

Against risk

JACK DOWIE

Applied Social Sciences, The Open University, Milton Keynes, MK7 6AA, UK

Abstract

'Risk', whether used separately or in conjunction with other terms (as in expressions such as risk assessment, risk factors, acceptable risk, and risk communication) is an obstacle to improved decision and policy making. Its multiple and ambiguous usages persistently jeopardize the separation of the tasks of identifying and evaluating relevant evidence on the one hand, and eliciting and processing necessary value judgements on the other. They also make it impossible for the integration of these conceptually distinct types of inputs into overall option evaluations, essential for choice, to be achieved in a coherent and transparent way. Much of the warranted concern about the level of public understanding of, and participation in key policy issues, is therefore flawed by a failure to diagnose a key linguistic pathology at the root of the problem. Fortunately 'risk' and all its cognate terms and expressions can be replaced, as appropriate, by ones drawn from a set of alternative terms and concepts.

1. Introduction

'Risk' – interpreted to subsume ~~all~~ all cognate terms and expressions such as risk assessment, risk perception, risk factors, acceptable risk, etc. – should be abandoned by everyone interested in improving public or personal decisions. Its multiple, confusing and ambiguous usages persistently interfere with the distinct tasks of identifying and evaluating knowledge and evidence relevant to the decision on the one hand and eliciting and processing value judgements relevant to it on the other, as well as making it much more difficult for the necessary integration of these two distinct types of inputs to be achieved in a coherent and transparent way.

This message is a fairly radical one and while it is intended to be completely general it may be more effectively communicated if it is set in the context of a specific case. However, to avoid the button-pressing that would inevitably result from the choice of any specific real world example, I will take the opportunity to resolve an unanswered question about one of the great personal calamities of all time, familiar to most of us from childhood. It has been an *unanswered* question, mainly because it has been a largely *unasked* question: why did Humpty Dumpty sit on the wall? Why, in the sense of *how did he decide* to sit on the wall.

The answer can be pieced together following the discovery of a tape of a conversation that appears to have taken place shortly before the tragic event, along with a crumpled and yolk-stained diagram. The conversation was one between Mr Dumpty and a decision analyst, who can be heard making the case against risk in the context of an introduction to, and application of, the decision analytic approach. What follows is my attempt at transcribing this conversation, always quirky and rather tetchy at times, and reconstructing the diagram.

2. Before the fall

... you imply by your look that I should think carefully before climbing up and sitting on that wall. Do you think it's too risky for me – and perhaps all my people?

I can't respond sensibly to that question, either for you individually or at the public health level for your subgroup of the population, essentially because I don't know what you mean by 'risk', let alone 'too risky'.

When I use a word like risk it means just what I choose it to mean – neither more nor less.

I've often heard you quoted to that effect, but I regret to say that such an attitude to words is not a fruitful one to adopt if we are trying to analyse your personal choice jointly, or to develop a public health policy for eggpersons. Indeed it's to be deplored even if you are simply trying to think seriously and coherently about choices by yourself.

Before you came along I wasn't trying to 'analyse my choice' or 'think seriously and coherently'. I was just standing here trying to make up my mind.

My point exactly. And how were you going to 'make up your mind'?

I've no idea, but everyone is doing it all the time. I hear them saying that they will 'bear things in mind' and 'take things into account' and 'give considerations due weight' ... and then make up their minds. Choice is agonizing for we eggpersons too, as you will know if you're familiar with our famous play 'Omlet'. Are you suggesting that I'm not entitled to do what everyone else does?

Entitled, but not always advised. I'm treating you as an autonomous eggperson who wants to make the best choice faced by the alternative options. It's on that basis that I'm staying here to help, at your request.

Good. I have to say it's a change to find someone willing to address one's problems beforehand, rather than pontificate in hindsight. It's vital to adopt what we refer to as an eggs *ante* position.

Precisely. Life is understood backwards, but lived forwards. Even if not for long in some cases.

I don't like the tone of that. Anyway if you are going to help me with my risk assessment, let's get on with it.

'Risk assessment'? Who, said anything about 'risk assessment'? I'm certainly not going to help you with anything of the sort. I'm here to help you identify the best course of action.

Aren't they much the same thing? Or at least isn't risk assessment a key part of the process of identifying the best course of action?

No. And No. There's no need to use the word 'risk' in the process of identifying the best course of action and trying to assess anything about 'risk' *per se* is a waste of time – largely because there isn't a *se!*

There's a lot of it about. And lots of people with doors labelled 'risk assessor' or 'risk manager'.

It sounds a good idea, but only because most people haven't thought really deeply about it. A lot of risk assessment therefore goes on at great public expense, to no useful effect and invariably increased confusion among experts, administrators, politicians and public alike.

