wider social malaise. The way humans pollute, degrade, and destroy the natural world is merely a very visible indicator for the way they treat each other and particularly the weaker members of society. The logic that allows us to fell thousands of square kilometers of rainforests, to dump toxins in waterways, or pollute the air, is precisely the same logic that produces racism, misogyny, and xenophobia. Tackling one problem inevitably implies tackling all the others.

The heroes of the profligacy story are those organizations and individuals who have managed to see through the chimera of progress in advanced industrial society. They are those groups and persons that understand that the fate of humans is inextricably linked to the fate of Planet Earth. The heroes understand that, in order to halt environmental degradation, we have to address the fundamental global inequities. In short, the heroes of the profligacy policy argument are those organisations of protest such as, most prominently, Greenpeace or Friends of the Earth. These organizations, we need hardly point out, are strongly biased towards the egalitarian social solidarity.

What, then, is the moral of the profligacy story? Its proponents point to a number of solutions. In terms of immediate policy, the profligacy tale urges us to adopt the precautionary principle in all cases: unless policy actors can prove that a particular activity is innocuous to the environment, they should refrain from it. The underlying idea here is that the environment is precariously balanced on the brink of a precipice. The story further calls for drastic cuts in carbon dioxide emissions; since the industrialized North produces most of these emissions, the onus is on advanced capitalist states to take action. Of course, this policy argument calls for a total and complete ban on chlorofluorocarbons.

Yet none of these measures, the story continues, is likely to be fruitful on its own. In order to really tackle the problem of global climate change we in the affluent North will have to fundamentally reform our political institutions and our unsustainable life-styles. Rather than professionalised democracies and huge centralized administrations, the advocates of the profligacy story suggest we decentralize decision-making down to the grassroots level. Rather than continuing to produce ever-increasing amounts of waste, we should aim at conserving the fragile natural resources we have: we should, in a word, move from the idea of a waste society to the concept of a conserve society. Only then can we meet real human needs. What are real human needs? Simple, they are the needs of Planet Earth.

- *Population: a hierarchist story.* This policy argument tells a story of uncontrolled population growth in the poorer regions of the world. Rapidly increasing population in the South, this story argues, is placing local and global eco-systems under pressures that are fast becoming dangerously uncontrollable: more people means more resource consumption which inevitably leads to environmental degradation.

The setting of the population policy story differs slightly, but significantly, from the settings in the other two diagnoses. Like the protagonists of the profligacy story, the population policy argument maintains that global climate change is a moral issue. Human beings, due to their singular position in the natural world, are the custodians of Planet Earth; since civilization and technological progress has allowed us to understand the natural world more than other species, we have a moral obligation to apply this knowledge wisely. Unlike the profligacy story, the population tale assumes that humans have a special status outside natural processes. The population story, like that of the proponents of the pricing argument (see next story), contends that human actions are rational. However, unlike the pricing argument the population story tells us the sum of individual rational actions can lead to irrational and detrimental outcomes. The population story, then, is set in a world that needs rational management in order to become sustainable. Yet, while the motive of rational management is an ethical duty to preserve the planet, the means of management are technical. Economic growth, and the socio-economic system that underpins that growth, are necessary components in any global climate change policy response. However, economic growth in itself is no solution: it must be tempered, directed, and balanced by the careful application of knowledge and judgement.

The villain in the population tale is uncontrolled population growth. Since each individual has a fixed set of basic human needs (such as food, shelter, security, etc.) and these needs are then standardized at every level of socio-economic development, population increase, other things being equal, must lead to an increase in the aggregate demand for resources. Humans, the story insists, satisfy their basic human

needs by consuming resources. It follows that population growth must lead to an increase in resource consumption: more people will produce more carbon dioxide to satisfy their basic needs. Given the limited nature of most resources, population growth must invariably lead to over-consumption and degradation of natural resources.

The heroes of the population story are those institutions with both the organizational capacities (that is, the technical knowledge) and the "right" sense of moral responsibility. In short, the global climate change issue should be left to experts situated in large-scale, well-organised administrations. In terms of our typology of organisational types, the population story emerges from hierarchically structured institutions.

The moral of the population story is to rationally control population growth. In particular, this means the introduction of family planning and education in the countries most likely to suffer from rapid population growth. Here, the onus for action is quite clearly on the countries of the South. Rapid population growth has eroded societal management capacities; if we are to tackle the global climate change issue we must first establish the proper organizational preconditions.

- *Prices: an individualist story.* This story locates the causes of global climate change in the relative prices of natural resources. Historically, prices have poorly reflected the underlying economic scarcities; the result, plain for all to see, is a relative over-consumption of natural resources.

The setting of the prices tale is the world of markets and economic growth. Unlike the profligacy story, the prices diagnosis sees no reason to muddy the conceptual waters with extraneous considerations of social equality. Yes, it says, global climate change is an important issue, but it is an issue that is amenable to precise analytical treatment. It is, in short, a technical issue to which we can apply a technical discourse.

Economic growth, far from being a problem, is the sole source of salvation from environmental degradation. Environmental protection, the proponents of this policy argument contend, is a very costly business. In order, then, to be able to foot the huge bill for adjusting to a more sustainable economy, societies will have to command sufficient funds. These funds, in turn, will not materialize from thin air: only economic growth can provide the necessary resources to tackle the expensive task of greening the economy.

In sum, the prices tale takes place in a world determined by the Invisible Hand. Here, individuals know and can precisely rank their preferences. In the world of the prices story, individual pursuit of rational self-interest (economic utility) leads, as if by magic, to the optimal allocation of resources. If market forces are allowed to operate as they should then resource prices will accurately reflect underlying scarcities; the price mechanism then keeps environment-degrading consumption in check. However, if someone (usually the misguided policy-maker) meddles with market forces, prices cannot reflect real scarcities; this gives rise to incentives for rational economic actors to over- or under-consume a particular resource.

The villain in the prices story is misguided economic policy. Barriers to international trade, subsidies to inefficient national industries, as well as price and wage floors, introduce distortions to the self-regulatory powers of the market. These distortions have historically led markets to place a monetary value on natural resources that belies the true market value. The result, the protagonists of this policy argument maintain, has been wholesale over-consumption and degradation of the natural world.

The heroes of the prices story are those institutions that understand the economics of resource consumption. In the global climate change debate, these institutions comprise players such as the Global Climate Coalition and trans-national energy companies. In terms of the cultural theory typology, the heroes of this story are those institutions that are strongly permeated by the individualist solidarity.

The moral of the prices story is as simple as its prognosis: in order to successfully face the challenge of global climate change, we have to "get the prices right". Unlike the profligacy story, the prices tale sees no necessity to restructure existing institutions. If it is the distortions of global, national and regional market mechanisms that undervalue natural resources then any climate change policy that fails to remove these distortions is "fundamentally flawed". Policy responses must work "with the market". Here, concrete policy proposals consist of both general measures, such as the liberalization of global trade, as well as more specific measures, such as carbon taxes or tradable emission permits.

There is, one should say, an alternative, rosier, version of the individualist's story that maintains that prices and markets are already working, and that either significant warming is not occurring or, if it is, that a free market's adaptive capacities will be able to cope.<sup>16</sup> In the present state of scientific knowledge, global warming is a virtual risk as defined in Chapter 2. But even where there is agreement that it is taking place there is no consensus about the seriousness of the problem or the policy prescriptions for dealing with it. While the problem of global warming is not one that the HSE is expected to address, the global warming stories summarized above exemplify the societal concerns commonly found in the company of less grandiose risks.

Consequently, it is only by teasing out these sorts of policy arguments and their adherents that we can understand "societal concerns": how they are generated, how they are reproduced and transformed, and how they shape the policy process.<sup>17</sup> This understanding has some important implications.

- The three stories tell plausible but conflicting tales of climate change. All three tales use reason and logic to argue their points. None of the tales is "wrong", in the sense of being implausible or incredible. Yet, at the same time, none of the stories is completely "right"; each argument focuses on those aspects of climate change for which there is a suitable solution cast within the terms of a particular form of organization.

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<sup>16</sup> Indeed there are alternative versions of the other two stories. The population story post Kyoto, for instance, emphasises technology forcing and transfer as a means of reducing the impact of rising population, and the profligacy story now places greater emphasis on the iniquities of globalisation.

<sup>17</sup> The three climate change stories presented above are highly condensed versions from a much more comprehensive analysis (Thompson, Rayner, & Ney 1998).

- These three policy discourses are not reducible to one another. No one of the policy arguments is a close substitute for the others. Nor are any of the stories' proponents ever likely to agree on the fundamental causes of and solutions to the global climate change issue. And, since these stories implicitly convey a normative argument, namely that of the good life (either in enclaves, in hierarchies, or in markets), they are curiously immune to enlightenment by "scientific" facts: we cannot, in any scientific sense, prove or falsify policy stories.
- These stories also define what sort of evidence counts as a legitimate fact and what type of knowledge is credible. The profligacy story discounts economic theory as the obfuscation of social inequalities and dismisses rational management as the reification of social relations. The tale of prices views holistic eco-centrism as amateur pop-science and pours scorn on the naïve belief in benign control. Last, the population story rejects laissez-faire economic theory as dangerously unrealistic and questions the scientific foundations of more holistic approaches.

This leaves us with a dynamic, plural and argumentative system of policy-definition and policy-framing that policy-makers can ignore only at their cost, for two reasons. First, each policy story, as we have seen, thematises a pertinent aspect of the climate change debate; very few would argue that Northern consumption habits, distorted prices, or population growth have no impact on global climate change at all. However, as we have seen, each story places a different emphasis on each aspect. Any global climate change policy, then, based on only one or two of these stories, will merely provide a response to a specific aspect of the global climate change problem. It will, in short, provide a partially effective response. Second, and more significantly, each of the stories represents a political voice in the policy process. Ignoring any of these voices means excluding them from policy-making. Within democratic polities, this inevitably leads to a loss of legitimacy. What is more, in democracies, dissenting voices will, eventually, force their way into the policy process (as we have seen for instance, with the Brent Spar and, more recently with the World Trade Organisation and the G8 riots in Genoa). Neither the cost of acrimonious and vicious political conflict, nor the loss of public trust experienced by those who (perhaps inadvertently, perhaps not) suppress dissenting voices, are particularly attractive. The former often leads to policy deadlock; the latter may well result in a legitimacy crisis in the polity as a whole.

