

DECISION-ANALYSIS NEWSLETTER

Published by the ORSA Special Interest Group on Decision Analysis

VOLUME 6, No. 1

March, 1987

Editor's Note

Please send copies of your complete but as-yet unpublished papers, together with abstracts not exceeding 200 words, to the editor:

Irving H. LaValle
A. B. Freeman School of Buisness
Goldring/Woldenberg Hall
Tulane University
New Orleans, LA 70118
(O) 504 865-5484
(H) 504 899-8110

Ramsey Medal

At the SIG membership meeting in New Orleans on May 4, 1987, the third award of the Frank P. Ramsey Medal will be presented. To whom? Come to the meeting and find out!

A Letter to the Editor: Ward Edwards on Appliers (Final Exam at the end!)

Dear Irv -- I have been meaning to write to you about the Decision Analysis Newsletter, the SIG, and its problems. When I saw the announcement of the competition for best applied paper, sponsored by the SIG, I had to laugh through (figurative) tears. So far as I am aware, most appliers of decision analytic methods (a) are not members of ORSA, TIMS, or the SIG, and (b) never write papers for publication. Thus we have the curious phenomenon of a technology vanishing from public view because of its success. Why? Appliers tend to live in consulting firms, not in academia. Societies of any kind are rather irrelevant to their concerns. They may or may not write reports, but few if any of them take the trouble of turning them into publication form and

(cont. page 2)

Kathryn Blackmond Laskey Wins 1986 ORSA Decision Analysis Special Interest Group Student Paper Competition

by L. Robin Keller

Dr. Kathryn Blackmond Laskey won the first annual ORSA Decision Analysis Special Interest Group's Student Paper Competition with her paper, "An Experimental Study of Multiattribute Utility Judgments." Dr. Laskey graduated from Carnegie-Mellon University. Her advisor on the paper was Professor Joseph Kadane. She currently works for Decision Science Consortium Inc. in Falls Church, Virginia.

Professor L. Robin Keller is the Chair of the 1987 Student Paper Competition. The winner will present his or her paper at the ORSA/TIMS meeting in St. Louis, October 25-28, 1987. Inquiries about this year's competition may be addressed to Professor Keller at the Fuqua School of Business, Duke University, Durham, NC 27706, (919) 684-2595, or (after May 1, 1987) at the Graduate School of Management, University of California, Irvine, CA 92717 (714) 865-6348.

Future Cluster Chairs:

Irv LaValle and Bob Bordley have organized the Decision Analysis sessions for the New Orleans and St. Louis meetings respectively. Greg Fischer is organizing the sessions for the Washington meeting (Spring 1988), and Detlof von Winterfeldt is doing the same for the Denver meeting. Anyone with suggestions for sessions should contact them.

submitting them to journals. Moreover, as applications become more and more important, they also become more and more invisible -- perhaps they are company confidential, perhaps classified. I know instances of both kinds, and indeed once had to recall a paper already submitted because I had unwittingly included in it some company confidential information. The most effective applicers are vigorously doing their thing, but that thing is not writing or publishing papers. Only a few of us, who have tried to keep one foot inside conventional academia and the other outside, have any awareness of this. Who are the invisible applicers, who would win an applications award hands down? I have a list of those I know, your list will overlap mine only somewhat. But they do exist, probably are numerous, and for the most part are not distressed over being invisible. The loss is ours, not theirs, for they have much to teach us. A convenient taxonomy for thinking about this topic defines three classes of experts in Decision Analysis: 1. Academics who teach the topic; 2. Straddlers, who both teach and apply; 3. Practitioners. Two sub-species of straddlers exist -- those outside of academia looking in, and those inside looking out. Rex Brown is one of the former; Ron Howard and myself are among the latter. Straddlers try to bridge the two worlds of academia and practise. But our efforts seem to me to be failing -- partly because what the practitioners do is at best visible at 2nd or 3rd hand, and partly because interdisciplinary efforts suffer from invisibility even inside academia, and of course works of geniuses, visible via major honors (e.g., Herb Simon's Nobel prize), or via their exceptional skill in turning out brilliant practitioners (e.g. the platoons that have marched from the PhD-producing