That sounds a bit arrogant. If I sit on the wall there is a risk of my falling, breaking and becoming, to put it bluntly, an ex-egg. I risk death – or at least disability. That is why I want your help in assessing whether the risk of my sitting on the wall is too high to be acceptable.

You won't be doing that with my help. I'm only prepared to help you decide whether sitting on the wall or not is your best course of action. The multiple and confusing ways you have just used 'risk' should confirm that we are well rid of it in making this decision.

What do you mean, multiple and confusing ways?

Well, you first used risk as a synonym of probability or chance in relation to an event or outcome ('my risk of falling or dying'). If we are to raise ourselves to the minimal level of analysis needed to make a serious decision we can and must use either of those two formulations of the concept concerned – 'chance of' or 'probability of' – rather than 'risk of'.

But I only talk of the risk of *bad* events happening, like my falling – or it raining – never of the risk of winning the lottery. So it tells you something about my attitude to the outcome as well as the chance.

Thereby allowing the *value* you place on the outcome to influence the term you use to talk about its *chance* of it occurring. In a drought would you talk of the *risk* of rain? Confusing the chance of an outcome and its desirability is one of the most venal sins in serious decision making and if you can't accept the fundamental distinction between them, I can be on my way.

OK, calm down. Should I call you Reverend by the way? You seem a bit of a fundamentalist.

Secondly, you used risk as a synonym for the harm or loss you might suffer – the

undesired outcomes of death or the disability, as distinct from the chance or probability of those two undesired outcomes occurring.

I can see the difference, but still not why it's so important.

Wait and see. And finally you talked of the risk of wall sitting – an *action*, not an event or an outcome. You imply by your question (is the risk of engaging in it 'too high?') that this 'risk' must be some sort of compound summation of all the consequences of the action and their chances of happening – an integration of the chance assessments and outcome valuations.

And surely such a 'compound summation' is needed, despite the fact that you have just implied that chances and values had to be kept separate?

I actually said they must be distinguished – not confused conceptually. But, yes, they must be kept separate when they are being *assessed*. Subsequently, after the independent empirical assessment of their values, they do have to be integrated, since both are relevant to the choice.

So I used the term risk in a few different ways. So what? Can't we use the word for one of these ways at least? Your 'compound summation' seems pretty close to it. Why can't we use it for that?

Because there will be a perfectly good, precise and accurate term for the summation, depending on how it's done – and it won't be 'risk'. I'll tell you what mine is later.

I can't believe we can really address all the things I'm concerned about in my decision without any mention of 'risk'?

I assure you we can.

And guarantee that I can sit on the wall without danger and in complete safety.

No, of course not. The only guarantee is that you will have made the best decision for yourself, *ex ante* – when all decisions have to be made – even if you fall off later. By the way, 'danger' and 'safe' are two more words we must consign to the dustbin at this analytical level. In working out what is the best course of action there is simply no purpose whatsoever in *characterizing* options in terms of words like 'risky', or 'safe', or 'dangerous'. They are either the best or not the best – though two or more may be equal best, of course.

But if the best course of action from the analysis turns out to be to 'sit on the wall', and then I fall off, won't I later regret implementing what you call the best course of action?

If you're alive you will certainly regret falling off, but there will be no point in

regretting the decision to sit on the wall. It can only have been the best option *ex ante* if you have arrived at it in the best possible way, including embodying all your feelings about what might happen later under all circumstances. It's pointless regretting not having your cake after having decided to eat it – and done so.

Pointless, but very human, even for us. Never mind, let's get down to this analysing of my decision. What? Pencil and paper? Aren't you clever enough to do it in your head.

I'm clever enough to know that only stupid people *assume* they can make the best possible judgements and decisions in their head.

I thought your species were the high point of evolution.

There is no point in restricting ourselves to what evolution has provided us with in the way of information processing capabilities – any more than in restricting ourselves to what it has provided us with in the way of physical strength. Obviously evolution has provided us with the cognitive means to devise ways of outperforming our unaided cognition as well as our unaided manual labour. This includes making judgement and decisions. I'll keep the structuring of your decision simple to start with. We can make it more complicated as and when you want, if necessary going into Markov modelling and time discounting and that sort of thing.

The *structure* of my decision?

Yes, here's my first go at it [Figure 1, imagined without any numbers]. You have two options coming out of this square, called a choice node because it's where your choice is made.

Brilliant! I had got that far all by myself.

Now we model the possible scenarios if you sit on the wall – that's the top choice branch. There are three big uncertainties here. The first is whether you Fall or not, the second, only relevant if you do Fall, is whether you Break or not, and the third, only relevant if you both Fall and Break, is whether you are Puttable Together again or not. We represent such uncertain events that are not under your control by chance nodes, drawn circular to distinguish them from the square choice node, where you are in control.

