

about probabilities themselves. Standard gambles lead to inconsistent estimates of utilities of identical outcomes. Other methods, particularly difference measurement, may be better.^{3, ch. 17}

More generally, the goal-achievement definition of utility implies that true utility is not necessarily the same as utility inferred from preferences. Resistance to the goal-achievement view comes from the behaviorist beast, which, having largely moved out of the house of psychology, has taken up residence in economics.

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The Strengths and Limitations of Expected Utility Theory

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Expected utility (EU) theory has long served as the backbone for decision analysis. The theory has been applied to decision problems in management, public policy, and, most importantly for readers of this journal, medicine. The dominant status enjoyed by EU theory reflects a presumed *normative* justification: it is often argued that rational, reflective individuals would want to adhere to the basic principles of EU theory. In this issue, Cohen argues that EU theory is inappropriate for medical decisions because these are one-time decisions and expectation is a long-run property that applies only to repetitive decisions.¹ The question of whether EU is an appropriate normative standard is vitally important for medical decision making. However, the arguments Cohen offers are not convincing enough to abandon EU theory in medical or other contexts. The theory does have limitations, but before we abandon a proven theory we must propose alternative theories and scrutinize them as closely as we have scrutinized EU theory.

The Importance of Axioms

Expected utility is implied and implies a set of axioms: ordering, continuity, independence, and tran-

sitivity. Building a normative theory of decision making from axioms has great merit. Axioms impose a consistency between actual and hypothetical choices. Cohen is correct that "intuitive rules of consistency alone cannot serve as a sufficient basis for rationality." He seems, however, to imply that proponents of EU theory have taken consistency to be sufficient justification for it. On the contrary, EU theory has been defended in a number of ways. The first and most natural support stems from the intuitive appeal of an axiom, the extent to which it provides a reasonable guide for individual behavior.^{2,3} Axioms decompose a larger theory into smaller pieces that can be separately judged as normative principles. For many students of decision theory, the independence axiom survives as a normative principle despite the substantial psychological pull of EU "counter-examples" such as the Allais paradox.⁴ Second, EU theory supporters have enumerated many implications of violating EU, such as dynamically inconsistent behavior, vulnerability to a money pump, a negative value of information, and "horizon inflexibility" (the optimal choice depends on how far the decision tree is carried out).⁵⁻⁸

Central to Cohen's thesis is the argument that the normative status of EU can be judged only through the lens of a broader vision of rationality, that "the value of rationality is its ability to help people further their own interests." Goal achievement seems to be indisputable as a principle of rationality. However, it

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