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Editor's notes

Just a reminder that we are eager to publish abstracts of all papers in the area of Decision Analysis, broadly conceived. The only requirements for our publishing an abstract of your work are:

1) That the paper itself be available for distribution upon request; and 2) that the abstract not exceed 200 words by much.

If there is a charge, please so indicate when you send your *complete paper* to the editor:

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Please phone or write in any changes in your activities or employment that could be of interest to our membership.

Please Note: Inform the ORSA business office at Mount Royal and Guilford Avenues, Baltimore MD 21202 of address change; we get our mailing labels from them! Thanks!

Also Note: To be included on the mailing list, you should join the Special Interest Group on Decision Analysis: send letter to ORSA office and $3 ($5) for a ORSA (non)member.

Inside

Candidates for Vice Chair/Chair Elect :

James S. Dyer

James S. Dyer is Foster Parker Centennial Professor of Management and Finance and Chair of the Department of Management Science and Information Systems at the University of Texas in Austin, to which he came in 1978 after several years on the Faculty of the Graduate School of Management at UCLA. He holds B.A. and Ph.D Degrees from the University of Texas.

He is the author of an introductory textbook and has published over thirty articles and chapters in leading publications on topics such as multiple-criteria decision making, measurable multiattribute value functions, subjective probability assessments obtained through decomposition, and (to appear soon) the Analytic Hierarchy Process. His current research interests concern capital-budgeting methodology which synthesizes the concepts of decision analysis and those of traditional financial theory.

He has consulted extensively for major private and public organizations such as Standard Oil Co. (Indiana), Rand, Jet Propulsion Laboratories, the Salt River Project, the Los Alamos Laboratories, and Texas Instruments, for whom he provided guidance regarding the development of the ARBORIST decision-analysis software.

Craig W. Kirkwood

Craig W. Kirkwood is Professor of Management Science at Arizona State University. His current research interests are in approximation methods to simplify application of multiobjective decision analysis, and development of better computational and modeling support for decision analysis. He has served as Chair of the Department of Decision and Information Systems at Arizona State, Acting Dean of the ASU College of Business, Senior Project Engineer and Manager of the Decision Analysis Group at Woodward-Clyde Consultants, San Francisco, and a member of the faculty at the University of Michigan and the University of Colorado at Colorado Springs.

He has served in a variety of positions in ORSA and TIMS, including Chair of the ORSA/TIMS Combined Publications Committee, Chair of the ORSA Publications Committee, member of the ORSA/TIMS Combined Finance Committee, and Vice Chairman of the Joint Northern California Chapter. He also served as Editor for the *Operations Research* special issue on decision analysis (January-February 1980) and as Associate Editor for the decision analysis department in *Management Science*. His articles on decision and risk analysis applications and methodology have appeared in *Operations Research, Management Science*, and other journals. He holds S.B., S.M., E.E., and Ph.D. degrees from the Massachusetts Institute of Technology.

Candidates for Secretary-Treasurer:

Colin F. Camerer received a BA in quantitative studies from Johns Hopkins in 1977, an MBA in finance (1979) and a Ph.D. in behavioral decision theory (1981) from the University of Chicago Graduate School of Business. He taught corporate strategy for two years at the Kellogg Graduate School of Management, Northwestern, and came to the Wharton School, Department of Decision Sciences in 1983, where he is now an associate professor. He also was a visiting assistant professor of business at the California Institute of Technology in 1987. His research interests include experimental economics, choice and game theory, and corporate strategy. He has published several articles on these topics in economics journals. He is on the editorial boards of *Journal of Behavioral Decision Making, Management Science*, and *Quarterly Journal of Economics*.

Robert F. Nau received his Ph.D. in Industrial Engineering and Operations Research from the University of California-Berkeley in 1981. He served as Manager of Information Systems at Liberty

Mutual Insurance in Boston for two years, coming to the A. B. Freeman School of Business at Tulane University in 1983. Since 1985, he has been an Associate Professor in the Fuqua School of Business at Duke University. His research interests concern the foundations of decision theory and game theory, particularly from the coherence or non-arbitrageability viewpoint, as well as applications in business and economics. He is an Associate Editor of *Management Science.*

Candidates for Council:

