In defence of bad luck - and a plea for a sense of proportion

(an abbreviated version of this paper used to be accessible on-line at – http://www.spiked-online.com/Articles/00000006E02C.htm) – link no longer works,

Napoleon was asked whether he preferred courageous generals or brilliant generals. Neither he replied. He preferred lucky generals. A society that cannot accept the concept of luck is one that will seek to attach blame to every undesired outcome. Without an acceptance of bad luck we are destined to be governed by a risk-blame-litigation-compensation culture that suffocates initiative.

For some this culture is extraordinarily rewarding. Tripping over an uneven paving stone, plus a note from a compliant doctor, plus the assistance of an enterprising lawyer can yield untold riches – sometimes without the tripping. For others this culture is threatening. All the traditional risks routinely encountered in our daily lives are now overhung by legal and financial risks.

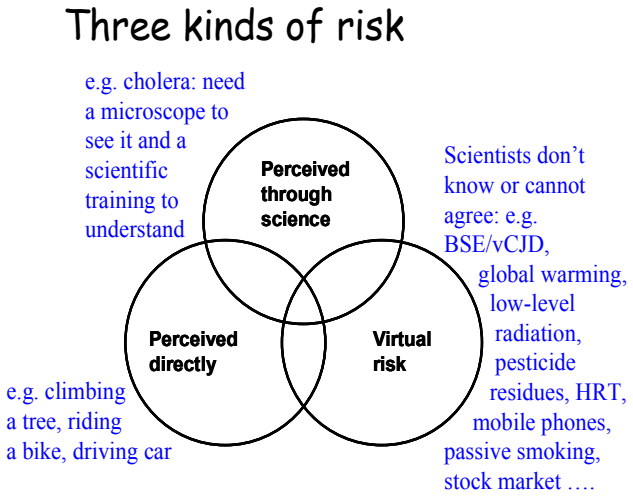
The whole world is now struggling to come to grips with this culture. Leading the running are the lawyers and insurers. For them business is booming. At the time of writing typing "personal injury lawyer" into Google yields over half a million hits. "personal injury insurance" yields over one million; "risk assessment" yields over 6 million; and the single word "risk" 43.5 million.

Types of risk

Risk is a much used, over-used, word, and the subject of a vast and quarrelsome literature. Sampling a small fraction of the millions of websites on which the word is found will reveal that the same word means different things to different people. Many arguments could be eliminated from this literature if people were to be clear about the type of risk under discussion. Figure 1 presents a typology that I have found useful in clearing away some unnecessary arguments.

- *Directly perceptible risks* are managed using *judgment* – a combination of instinct, intuition and experience. We duck if we see something about to hit us and we do not undertake a formal probabilistic risk assessment before we cross the road.
- Other risks are *perceived with the help of science.* Physicists, chemists, biologists, doctors, engineers, statisticians, actuaries, epidemiologists have all helped us to see, and manage, risks that are invisible to the naked eye.
- There is a third much larger and more difficult category. Over 80 years ago Frank Knight in his classic work *Risk, Uncertainty and Profit,* distinguished between "risk" – when you know the odds - and "uncertainty" – when you don't. This latter category might be termed *virtual risk.*

Figure 1



Managing risk

Virtual risks are socially or culturally constructed – when science cannot settle an argument people are liberated to argue from pre-established beliefs, convictions and prejudices. They may, or may not be real, but beliefs about them have real consequences. And, as with directly perceptible risks, when dealing with them we are forced to fall back on *judgment.* When virtual risks get mistaken for risks about which science has clear and useful advice to offer, much confusion results. Pretending we know the odds when we don't creates confusion or worse.

Let us first look (Figure 2) at the management of directly perceptible risk.

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 perceived rewards of risk taking;
• perceptions of risk are influenced by 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 risks; and
• *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 people take, the greater, on average, will be both the rewards they gain and the losses they incur.*

After an accident it is often observed, in head-shaking tones, that the person responsible did not understand the risk. But if one accepts the above definition of risk, it is possible to conclude that they did understand the risk – and their number came up. They were unlucky.