Exactly how I sit on the wall is under my control, at least to some extent.

Well, if you wanted to distinguish 'sitting carefully' from 'sitting carelessly' we could do that by making three options instead of two, but I suggest we just assume you will sit as carefully as possible. The chance of you falling will be assessed on that assumption and will not be any further under your control. Neither will the chance that you can be put together if you do fall.

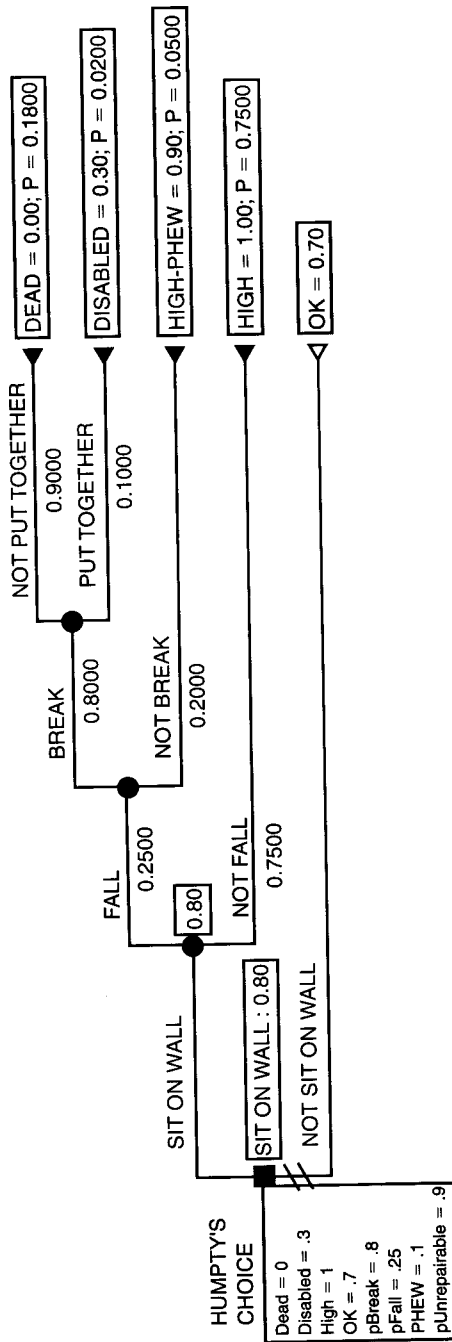


Fig. 1. Decision tree for Humpty's choice.

This is certainly not a very *pleasant* way to make a decision. You are constantly talking about all the nasty possibilities.

Not any more than about the good ones. Indeed, by objectifying the structure in this graphic way we can keep all possibilities equally present to our attention all the time. In talking we can't, which is why meetings get out of hand very easily. If you sit on the wall there are three possible outcomes (represented as triangular nodes). Starting from the top, the outcome from *Falling and Breaking and Not being put together* is a state I think we can agree to call 'Dead'. Next, the outcome from *Falling and Breaking but being Put Together* (as well as can be done) I will call 'Disabled'. Then we have an interesting state where you *Fall* but do *Not Break*. It seems unlikely to occur to me. ...

There is a school of Big-enders among us who insist it is quite likely.

Well, we'll come back to the question of how likely 'quite likely' means. For the moment all you have to do is describe the state you would be in as a result?

Whatever I felt from having sat successfully on the wall, but with a sense of Phew, that was close!

And what do you suggest as a label for the outcome of a successful sit on the wall?

I suppose you're really asking me what is my goal in sitting on the wall. Well, it's quite complicated ...

To save time, let's say that you'd be in a state called 'High'. That means we can use 'High minus Phew' as the label for the previous outcome. So now we have dealt with the subtree for the option 'Sit on Wall' and we're left with the other possible outcome involved in your decision, which is the one that's certain to occur if you take the option 'Not sit on the wall'.

Just sitting down here, feeling low in both senses?

Yes, and remember you said when I first arrived that you weren't considering any other options, such as going ballooning or rock climbing. So is sitting down here much better than being Dead or Disabled?

Yes, I suppose it's OK, if you know what I mean.

I haven't a clue what you mean, but it doesn't really matter, because we can use the label 'OK' and see what you mean by it – what you mean by it in the only way that is relevant to the choice – later. So, there are five possible outcome states – Dead, Disabled, OK, High with a downward adjustment called Phew, and High itself – and these are in your ascending order of preference.

You seem to have found a pompous way of saying something pretty obvious.