laboratories of Clyde Coombs and Ron Howard into the consulting world). I see no ready solution to the problem of invisible practitioners. But I feel intensely the need for a solution. This letter is essentially a cry for help. The field will vanish if those who know how to use the tools are invisible, and those who teach them for the most part do not know how to use them. Perhaps the award is an attempt to extract invisible practitioners from the woodwork -- but it is guaranteed not to work. For most of us, even academics, writing is a painful necessity; why bother if you don't have to? I consider the problem of the invisible applicer to be one of the most crucial to face Decision Analysis as a field. To put it bluntly: academic decision analysts, for the most part, don't know what the hell is going on! You are an academic decision analyst. Let's try a little test. 1. What are swing weights? Why are they the preferred weight elicitation method of most of the practitioners I know? 2. What procedures are used in decision conferencing? What computer programs are most commonly used to support them? Who is the leading practitioner of decision conferencing in England? 3. What is the most common single-attribute utility function elicitation procedure used by practitioners? 4. What do practitioners do about risk aversion? I am confident of my answers to 1,2, and 4. I am less confident of my answer to 3, since I haven't taken a poll, and don't even know the identities of those who should be polled. To pique your curiosity, and thus to stimulate some thought about the problem presented by invisible practitioners, I will omit from this letter my answers to those questions. As I said, this letter is a cry for help. Cordially, Ward Edwards (Ed. note: Answers in the next issue!)

From Peter C. Fishburn, AT&T Bell Laboratories, Murray Hill, NJ 07974:

Generalizations of Expected Utility Theories: A Survey of Recent Proposals

This paper reviews recently developed theories that generalize the von Neumann-Morgenstern theory of preference under risk and Savage's theory of preference under uncertainty. The new theories are designed to accommodate systematic and predictable violations of previous theories while not giving up too much of the mathematical elegance of their expected utility representations. The material in the paper is adapted from the author's book Nonlinear Preference and Utility Theory.

From David E. Bell, The Harvard Business School, Boston, MA 02163:

Multilinear Representations for Ordinal Utility Functions:

An ordinal utility function u over two attributes X_1, X_2 is additive if there exists a strictly monotonic function ϕ such that $\phi(u) = v_1(x_1) + v_2(x_2)$ for some functions v_1, v_2 . Here we consider the class of ordinal utility functions over n attributes for which each pair of attributes is additive, but not necessarily separable, for any fixed levels of the remaining attributes. We show that while this class is more general than those that are ordinally additive, the assessment task is of the same order of difficulty, and involves a hierarchy of multilinear rather than additive decompositions.

From Charles M. Harvey, International Institute for Applied Systems Analysis, Laxenburg, Austria:

Special Conditions on Risk Attitudes.

This paper is concerned with a traditional problem in decision analysis, that of developing simple prescriptive models of preferences between lotteries. A general expected-utility model is assumed throughout. First, the condition of risk neutrality is shown to belong to a family of conditions, each of which determines the decision maker's utility function. Second, the condition of a constant risk attitude is shown to belong to an analogous family of conditions, each of which determines the decision maker's utility function except for a single parameter. Assumptions of the utility function's differentiability, and often of its continuity, are not needed in these models. Two contrasting methods are discussed by which the models can be used in applications.

From Robert F. Nau, Fuqua School of Business, Duke University, Durham, NC 27706:

Blau's Dilemma Revisited.