So these three policy stories have important implications, not just for global climate change policy-making, but for policy, and for risk management, generally.

- **Endemic Conflict:** In a policy process where politics matters (that is, in any policy process) there will always be at least three divergent but plausible stories that frame the issue, define the problem, and suggest solutions. Thus conflict in policy-making processes is endemic, inevitable, and desirable, rather than pathological, curable or deviant. Any policy process that does not take this into account does so at the risk of losing political legitimacy.
- **Plural Policy Responses:** We have seen that each story tells a plausible, but selective, story. Any policy response modelled solely in terms of just one or two of these tales will be, at best, partial and, at worst, irrelevant.
- **Quality of Communication:** Since policy-making is inherently conflictual, and since effective policy responses depend on the participation of all three voices, policy outcomes crucially depend on the quality of the communication within the debate. A policy debate that can harness the inherent communicative and argumentative conflict between different story-tellers will profit most from the potentially

constructive interaction between different proponents. Conversely, a policy debate in which all three positions are sharply polarized will probably lead to policy deadlock. This is a structural argument that concerns the implicit and explicit "rules" that govern policy deliberation in a polity. If the "rules of the game" permit or even force policy actors to take seriously different types of stories, then what Sabatier and Jenkins-Smith call "policy-oriented learning" can take place. If this is not the case, then the policy debate will be an unconstructive dialogue of the deaf (Sabatier, Jenkins-Smith, & eds 1993).

Summarising all of the above, we have at one extreme an unresponsive monologue and at the other a shouting match amongst the totally deaf. Between these extremes we occasionally find a vibrant multivocality in which each voice puts its view as persuasively as possible, sensitive to the knowledge that others are likely to disagree, and acknowledging a responsibility to listen to what the others are saying. This is the condition we must strive for if we value democracy or, as is the case with the HSE, we are mandated to develop and implement policy on behalf of a democracy. Getting there and staying there is, of course, not easy.

At the monologue end of the spectrum the policy process is seductively elegant and reassuringly free (it would seem) from the defiling intrusion of politics. Here we find the mind-set characterised by single-metric rationality. At the other extreme we wallow in the incoherence of complete relativism. The cultural theory typology presented here suggests that between these extremes there is the possibility of constructive dialogue. It will often be a noisy, discordant, contradictory dialogue, but this is the clumsy beast that democratic policy makers and regulators must seek to harness and ride.

## 2.6 CLUMSY INSTITUTIONS

The term "clumsy institution" was coined by Michael Schapiro (Schapiro 1988) as a way of getting away from the idea that, when we are faced with contradictory definitions of problems and solutions, we must choose one and reject the rest. It is now established in the literature as the precondition for decision-making arrangements that embody sufficient *essential contestation*. It is a tongue-in-cheek label that thumbs its nose at the hubris of the advocates of single-metric optimisation. How might the HSE know if its policy-making procedures were sufficiently clumsy?

It is important to specify the various positions that need to be acknowledged and listened to if we are to have high-quality communication. There are two ways in which this might be done: empirically (by the sort of discourse analysis that, for example, has revealed the various storylines that animate the global climate change debate) and theoretically (with the hypotheses, and in particular the fourfold typology of forms of social solidarity, that have been used as the basis for the explanation of "societal concerns"). Our confidence in the validity of this approach will be strengthened if predictions from the theory are matched by empirical findings, and there is now considerable confirmation of that, from both qualitative and quantitative research (Marris, Langford, & O'Riordan 1996), (Grendstad & Selle 1997), (Yazici, Petry, & Pendergraft 2001).

Clumsy institutions, we can now say, are those institutional arrangements in which none of the voices – the hierarchist's calling for "wise guidance and careful stewardship", the individualist's urging us to "get the prices right", the egalitarian's insisting that we need "a

whole new relationship with nature", and the fatalist's asking "why bother?"<sup>18</sup> – is excluded, and in which the contestation is harnessed to constructive, if noisy, argumentation<sup>19</sup>.

Clumsiness is also closely linked to democracy. Indeed, each of the three "active" solidarities has its distinctive model of democracy – "the guardian" (hierarchy), "protective" (individualism), and "participatory" (egalitarianism) – all of which (together with the fatalist's "It doesn't matter who you vote for, the government always gets in") have to be present, and in vigorous contention, in the public sphere if we are to have democracy (see Box 2.1).

From a vantage point high up in the crow's nest of the insight axis, and with the benefit of hindsight, it can be seen that many of our public institutions - Britain's former Ministry of Agriculture, Fisheries and Food, the World Trade Organisation, the Intergovernmental Panel on Climate Change, and most national overseas aid agencies - are insufficiently clumsy and, in consequence, erosive of democracy. Most policy tools (all single metrics such as cost-benefit analysis, probabilistic risk assessment, quality-adjusted life-years, general equilibrium modelling) and policy precepts (the insistence on a single agreed definition of the problem, the clear separation of facts and values, and the focus on optimisation) are similarly flawed.

## 2.7 SO WHAT?

The HSE is required to be decisive. It must act. It must make and enforce risk-management policy in a fluid and plurally perceived world. By virtue of commissioning this report, it has signalled an intention of doing so in a way that takes into account "societal concerns". It is clear that the job is not one that can be reduced to a simple tick-list manual. Our final chapter summarises our suggestions for how the HSE might approach its hierarchist task. They are mainly reminders of the sensitivities that will be encountered and the costs of ignoring them. Our work with the HSE leads us to believe that many within the HSE are already aware of many of them. We hope that we have identified and organized them in a way that will be helpful.

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<sup>18</sup> There can be circumstances in which fatalism is a reasonable response – e.g. perhaps asteroid impacts or tsunamis from Hawaii or La Palma, but institutions from which large numbers routinely absent themselves cannot be described as democratic.

<sup>19</sup> Thompson describes the successful operation of clumsy institutions in diverse circumstances including Himalayan villages, Austria's arrangements for the management of hazardous wastes, the handling of radiation risks in a Boston hospital, and the current international regime that has cleaned up the Rhine (Thompson 2001).

<p><b>FATALISM (The Non-model)</b></p> <ul style="list-style-type: none"> <li>• True to its learning style (which consistently drives home the lesson that nothing you do will make much difference), the upholders of this solidarity waste no effort building a model of democracy</li> <li>• And true to their conviction that all goods are really club goods (from which they are excluded), their verdict on democracy is not enthusiastic: It doesn't matter who you vote for, the government always gets in".</li> </ul>	<p><b>HIERARCHY (The Guardian model)</b></p> <ul style="list-style-type: none"> <li>• Sides with Plato and his "philosopher-king". Only right that those with superior insight and virtue should make the decisions.</li> <li>• Democracy should be indirect, representative and majoritarian, the political class being given primacy over public affairs on the basis of popular elections every few years.</li> <li>• This elite should act as "trustees"(Burke) focusing on the long-term general interest, not short-term individual or factional claims and interests.</li> <li>• Loyalty and complaisance are the crucial virtues.</li> </ul>
<p><b>INDIVIDUALISM (The Protective model)</b></p> <ul style="list-style-type: none"> <li>• Self-determination is crucial. Paternalism is therefore anathema and plebiscitary processes attractive at first glance.</li> <li>• But such processes tend to crude majoritarianism, which can result in even large minorities being denied self-determination.</li> <li>• Hence need for measures to protect individual and minority rights and interests.</li> <li>• Government's raison d'être is "the protection of individual rights, life, liberty and estate" (Locke).</li> <li>• The prime desideratum is that people be able to carry out their plans.</li> </ul>	<p><b>EGALITARIANISM (The Participatory model)</b></p> <ul style="list-style-type: none"> <li>• No place for deference and no support for indirect or majoritarian models of decision making. Choice must be by direct and broad participation.</li> <li>• Decisions should be agreed by all, ideally in a small-scale, face-to-face way and at a single level: the grassroots.</li> <li>• Leadership is resisted and equality prized.</li> <li>• The equal right to self-development is the overriding principle.</li> </ul>

**Box 2.1:** The Essential Contestation of Democracy.

### 3 CONCLUSIONS AND RECOMMENDATIONS

“Risk”, we conclude, is ineluctably subjective. It is a word that refers to an uncertain future that exists only in our imaginations. In the realm of risk, as Einstein famously said of his science, “imagination is more important than knowledge.” Risk management is a balancing act performed with various risks, variously perceived. Figure 3.1 is a diagrammatic summary of our further conclusions and recommendations.

#### 3.1 DIFFERENT RISKS ARE PERCEIVED ...

- Whether risks are perceived as voluntary or imposed influences enormously the response to them. The (very small?) radiation exposures associated with mobile phone handsets, for example, are much larger than the exposures associated with base stations. But while people volunteer, in their millions, to take the hand-set risk, the imposed risks associated with base stations have become the focus of much opposition.
- Where risks are voluntary people appear to resent imposed safety almost as much as imposed risk, and behave in ways that frustrate the intentions of those who seek to make them safer than they voluntarily choose to be. The widespread flouting of speed limits is an obvious example.
- “Risk” in common parlance – the parlance we recommend for purposes of communicating with lay publics – embraces both the probabilities and magnitudes of adverse events.
  - Where risks are directly perceptible these probabilities and magnitudes are estimated instinctively and intuitively; we do not undertake formal probabilistic risk assessments before crossing the street.
  - Science can inform speculations about probabilities with the help of actuarial evidence, or cause-and-effect reasoning, but is rarely of assistance in estimating the magnitudes – the values – of the costs and benefits of risk taking (see problems with single metrics below).
  - Where the science is contested or inconclusive scientists argue with scientifically-framed hypotheses and the rest of us are liberated to argue from prejudice and superstition.