Since Dead is the worst state I'm going to suggest we regard it as being at zero on your personal outcome valuation (or utility) scale. And since High is the best state I suggest we put it at 1 or 100 on that scale.

I didn't know I had a valuation or utility scale.

Maybe you did and maybe you didn't, but you *must* have one to make this decision this way. Don't worry, it's just like a temperature scale.

Where are 'Disabled' and 'OK' on it? And 'Phew'?

That's what you're about to tell me. In terms of your strength of preference how far is 'OK' from 'High' at one end and 'Dead' at the other?

I haven't the faintest idea.

Then I have to ask you a question or two. If I offered you a choice between a 50-50 chance of being High or Dead on the one hand and the certainty of being OK on the other, which would you choose?

The certainty of being OK.

What if I offered a 90% chance of being High coupled with a 10% chance of dying on the one hand, versus the certainty of being OK on the other?

I'd take the uncertain option with its good chance of being High.

So, being a logical eggperson, you will be able to see that somewhere between 50% and 90% chance there must be a chance of being High at which you would find yourself equally strongly attracted to the uncertain option and to the certain one (in which you are OK). At that point you would see the choice as a 'toss-up'. We've got to locate this point and we'll do it by changing the chance of being High upwards from 50 and downwards from 90. What about 60%?

Not high enough. I'd stay with OK.

What about 80%?

Yes, I'd take that chance.

What about 70%?

Mmmn ... Don't know. Can't make up my mind.

In that case we have arrived at 0.7 or 70 as your utility for being OK. OK? Now we have to do the same thing for Disabled and for Phew.

[sometime later]

So it's 0.3 or 30 for disabled. And 0.1 or 10 for the Phew adjustment downward from High.

Is that it then? Incidentally, you will pardon me if I suggest it could be said you were trying to find out my attitude to *risk* in those questions.

Not at all. I was simply trying to establish your utility for various outcome states, under *uncertainty* as to whether they will occur. Some analysts *would* introduce the word 'risk' here and characterize your utilities as exhibiting risk aversion, risk neutrality or risk loving. I suppose that it's all right so long as it is given this sort of highly specific and technical meaning, but there's really no need to do it for decision making. All we need are your utilities, not any characterization of them. And there's one big disadvantage if we do allow this specialist usage of 'risk' – it will be seen and recognized and encourage others to use the word in their own multiple and less rigorous ways.

You must find life very difficult as a social being. Do you spend a lot of time alone talking to yourself?

I think you are confusing discourses. I can chat away about things as well as anyone, skilfully deploying the vague terms and imprecise quantifications that are the necessary discursive lubricant of daily social interaction. Want to stop?

No, I've started so I'll finish. I have a feeling this might turn out to be a historic occasion.

There's one task remaining before we can calculate the best option for you – say 'figure out' if you don't like 'calculate'. We have worked out how desirable and undesirable the five possible outcomes are, but not how likely or unlikely they are to occur. So we have to assess their chances of coming about and we do this by looking at the probabilities of the uncertain events that combine to produce them.

The first being the chance of my falling... the second being my chance of breaking if I fall ...

And the third being, given you fall and don't break, the probability of you being put together again.

I assume you're after numbers again?

Yes, in each case a pair of percentage chances that add up to 100%, since these are exclusive events – you either fall off or you don't, you either break or you don't and you can either be put together again or not.

So the chances are either 100% or 0%.

Ex post, but that's a useless perspective. We must estimate the probabilities before we take the action and know its outcome, and none of these chances are 100% or 0% at that stage.

How can we work out the probability of my falling?

I suggest that we call it *our* probability for you falling rather than *the* probability, since in my view there is no such thing as the latter. '*The* probability does not exist' as a friend of mine often said. In fact he said 'probability does not exist', and I agree, but I won't bother you with that argument today.

I suppose we could try to work it out mathematically by considering the physics of ovoid shapes like myself placed on flat surfaces of specific dimensions.

It would be a theoretical possibility. A less scientific, but still serious approach, is to ask about the outcomes from eggpeople like you sitting on walls. What is the evidence on frequency of falls from walls? And breakages from falls from walls?

I'm afraid I can't help you with these figures, because as far as I know there are no official data for us. There are lots of claims by my people to have sat on walls and survived, although some of them do appear a bit cracked to me. And the ones that didn't survive didn't get interviewed. But I'd be quite optimistic myself. After all this is quite a wide wall.

Well, let's start with a reasonably low probability of your falling then. Say 25%. If the analysis doesn't come out in favour of wall sitting with that sort of number I think you're going to have to keep your feet on the ground. What about the chance of Breaking, given you Fall?