Figure 2

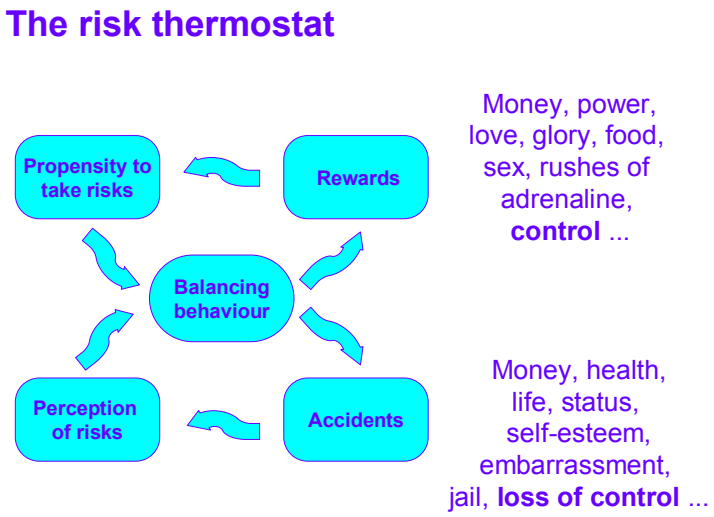


Figure 2 describes risk management as a form of cost-benefit analysis without the £signs. Certainly money can be a significant reward, and accidents can lead to its loss. But the "rewards" and "accidents" boxes are full of many other incommensurable variables.

In economics there is a large literature on cost-benefit analysis (363000 Google hits) that pretends that all these variables can be reduced to money. It goes further to argue that the development of coherent public policy *requires* them to be reducible to money. A useful introduction to this view has been published by Britain's Health and Safety Executive[1]. It sets out the "fundamental premise" of this literature as follows: "This review takes as its starting point the fundamental prescriptive premise of conventional welfare economic theory, namely that public sector allocative and regulatory decisions should, so far a possible, reflect the preferences, and more particularly the strength of preferences, of those who will be affected."

The "so far as possible" caveat that one finds throughout this literature is throwaway lip-service to uncomfortable reality. This literature not only pretends to know the odds, it pretends to know the cash value of one's unlucky number coming up. This literature's commitment to a scientific/quantitative approach to risk management blinds it to its limitations. Its methods must be fed with numbers and where they do not exist they must be invented.

Control and *loss of control* are highlighted because they create particular difficulties for the cash-valuers. Consider the case of mobile phones. The risk associated with using a handset is contested but, according to the literature, would appear to range from tiny to non-existent. Measured in terms of radiation exposure, the risk associated with the base stations – unless one is up the mast with one's ear to the transmitter – is orders of magnitude less. Yet people are queuing up around the world in their billions

[1] Valuing Health and Safety Controls: a literature review by S Chilton, M Jones-Lee, G Loomes, A Robinson, R Cookson, J Covey, A Spencer, L Hopkins, N Pidgeon and J Beattie, Health and Safety Executive, 1998. Online at http://www.hse.gov.uk/research/crr_pdf/1998/crr98171.pdf.

[2] For an extended version of this argument see Appendix B, Single Metric Decision Models, in *Taking*

to take the first, voluntary, risk, while almost all the opposition is focussed on the base stations, which are seen as impositions.

Here one runs up against the rules by which cost-benefit analysts are nominally bound. The cash value of a safety improvement – say a shielding device that will reduce the radiation from one's mobile phone – should, they say, be valued in terms of what people are **w**illing **t**o **p**ay for it (WTP). Here one can consult behaviour. What do people pay for such devices in the face of scientific disputes about whether they offer any extra protection at all? They also run into the problem that their method assumes that the poorest people, who can afford no extra protection, are assumed to attach a zero value to safety. The problem of imposed risk creates more difficult problems. Here the rules dictate that people should be asked what they would be **w**illing **t**o **a**ccept (WTA) as compensation for the extra perceived risk. In this case there is no limit to what might be demanded. It takes only one infinity to blow up a cost benefit analysis, so the process breaks down.