#### 3.2 RISK MANAGEMENT IS A BALANCING ACT (FIGURE 1.2)

- Risk management is an exercise in cost-benefit analysis without the £ or \$ signs. Money is but one of the elements that make up the contents of the *rewards* and *accidents* boxes in Figure 1.2. It is usually not the most important one, and the rest, despite the strenuous efforts of many economists over many decades, usually defy transformation into money (see Appendix B).
- Attempts to reduce the various consequences of risk-taking to a single common denominator will inevitably exclude legitimate voices. The various participants in debates about risk (see discussion of social solidarities below) bring different value systems to the table. Even if the possessors of these different value systems could reduce all their concerns to money – which they cannot – attempting to measure societal concerns by an average value would obscure precisely those value-differences which distinguish the solidarities from each other.

- The HSE's attempts to reduce risks to levels that are ALARP (As Low As Reasonably Practicable) encounter the difficulty that "low", "reasonable", and "practicable" are what Habermas has called empty words, i.e. words that different people fill with different meanings.
- The Risk Thermostat (Figure 1.2) has a top loop – the rewards loop. This is widely disregarded by institutional risk managers and safety professionals and campaigners who commonly define risk management as risk reduction, without regard to the opportunity costs (the rewards foregone) of restricting risky activities. The formal procedures for managing institutional, as distinct from individual, risk commonly have no top loop (Figure 1.3) and where they do there is often a "gross disproportion" between risk and rewards (Figure 1.4).<sup>20</sup>
- If risks are taken there will, by definition, be accidents (see 1.2.1).

### 3.3 ... DIFFERENTLY PERCEIVED BY DIFFERENT PERCEIVERS (FIGURE 1.6)

- In seeking to understand societal concerns about risk one finds, to quote a famous phrase, that there is no such thing as "society" – only contending social solidarities (see also Appendix A).
- The HSE according to our typology is a Hierarchist – the formulator of safety policy and the enforcer of safety laws and regulations. The challenge for a hierarchical institution that seeks to discharge its duties democratically is to understand the concerns of those it seeks to govern.
- It can expect to be pressed by Egalitarians to be more risk averse. Especially in the presence of virtual risks where the hypothetical risks (as they perceive them) are large and the rewards (as they perceive them) are small or non-existent, egalitarians seek to place the burden of proof on those who seek to depart from the *status quo*: the advocates of GMOs, pesticides, low-level radiation, passive smoking etc. In the face of such risks they argue "if you cannot prove it is safe assume it is dangerous."
- It can expect to be pressed by Individualists to be more aware of the benefits of risk-taking and of the costs of excessive risk aversion. They are often more aware of the rewards – of GMOs for example – because they expect to reap them. Except for individual, local-scale risk management exercises such as crossing the street, the rewards and costs associated with risk management rarely fall evenly on the same people. With an

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<sup>20</sup> An example of bottom-loop dominance in institutional risk management – and the consequences of this bias – widely reported at the time this conclusion was being written, was the High Court judgement that a school was 50% responsible for the injuries suffered by a 17 year old boy on a school skiing trip. The boy was injured skiing off-piste, despite having been reprimanded for doing it previously. The Court held that a reprimand was insufficient and that the supervising teacher should have confiscated his ski pass. As a result of this and similar judgements the National Association of Schoolmasters and the Union of Women Teachers are now advising their members not to organise school trips: "our advice is stark. These trips are so fraught with difficulty that we advise our members not to go on them. If something goes wrong, they place their jobs at risk and may face prosecution" (*The Times*, 26 July 2001).

A recent example of the "gross disproportion" principle in action is the implementation of new safety rules preventing the touching of wildlife in zoos and aquariums. The cost of meeting the requirement that washbasins be provided for hand-cleaning afterwards has led a number of aquariums to stop touching and holding sessions. The reward foregone for obviating a miniscule risk? "Touching the creatures brings the whole thing to life for children. It makes it more memorable, and that helps the learning process" (Mark Oakley, spokesman for Sea Life Centres, quoted in *The Sunday Telegraph*, 29 July, 2001).

eye on the rewards the Individualist argues “if you cannot prove it is dangerous assume it is safe.”

- The Fatalist is rarely heard in debates about risks because he or she does not expect to be listened to. The challenge for a democratic Hierarchist is to empower the Fatalists by listening and responding convincingly to what is heard. A more common Hierarchist response is to assume an *in-loco-parentis* role, deciding what is best for those who are assumed not to know.
- The HSE can only incorporate “societal concerns” about risks in its policy-making and regulation-enforcing effectively by listening to and responding to *all* the solidarities – by being a “clumsy” institution. We use the word clumsy to highlight the importance of not being seduced by the charms of its opposites: sophisticated, elegant, efficient and optimal. A condition of optimality can only represent one voice. It can only be achieved at the cost of excluding the others. And those who are excluded usually find disruptive ways of expressing their resentment. The end result rarely looks optimal to anyone.
- Exclusion is a defining fate of the fatalist voice, and a fatalistic shrug the most common response. But even they, on occasion, bite back. The Great British Petrol Tax Revolt of 2000 might be described as the Fatalists’ revenge. The revolt
  - caught almost all the established social pundits off-guard; they could not explain it.
  - was spontaneous; it had, at least initially, the support of no established social institutions.
  - had no nationally recognised leaders; the people interviewed at the refinery gates self-described themselves as “little people, “ordinary people” who had never done anything like this before.
  - provided an indicator of the number of fatalists in Britain; the revolt registered extraordinarily high levels of popular support in the opinion polls.
  - fizzled out because of a lack of organization and coherent arguments.

What began as a highly local manifestation of frustration and resentment, with the help of the tabloids, briefly caught the popular imagination. Fatalists saw an opportunity to poke the Government in the eye with a big stick and for once in their lives to be noticed – if only briefly. Most of their manifestations of resentment on a smaller scale – graffiti, vandalism and minor acts of sabotage – are usually characterised by the other solidarities, whose lives they disrupt, as pointless nihilism.

### 3.3.1 THEREFORE

The HSE, according to the typology and definitions used in this report, is a statutory Hierarchist. In this role it should:

- be clear about the nature of the risks it seeks to manage; the different types of risk that we have identified generate different concerns and require different approaches; it should in particular be clear about
  - whether risks are perceived as voluntary or involuntary; many people (especially young men) rush to embrace voluntary risks while fiercely resisting imposed risks;
  - the extent to which risks can be perceived through science; where science can see risks invisible to the naked eye there is a role for the risk communicator; where the science is speculative and contested we are in the realm of virtual risk where prejudice assumes an unaccustomed legitimacy.

- hesitate to seek to manage voluntary risks; safety measures that are deemed to impose excessive prudence will be resisted; attempts to criminalize self-risk usually have undesirable consequences.
- be clear that taking risks leads by definition to accidents and that the only way to eliminate accidents is to eliminate risk-taking<sup>21</sup>; be clear also about the costs of risk aversion; does it make sense to insist that they be “grossly disproportionate” to the risks averted?
- avoid single-metric, optimising decision methods that cannot embrace all voices.
- encourage “clumsiness” in the arrangements for negotiating risk-management strategies: the pursuit of efficiency and bureaucratic neatness will end in disappointment
- climb as high as possible on the insight axis (Figure 2.1); the higher one climbs, the more detached one can be from the fray on the ground, and the clearer becomes the view of the way different societal concerns about risk contend with one another; and the better able one will be to deal with these concerns in an even-handed way that inspires mutual trust.

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<sup>21</sup> As the final revision of this report was being completed the *British Medical Journal* published an editorial (BMJ 2001; 322:1320-1321 (2 June)) that calls attention to the importance of this recommendation in a dramatic way. The editorial is entitled “*BMJ bans ‘accidents’*.”

It proclaimed that henceforth, except in very limited circumstances, the use of the word “accident” would not be permitted in the BMJ. The reason: “An *accident* is often understood to be unpredictable – a chance occurrence or an ‘act of God’ – and therefore unavoidable. However, most injuries and their precipitating events are predictable and preventable.” It declares its preference for a word that suggests that almost all injuries are preventable. It finds the English language inadequate – “we are struggling to find a generic term ... the English language may simply fail us here” – and proposes a new word, “injidant” (injury producing incident).

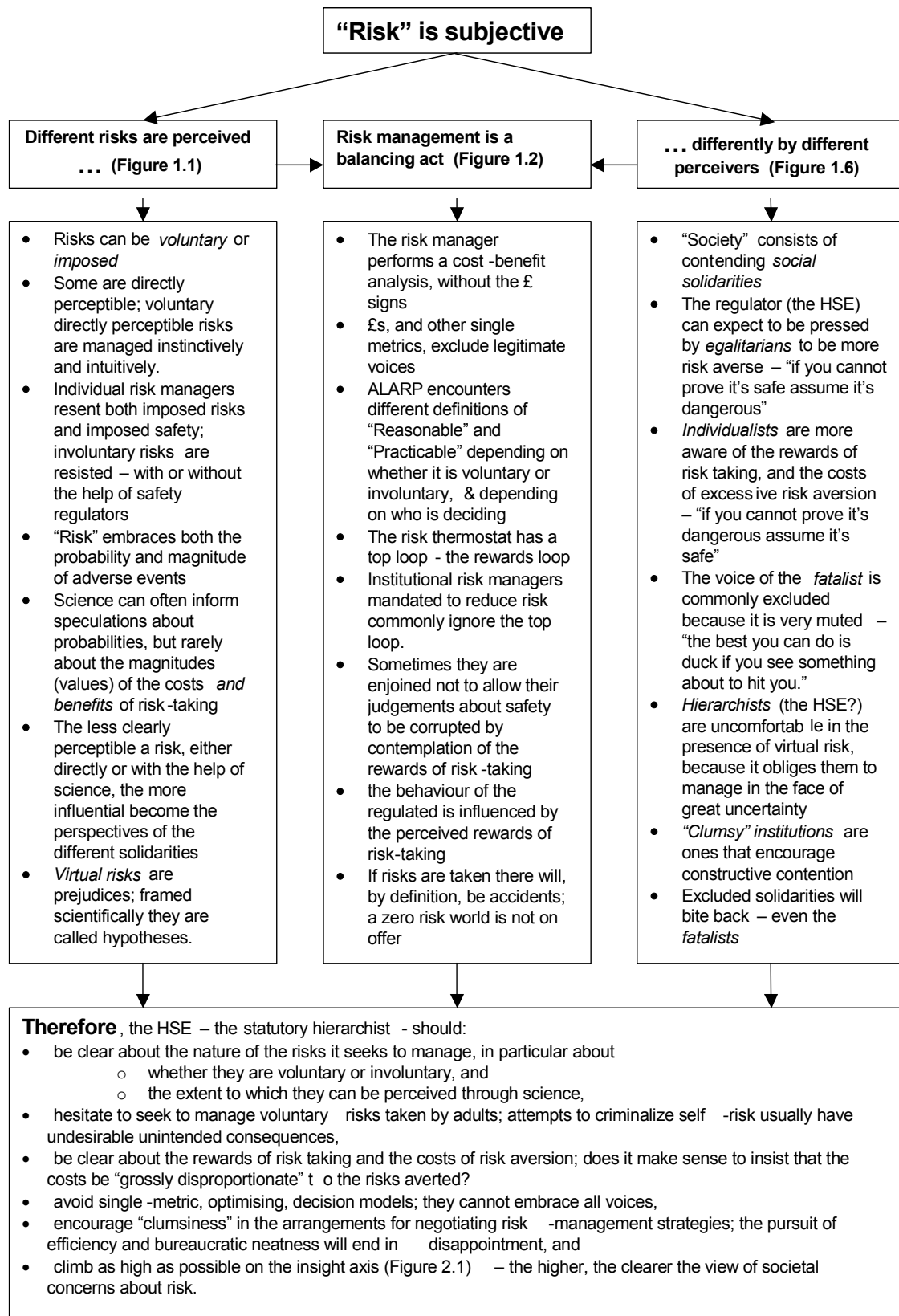
The editors should perhaps have pondered why a language as rich and ancient as English should lack a word adequate to their purposes; the language might be trying to tell them something. An *accident*, as we use the word in Figure 1.2, is a possible, probable (in a statistical sense), unintended and undesired outcome of a risk taking decision, and a *reward* is a possible, probable, intended and desired outcome.