Despite the Big-enders' confidence – untested because a controlled trial has always been held to be unethical – I'd feel it's about 90% that one would hit the ground in an undesirable way. And, to anticipate your enquiry about the remaining uncertainty, I'd say that the chance of being put together is also quite poor given the lack of specialist care in this area. We are obviously a minority group and it's a Cinderella speciality. I'd put the chance of being repaired at no more than 10%.

It would have been preferable to have some more evidence-based probabilities, but you clearly want a decision now, so let's see what is implied by the present ones – and the utilities you provided. Then we can see how sensitive the conclusion is to each of these numbers.

How does it help me to find out how sensitive the conclusion is to these numbers, if there's no way of getting better ones?

It doesn't help as much as some people think and it's very astute of you to see that. I fear it mainly increases anxiety, though it can prompt useful reflection.

What's going to happen to all these numbers, now that we've produced them?

We have to use some explicit process to integrate the probabilities and utilities for each option into a single number which summarizes its overall value to you. Actually we only have to do this for the wall-sitting option, because we already have the figure – 70 – which you are certain of achieving if you stay sitting down here. For the wall-sitting option with its multiple uncertainties I'm going to use the principle in which we weight – multiply – the utility of each outcome by its chance of occurring and add the results. The answer will be the 'expected utility' for sitting on the wall, which we can compare with the 70 for the certain option. Since we should maximize expected utility we select the option with the highest figure.

Who says we should maximize expected utility?

I do. And think you would do, too, since I'm fairly sure you will agree with the axioms underlying the recommendation that you do it. Or at least find them attractive enough as the prescriptive basis for practical action.

I suspect there's a can of worms in there somewhere, but I'll take your word for it. So what's the verdict?

Well, it's a bit of a surprise to me. Your optimal action is to sit on the wall. It has an expected utility of 80 against the 70 of staying put. Look here on the diagram [Figure 1, with numbers]. You can see that the 80 comes from a 75% chance of being High (with a utility of 1), an 18% chance of being Dead (utility 0), a 5% chance of being in a post-High Phew (utility 0.9) and a 2% chance of being Disabled (utility 0.3) ... So it looks ... Mr Dumpty? Where are you?

I'm up here on the wall. That's the result I wanted, so I don't want to waste any more time on the ground.

But I'm just doing the sensitivity analysis to check the robustness of the verdict to changes in some of the probabilities and utilities. Look, you can see that it doesn't matter how big the Phew adjustment is, because the chance of the outcome involving it is so small. But, see, here, if the probability of Falling is 40% or higher, the recommendation switches to staying on the ground.

Hold the paper higher, please, I can't see it very clearly ...

Careful, Mr Dumpty! Don't lean over too far! ... Damn. Another decision analyst with egg on his face.

3. The case for abandoning risk

Much of what I have said or implied above has been said recently by Stan Kaplan on the occasion of his receipt of a Distinguished Award from the Society for Risk Analysis (Kaplan, 1997). The purpose of his talk was to contribute towards 'a single

uniformly understood language for the risk analysis community'. He does not actually go so far as to say the word should be abandoned in serious discourse, as I propose, but, given what he says and implies throughout the talk, this may simply be a matter of being polite. He begins by noting that

... when our Society for Risk Analysis was brand new, one of the first things it did was to establish a committee to define the word 'risk'. This committee laboured for four years and then gave up, saying in its final report, that maybe it's better not to define risk. Let each author define it in his own way, only please each should explain clearly what that way is. (p. 407)

The rest of Kaplan's paper is a straightforward presentation of the case for Bayesian decision theory – and its practical implementation in decision analysis – a case that he implies will be accepted as soon as we realize that:

We are asking the wrong question. The question is not, 'How much risk is acceptable?' The question is, 'What is the best decision option?' (p. 416)

He concludes that

For [communication] to take place, it's crucial that we have words that we all understand and use in the same way.

It is the central proposition of the present paper that 'risk' is not one of those words and that attempts to clarify it are doomed. Earlier attempts to sell the same message (Dowie, 1984; Dowie, 1990), were obviously unsuccessful and the clarification route is still being pursued. For example, Jardine and Hruday (1997) set out the difficulties that multiple and imprecise meanings of words inflict on 'risk communication' and put forward a bundle of recommendations to reduce the problems so created. And Calman and Royston (Calman, 1996; Calman and Royston, 1997) attempt to devise a standard classification of risk levels, calling for a standardization of 'the language of risk' in order to improve 'risk communication'.

It is a paradox that all such attempts at clarification and standardization will fail unless they address the relevant conceptual elements – probability, utility and their integration – separately, but that if they do address them separately then they are no longer concerned with 'risk'.

