
Howard Raiffa and Our Responsibility to Rationality

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Howard Raiffa's Rational Insights

Howard Raiffa improved many peoples' lives by pushing out the boundaries of academic fields, changing forever the areas of game theory, decision analysis, and negotiation analysis. Game theory, as a field, had been mostly lying fallow until Howard, with Duncan Luce, wrote *Games and Decisions* (1957). In comments prepared for Howard's memorial service, noted economist Thomas Schelling remarked: "I wouldn't have won the Nobel Prize were it not for Howard Raiffa." Like so many others, Schelling had first become entranced by game theory while reading Duncan Luce and Howard's remarkable book.

One of Howard's trademarks was to move continually onward and upward; thus his progression across various schools and disciplines. As a college junior, I went to visit Professor Raiffa to ask a question about game theory. He offered to answer fully, but only after I had read the half dozen papers on decision theory that he gave me. He had already moved on from game theory and was in the midst of breaking open the field of decision analysis, in conjunction with Robert Schlaifer. His simple *quid pro quo* was a demand that was designed to benefit me; indeed, it changed my life. Such beneficent negotiations were a Raiffa staple as he guided his many students.

Like so many of Howard's pupils, I became a fierce proponent of rational decision theory (RDT), not as a description of how people *do* behave, but as a prescription for how we *should* behave. As a natural complement, I became a fervent Bayesian. Howard went on to write a small shelf of books on decision

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theory, often in conjunction with others, from the layman's *Smart Choices: A Practical Guide to Making Better Decisions* (Hammond, Keeney, and Raiffa 1999) to the magisterial, advanced *Applied Statistical Decision Theory* (Raiffa and Schlaifer 1961). Readers from all walks of life learned how to make superior decisions.

A person who learns how to think like a Bayesian, including using subjective probabilities effectively, will find life improved in many ways. The path to rational decision making in medical, financial, commercial, and interpersonal matters will become more familiar and the decisions more effective. The Bayesian practitioner will habitually take time to consider preferences and alternative possible outcomes. He will become adept at determining when to act immediately and when to gather further information first. Very importantly, he will learn neither to regret sound decisions that lead to poor outcomes, nor to take pride in the occasional irrational decision that works out well. I believe that a conscientious attempt to banish regret from one's decision calculus is one of the prime benefits of fully embracing decision analysis, of acting as Howard would recommend.

Howard's next major contribution was the creation of the field of negotiation analysis. Properly considered – and proper consideration was a Raiffa hallmark – negotiation analysis is just a domain where decision analysis, usually multiattribute, can be deployed effectively. The difference is merely that the chance nodes have become the decisions made by others, rather than inexorable events, such as economic developments or medical outcomes. In this context, Howard often investigated asymmetric prescriptive behavior. How should one negotiate, best assessing the likely distribution of the other party's possible behaviors?

Howard took a consistent approach to all of his academic endeavors. Research, teaching, and the real world were always strongly intertwined. He would find a phenomenon in the real world, analyze it, define its conceptual underpinnings, generalize it, and nurture students in the subject matter. He would teach his courses on the phenomenon, with painstaking attention to pedagogic materials. He would direct theses addressing that phenomenon and its underpinnings, then publish his findings in books. He would later repeat this process, breaking open a new field every decade or so. To his students, he recommended that if they first found a relationship, however abstract, in their scholarly investigations, they should test its applicability and validity in real-world situations and then follow that route.

Howard took delight in all his academic undertakings, but his greatest love, I believe, was for decision analysis. He was deeply disappointed that, although he had trained dozens through their theses, thousands through his courses, and multitudes through his books and the teachings of his former students, academic attention to rational decision theory dwindled in his later decades. Perhaps this was partly because of the rise of the field of behavioral decision analysis and behavioral economics, which assessed

descriptively how everyday people *actually* behave, not prescriptively how they *should* behave. The behavioral revolution produced a tidal wave of studies. However fascinating these behavioral investigations are, Howard might have pointed out that an individual who was able to act in accord with RDT was far better off than a peer who was subject to a thousand effective nudges.

Rational Insights from Outcomes

The results of the study and analysis of behavioral decision making, like optical illusions, are forever fascinating. These findings have changed the way we think about the world. But in curricular matters, they have tended to crowd out opportunities to learn through RDT. The substantial literature on hindsight bias provides a good example. Ample evidence indicates that people over-extrapolate from outcomes, giving decision makers too much credit for both probability assessment and skill in action after good outcomes, and too little credit after bad outcomes. Psychologists and others have amply demonstrated this phenomenon through laboratory experiments, but those experiments are often structured in ways that differ from the real world by eliminating the potential to actually learn from outcomes. Thus, the experiment might specify that a surgeon being assessed is 60 percent likely to perform a particular operation successfully. Obviously, given this assumption, whether the operation succeeds or fails tells us nothing of the surgeon's skill, nor of her ability to assess probabilities. But learning about either of these factors is almost always possible and desirable in real-world contexts.

Posit that the surgeon's skill is simply her chance of performing the particular operation successfully. The surgeon knows her skill level; you do not. You assess that level as being uniform on (equally likely to take any value from) 0.3 to 0.9. You know the surgeon will not operate unless there is at least a 50 percent chance of success. She chooses to operate. Your assessment of her skill now becomes uniform on 0.5 to 0.9. The operation succeeds. You now update again. Your best estimate of her skill rises to 0.719. (If you did not know how well the surgeon gauged her skill level for the operation, or if her preferences in terms of cutoff probability were unknown, Bayesian methods would still work, but in a more complicated manner).

Baruch Fischhoff's pioneering 1975 article on hindsight bias briefly discussed how to properly draw insights from outcomes, although only in cases in which there are recurring events. Since that time, industrial quantities of articles on hindsight bias and outcome bias have been published. By contrast, all the articles written on how to draw appropriate inferences from outcomes, including unique outcomes, particularly in the real-world policy contexts that drew Howard's attention, are equivalent to the output of a single, part-time practitioner.

Our Responsibility to Rationality

If we want to understand how to respond to a medical incident, a climate-change warning event, a surprising off-the-cuff comment by a negotiation counterpart, or a political statement of doubtful validity, we had best attend to Howard's overarching lesson: "Employ rational decision theory."

Those of us who have learned from Howard know that people can improve their own lives using the process of rational decision making. We know that the widespread implementation of rational thinking could also improve outcomes for our families, our communities, our nation, and the world. We who have benefited from Howard's insights have a responsibility to disseminate our knowledge of his approach to decision making. Our often irrational world can only benefit from reconsidering Howard Raiffa's prescriptions for rationality.

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