Increasingly, many risks that, with the benefit of foresight, appeared worth taking, with the benefit of hindsight and a clever lawyer have become culpable negligence. Foresight is directed, metaphorically or sometimes actually, through the dense foliage of fault trees and event trees. When an improbable (i.e. low-probability), undesired event at the tip of one of the tree’s branches comes to pass, at the subsequent inquest all the other branches get hacked away by the machete of hindsight leaving just one clear and direct path back to the original culpable act.

The BMJ Publishing Group has also changed the name of another of its journals from the *Journal of Accident and Emergency Medicine* to *Emergency Medicine Journal*, and advocates renaming “Accident and Emergency Departments”. Such attempts by such an influential institution to consign the concept of accident to the Orwellian Memory Hole are likely to give an enormous boost to the blame-litigation-compensation culture and its attendant suppression of any activity that cannot be guaranteed to be completely free of risk.

In terms of our cultural theory typology the BMJ is behaving like a paranoid Egalitarian (see Appendix A). But its diktat banning “accidents” resonates with opportunistic Individualists (especially lawyers and insurers) and Fatalists who are offered unprecedented opportunities for claiming compensation from people and institutions with deep pockets. Perhaps the psychiatrists referred to in Appendix A might consider prescribing chlorpromazine for the BMJ.

**Figure 3.1.** Societal concerns about risk: summary and recommendations





## APPENDIX A

### THE CULTURAL THEORY TYPOLOGY: SOME EXAMPLES

The Cultural Theory typology has been used to organise the participants in a variety of debates.

- Appendix A.1, prepared for a conference on BSE/vCJD shortly after the Government acknowledged a “probable” connection between BSE and vCJD, describes the way in which perceptions of the threat of BSE fit the characteristics identified by the typology. Here the hierarchy is in disarray. The risk is *virtual* – science cannot settle the argument. The ball in Figure 1.6 has gone over the rim; it has become a hot potato that neither politicians nor their scientific advisers wish to be left holding.
- Appendix A.2 was prepared for Shell Expro in the aftermath of the protest generated by their proposal to dump the Brent Spar at sea. Shell, famous for its scenario planning, was caught off-guard; it did not have a scenario containing the egalitarian Greenpeace.
- Appendix A.3, prepared for a conference of health service managers, uses the typology to organise the participants in debates about the provision of health care. Here one encounters starkly opposed views about the nature of, and responsibility for, health care.
- Appendix A.4 was presented to a conference on methods of risk assessment for transgenic plants.
- Appendix A.5 categorises responses to the “Diana Phenomenon” – the enormous reaction to her death. Here the usually muted voice of the fatalist was heard loud and clear.
- After a few encounters, the various participants one meets in debates about risk begin to acquire distinctive personalities. Appendix A.6 was produced during a conference of psychiatrists discussing the challenge of managing the risks posed by people diagnosed as having personality disorders. Some of the psychiatrists thought that they could recognize their patients in the typology. The Egalitarian was deemed paranoid (and prescribed



Fatalist



Hierarchist







Individualist







Egalitarian

chlorpromazine), the Individualist was manic (and prescribed lithium), and the Fatalist was depressed (and got Prozac). They did not instantly recognise themselves as Hierarchists, but that - as the definers of “normality”, the assessors of deviations from it, and the prescribers and supervisors of treatments for deviants – is the role that they had prescribed for themselves. It is important to acknowledge that the Cultural Theory types are caricatures – real people are more complex. But with this caveat borne in mind they are nevertheless useful caricatures. They serve as simple and forceful reminders of the profound differences that underpin societal concerns about risk.





## Appendix A.1 BSE/CJD: a typology of bias

<p> <b>Fatalist</b></p> <ul style="list-style-type: none"> <li>• “They should shoot the scientists, not cull the calves. Nobody seems to know what is going on.” Dairy Farmer quoted in <i>The Times</i> (2.8.96)</li> <li>• “Charles won’t pay for Diana’s briefs” Main headline in <i>The Sun</i> on 21.3.96, the day every other paper led with the BSE story.</li> </ul>	<p> <b>Hierarchist</b></p> <ul style="list-style-type: none"> <li>• “We require public policy to be in the hands of elected politicians. Passing responsibility to scientists can only undermine confidence in politics and science.” John Durant, <i>The Times Higher</i> 5.4.1996</li> <li>• “As much as possible, scientific advice to consumers should be delivered by scientists, not politicians.” <i>The Economist</i>, 21 March 1996</li> <li>• “I believe that British beef is safe. I think it is good for you.” (Agriculture Minister Douglas Hogg 6.12.95)</li> <li>• “I believe that lamb throughout Europe is wholly safe.” (Douglas Hogg, 23.7.96)</li> <li>• “I felt the need to reassure parents.” Derbyshire Education chief quoted in <i>The Sun</i>, 21.3.96</li> <li>• “I have not got a scientific opinion worth listening to. My job is simply to make certain that the evidence is drawn to the attention of the public and the Government does what we are told is necessary.” Health Secretary Stephen Dorrell, <i>Daily Telegraph</i>, 22.3.96</li> <li>• “We felt it was a no-goer. MAFF already thought our proposals were pretty radical.” Richard Southwood explaining why he had not recommended a ban on cattle offal in human food in 1988, quoted by B Wynne, <i>Times Higher</i> 12.4.96</li> </ul>
<p> <b>Individualist</b></p> <ul style="list-style-type: none"> <li>• “The precautionary principle is favoured by environmental extremists and health fanatics. They feed off the lack of scientific evidence and use it to promote fear of the unknown.” T. Corcoran, <i>The Toronto Globe and Mail</i></li> <li>• “I want to know, from those more knowledgeable than I, where a steak stands alongside an oyster, a North Sea mackerel, a boiled egg and running for the bus. Is it a chance in a million of catching CJD or a chance in ten million? I am grown up. I can take it on the chin.” Simon Jenkins, <i>The Times</i>, quoted by J. Durant in <i>Times Higher</i>, 5.4.96</li> <li>• “‘Possible’ should not be changed to ‘probable’ as has happened in the past.” S.H.U. Bowies, FRS, <i>The Times</i> 12.8.96</li> <li>• “It is clear to all of us who believe in the invisible hand of the market place that interference by the calamity-promoting pushers of the precautionary principle is not only hurtful but unnecessary. Cost-conscious non-governmental institutions are to be trusted with the protection of the public interest.” P. Sandor, <i>Toronto Globe and Mail</i> 27.3.1996</li> <li>• “I shall continue to eat beef. Yum, yum.” Boris Johnson, <i>Weekly Telegraph</i>, no 245.</li> </ul>	<p> <b>Egalitarian</b></p> <ul style="list-style-type: none"> <li>• Feeding dead sheep to cattle, or dead cattle to sheep, is “unnatural” and “perverted”. “The present methods of the agricultural industry are fundamentally unsustainable.” “Risk is not actually about probabilities at all. It’s all about the trustworthiness of the institutions which are telling us what the risk is.” (Michael Jacobs, <i>The Guardian</i>, 24.7.96)</li> <li>• “The Government ... choose to take advice from a small group of hand-picked experts, particularly from those who think there is no problem.” Lucy Hodges, <i>Times Higher</i> (5.4.96)</li> <li>• “It is the full story of the beginnings of an apocalyptic phenomenon: a deadly disease that has already devastated the national cattle herd ... could in time prove to be the most insidious and lethal contagion since the Black Death.” “The British Government has at all stages concealed facts and corrupted evidence on mad cow disease.” “Great epidemics are warning signs, symptoms of disease in society itself.” G. Cannon in the foreword to <i>Mad Cow Disease</i> by Richard Lacey</li> <li>• “My view is that if, and I stress if, it turns out that BSE can be transmitted to man and cause a CJD-like illness, then it would be far better to have been wise and taken precautions than to have not.” Richard Lacey <i>ibid.</i></li> </ul>