If, for example, the probability element is dealt with separately – and equated with 'risk' – any attempt to give the result policy relevance requires resort to constructs such as 'negligible risk', 'avoidable risk', 'acceptable risk', 'justifiable risk' and 'serious' risk – or even 'normal' risk (Madeley, 1996). Each of these adjectives implies that the value aspects have been dealt with, but rarely is there any suggestion that these aspects need to be *explicitly analysed separately* before their integration with the probability – by an integration principle which itself has been explicitly discussed. To seek clarification of probabilities as a 'first step in communication about risk' (Calman and Royston, 1997, p. 942) may therefore seem sensible, but unless the other elements of any decision are addressed simultaneously at equal analytical depth (and separately) any clarification is likely to be a mirage.

Walker is also worried. (Walker, 1995, 1996). His papers on risk are excellent analyses of key problems concerning probabilities. But he fails to see that the key to getting people to focus on the real problems with probabilities – i.e. the relationship

of group and individual probabilities and the conceptual nature of probabilities – is to get them talking about *probabilities*, not about ‘risk’. ‘Risk’ contaminates all discussions of probability because of the implicit value judgement/s that the term always brings with it, just as it contaminates all discussions of value assessment because of the implicit probability judgement/s that it contains.

4. Is anything lost if ‘risk’ is abandoned?

‘Risk’ is not, in any case, needed to establish the best option from the available set, if the mode in which decision making is being undertaken involves an analysis-to-intuition ratio that is appropriate for *serious* decisions (Hammond, 1996). I assume there are three contexts in which a *serious* approach to decision making is mandatory: (i) where competent individuals or groups ask for prescriptive assistance voluntarily (e.g. medical care); (ii) where proxies must make decisions on behalf of legally incompetent individuals (e.g. the mentally ill); and (iii) where public expenditure or regulation is involved.

In any of these situations we need to remove ‘risk’, not try to understand it better or to treat its symptoms by attempts at ‘clarification’. It is simply not needed. We do not need a category of ‘risk decisions’ or ‘risk management decisions’. They are just decisions. We do not need a category of ‘risk factors’. They are just factors. And so on. A list of recommended replacements terms and phrases is provided in Table 1.

Nothing of importance will be lost with ‘risk’, except by those who rely on fudge and confusion as instruments of political persuasion and social lubrication. The apparent advantage arising from its location in multiple discourses – which would seem to facilitate and encourage widespread participation in debates and decision processes – is an illusion and actually hampers the enfranchisement and emancipation of less powerful and oppressed groups, be they particular sections of the lay public or the lay public as a whole (*vis-a-vis* ‘scientific experts’). Familiarity with an apparently relevant term (‘risk’), legitimated by the media and by social researchers asking questions which employ it, distracts attention from the need to acquire ownership of the concepts and terms that are needed for truly informed participation in coherent debate. Much of the warranted concern about the level of public understanding of, and participation in key policy issues, is therefore fatally flawed by a failure to diagnose a key linguistic pathology at the root of the problem. Or, if it is diagnosed, by a ‘politically correct’ reluctance to suggest that education in relevant analytical skills is a prerequisite for effective participation. (Incidentally, in these respects most scientists, judges and other professional groups are no better equipped than the majority of the population.)

The vast amount of descriptive theorizing and testing of psychological concepts of ‘risk’ (‘risk perception’, ‘acceptable risk’, etc.) is of value to improved decision making only insofar as conclusions relevant to either probability assessment or utility assessment (separately), or to the amalgamation of independently generated probabilities and utilities, can be extracted from it. The substantial body of research dedicated to factor analysing ‘risk’ assessments has undoubtedly been useful in terms of *hypothesis generation* regarding the contents of the multi-attribute utility functions needed for decision making. But nothing more, because from a decision-improving perspective it has fundamentally been a distraction, nothing prescriptive following from any descriptive discovery.

Table 1. Recommended replacements for usages of 'risk' and expressions involving 'risk'.