The well-documented failure of cost benefit analysis to settle policy debates about risk can be viewed, with the help of Figure 1, as a case of a pseudo-scientific method trying and failing to impress itself on the realm of virtual risk.[2]

Virtual risk and perceptual filters

At the time of Britain's BSE inquiry in 1998, Stanley Prusiner who was awarded a Noble Prize for the discovery of prions, when asked whether he had changed his diet since learning about BSE said:

> "I have worked in this field for 25 years … did I go out and eat lamb chops, did I go out and eat lamb brain, sheep brain? The answer was 'no', but it was not based on scientific criteria, it was based on just emotion. … At a scientific level I cannot give you a scientific basis for choosing or not choosing beef, because we do not know the answers."

The fact that Prusiner had been trying and failing for many years to establish this risk was reason enough for me to place it a long way down my personal list of things to worry about. Perhaps I like steak better than Prusiner? Perhaps he is more alarmed about potential damage that would result should the hypothesis linking BSE to vCJD be confirmed. The less conclusive the science, the more influential become the perceptual filters through which evidence about the rewards and risks must pass (Figure 3). In the presence of virtual risks about which science can provide no useful guidance risks are culturally or socially determined.[3]

Figure 4 presents, in cartoon form, a typology of perceptual filters.

• Hierarchists are committed to the idea that the management of risk is the job of *authority* – appropriately assisted by expert advisers. They often cloak their deliberations in secrecy or technical mumbo-jumbo because the ignorant lay public cannot be relied upon to interpret the evidence correctly or use it responsibly. They are extremely uncomfortable in the presence of *virtual risk*

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[2] For an extended version of this argument see Appendix B, Single Metric Decision Models, in *Taking Account of Societal Concerns about Risk*, J Adams and M Thompson, a report for the Health and Safety Executive; on line at http://www.hse.gov.uk/research/rrpdf/rr035.pdf .

[3] For more on this theme see J Adams, *Risk*, UCL Press 1995, and *Risky Business*, Adam Smith Institute, 1999; on line at http://www.adamsmith.org/policy/publications/pdf-files/risky-business.pdf .

because they are, supposedly, in charge of events; unpredictability makes them nervous.
• Individualists scorn authority as the "nanny state" and argue that decisions about whether to wear seat belts, drink, smoke or eat beef should be left to individuals and settled in the *market.* If science cannot settle the issue they advocate publishing everything that is known and letting the shopper decide. They are gamblers and optimistic pragmatists - if you cannot prove it's dangerous, assume it's safe.
• Egalitarians focus on the importance of *trust*; risk management should be a consensual activity; consensus building requires openness and transparency. They are advocates of the precautionary principle – if you cannot prove it's safe, assume it's dangerous.
• Fatalists (most of us most of the time) take whatever comes along. We buy lottery tickets and duck if we see something about to hit us. *Que sera,sera.*
(see footnotes 2 and 3 for an elaboration)

