

Problems with Risk Comparisons

There are two conceivably legitimate purposes for risk comparisons. Readers who consult the risk communication literature will find that serving either requires a distinct set of disciplinary skills (in the decision and behavioral sciences), in order to ensure that defensible comparisons are being made, and dedicated empirical research, in order to ensure that the result is understood as intended. Readers of that literature will also find that poorly done risk comparisons can confuse, mislead, and antagonize recipients. Unless done in a scientifically sound way, risk comparisons are unlikely to be useful and relevant, hence should be avoided.

One conceivably legitimate purpose is giving recipients an intuitive feeling for just how large a risk is, by comparing it to another, otherwise similar risk, that recipients do understand. For example, roughly one American in a million dies from lightning in an average year (NOAA, 1995). “As likely as being hit by lightning” would be a relevant and useful comparison for someone who (a) has an accurate intuitive feeling for the probability of being hit by lightning, (b) faces roughly that “average” risk, and (c) considers the comparison risk to be like death by lightning in all important respects. It is not hard to imagine each of these conditions failing, rendering the comparisons irrelevant or harmful.

(a) Lightning deaths are so vivid and newsworthy that they might be overestimated, relative to other, equiprobable risks. On the other hand, “being struck by lightning” is an iconic very-low probability risk, meaning that they might be underestimated. Where either occurs, the comparison will mislead (Lichtenstein et al., 1978; National Research Council, 1989).

(b) Individual Americans face very different risks from lightning. For example, they are, on average, much higher for golfers than for nursing home residents. A blanket statement would misread readers who did not think about this variability and what their risk was, relative to the average American (Slovic, 2001; Tversky & Kahneman, 1974).

(c) Death by lightning has distinctive properties. It is sometimes immediate, sometime preceded by painful suffering. It can leave victims and their survivors totally unprepared. It offers some possibility of risk reduction, which individuals may understand to varying degrees. It poses an acute threat at some very limited times, but typically no threat at all. Each of these properties may lead people to evaluate the risk differently – and undermine the relevance of comparisons with risks having different properties (Fischhoff et al., 1978; Lowrance, 1976).

The second conceivable use of risk comparisons is to facilitate making consistent decisions regarding different risks. Other things being equal, one would want similar risks from different sources. However, there are many things that might need to be held equal, including the various properties of risks (discussed above) that might make people want to treat them differently, despite similarity on one dimension (e.g., annual fatality rate) (Fischhoff et al., 1978; HM Treasury, 2005; Wittenberg et al., 2003).

The same risk may be acceptable in one setting, but not another, if the associated benefits are different (e.g., being struck by lightning while golfing or working on a road crew). Even when making entirely voluntary decisions, people do not accept risks in isolation, but in the context of the associated benefits. As a result, “acceptable risk” is a misnomer, except as shorthand for “a voluntarily assumed risk accompanied by acceptable benefits.” (Fischhoff et al., 1981)

Risk comparisons should not be made, unless they are developed in a scientifically sound way, addressing all recipients’ values and circumstances, and are empirically evaluated.

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