Current usage	Concept	Replace by
<i>the risk of</i> an event (e.g. death) <i>is</i>	either a probability or a probability surrogate in the form of a value/score on some scale that must be mapped on to a probability scale if it is to be used	<i>the probability of, the chance of</i> (where chance is a strict synonym for probability)
<i>the risk from</i> an action/option or what I/we <i>risk</i>	loss, harm, undesired outcome state with low utility	<i>the less desired/undesired/negatively valued/low utility outcome from</i>
<i>risk of action/option</i> is too high	some compound summation of implicit chance ('risk of') and outcome value ('risk from') assessments	<i>the expected utility</i> (or some equally well-articulated and grounded summary integration of probabilities and utilities) of this option is not the highest
is an <i>acceptable/unacceptable risk</i>	none, because not needed; to be avoided because such characterization distracts from need to arrive at <i>best</i> course of action on basis of independent judgements of probabilities and utilities	is/is not in my view <i>the option which emerges as best/optimal</i>
<i>at risk</i>	meaningless; only tautologies have nonzero probability of less/undesired outcome/s; and imposition of a threshold on any probability/surrogate scale requires value judgement and hence implies a <i>decision</i> not just a <i>judgement</i> has been made	no replacement needed
place on <i>at risk register</i>	register is of those it has been decided to take some <i>action</i> about (e.g. supervise, protect) and it should be denoted by this action not by the criterion	place on <i>supervision register, protection register</i>
<i>risk assessment</i>	either probability assessment or option evaluation (if any valuation or integration/aggregation of outcomes involved)	<i>probability assessment</i> <i>option evaluation</i>
<i>risk management decision</i>		<i>decision</i>

Table 1. (continued)

Current usage	Concept	Replace by
<i>risk factor</i>		<i>factor</i>
<i>risk</i> is everywhere		<i>uncertainty and/or potential for loss, undesired/low utility outcomes</i> is everywhere
it is a <i>risk</i>	almost meaningless	it is an action with some probability of leading to an outcome/outcomes of lower desirability/utility than another
<i>risk-aversion</i>	uncertainty aversion or loss aversion or not needed	<i>uncertainty aversion or loss aversion</i>

While decision analysis is based on expected utility theory, the present argument does not depend on acceptance of the latter. Expected utility theory does not need 'risk', but then none of the attempts to build *prescriptive* alternatives to it on descriptive foundations (e.g. regret theory, prospect theory) require it either, so this paper has no need to become involved with the EU controversy as such. However, any attempt to refute EU theory – in the belief that such refutation is relevant to the present issue – would be met by repeats of the strong (Lindley, 1985; Howard, 1992) and weak (Nease, 1996) forms of the argument in favour of Bayesian decision theory and its real world implementation in decision analysis. Incidentally, a reasonable position for protagonists in this debate to adopt would be one that agrees on the need for comprehensive comparative empirical evaluation (CCE) of competing prescriptive approaches, rather than partial or noncomparative evaluation (PONCE), in which the most explicit method is ruthlessly examined for defects, but scant attention paid to the less explicit alternatives. Eeckhoudt is particularly clear on this point in the useful Medical Decision Making forum (Baron, 1996; Cohen, 1996a, 1996b; Douard, 1996; Eeckhoudt, 1996; Wu, 1996). The defects of the alternatives in most cases remain relatively immune to exposure because they are too poorly articulated to be examined with equivalent rigour.

It may be worth anticipating the objection that there is a strong *prescriptive* case for 'satisficing', rather than maximizing, that is for choosing the first option from the available set that meets some minimal criteria of acceptability, rather than working through the full set to establish the best one. There is no such case, because the distinction rests on the erroneous assumption that the costs and burdens of processing information about options is not part of *prescriptive* maximization. They are, to be sure, not part of *normative* maximization, but that is precisely the difference between these two types of maximization.

There is no intention here to deny the importance of thinking creatively about the *options* which will be analysed in the decisional choice. (I take 'creatively' to imply a relatively low analytical-to-intuition ratio.) For example, there is a good case for

exploring his goals with Humpty and establishing whether ballooning or rock climbing might be options that should be evaluated, along with wall-sitting and sitting on the ground. But this can do nothing more (or less) than multiply the options. The task of arriving at the best option from the final set still remains. Resistance to the idea that there is ever a final set is tempting to those who wish to avoid choice – especially ‘tragic choices’ – by endlessly ‘reframing’ problems. But this requires one to believe that decisions can be postponed. Decisions cannot be postponed. All that happens is that one option – the *status quo* – is *chosen* and applies until a new, not a postponed, decision is made.

5. The benefits of a no-risk policy

Once one has accepted the prescriptive necessity of decomposing ‘prospects’ into their probability and utility components and making independent assessments of each prior to their necessary integration by some explicitly articulated procedure, one has opened the doors to the vast and useful literature on each of these three topics. One can enjoy and benefit from the exchanges between ‘optimists’ and ‘pessimists’ on the quality of human probability judgements, still as heated as ever (Gigerenzer, 1996; Kahneman and Tversky, 1996); from the extensive discussion about the best means to establish people’s preferences and values (utilities) in a decision-relevant way; and, as intimated, from the vast literature which concerns EU theory and proposed (prescriptive) alternatives.