Figure 3. The Risk Thermostat with Perceptual Filters

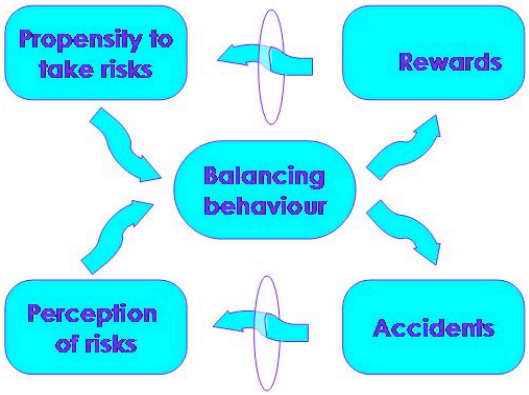
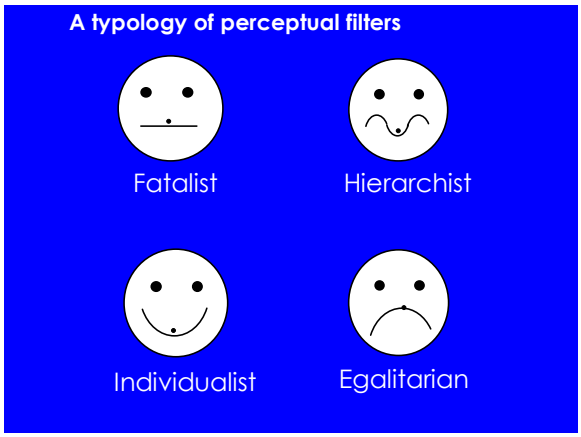


Figure 4



Bad luck
The curve in Figure 5, The Human Reliability Curve, comes from the risk management manual of a major airline – plus my elaborations. The original graph proposes a relationship between safety and resources devoted to improving it. The curve plateaus below 100% safe, making the point that 100% safety (zero risk) is

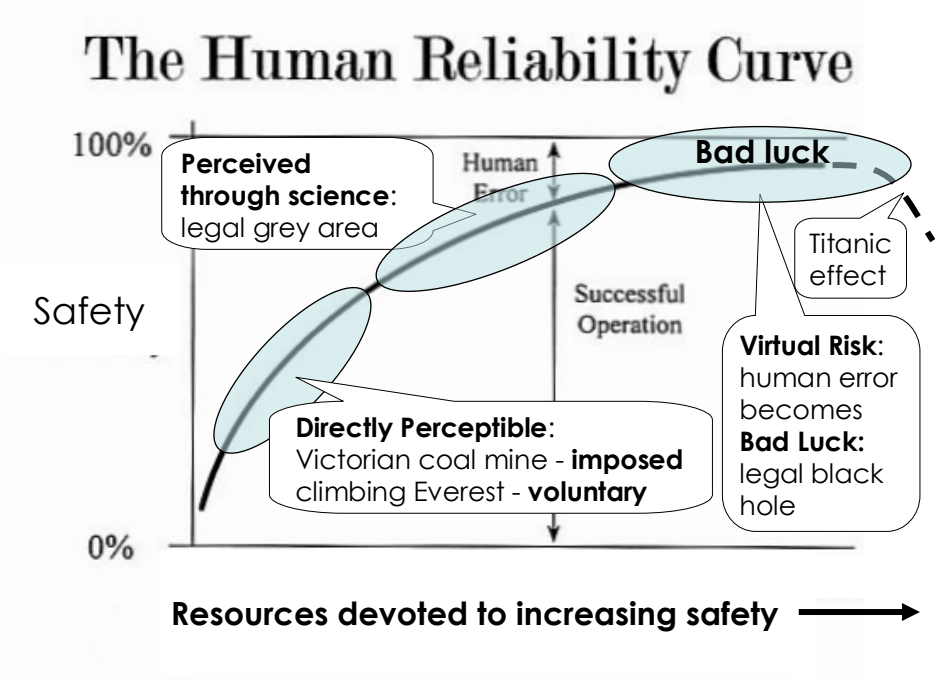
unattainable in the real world. The steep part of the curve can be described as an area of *directly perceptible risk;* here conditions are manifestly dangerous and measures to make them safer are usually obvious. On the shoulder of the curve one finds *risks perceptible with the help of science*; with microscopes and actuarial tables one can see dangers that are invisible to the naked eye and take appropriate precautions. The flat part of the curve corresponds to the realm of *virtual risk.* Here one does not have a clue as to whether any further investment will yield a safety benefit. The drooping tail labeled "Titanic effect" highlights the possibility that too much investment in safety can induce complacency - modern airplanes have so much safety built into them that airlines have trouble keeping their pilots awake on long journeys across time zones; why should one stay vigilant for the whole of one's working life for an event that is never supposed to happen?