The issue of equivalence between chance-constrained programming problems (CCPP's) and Bayesian utility-maximization problems (BUMP'S), and the anomalous evaluation of information in CCPP'S, are re-examined in light of a recent paper by Jagannathan and the ensuing exchange between Jagannathan and LaValle. It is shown that, for a CCPP to maintain solution-set equivalence with a BUMP upon the receipt of sample information, its

risk levels must be allowed to vary with the information. Even in this context the two problems will generally yield different results for EVSI and EVPI, and the expected value of information in the CCPP may even be negative. The usefulness of the equivalence relation is further compromised by the need to assess certain weight parameters in the utility function of the BUMP. These points are illustrated in a numerical example due to Jagannathan.

From Jutta Brauers and Martin Weber, Forschungsgebiet Allgemeine Betriebswirtschaftslehre, RWTH Aachen, Templergraben 64, 5100 Aachen, West Germany:

Scenario Analysis as a Strategic Planning Tool: Comparison of Methodologies and the Presentation of a New Method.

We first present scenario analysis as a qualitative forecasting technique useful for strategic planning. Then we develop an overview of the two classes of methods for scenario analysis described in the literature. Based on both classes, a new method is developed which especially fits the needs of strategic planning. The method can be divided into three stages: 1. Determination of compatible scenarios, 2. Determination of scenario probabilities, and 3. Determination of main scenarios. An example is given to illustrate the method.

From Richard Engelbrecht-Wiggans, College of Commerce and Business Administration, University of Illinois, Champaign, IL 61820:

Optimal Auctions: The Efficiency of Oral Auctions Without Reserve for Risk Neutral Bidders with Private Values and Costly Information.

We argue that for one family of auction models, oral auctions generate nearly as high a selling price as can be reasonably expected. Specifically, consider the case of uninformed risk neutral individuals who must acquire (at a known cost) perfect information on their own values for the object being sold before being allowed to bid; perhaps one incurs costs in traveling to the auction, but once there can costlessly inspect and accurately appraise the objects(s) being sold. To assure the potential buyers as a whole a non-negative expected profit, the selling price cannot average above the maximum (over sets of potential buyers) of the bidders' highest value net of all potential buyer's costs. Then for a progressive oral auction with a reservation price equal to the seller's value for the object, at equilibrium -- with respect both to who participates and to how bidders bid -- the expected price of the object falls short of the maximum possible by less than the effect on the selling price of having one too many potential buyers. An entry fee (paid to the seller), a reservation price, or a subsidy (paid by the seller) can decrease this gap between the equilibrium price and the maximum possible. However, the optimal sizes of such fees, reservation prices, or subsidies depend on the distribution of the potential buyers' values; the auction must now be tailored to the specific situation. Still, an optimal fee or reservation price will not reduce the number of potential buyers below the original equilibrium number, nor will an optimal subsidy increase the number by more than one. Thus, roughly speaking, except for the discreteness of the number of potential buyers, an oral auction without reserve generates the highest selling price that can be reasonably expected in the case of risk neutral bidders, private values, and costly participation.

On Gains to Bid-Takers From Using Multi-stage Auctions

Each year, multi-stage auctions of one form or another sell or let billions of dollars worth of goods and contracts. Yet despite the significance of such auctions, the existing theory of auctions and competitive bidding fails to explain why a bid-taker might prefer a multi-stage auction to a, possibly simpler, single-stage mechanism. In fact, the existing theory tends to overlook multi-stage mechanisms altogether.

This paper takes a first step in correcting that omission. We start with several illustrations of what we will define to be multi-stage auctions. All the illustrated auctions allow bidders to acquire information -- or, more generally, to increase the amount of resources committed to bidding -- in stages. We conjecture that allowing such a sequential commitment of resources could result in a more efficient auction than if bidders had no chance to adjust their commitments.

An analytic example illustrates and documents the benefits to the bid-taker from using a multi-stage auction. In the example, bidders acquire costly information in stages; a bidder may stop acquiring additional information as soon as further participation in the auction would no longer increase his expected net profit. The resulting auction generates significantly more expected revenue for the bid-taker than if the bidders all had to acquire the same amount of information.