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May 2001

Regulars



## Opinion



### Topic of the month

- Safe as houses – the difficulty of evaluating risk
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### Safe as houses

Let's say I need to get from London to Edinburgh. I have a choice of modes of travel: I can fly, drive, take a train, cycle, motorcycle, walk, or take a ferry. Some of these are less practical than others – flying might be quite expensive, and walking would take several weeks – but we'll suppose I have plenty of time, the cost is not very important, and my only concern is safety. Which method of travel carries the least risk of being killed in an accident?

Before reading on, you might like to make your own estimates – put the given modes of transport in order, from least to most dangerous, say.

Evaluating risk is an important skill in many areas of life: how safe are the railways? How serious is the latest health scare — for instance how safe is eating beef, compared to, say, crossing the road? How dangerous is it to live near a nuclear reactor (and how near is "near")? It is an aspect of the more general problem of understanding probabilities (what is the likelihood that I will win the lottery – and what does that number mean?)

Unfortunately, it is also an area where people's intuitive guesses are often very badly wrong. It isn't something we're taught to do in school, and is also difficult or impossible without enough information – which can be

## Opinion

hard to get hold of. The media often compound the problem with poor reporting. The good news is that with a little practice and some clear thinking, it's possible to get a much better handle on different risks.

One problem is the "availability error", by which people subconsciously give undue weight to facts that are particularly "salient", for example because they have been heavily reported or commented on. This is why, for instance, people are inclined to overestimate the risks of travelling by rail, because of the very extensive reporting when a train is derailed and a number of passengers are killed. The same number of people might be killed on the roads in a week, but for various reasons this is far less widely reported. Probably one reason is that the very rareness of rail accidents makes them newsworthy; another may be that in a train crash many people are killed all at once, but road fatalities normally happen in small numbers in any one accident, though the accidents themselves are far commoner.

In actual fact, the number of railway passengers killed in the UK ever – since the first railways started about 180 years ago – is about the same as the number killed on the roads *every year*. This is an impressive-sounding statistic, but after careful thought, we should realise that it doesn't necessarily help decide which of rail and road is a safer way of travelling from London to Edinburgh! The reason is that it counts deaths, not probability of dying, which is a very different thing. Perhaps not many people, relatively, use the railways, and that is why there are so few deaths. After all, very few people die each year from having a skyscraper collapse on them, but that does not mean this is a safe activity.

There are other ways of measuring deaths than by sheer number: we could measure deaths per journey, or deaths per passenger mile, or deaths per passenger hour, for example. The first is not very useful in the present instance, as it doesn't take account of the fact that some kinds of journey are normally shorter than others (people don't often walk from London to Edinburgh, for example), and the last would be the right measure if I wanted to travel for a fixed period of time, say three hours, by any means, rather than a fixed distance. To compare risks for a journey of a fixed distance, we should measure deaths per passenger mile.

These figures are available – here are the numbers of passenger deaths per billion passenger kilometres in 1999:

<b>Mode of transport</b>	<b>Deaths per billion passenger km</b>
Air	0.02
Rail	0.9
Water	0.3
Car	2.8
Two-wheeled motor vehicle	112
Pedal cycle	41
Pedestrian	49

As you can see, flying turns out to be far the safest method of travel, and travelling by rail considerably safer than driving (even in 1999, which is a particularly bad year for rail safety figures, as it includes the appalling crash at Ladbroke Grove in which about 30 people were killed).

Of course this probably isn't the whole story. For example, the most dangerous parts of a flight are landing and take-off, each of which happens once per flight however long the flight. So perhaps this table underestimates the risk of flying for short distances (and overestimates it for long ones).

In spite of problems like this, this kind of data at least gives us a rough idea of the scale of different risks involved, which is better than relying on guesswork. Perhaps most usefully it is a good guide to how wrong

## Opinion

public perceptions of risk can be.

Finally, the fact that one mode of transport is less dangerous than another is certainly not a cause for complacency. Our railways may be safer than our roads but they are not as safe as other European rail networks. 100% safety is never achievable (another fact that people often do not appreciate when they insist that "such a tragedy must never happen again"), but we could realistically do a great deal better than we are doing at present. Let the new government take note.

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