So if, statistically, one finds oneself on this plateau[4] what should one do?

1. Undertake more risk assessments and fund further safety measures?
2. Or carry on as before relying on all relevant personnel to continue exercising the judgments that got them unto the plateau?

The risk-blame-litigation-compensation culture prompts a further question: what if something should go wrong? If you have no evidence that 1. will reduce the risk of something going wrong, and may even increase this possibility, one ought to opt for 2.; surely if something goes wrong, despite all the existing precautions in place, one is entitled to put it down to *bad luck*.

Figure 5



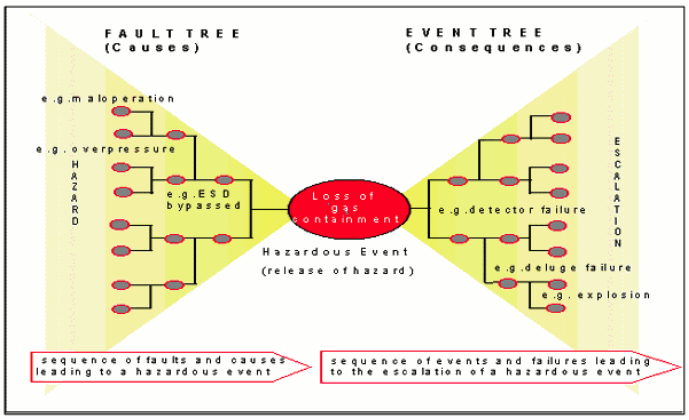
[4] The Health and Safety Executive, in *Reducing risks, Protecting People* (1999) offers some statistical guidance about how one might recognise this plateau. It notes that Briton's have a risk of death of one in a hundred per year averaged over a lifetime and that "a residual risk of one in a million per year is extremely small when compared to the background level of risk." Risks smaller than this it calls "broadly acceptable".

On the original graph the area below the curve was labeled "successful operation" and the area above the curve "human error". But if you have no evidence that further interventions in the name of safety will increase safety, if something goes wrong, it must be bad luck. The current deluge of risk assessments and expensive precaution afflicting the whole world strongly suggests that this is not a popular option. Why?

Event trees and bottom-loop bias

Figure 6 presents two forms of risk assessment much used by engineers and project managers. The fault tree on the left sets out the chains of faults that could have produced an undesired outcome; the event tree on the right sets out the chains of contingencies that could lead to future undesired outcomes.

Figure 6



www.acm.ab.ca/safety/images/ fault-tree.gif

Event trees are useful devices for setting out systematically what one knows about possible causes of accidents. But they have a very demanding appetite for numbers. Each branching point in the tree must have attached to it a probability. In the absence of large and stable actuarial data bases, most of these probabilities will be guesses with wide error bands. The numbers on the right-hand margin of the page will therefore commonly be compound guesses with extremely wide error bands. Further, most event trees, such as the one above, will be highly simplified versions of the reality they seek to capture. They are particularly bad at representing the probabilities of human error.

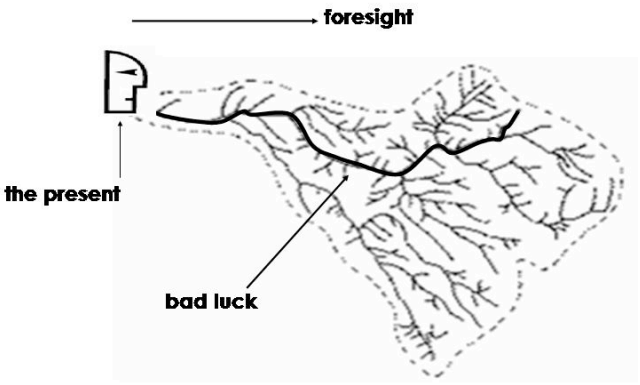
Event trees nevertheless provide a useful metaphor for the way in which we try to manage risk. Figure 7(a), while still simplistic, is an attempt to suggest the density and complexity of the real world event tree through which we must peer when trying to manage risk. Occasionally something nasty, which had looked from our vantage point like a risk worth taking, happens. With obscured foresight the nasty event appeared to be at the end of a chain of contingencies whose compound probability was judged to be "broadly acceptable" (see footnote 4). This used to be, in a less litigious age, called *bad luck*.