## Appendix A.2. An analysis of reactions to Brent Spar

<p> <b>Fatalist</b></p> <ul style="list-style-type: none"> <li>• “As long as I’ve a pint and a quiet life, it is nothing to do with me.” (F. Arbuthnot, <i>Guardian</i>, characterising and complaining about the apathic response to Brent Spar of the British public, 19.6.96)</li> <li>• “Only 59% of those questioned about Brent Spar were aware of the incident.” (Shell spokesman, <i>P.J.</i>, 5.2.96). 41% is a conservative estimate of the proportion of fatalists in the UK.</li> </ul>	<p> <b>Hierarchist</b></p> <ul style="list-style-type: none"> <li>• “Government permission has been given for the disposal of the redundant structure in a designated deepwater Atlantic site.” (Shell, <i>Daily Mirror</i>, 1.5.95)</li> <li>• “The British Government says that it has observed all the rules and that it must take a ‘balanced and proportionate approach’.” (<i>Guardian</i>, 6.5.95)</li> <li>• “Most experts ... believe that the environmental implications of [on shore disposal] would be far greater than at sea.” (<i>Guardian</i>, 22.6.95)</li> <li>• “The total radioactivity of the Brent Spar is roughly equivalent to a medium-sized street of granite buildings in Aberdeen.” (<i>Aberdeen Evening Express</i>, 2.5.95)</li> <li>• “The authority of government remains an asset no nation can dispense with.” (Hugo Young, <i>Guardian</i>, 22.6.95)</li> <li>• “Militant pressure groups ... rush to judgement, exaggerating their case, and expressing themselves in simplistic terms designed for easy headlines. They undermine both balanced decision-making and parliamentary democracy.” (Michael Dobbs, <i>Times</i>, 13.9.95)</li> <li>• “Wimps.” (John Major’s description of Shell for backing down on plans to sink Brent Spar - all national newspapers 22.6.95)</li> </ul>
<p> <b>Individualist</b></p> <ul style="list-style-type: none"> <li>• “Greenpeace is an irresponsible single-issue lobby, and its business is to make a hysterical case against any pollution of the sea ... Shell has behaved with cowardice.” (William Rees-Mogg, <i>Times</i>, 22.6.95)</li> <li>• “Out of this there may well be all kinds of environmental technologies for dismantling and dealing with and detoxifying this whole thing. ... If they don’t exist, we can invent them. Under stress innovation will rule supreme.” (R. Aspinwall, <i>Guardian</i>, 22.6.95)</li> <li>• “All industrial activities have environmental downsides, and the only issue is how to minimise the ecological costs of what we do. ... It is the old game of creating a Them and Us world, in which capitalists are villains and the public are victims.” (Richard North, <i>Evening Standard</i>, 21.6.95)</li> <li>• “Rival contractors vie for possible dismantling contract.” (<i>Financial Times</i> 22.6.95)</li> <li>• “The U.S. oil industry has dumped thousands of oil rigs into the Gulf of Mexico with the approval of environmentalists. That’s because ... man-made structures like sunken ships or oil rigs create habitats for marine life quite similar to that of a coral reef.” (<i>Wall Street Journal</i>, 6/9/95)</li> </ul>	<p> <b>Egalitarian</b></p> <ul style="list-style-type: none"> <li>• “Our argument was always that Shell was wrong in principle to seek to dump the installation at sea.” (postscript to apology by Peter Melchett to Shell for overestimate of the amount of oil in Brent Spar, <i>Guardian</i>, 6.9.95)</li> <li>• “it would set a precedent ...” (M. Corcoran, <i>Scotsman</i>, 3.5.95)</li> <li>• “The Government are allowing oil companies to get away with murder ... they have raked in millions from North Sea oil and now they won’t pay the bill to clean up.” Greenpeace, <i>Daily Mirror</i> 1.5.95)</li> <li>• “Thousands of jobs are at stake” (Jimmy Airlie of AEEU, <i>Times</i>, 22/6/95)</li> <li>• “The Government negotiates secretly with the ... corporation and both keep under tight wraps the data on which the rest of us might base a reasoned opinion.” (S.Holt, <i>The Ethical Consumer</i>, 6.2.96)</li> <li>• “In the depths strange species lurk and though we may never see them, we feel in our hearts that they should be left alone. Why must they share the great dark, deep with bits and bobs from a dismembered oil platform?” (Suzanne Moore, <i>Guardian</i>, 22.6.95)</li> <li>• “It is wrong to dump old cars in the village pond, and it is wrong ... to treat the sea as a dump.” (Greenpeace, <i>Dundee Courier</i>, 6.2.96)</li> </ul>

## Appendix A.3 The provision of health care

<p> <b>Fatalist</b></p> <ul style="list-style-type: none"> <li>• Smokes, eats junk food, drinks and takes drugs, resorts to faith healers</li> <li>• Low expectations</li> <li>• <b>“Encouragement to eat healthy foods has small response.”</b> Headline, <i>Western Morning News</i>, 10.7.96</li> </ul>	<p> <b>Hierarchist</b></p> <ul style="list-style-type: none"> <li>• “We work closely with the trusts to monitor their performance and to encourage them to improve services. We welcome the high standards revealed in the performance tables and look forward to building on this in the future.” Ron Spencer, Chief Executive, Cornwall and Isles of Scilly Health Authority, <i>Cornish Guardian</i>, 4.7.96.</li> <li>• Orthodox, high tech, allopathic medicine</li> <li>• Pursues immortality within budgetary constraints (40% of Americans die as a result of intensive care being switched off)</li> <li>• Emphasis on cure rather than prevention</li> <li>• Pills for mental problems</li> <li>• Invasive procedures - surgery, chemical and radiation therapies, X-rays, organ transplants</li> <li>• Large scale - big hospitals, large bureaucracy</li> <li>• Authoritarian management headed by unelected quangos</li> <li>• Many accountants, risk managers, cost-benefit analysts</li> <li>• Hold many conferences</li> <li>• “HIV and Aids are self-inflicted diseases contracted through immoral behaviour.” Dr. Adrian Rogers, cons. Parliamentary candidate for Exeter explaining opposition to Disability Discrimination Bill.</li> </ul>
<p> <b>Individualist</b></p> <ul style="list-style-type: none"> <li>• <i>Freedom</i> - to smoke, drink, drive without seat belts</li> <li>• Cryogenics</li> <li>• Private health insurance, and health care</li> <li>• “Trivial” cosmetic surgery</li> <li>• Pursues immortality to limits set by personal wealth</li> <li>• Buys organs for transplanting</li> <li>• Eats steak</li> <li>• Sees health care as a business opportunity</li> <li>• Hedonistic life style - lives life to the limit, and then prepared to spend a lot on repairing the damage</li> <li>• “Overwhelming evidence shows that the economic growth and technological advance arising from market competition have in the past two centuries been accompanied by dramatic improvements in health - large increases in longevity and decrease in sickness. ... Not a day goes by without charges that products of technology harm the human body and the physical environment. The very earth itself is said to be in serious danger ... it could be claimed that ours is the environmental age, the time in which technology ceased to be a liberating force and became, instead, a mechanism for self-enslavement, as if the things we created were destroying us.</li> </ul> <p>The claims of harm from technology, I believe, are false, mostly false or unproven.” (Aaron Wildavsky (1988) <i>Searching for Safety</i>)</p>	<p> <b>Egalitarian</b></p> <p><b>a) Conventional</b></p> <ul style="list-style-type: none"> <li>• “What is going to make these GPs realise that the service which they are providing is totally inadequate.” (W. McIntosh, director Patient First, <i>Cornish Guardian</i>, 4.7.96)</li> <li>• “The health service internal market is costly and wasteful. It is undermining fundamental NHS principles of equity and treatment according to need. Managers are under intense pressure to fiddle the figures to show that it works.” (J.Drown, former finance director, Radcliffe Infirmary NHS Trust, <i>Guardian</i>, 24.4.96)</li> <li>• Concern for fairness of provision</li> <li>• Suspicious of secretive, unelected quangos</li> <li>• prevention stressed before cure - emphasis on healthy living</li> <li>• small scale - local clinics</li> <li>• accessible by public transport</li> </ul> <p><b>b) Alternative</b></p> <ul style="list-style-type: none"> <li>• Low tech &amp; “natural”</li> <li>• Herbalism, kinesiology, acupuncture, homeopathy</li> <li>• Meditation, analysis &amp; therapy for mental problems</li> <li>• small scale -sitting room surgeries</li> <li>• vegetarian, organic foods, vigilant for pesticides, preservatives, genetically modified foods</li> <li>• Natural span = 3 score years and 10</li> <li>• Natural death</li> <li>• Dignity in death</li> </ul>