The benefits from moving from ‘risk’ to probabilities (to select just of one of these three) is well exemplified in Baruch Fischhoff’s recent essay on the problems in communicating forecasts (Fischhoff, 1994). Of the four possible sources of failure in forecast communication that he advances – ambiguity, irrelevance, immodesty and impoverishment – it is really only the former that is of concern here. He makes clear that the ambiguity may reside in *two* sites: in the specification of the probability or in the specification of the event to which the probability relates. The point to be stressed is that the duality of this problem is exposed, and diagnosis and treatment made possible, only when we focus on probability, not on ‘risk’.

There are significant implications for those seeking to improve decisions by improving ‘risk communication’. The ‘risk’ construct leads to generalized messages and warnings (about AIDS, drinking and driving, drugs, smoking, beef on the bone) and generalized attempts at reassurances (about beef off the bone, triple vaccination). Such simple generalized messages are unlikely to be effective because

1. they will be ambiguous since the probabilities they contain will be ambiguous (as well as implicit);
2. they cannot be evidence-based, because no evidence produces a simple conclusion;
3. they contain implied value judgements about outcomes as well as probabilistic judgements;
4. they have been produced by an implicit procedure for integrating value judgements and probabilities,

It does not, accordingly, take an immature or malign mind to distort or ignore an attempt at any ‘risk communication’ which employs the term ‘risk’. It only requires a decision maker who has a reasonably complex mental model that reflects the key

elements of decision analysis. Promoters of public and personal health are therefore likely to communicate much more effectively if they assume that decision makers are informal decision analysts who operate with considerably more complex decision structures than risk constructs imply. They need to shift their focus from 'risk communication' to 'decision communication'. (Dowie, 1999).

References

- Baron, J.A. (1996) Why expected utility theory is normative, but not prescriptive, *Medical Decision Making* **16**, 7–9.
- Calman, K.C. (1996) Cancer: science and society and the communication of risk, *British Medical Journal* **313**, 799–802.
- Calman, K.C. and Royston, G.M. (1997) Risk language and dialects, *British Medical Journal* **315**, 939–42.
- Cohen, B.J. (1996a) Is expected utility-theory normative for medical decision-making? *Medical Decision Making* **16**, 1–6.
- Cohen, B.J. (1996b) Reply: utilitarianism, risk aversion, and expected utility, *Medical Decision Making* **16**, 14.
- Douard, J. (1996) Is risk neutrality rational, *Medical Decision Making* **16**, 10–11.
- Dowie, J. (1984) Perceived risk: a chimera, in: A. J. Jouhar (ed.) *Risk in Society* pp. 83–93, London: John Libbey.
- Dowie, J. (1990) Clinical decision making: risk is a dangerous word and hubris is a sin, in: D. Carson (ed.) *Risk-taking in Mental Disorder: Analyses, Policies and Practical Strategies* pp. 29–39, Chichester: SLE Publications Ltd.
- Dowie, J. (1999) Communication for better decisions: not about risk, *Health, Risk & Society* **1**, 41–53.
- Eeckhoudt, L. (1996) Expected utility theory – is it normative or simply 'practical'? *Medical Decision Making* **16**, 12–13.
- Fischhoff, B. (1994) What forecasts (seem to) mean, *International Journal of Forecasting* **10**, 387–403.
- Gigerenzer, G. (1996) On narrow norms and vague heuristics, *Psychological Review* **103**, 592–96.
- Hammond, K.R. (1996) *Human Judgment and Social Policy: Irreducible Uncertainty, Inevitable Error, Unavoidable Injustice*, New York: Oxford University Press.
- Howard, R.A. (1992) Heathens, heretics, and cults – the religious spectrum of decision aiding, *Interfaces* **22**, 15–27.
- Jardine, C.G. and Hrudey, S.E. (1997) Mixed messages in risk communication, *Risk Analysis* **17**, 489–98.
- Kahneman, D. and Tversky, A. (1996) On the reality of cognitive illusions, *Psychological Review* **103**, 582–91.
- Kaplan, S. (1997) The words of risk analysis, *Risk Analysis* **17**, 407–17.
- Lindley, D.L. (1985) *Making Decisions*, London: John Wiley & Sons.
- Madeley, D. (1996) Risks can also be categorised as normal or abnormal [Letter], *British Medical Journal* **313**, 1483.
- Nease, R.F. (1996) Do violations of the axioms of expected utility theory threaten decision analysis? *Medical Decision Making* **16**, 399–403.
- Walker, V.R. (1995) Direct inference, probability and a conceptual gulf in risk communication, *Risk Analysis* **15**, 603–9.
- Walker, V.R. (1996) Risk characterization and the weight of evidence: adapting gatekeeping concepts from the courts, *Risk Analysis* **16**, 793–99.
- Wu, G. (1996) The strengths and limitations of expected utility theory, *Medical Decision Making* **16**, 9–10.