We might, after such an event, have then invoked hindsight (Figure 7(b)) in order to try to understand what went wrong and perhaps learn a lesson for the future. In the

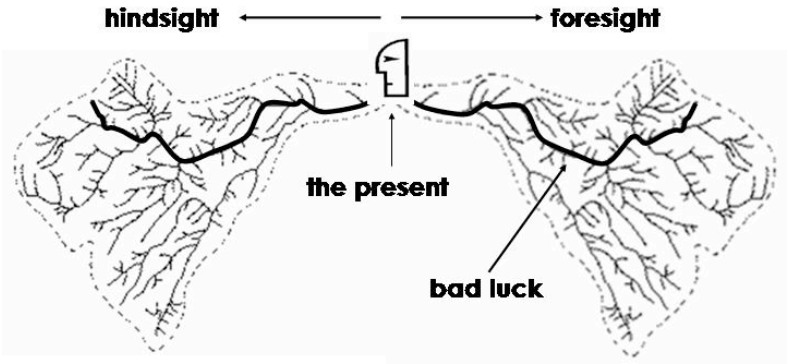
risk-blame-litigation-compensation culture the application of hindsight has now, almost routinely, acquired a forensic character. The unhappy decision is likely to be examined in court by a lawyer armed with a machete with which he cuts off all the other branches, leaving starkly exposed a one-branch fault tree called "culpable negligence" - Figure 7(c).

Figure 7

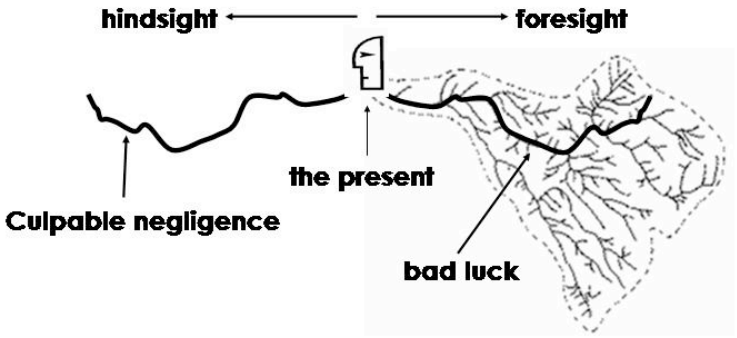
a.



b.



c.



The job of the institutional risk assessor is to try to imagine what might go wrong, and what steps might be taken to avoid it. The job is confined to the bottom loop of Figure 2. Its purpose is to reduce the likelihood of accidents. The "rewards loop" of Figure 2 is someone else's business. Indeed the risk assessor is often warned not to allow

his/her judgment about what is safe or dangerous to be corrupted or compromised by contemplation of the rewards of risk taking. This bottom-loop bias transforms risk management from a balancing act, as in Figure 2, into a risk reduction exercise.
A growing perceived risk, that risk managers everywhere are striving to reduce is the risk of being found guilty of culpable negligence – with the growing risk that such a verdict could lead not just to a heavy financial penalty, but time in jail.

There are multitudes of entrepreneurs in cyberspace offering protection from this threat. The proffered protection consists mostly of risk assessments. One's best defense, in a world threatened by lawyers, is a precautionary document in your filing cabinet – a risk assessment with all the right boxes ticked – showing that, if something has gone wrong, it could not possibly have been your fault.

