

From the Editor . . .

L. Robin Keller

Operations and Decision Technologies, The Paul Merage School of Business, University of California,
Irvine, Irvine, California 92697, lrkeller@uci.edu

This issue begins with a multi-attribute utility model by Ralph L. Keeney and Dinah A. Vernik for a woman's decision to have a child when facing the biological clock. Then Barry R. Cobb presents a method for analysis of influence diagrams which contain continuous decision variables and non-Gaussian probability distributions. Next is an article by Johan René van Dorp, Salvador Cruz Rambaud, José García Pérez, and Rafael Herrerías Pleguezuelo, who introduce a probability elicitation procedure for the generalized trapezoidal distribution with a uniform central stage. This issue ends with an essay by Michael H. Rothkopf on why decision analysis, rather than game theory, is the right tool for auctions.

Key words: decision analysis; applications: medical; multiattribute utility theory; objectives: structuring of; timing of decisions; influence diagram; approximations; value of information; probability: elicitation; generalized trapezoidal distribution; games-group decisions: bidding-auctions; editorial

"It's not hard to make decisions when you know what your values are."
Roy Disney

Value-focused thinking is fundamental to decision making, as highlighted by the quote above from Roy Disney. An overarching theme of understanding and modeling a decision maker's values and subjective probabilities for decisions under risk cuts across all of the papers in this issue, as well represented by Keeney and Vernik's multiattribute model for aiding a woman's decision of when (and whether) to attempt to become pregnant.

When I think about multiple objectives in decision making, I think of Howard Raiffa's fundamental work on multiattribute utility (e.g., Keeney and Raiffa 1976). When I think about studying decisions under risk, I think of Duncan Luce's fundamental work on *how* people make choices among risky alternatives (e.g., Luce 2000). This leads me to this issue's *Trivia question*: What do Howard Raiffa and R. Duncan Luce have in common? (a) Decision Analysis Society Ramsey Medalist, (b) co-author of a book published 50 years ago, (c) Harvard, (d) all of the above, (e) none of the above.¹

¹ *Trivia answer*: (d) all of the above. *Games and Decisions* by Luce and Raiffa (1957) is now 50 years old. Both have been Harvard professors and both have won the Frank P. Ramsey Medal. The

In their paper on "Analysis of the Biological Clock Decision," Ralph L. Keeney and Dinah A. Vernik present a modeling approach to consider the professional, social, and family aspects of a woman's life and integrate them into a quality of life utility function with the novel feature of allowing change in the relative importance of these aspects as the woman becomes older. Combining preference information with the probability of conceiving when trying, as a function of a woman's age, they demonstrate how to calculate when a woman should begin trying to conceive her first child. A previous paper in *Decision Analysis* by Keeney (2004) advised that "more emphasis must be placed on structuring decisions worth thinking about." In this paper, Keeney and Vernik have certainly addressed a significant personal decision involving probabilistic uncertainty that is "worth thinking about." See Baucells and Rata (2006) in *Decision Analysis* for a survey on people's personal and professional decisions under uncertainty.

Medical decision models have been addressed earlier in *Decision Analysis* by Gordon Hazen (2004, 2007)

Medal, the highest award of the Decision Analysis Society of INFORMS, is named in honor of Frank Plumpton Ramsey, a Cambridge University mathematician who was one of the pioneers of decision theory in the 20th century. (Source: <http://decision-analysis.society.informs.org/Activities/ActivitiesAwards.html>.)

and by Stephen Pauker (the “Father of Medical Decision Analysis”) and John Wong (2005), who discussed the use of influence diagrams in medical decisions. For our next article, we move away from the medical domain to influence diagrams.

In “Influence Diagrams with Continuous Decision Variables and Non-Gaussian Uncertainties,” Barry R. Cobb defines operations for solving a specific type of influence diagram (“solving” an influence diagram is analogous to “rolling back” a decision tree to identify the optimal decision). He demonstrates the method to solve a continuous decision MTE influence diagram (one which uses mixtures of truncated exponentials (MTE) potentials to approximate probability density functions and utility functions, and develops a piecewise linear decision rule for continuous decision variables). A number of papers published earlier in *Decision Analysis* have addressed influence diagrams, particularly in the 2005 special issues (Volume 2, issues 3 and 4) on graph-based representations, including Howard and Matheson (2005a, b), Pearl (2005), Buede (2005), Detwarasiti and Shachter (2005), Matheson and Matheson (2005), and Boutilier (2005).