## Appendix A.4. Ecological risks and prospects of transgenic plants: a typology of bias

<p>☹ <b>Fatalist</b></p> <ul style="list-style-type: none"> <li>• <i>The whole world is powerless to countermand the actions of powerful, profit-driven corporations: “[GMOs are] being inflicted on unwilling people like myself by Monsanto’s unwelcome inclusion of GMOs in the world’s food supply.... There are no benefits for the consumer by the inclusion of GMOs, only greater profits for Monsanto.”<sup>vi</sup></i></li> </ul> <p>Austin, <i>The Guardian</i>, 16 December 1997.</p> <ul style="list-style-type: none"> <li>• Gallows humour is a common fatalist response to perceived powerlessness.</li> </ul>	<p>☹ <b>Hierarchist</b></p> <ul style="list-style-type: none"> <li>• <i>genetically modified organisms constitute a management problem, soluble by science and regulation</i></li> <li>• “We conduct a full scientific risk evaluation . Once we are satisfied, we recommend to Ministers, who have always accepted our advice and who then issue Government approval.” Derek Burke, Chairman of the Advisory Committee on Novel Foods and Processes, explaining how genetically modified foods gain approval in Britain.<sup>ii</sup></li> <li>• “We had no safety concerns [about genetically modified soya] and the Food Advisory Committee did not require labelling.” <i>ibid</i></li> <li>• <i>Government and the scientists it employs know best - but there is a risk communication problem.</i> “We used to think that all we had to do was to decide whether a novel food or process was safe or not, and a grateful public would accept what we said. We should have known better! Food irradiation, a process I and many others, believe to be safe is unusable because of fears connected with the word ‘irradiation’, which go back to the atomic bomb and are fed by concerns about nuclear power stations.” <i>Ibid</i></li> </ul>
<p>😊 <b>Individualist</b></p> <ul style="list-style-type: none"> <li>• “The new technologies are environmentally friendly and will lead to health benefits, an end to world hunger and reduced use of pesticides. ‘There’s no crop or person that cannot benefit. There’s a tide of history turning. You can look back, or ask how you’re going to feed the world,’ Monsanto said.”<sup>iii</sup></li> <li>• “Biotechnology is, and has always been, used to make bread, bacon, beer, wine, cheese, yoghurt, pickles and sauces. Humans have been manipulating plant and animal genes for about 8000 years, by breeding and cross-breeding. The difference is that, since Crick and Watson worked out the structure of the genetic code in 1953, it is now possible to work out exactly what is going on when an animal or plant grows faster, taller, or straighter, or withstands rust or blight or brucellosis.”<sup>iv</sup></li> <li>• <i>if you can’t prove its dangerous assume it’s safe:</i> “Do you cease to approve all new technologies until everything you could conceivably imagine as a risk has been evaluated to the nth degree? ... I am confident it is safe. It is not possible to prove that it is entirely safe.” Monsanto<sup>v</sup></li> </ul>	<p>☹ <b>Egalitarian</b></p> <ul style="list-style-type: none"> <li>• <i>abhors “unnatural” practices; is averse to unpredictability; fears technology dependence, and the polarising socio-economic consequences of the concentration of the ownership of the new technology in a small number of hands</i></li> <li>• “Robert Shapiro [CEO of Monsanto] ... has to find a market for the products his company has spent billions developing ... The wants and needs of ordinary humans are incidental. This ‘growth at any costs’ attitude on the part of the world’s corporate giants is destroying not just our physical environment but the social environment that nurtures human community. ... The biotech industry [seeks] to prohibit labelling of genetically modified foods. ... The premium now is clearly on ignorance. ... Whatever the multi-million dollar spin merchants care to tell us, the scientists cannot guarantee their results. ... man’s tampering with nature in this way is a recipe for disaster straight out of a horror movie. And you know what comes next. Nature fights back.”<sup>vi</sup></li> <li>• <i>if you can’t prove its safe assume it’s dangerous:</i> “We cannot just release these things into the environment and hope for the best” Greenpeace<sup>vii</sup></li> </ul>





## Appendix A.5

### The Diana Phenomenon viewed through the lens of Cultural Theory





#### The World gangs up on Hierarchy

### “A nation united against tradition”

(Main headline in *The Observer* 7.9.1997)

 <p><b>Fatalism</b> A fatalist icon.</p> <ul style="list-style-type: none"> <li>• Venerated by the weak, the poor, the maimed, the sick, the powerless.</li> <li>• “she met individuals and made them feel significant.”</li> <li>• They are experiencing a rare, heady sense of strength in numbers, and enjoying being able to dictate events - e.g. length of funeral route, flag at half mast, Queen’s speech.</li> <li>• “We just wanted to be counted”</li> </ul>	 <p><b>Hierarchy</b> A thorn in the flesh of hierarchy.</p> <ul style="list-style-type: none"> <li>• She did not respect, or play by, their rules.</li> <li>• “How long can she be taken seriously if she has not learnt to conduct herself as her position and serious views demand.” John Gummer, writing in the Catholic Herald shortly before her death</li> <li>• “a loose cannon” Earl Howe</li> <li>• The ball has gone over the rim. Hierarchy is struggling to reassert its authority.</li> <li>• “deeply flawed” Archbishop of Canterbury – after her death.</li> </ul>
 <p><b>Individualism</b> Admired her free spirit</p> <ul style="list-style-type: none"> <li>• Successful, non-establishment, “self-made” people, especially in the arts, Pavarotti, Spielberg, Cruise, Hanks, Elton John etc</li> <li>• Those who envied her style, her conspicuous consumption, her glamour, and her rich and powerful friends.</li> <li>• Applauded her ability to exasperate the establishment</li> <li>• Applauded Spencer speech in Westminster Abbey</li> </ul>	 <p><b>Egalitarianism</b> Ambivalent.</p> <ul style="list-style-type: none"> <li>• Approved her “good causes” but suspicious of her motives.</li> <li>• Disliked her narcissism - obsessions with make-up and fitness.</li> <li>• Disapproved of her conspicuous consumption - fast cars, designer dresses - and decadent friends - Dodi, Versace etc. Not an environmentalist.</li> <li>• Enjoyed her ability to discomfit the hierarchy</li> </ul>

## Appendix A.6 Personality disorder – a typology of definitions and responses

 <b>Fatalist</b> <ul style="list-style-type: none"> <li>•Depressive</li> <li>•Sad</li> <li>•Helpless</li> <li>•Hopeless</li> </ul>	 <b>Hierarchist</b> <ul style="list-style-type: none"> <li>•Defines “order”</li> <li>•The font of trustworthy science and expertise</li> <li>•The Governor of Bedlam</li> <li>•Prison &amp; parole officers</li> <li>•Assesses risk of re-offending</li> <li>•A pill for every ill</li> <li>•Chemical cosh for dangerous cases</li> </ul>
 <b>Individualist</b> <ul style="list-style-type: none"> <li>•Manic</li> <li>•Pull-your-socks-up</li> <li>•Self-prescribing</li> <li>•Self-confident</li> <li>•Lacks understanding of, and sympathy for the mentally ill</li> </ul>	 <b>Egalitarian</b> <ul style="list-style-type: none"> <li>•Paranoid</li> <li>•Psychological “disorder” symptomatic of inharmonious social order (Laingian?)</li> <li>•Care in the community</li> <li>•Psychiatric social worker</li> <li>•Attracted to “alternative” treatments</li> </ul>

**Appendix A.4** is taken from Transgenic plants and the management of virtual risks (Adams 1999)

Sources of quotations in Appendix A.4:

- i. Lynette Anderson, *Food Magazine*, November 1997. A true fatalist would not trouble to write to a magazine because there is no point, but this quotation exemplifies what might be termed an informed-fatalist perspective. A recent study of public attitudes in Britain to genetically modified foods discovered that fewer than half the people recruited for focus group discussions of GMOs had even heard of biotechnology in the context of food (R. Grove-White, P. Macnaghten, S. Meyer & B. Wynne (1997) *An uncertain World: genetically modified organisms, food and public attitudes in Britain*, Centre for the Study of Environmental Change, Lancaster University). Thus fatalists can be assumed to outnumber by a wide margin all the active participants in debates about GMOs.
- ii. Derek Burke (1997) The regulatory process and risk: a practitioner’s view, in *Science, Policy and Risk*, The Royal Society, London.
- iii. *The Guardian*, 15.12.97.
- iv. Bernard Dixon, editor of *Medical Science Research*, in *The Guardian*, 18 December 1997
- v. *The Guardian*, 17.12.1997
- vi. Anita Roddick, Body Shop International in letter to *The Guardian*, 19 December 1997
- vii. *The Guardian*, 17.12.1997



## APPENDIX B: SINGLE METRIC DECISION MODELS

The “risk thermostat” model presented in Figure 1.2 is described as “cost-benefit analysis without the £ signs”. The £ signs are avoided because to include them would imply that all the values that must be considered by those wrestling with *societal* risk management problems can be accommodated on a single monetary scale.

Cost-benefit analysis is the most ambitious and comprehensive of the single-metric decision-making methods encountered in the risk management literature. It seeks to impose a common denominator on *all* the significant factors impinging on a risk decision. The criticisms of cost-benefit analysis ventured below apply equally to various weighting-factor methods. They all exclude from the decision process those whose values are not represented by the metric chosen.

Cost-benefit analysts assume, not only that all risk-management concerns can be reduced to cash, but that such a reduction is a prerequisite for the making of “rational” decisions. The 1992 Royal Society Report put it this way:

“The optimum level of safety will be when risks have been reduced to the point where the extra costs of an extra reduction just equals its benefits, but no further. ... To weigh costs and benefits explicitly requires measuring them in common units and, so far, the only common unit suggested has been monetary value” (Royal Society 1992)

A review of the cost-benefit (Ball 2000) literature produced by earlier attempts at discovering the cash value of a human life uncovers a wide range – from £0 to £60 million. Furthermore, all of these numbers come from studies in which the researchers – mainly economists – believe in the existence of a true number waiting to be uncovered. All the numbers produced in previous studies, mainly by economists, have the merit of falling within the actual range: i.e. from infinitely negative (for suicides and abortions not motivated by financial difficulties) through zero (indifference to the fate of the lives at risk) to infinitely positive (the amount of money that would be required to compensate me for shooting myself).

For many decades economists have pursued the cash value of life and limb – to no avail.<sup>22</sup> The most recent contribution to this pursuit – commissioned by the HSE along with other government departments<sup>23</sup> – concludes that “one can ... have little confidence that the VOSL [Value of a Statistical Life] estimates that emerge from these studies [i.e. the studies reviewed, plus contingent valuation studies undertaken in the project] can be used as a reliable basis for policymaking.” They conclude that their research methods have elicited “aberrant response patterns”. This conclusion yet again implies a belief in the existence of an elusive “true” number whose value they, and their numerous predecessors, have failed to elicit.<sup>24</sup>

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<sup>22</sup> See ... *and how much for your grandmother?* (Adams 1974) for an explanation of the futility of this quest. So far as we are aware there have been no advances in economics since 1974 that have overcome the problems discussed.

<sup>23</sup> The Department of the Environment, Transport and the Regions, the Home Office, and the Treasury.

<sup>24</sup> In this study (Beattie et al. 1998) the authors suggest that the pursuit should be continued by means of contingent valuation surveys in which responses to questions about injuries “less awesome and

All the numbers previously estimated/calculated for the Value of a Life have been produced by researchers working in a tradition that believes in a single-metric, calculable, rationality. This paradigm is resistant to the idea that all significant *societal* risk issues are grounds upon which plural rationalities contend. Even given the, highly implausible, assumption that most people can place a cash value on life, it is obvious that different people who can be bullied or cajoled into attempting this valuation exercise<sup>25</sup> will do so using very different scales of value. Any research project that attempts to collect such numbers, and reduce them to a single mean plus a standard deviation, will ride roughshod over a diversity of value systems.

