

Seminar article

Medical decision making: Lessons from psychology

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A wide variety of psychological mechanisms can interfere with clear thinking as patients make choices among risky treatments. The availability heuristic can make some outcomes seem more likely than they really are, the way treatment options are framed and presented can radically affect choice, the placement of a patient's reference point between gains and losses can create a bias towards caution or risk-taking, outcomes that seem certain may make a greater impression than probable or improbable ones, highly-desired benefits can obscure very real risks (and vice versa), and denial mechanisms may render a doctor's best efforts at communication virtually worthless. © 2008 Elsevier Inc. All rights reserved.

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Introduction

Decision-making about treatment options in the face of serious illness necessitates a careful consideration of risk. Being able to understand, properly assess, and respond to such challenges effectively can make the difference between life and death. Patients who confront hard choices in treatment often have no experience or intellectual foundation for properly estimating the risks they confront; so it often becomes the job of physicians to help patients make such difficult choices well, often while trying not to impose their personal views or values on them. The prospect of risk remains frightening because it encompasses both chance and loss; the key questions revolve around how much of what is likely to be lost, and how likely the loss is, and thus, necessarily, some element of risk perception will always remain inherently subjective.

A great deal of research in psychology over the last several decades has focused on questions surrounding risk perception and assessment. Important lessons on how to reduce the likelihood of inadvertent bias and enhance the opportunities for optimal choice can be gleaned from this research.

Psychological bias in judgments

When people confront various treatment options for serious illness, each choice presents certain potential risks and other possible benefits. In considering the options they confront, individuals are often affected by certain cognitive biases, which can influence their perception of the likelihood or frequency that a certain outcome will occur if a particular choice is made. One of these judgmental biases, known as the availability heuristic, deserves special mention in this context. Events that are vivid, salient, or easy to imagine—that are mentally “available” to the patient—are judged to be more likely than those that are harder to envision. Not surprisingly, actual risk often has nothing to do with the factors that can enhance subjective risk perception. So, for example, when people estimate the frequency of certain lethal events, they tend to overestimate dramatic and sensational causes, such as murder or shark attack, while underestimating causes that seem dull and boring, such as diabetes or emphysema [1]. Biased reporting in the media may account for some of this effect, but such coverage may itself reflect peoples' preferences.

A real concern with all cognitive heuristics is that people remain highly confident in judgments reached using these methods, even when they are not as accurate as decision makers believe them to be. Note the way in which such processes might support the often irrational hope that individuals display in alternative or crazy treatments that have not been proven, or worse, have been shown to be harmful,

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such as laetrile. Many greedy individuals appear more than willing to exploit the fear and sadness of those who seek such cures. People rarely have insight into the extent to which their judgments rest on inaccurate assumptions or faulty data. Availability, along with other cognitive and affective biases, can thus influence judgment long before final choices among options are made by patients.

Among the reasons that the availability bias raises concerns is that the mere discussion of even a very low-probability risk, such as death from surgery, may in and of itself make such an outcome easier to imagine and to remember, and thus raise its perceived risk [2]. This does not mean that such risks should not be discussed, but rather that health care providers should remain aware of how the structure of these discussions can affect the patient's perceived sense of risk. In particular, people appear especially sensitive to prospects for extreme loss, such as death.

Once options are presented, choices must be made. One of the most prominent models to describe such decision making under conditions of risk is Prospect Theory, developed by psychologists Daniel Kahneman and Amos Tversky [3]. Prospect Theory grew out of an empirical investigation into how people *actually* make decisions; it carries no normative imprimatur concerning how decisions *ought* to be made. Since this theory tells us how people actually do make choices, it is particularly useful in helping physicians understand the process by which their patients make decisions among treatment options. Prospect Theory comprises two sequential phases: first, editing (in which framing effects occur); and second, evaluation. Each can help patients confronting life threatening diseases to make difficult decisions concerning the treatment options they confront.

Framing effects

Framing effects explain the way in which particular options, or choices, are constructed prior to choice. One of the most significant aspects of framing lies in the fact that people have a strong tendency to accept the frames or options with which they have been presented. This matters because the order or manner in which choices are offered can substantially affect the content of the subsequent choice without individuals being aware of this influence. In the original classic experimental demonstration of this effect, subjects were presented with the following health policy problem, whose prescience is evident more than two decades later [4]. Subjects were told:

“Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been prepared. Assume that the exact scientific estimates of the consequences of the program are as follows.”

Then subjects were presented with one of the two following formulations of options, from which they had to choose their preferred option:

(A) If program A is adopted, 200 people will be saved.

(B) If program B is adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved.

OR

(C) If program C is adopted, 400 people will die.

(D) If program D is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.

For those given the first choice set, 72% of individuals chose A, while 28% chose option B. But for those with the second set, only 22% chose option C, while 78% picked D. Yet note that the objective probabilities of mortality are identical in each set: A represents the exact same outcome as C, while B's is identical to D's, yet individuals presented with only one or the other framing of options make radically different substantive choices about what to do. Once both sets of options are placed side by side, their comparability becomes transparent, but this will obviously not occur when only one framing of the problem is presented.

Even more telling and relevant examples of this phenomenon come from the area of medical decision making. McNeil et al. found that patients confronting surgery for lung cancer reported as much concern about the risk of death in surgery as for the overall risk to their life expectancy from the illness itself [5]. In later work, researchers elicited the preferences of lung cancer patients and physicians concerning treatment options [6]. These choices included either surgery or radiation; obviously, surgery entailed some risk of death during treatment itself that was not as high in the case of radiation. Options were presented for both immediate and 5-year outcomes, either in terms of “mortality” risk or “survival rates.” As in the Asian flu example, the objective probabilities remained identical. Yet, as with that example, the choices of both physicians and patients were substantially affected by the framing of the options; in this case, surgery appeared less attractive when outcomes were described in terms of mortality rather than survival.

Of course, the trade-off here between long-term and short-term outcomes poses an important substantive consideration, especially for patients who may have young children. But the actual wording of the choice also independently affects the content of choice. In other words, even important medical decision making appears remarkably susceptible to trivial transformations in the order or method of presentation. Nefarious motives need play no role in the power and pervasiveness of this effect; such tendencies occur frequently in both experts and novices in a remarkable number of domains outside of medicine as well. As Kahneman and Tversky note, “A physician, and perhaps a presidential advisor as well, could influence the decision made by the patient or by the President, without distorting or suppressing information, merely by the framing of outcomes and contingencies. Formulation effects can occur fortuitously, without anyone being aware of the impact of the frame on the ultimate decision. They

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