Our next article, “An Elicitation Procedure for the Generalized Trapezoidal Distribution with a Uniform Central Stage,” is by Johan René van Dorp, Salvador Cruz Rambaud, José García Pérez, and Rafael Hererías Pleguezuelo. The triangular distribution, popular in Monte Carlo simulation applications, can be generalized by a trapezoidal distribution. This paper presents novel probability elicitation procedures for obtaining information from experts to estimate the parameters of the generalized trapezoidal distribution with a uniform mid-section. Van Dorp’s previous publication in *Decision Analysis* was on correlated expert probability judgments (Merrick et al. 2005).

We complete this issue with Michael H. Rothkopf’s essay on “Decision Analysis: The Right Tool for Auctions,” in which he compares the relative merits of decision analysis and game theory for bidders in standard sealed bid auctions and for design of auctions. Previous articles in *Decision Analysis* addressing this issue are by van Binsbergen and Marx (2007) and Cavusoglu and Raghunathan (2004).

Our *Decision Analysis* editorial objectives and audience are printed on the inside back cover of every

issue. I strongly encourage submissions of manuscripts from the wide array of decision research fields. Whenever topics from a broadly related field are aimed for the journal, the focus should be on potential contributions to prescriptive decision analysis. Such manuscripts should include a discussion of implications of the work for aiding decision making, and a literature review to demonstrate how the manuscript’s field relates to the decision analysis literature.

Decision Analysis will soon be moving to the online manuscript submission and review system, Manuscript Central, which is also used by other journals published by INFORMS. Our Managing Editor, Ms. Kelly M. Kophazi (kmkophazi@earthlink.net), and I have been working on setting up the system for our journal. Please check our website (<http://da.pubs.informs.org/>) for the latest information on the submission process.

References

- Baucells, M., C. Rata. 2006. A survey study of factors influencing risk-taking behavior in real-world decisions under uncertainty. *Decision Anal.* 3(3) 163–176.
- Boutilier, C. 2005. The influence of influence diagrams on artificial intelligence. *Decision Anal.* 2(4) 229–231.
- Buede, D. M. 2005. Influence diagrams: A practitioner’s perspective. *Decision Anal.* 2(3) 235–237.
- Cavusoglu, H., S. Raghunathan. 2004. Configuration software: A comparison of decision and game theory approaches. *Decision Anal.* 1(3) 131–148.
- Detwarasiti, A., R. D. Shachter. 2005. Influence diagrams for team decision analysis. *Decision Anal.* 2(4) 207–228.
- Hazen, G. B. 2004. Multiattribute structure for QALYs. *Decision Anal.* 1(4) 205–216.
- Hazen, G. B. 2007. Adding extrinsic goals to the quality-adjusted life year model. *Decision Anal.* 4(1) 3–16.
- Howard, R. A., J. E. Matheson. 2005a. Influence diagrams. *Decision Anal.* 2(3) 127–143.
- Howard, R. A., J. E. Matheson. 2005b. Influence diagram retrospective. *Decision Anal.* 2(3) 144–147.
- Keeney, R. L. 2004. Making better decision makers. *Decision Anal.* 1(4) 193–204.
- Keeney, R. L., H. Raiffa. 1976. *Decisions with Multiple Objectives*. Wiley, New York.
- Luce, R. D. 2000. *Utility of Gains and Losses: Measurement-Theoretic and Experimental Approaches*. Lawrence Erlbaum Association, Mahwah, NJ.
- Luce, R. D., H. Raiffa. 1957. *Games and Decisions: Introduction and Critical Survey*. Wiley, New York.
- Matheson, D., J. E. Matheson. 2005. Describing and valuing interventions that observe or control decision situations. *Decision Anal.* 2(3) 165–181.

- Merrick, J. R. W., J. R. van Dorp, A. Singh. 2005. Analysis of correlated expert judgments from extended pairwise comparisons. *Decision Anal.* 2(1) 17–29.
- Pauker, S. G., J. B. Wong. 2005. The influence of influence diagrams in medicine. *Decision Anal.* 2(4) 238–244.
- Pearl, J. 2005. Influence diagrams—Historical and personal perspectives. *Decision Anal.* 2(4) 232–234.
- van Binsbergen, J. H., L. M. Marx. 2007. Exploring relations between decision analysis and game theory. *Decision Anal.* 4(1) 32–40.