Consider a case where risk managers have considered it helpful to have a cash value for a life that can be incorporated into a cost-benefit analysis. Every major road scheme built in this country in the past 30 years has been justified by COBA, the government's stripped down version of cost-benefit analysis. COBA always includes an estimate of the number of lives that will be saved by the proposed scheme over the next 30 years multiplied by the cash value of each life (the number is indexed for inflation and currently stands at about £1 million), and discounted at the prevailing interest rate. This has been, and continues to be, a disingenuous exercise.

Firstly, the Department of Transport has no idea how many, if any, lives will be saved by its proposed road schemes. Different types of road do have different average fatality rates per vehicle mile, but the variance about these means is so large as to render the mean fatality rates little more than statistical abstractions, and of highly doubtful relevance to any particular section of road. (Adams 1988)

Secondly, most road schemes are promoted to relieve congestion – the single most important “benefit” (usually accounting for about 85% of all benefits) of road schemes evaluated by COBA is time savings to motorists. These time savings liberate “suppressed demand”, thereby increasing traffic, and traffic danger, upstream and downstream of the proposed road scheme, on roads which enjoy no safety improvement. So even if it could be established that injury accidents might be reduced on the scheme itself, one is left with the much more difficult task of estimating the value of the increased danger elsewhere.<sup>26</sup> This is a task that has never been undertaken by the practitioners of COBA.

Perhaps the main reason why this task has never been attempted is that it greatly complicates the already intractable problem, encountered in the study by Beattie *et al* referred to above, of valuing life and limb. That study investigated only people's Willingness to Pay (WTP) for risk reduction. This is easy compared to the task of eliciting people's Willingness to Accept compensation (WTA) for new risks imposed upon them. It is the WTA measure that must be used to value the added traffic risk imposed by new road schemes, and attempts to elicit WTA values routinely encounter the “veto problem” – i.e. asking people what amount of

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emotive” than death will be “chained together”. The idea is that this will yield the cash values, obscured by the awe and emotion, that people truly attach to death.

<sup>25</sup> Researchers who interviewed people after they had taken part in contingent valuation exercises (Clark, Burgess, & Harrison 2000), discovered that many participants provided answers “under duress” – i.e. when confronted by interviewers seeking to elicit the cash values that they placed on environmental changes ventured numbers, rather than confess to economic inadequacy.

<sup>26</sup> The risk thermostat model proposes that *all* safety interventions that have a perceptible effect on either the costs or benefits of risky behaviour, and which do not alter propensities to take risks, will result in changes in behaviour in a direction that tends to offset the intended safety benefit.

money would compensate them for risks that would be created by projects gives every interviewee an effective veto over the project. Economists cannot answer for the interviewee, and are stuck with the answers they give, which are commonly much larger than WTP values and frequently infinite – i.e. people might honestly answer “no amount of money would compensate me for the loss of x.”

It is now accepted by most economists that the sums that people declare that they would be willing to pay (WTP) to prevent a loss are consistently less than the sums that they report that they would be willing to accept (WTA) as compensation for a loss. One obvious reason for this discrepancy is the fact that willingness to pay is constrained by ability to pay, while willingness to accept compensation is unconstrained. A second reason is that potential losses (increased risks) associated with projects are seen as involuntary risks, and people are likely to register their resentment at such impositions in their answers to contingent valuation pollsters. Wherever an economist encounters losses that are insoluble by money – serious injury and death are the most common examples – his contingent valuation methods cannot produce useable results – it takes only one infinity to blow up a whole cost-benefit analysis.

To salvage their methods economists routinely resort to asking the wrong question. They ask prospective losers what they would be willing to pay to prevent the loss and not what they would be willing to accept as compensation. In so doing, some economists insist “there is no justification within economic theory for choosing between WTP and WTA measures” (Pearce, Whittington, & Giorgiou 1994) and say “good economic analysis will require good judgement on the question of whether to use WTP or WTA measures of economic value”. But others acknowledge that they are breaking the rules, maintaining that “the conceptually correct measure of lost passive-use value that has already occurred is the minimum amount of compensation that each affected individual would be willing to accept.” (Arrow et al. 1993) However, because of their concern that respondents would give “unrealistically high answers” they prefer the WTP measure that they describe as “the conservative choice.” But this is to throw away the theoretical foundation of CBA, the criterion of Pareto optimality. It is a crucially important evasion; it sacrifices the Pareto improvement principle, from which cost-benefit analysis derives both its theoretical and moral legitimacy, to expedience. Asking the conceptually-correct WTA question does indeed run into the problem of extremely large numbers, and there is no affordable test of whether people who give “unrealistically” high answers are telling the truth. The choice facing the economist in such cases is to abandon his method as unworkable, or to ask the wrong question.<sup>27</sup>

Further, the definition of “costs” and “benefits” determines the choice of measure adopted. Box B.1, based on an illustration originally used by Mishan, shows the way in which the legal/moral context of a problem can transform a cost into a benefit (Mishan 1971). It represents the possible bargains that might be struck during a train journey by two travellers sharing a compartment – a non-smoker, and a smoker – depending on the rules of the railway company.

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<sup>27</sup> An alternative, sometimes resorted to, is for the economist to truncate respondents’ values at some arbitrary level deemed rational by the economist. For example “One factor in the questionnaire [of the Roskill Inquiry into London’s Third Airport] was the significant proportion of those interviewed who implied that no price would compensate them for movement away from their area. These replies would appear to be inconsistent with the general view that ‘each man has his price’. If the response is ascribed to some element of irrationality in the householder, the problem arises of how to treat the factor in the cost-benefit analysis. The procedure in the study was to truncate the distribution at some arbitrary level” (Pearce 1971).

This illustration can serve as a metaphor for a wide range of risk management problems for which governments (the railway company) consider themselves responsible. The smokers represent “developers” and other proposers of projects which will have adverse consequences for the environment or the people in it (the non-smokers). Such projects, undertaken under the permissive, rule treat as non-smokers those who must pay to preserve the existing state of the environment or levels of safety. Projects undertaken under the restrictive rule require *all* losers to be paid compensation which they consider leaves them as well off after the project as before.

Box B.1 Who pays whom for changes in risk on the CBA Railway?

	Smoker	Non-Smoker
Permissive rule	<b>Willingness to Accept</b> compensation for foregoing the right to smoke	<b>Willingness to Pay</b> for the benefits of a smoke-free journey
Restrictive rule	<b>Willingness to Pay</b> for the right to smoke	<b>Willingness to Accept</b> compensation for foregoing the right to fresh air

Under the *permissive rule*, which allows smoking, fresh air will be viewed by the non-smoker as a benefit - a departure from the status quo for which he expects to have to pay. The amount that he might pay will depend on the strength of his distaste for smoky air, and what he can afford. The amount that the smoker might accept to forego his rights might depend on the strength of his addiction or his income - or his compassion, the exercise of which would produce ‘payment’ in the form of moral satisfaction.

Under the *restrictive rule*, which forbids smoking without the agreement of fellow passengers, the smoker's willingness to pay will be influenced by his income and the strength of his addiction, and the non-smoker's willingness to accept, will be influenced by his aversion to smoky air and how badly he needs the money. While it is difficult to imagine a civilised smoker requiring an extortionate sum of money to forego his rights, it is possible to imagine a desperately ill asthmatic refusing a very large sum of money to maintain his air supply in a breathable state. In any event, only in exceptional circumstances are a person's WTA and WTP likely to be the same.

Even a project undertaken to protect the environment or reduce risk (say a proposal to buy a kidney dialysis machine) cannot avoid the need to establish the rule under which the game is

to be played. Such projects are usually undertaken under the restrictive rule – i.e. for most of the world access to a kidney machine is not usually an established right, but something for which one must demonstrate a willingness (and ability) to pay for what one wants/needs. What must one pay? Under the rules of the game devised by Pareto, a *Pareto improvement* requires that the winners should be able to compensate the losers and leave something over. CBA is a scarce-resources game. If resources are to be diverted to kidney machines some other opportunity must be foregone – perhaps some other expensive life-saving treatment of modern medicine for a newborn baby or a family breadwinner. The losers who must be compensated include those whose lives will be lost without the treatment, plus dependents and all others who will lament the loss.

Under the permissive rule the proposers of projects are assumed to have priority access to the necessary resources, while the potential losers must decide how much they are willing/able to afford to maintain their existing level of health care.

The participants in the cost-benefit game outlined by Mishan's metaphor correspond rather neatly to three of the principal characters in the cultural typology outlined in Chapter 2. The smoker/developer is the individualist; the non-smoker/environmentalist, the egalitarian; and the railway company/government, the hierarchist. Before the CBA game can begin there is a political issue to be settled: under which rule is the game to be played? The individualist favours the permissive rule, the egalitarian the restrictive. The hierarchist, who would like all difficult decisions to be reducible to mechanist calculation cannot begin his calculations until the rule has been decided.

Once the rule is decided, most decisions take themselves. The permissive rule will easily justify profitable developments whose costs fall mainly on people too poor to fend them off. The restrictive rule precludes all developments that cannot buy off all opposition. The political game is all important. Even if the contingent valuers could overcome the intractable measurement problems discussed above, they would have little to contribute to the management of societal risks. Politically robust risk management involves playing the political game in a way which keeps all the key participants (stakeholders) constructively involved. Single metrics are not compatible with multiple stakeholders.

A further practical difficulty that the HSE encounters when seeking to employ cost-benefit analysis is making sense of low probabilities, i.e. probabilities on the boundary between “tolerable” and “acceptable”. On this boundary one commonly encounters a lack of usable evidence which can only be overcome by means of arbitrary “adjustments”. For example, when trying to evaluate proposals for implementing Automatic Train Protection (ATP) on Britain's railways it found that “there had been no large scale ATP-preventable accidents in the preceding 26 years, i.e. those involving many fatalities. Hence HSE suggested that the estimate of safety benefits be increased to allow for the risk [unknown and unquantified] of a large-scale accident.”<sup>28</sup>

The position of the HSE on the use of cost-benefit analysis was set out as follows by Jenny Bacon, the former Director General<sup>29</sup>:

“The principle is that measures to reduce risk should be implemented unless the costs of doing so are ‘grossly disproportionate’ to the reduction in risk achieved.”