An example of this checklist approach to risk management downloaded from the Internet:

> "[Company XXXX] will save you time:
>
> - 5-10 minutes to produce individual assessments
> - 20-40 minutes to produce a complete Construction Phase Health and Safety Plan
>
> …….
>
> [XXXX] helps you produce your **Construction Phase Health & Safety documentation** in compliance with the CDM Regulations. It can create COSHH Assessments, Noise Assessments, Risk Assessments, Work Permits and **Checklists**, as well as a host of other Safety Management documentation for use on site. It will guide you through writing Safety Method Statements and Outline Health and Safety Plans (pre-tender plans)."

This approach to risk management has little to do with increasing safety and a lot to do with backside protection.

I discussed this hypothesis with my dentist recently. It was a somewhat one-sided discussion because most of the time he had his hand in my mouth. But he instantly warmed to the proposition, and afterwards emailed an example of the kind of risk assessment that he was being pressured to undertake. Figure 8 is an example taken from the Action List for COSHH (the HSE's guidance on the Control of Substances Hazardous to Health) from CODE (the Confederation of Dental Employers).

Figure 8

Oils and Lubricants Risk Assessment Sheet

Product Type: Handpiece Lubricant	
Used by	Dentist, Dental Nurse
Used for	Lubricating small equipment
Risks to health	Harmful by ingestion, may cause irritation to skin and eyes, flammable
Safety measures	Avoid breathing the vapour and use in a well-ventilated area. Keep away from sources of ignition and direct sunlight. Gloves to be worn during handling, if using an aerosol spray then glasses and mask should be worn

Presumably I should follow the same guidance when spraying WD40 on my bicycle chain; I should not drink it or inhale it, and should wear goggles, rubber gloves and a face mask while undertaking the operation.
Should my dentist, who is rather scornful of such guidance insist that those whom he employs in his practice follow this advice? The pressure builds up. The media publicize enormous awards for compensation and punitive damages. The message is "play safe" – insist that all those for whom you are responsible adhere to the letter of all the precautionary advice that comes your way. They, of course, will disregard it as bureaucratic nonsense – but nonsense that they will be tempted to pass down the chain of command, who will in turn laugh at it. The result will be a practice that continues with old-fashion common sense, but overhung with a distracting nervousness about the potentially legally-cataclysmic consequences of a misjudgment.

This nervousness is becoming a pandemic. I conclude with three examples. I am sure readers can provide many more.

1. the slogan on my plastic Sainsbury's shopping bag – already punctured with numerous breathing holes that make it useless for secondary use as a receptacle for wet kitchen rubbish – ***"To avoid suffocation keep away from children."***
2. a sign on a BBC studio door (Figure 9)

Figure 9

3. The banning, for fear of being sued, by some branches of the British Royal Legion of the use of pins with its poppies. The same story reported that poppies with pins had been confiscated from passengers at Toronto Airport for security reasons.

Figure 10

Poppy pins banned in case people sue
By Elizabeth Day
(Sunday Telegraph Filed: 02/11/2003)

The Royal British Legion has stopped supplying pins with its poppies because it fears compensation claims from "injured" members of the public.

A number of legion branches across the country have instructed members not to use pins to attach the paper poppies for health and safety reasons, claiming that they could cause pain if people accidentally stab themselves with them or damage workplace machinery if they fall off.

These are trivial manifestations of a non-trivial problem. In the world of education – the extraordinarily safe world in which I work - fear of prosecution and demands for ever more risk assessments are threatening the very existence of sports, school trips and fieldwork. Doctors are responding to the threat by practicing defensive medicine – medicine practiced more in the interests of the doctor than the patient. Rocketing insurance premiums for consultants and small businesses – the insurance industry's response to the growing threat of liability - are driving many out of business. And the routine pursuit of zero risk is putting up the price of just about everything we buy.

The above argument is ***not*** a defense of ***genuine*** culpable negligence. It is a plea for a sense of proportion. If one is on the flat part of the curve in Figure 5, I propose that fatalism is a rational response – or would be if the courts could be persuaded to acknowledge the existence of bad luck.