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<sup>28</sup> The use of cost-benefit analysis techniques in setting priorities for health and safety management, conference paper by Mark Beatson, Chief Economist, HSE, August 1996.

<sup>29</sup> Letter to John Adams, 24 April 1997.

To make such a judgement

“HSE prepares a CBA in support of all new regulatory proposals. The HSC will consider it before deciding whether or not to consult on new regulations. The CBA usually forms part of the consultation document, so interested parties have an opportunity to comment on its findings. And, like the draft proposals themselves, it may well be modified in the light of new information before it reaches Ministers.”

She acknowledges limitations:

“In many cases, of course, not all of the significant costs and benefits can be quantified. And there are often large uncertainties. The interpretation of the CBA then becomes very much a matter of judgement.”

This qualified defence of CBA is the common one - it is useful up to a point, beyond which *judgement* must be invoked. But its utility is severely compromised by the fact that it can incorporate the values - up to that point - of only one set of stakeholders – at the cost of alienating those excluded; over the decades in which COBA was used to justify government road building it became, to objectors, a term of abuse. There is no evidence of which we are aware that it ever persuaded a single objector of the virtue of the government’s road building programme. It was seen as *unfair*. Its principal effect on objectors was to undermine their trust in government.<sup>30</sup>

In 1998 the Prime Minister announced that no proposal for regulation that has an impact on businesses, charities or voluntary bodies, should be considered by Ministers without a regulatory impact assessment being carried out. This injunction has been interpreted by some as requiring that all proposed regulation should be subjected to a formal cost-benefit analysis. It clearly makes sense, when proposing to intervene in the way in which government or the governed conduct their affairs, to try identify those likely to benefit from the intervention and those likely to be adversely affected. But, as the Prime Minister observes, “Getting the balance right between costs and benefits is rarely straightforward” (Cabinet Office, 2000). For “rarely” we would substitute *never* if the aspiration is to reduce all the significant costs and benefits expected to arise from a regulation to a single monetary metric.

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<sup>30</sup> Lord Cullen in his *Ladbroke Grove Rail Inquiry Report* (HSE, 2001) employed a version of the useful-up-to-a-point defence of CBA: “para. 8.53. The use of a cost benefit analysis where human life is concerned is intuitively difficult to accept, but it is a concept which is well used by the rail industry, the HSE and Government. There is no nationally accepted standard as to how one should value certain benefits. It is left to the person performing the analysis to make assumptions regarding the benefits and to justify those in the process. It is also usual to perform a sensitivity analysis by calculating the benefits on a range of assumptions to determine which assumptions have significant effects on the outcome. Due to the imprecise nature of the process, it would not be normal practice to use a cost benefit analysis as the only decision-making tool. Rather, it should be seen as one of many inputs that management should consider when deciding on a course of action.”

He accepted as “reasonable” the W.S. Atkins CBA used to justify Thames Trains’ decision not to install ATP. This CBA used the values of life and limb in current use by the Government. These values, to the extent that they have any firm basis, are WTP values, i.e. the values used by “The Permissive Railway” in Box B.1. On this railway safety, like clean air, is a benefit that the passengers are expected to pay for. But those still clamouring for ATP are unconvinced by the W.S. Atkins CBA. They are in effect arguing for a “Restrictive Railway” on which absolute safety is a right. The value that they place on life and limb is much higher.

## APENDIX C: THE VAST INCHOATE OCEAN OF RISK

We append the review below, written by Adams for the *Times Higher Education Supplement* (7 June 2002), as a way of placing our report in the context of the wider, now vast, risk literature.

*The Government of Risk: Understanding Risk Regulation Regimes*

by Christopher Hood, Henry Rothstein & Robert Baldwin

Oxford University Press, 217pp, £30.00 hardback, ISBN 0-19-924363-8

Published 2001

*Risk, Uncertainty, and Rational Action*

by Carlo C Jaeger, Ortwin Renn, Eugene A Rosa & Thomas Webler

Earthscan, 320pp, £50.00 hardback, ISBN 185383 770-9, £19.95 paperback ISBN 185383 770-9

Published 2001

If you type “risk” into Google, you will be rewarded with 19 million hits. (Sex by way of comparison scores 59 million.) So is there anything more to say? Carlo Jaeger *et al*, after 296 pages conclude that we need a debate, “a debate among the proponents of RAP [the Rational Actor Paradigm] and competing approaches.” Christopher Hood *et al*, after 186 pages conclude that “the analysis of risk regulation regimes is in its infancy” and that “we need more debate about alternative ways to capture similarities and differences.” Risk may yet overtake sex.

The debates proposed by both sets of authors promise to be interminable because risk is inescapably subjective. It is a word that refers to an uncertain future that exists only in our imaginations. These books are inviting everyone to join debates about how we should undertake this imagining.

The central question proposed for debate by Jaeger *et al* is whether our imaginings can be “rational”. Their answer is - up to a point. Beyond this point lie “competing approaches”. The book revisits the now familiar debate about the limits of RAP, especially economics - what they call “the Monarch” of the shaky kingdom of rationality. Despite all the character defects that they identify in this Monarch they cannot bring themselves to reject him. Rather they would demote him from an absolute to a constitutional monarch constrained by the interests of his many and diverse subjects. The book is an account of their inconclusive struggle to draft this constitution.

They want to retain the Monarch: “The new paradigm must include the RAP perspective and it must be as rigorous and decisive as RAP with regard to computational structure and mathematical articulations of its assumptions.” But they would limit his powers in a way yet to be defined: “defining rationality for collective action without sacrificing individual freedom and cultural pluralism will be one of the most serious social challenges in the next century.” They seek “a platform for developing a consistent but pluralistic view in the era of increasing uncertainty and risk.”

The book, by virtue of its impressively wide-ranging coverage of the risk literature should become a key reference for courses about risk. But it evades the fundamental question that it

raises. Is it *possible* to combine a *collective, consistent, mathematically articulated rationality* with cultural pluralism?

Despite its range, and authorship by four established figures in the risk literature, the book exemplifies a reason to be pessimistic about the possibility of a new paradigm emerging that will unify the field of risk. The book has a lengthy bibliography that includes many references to previous works of its authors. But it contains not a single reference to any of the works of Hood *et al* – three other equally established and respected figures in the risk literature. And the extensive bibliography in *The Government of Risk* contains not a single reference to the works of Jaeger *et al*. The two books are small isolated vessels floating on the vast inchoate ocean of risk.

Hood *et al* set sail armed with the concept of the “regulatory regime”, defined as “the complex of institutional geography, rules, practice, and animating ideas that are associated with the regulation of a particular risk or hazard.” They concede, disarmingly, that it is an elusive concept: “There is ... no single correct way of conceiving risk regulation regimes. No one has ever seen a risk regulation regime.”

But they persist. They justify their pursuit of this elusive creature by asserting that there is a need for a level of understanding intermediate between macroscopic whole-society perspectives on risk and the microscopic perspective of “deep-trench case studies.” They offer examples of the sorts of puzzles they hope to shed light on. Why were cyclamates permitted and saccharin banned in Canada, and cyclamates banned and saccharin permitted in the United States? Why is the regulation of campsites very rigorous in France and relaxed in Greece and Ireland? Why is white asbestos permitted in some jurisdictions and banned in others? And why, in the UK, does the state tolerate high risks associated with radon in the home, while being much more risk averse with respect to much lower risks such as those associated with pesticide residues? The answer by the end of the book seems to be that it is all rather complicated: a regime is an n-dimensional analytic construct, where n can equal infinity.

At one point they quote Rutherford - “Science is divided into two categories, physics and stamp collecting” – and acknowledge that their approach is closer to the latter. They produce an elaborate set of rules for classifying different approaches to risk which have very limited predictive power or even, with respect to the puzzles cited above, post-dictive power.

The case of radon can be used to illustrate their problem. Before they begin to apply their analytic construct to radon they *assume* it is a significant risk. They establish this assumption by the following chain of reasoning: (1) “some claim ... that epidemiological data fails to reveal an association between high radon levels and above-normal incidences of lung cancer”; but (2) “a part government-funded epidemiological study ... lends support for the orthodox view ...”; (3) “if that orthodox assessment is accepted, radon is a significant killer ...”; (4) “radon ... is said by experts to kill about 2500 people a year in the UK ...” They then apply their analytical machinery to the puzzle of why this “significant” risk is ignored, ignoring the possibility that the answer may be that it is not a significant risk.

There may yet be a glimmer of hope. Both books in their impressively wide-ranging surveys of the risk literature land briefly, if distractedly, on the contribution of *cultural theory*, and then pass on. Both are complimentary, but go on to fry other fish leaving the impression that they see it as but one approach amongst many. But it does appear to offer solutions to the main problems they raise. Jaeger *et al* say “one of the most promising contributions of the

cultural theory of risk is that it acknowledges, accepts, and offers explanations for the clash of cultural orientations within modern society.” And Hood *et al* observe that “a cultural theory perspective leads us to see in risk regulation ... four polar approaches that could be expected to manifest themselves in different regimes.”

Jaeger *et al* reach the end of their book not knowing how to reconcile pluralism with a collective rationality. Hood *et al* reach the end of theirs with an analytic framework that has an infinity of possible dimensions, and offering no confident guidance about how to reduce it to a manageable number: “the process involves difficult judgements”; “we need more refined ways of mapping ...”. The cultural theory approach that both books compliment *en passant* offers answers to both problems. It does not reject rationality, it acknowledges *plural* rationalities; where the science is inconclusive the imagination is liberated to speculate *rationality* from different starting assumptions. Further, this approach limits the contending risk regulation regimes to a comprehensible and manageable number. It won’t stop us arguing, but if adopted more widely as a navigational aid, more of the small boats on the ocean of risk might communicate with each other and point in the same direction.



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