Gregory W. Fischer is currently Associate Professor of Decision Sciences at Carnegie Mellon University. He received his Ph.D. in psychology from the University of Michigan and was on the Faculty of Duke University before coming to Carnegie Mellon. His research focuses on links between behavioral and prescriptive decision theory, particularly on issues surrounding modeling and assessment of preferences for decision outcomes. His previous research has been published in a variety of journals including *Management Science, Organizational Behavior and Human Decision Processes, Decision Sciences,* and *American Political Science Review.* He is currently co-editor of the Decision Analysis Department of *Management Science.*

Gordon B. Hazen is Associate Professor of Industrial Engineering and Management Sciences at Northwestern University. His areas of research interest include statistical decision theory and decision analysis; utility and preference models; uncertainty modeling in decision analysis and artificial intelligence; multiple criteria decision making; and stochastic and decision-analytic applications in medical decision making. His papers have appeared in such journals as *Operations Research, Management Science, Theory and Decision, Mathematics of Operations Research,* and *Journal of Optimization Theory and Applications.* He is an associate editor for *Management Science* and was associate editor for the 1988 special issue of *Naval Research Logistics Quarterly* on multiple criteria decision making.

Donald L. Keefer is Associate Professor of Management Science in the Department of Decision and Information Systems, College of Business, Arizona State University. He holds a B.S. from Carnegie-Mellon and an M.S. from Stanford in Mechanical Engineering and an M.S. and Ph.D. from Michigan in Industrial and Operations Engineering (1976). He has had fourteen years of industrial experience with Gulf Oil and one year with Chevron, most of it within Gulf's management sciences group where he specialized in decision-analysis applications. He is conducting research on models for resource allocation problems involving major uncertainties and on approximation methods in probabilistic modeling.

Don N. Kleinmuntz is Associate Professor of Accountancy and Decision Research and Distinguished Research Fellow at The University of Illinois at Urbana-Champaign. His research interests focus on cognitive processes in decision making, including issues related to assessing and improving the effectiveness of decision analysis and computer-based decision-aiding techniques. Prior to joining the faculty at Illinois, he was a member of the faculties of the Sloan School of Management of the Massachusetts Institute of Technology and the Graduate School of Business of the University of Texas at Austin. He received a B.A. in Statistics, an MBA, and a Ph.D. in Business Admin- istration specializing in Decision Research, all from the University of Chicago. He has published articles in journals including *Management Science, Organizational Behavior and Human Decision Processes,* and *Psychological Review*, as well as chapters in a number of books. He currently serves on the editorial board of *Organizational Behavior and Human Decision Processes*, and is a member of the Publication Committee of the Society for Judgment and Decision Making. He is a member of the Institute of Management Sciences, the Operations Research Society of America, the American Psychological Society, and the Society for Judgment and Decision Making.

PAPERS RECEIVED

Please request copies directly from the author, not the Newsletter Editor

From Robert F. Bordley, General Motors Research Laboratories, Warren, MI 48090:

Two-Stage Bayesian Choice Models for Gaussian Lotteries

Psychological experiments have shown that the classical expected utility model appears descriptively inappropriate. This paper shows how the expected utility model can be reconciled with these experiments by supposing that individuals have prior expectations about lottery payoffs. Given these prior expectations, Bayesian theory implies that individuals revise lottery probabilities in light of these prior expectation, before choosing among lotteries so as to maximize utility. This theory, when formalized for lotteries which are normal distributions, implies a model exhibiting risk aversion for gains and risk seeking for losses, violations of independence, occasional intransitivity and non-monotonicty.

From **James L. Corner** and **Craig W. Kirkwood**, Dept. of Decision and Information Systems, Arizona State University, Tempe, AZ 85287-4206:

Decision Analysis Applications in the Operations Research Literature, 1970-1988

Applications of decision analysis that appeared in major English language operations research journals and closely related journals from 1970 through 1988 are surveyed. In addition, references are presented for useful decision analysis methods that are often not covered in introductory textbooks. The intent is to provide a guide to relevant source material for operations research practitoners interested in applying decision analysis methods. The applications are classified into five areas: energy, manufacturing and services, medical, public policy, and general. The energy application are futher subclassified into bidding, product selection, regulation, site selection, and technology choice. Those in manufacturing and services are subclassified into budget allocation, product planning, strategy, and miscellaneous. Applications in public policy are subclassified into standard-setting and miscellaneous. Those articles are noted which present significant detail about methodological and implementation issues, including problem structuring/formulation, decision trees, probability assessment, utility assessment, communication/facilitation, and group decision making.

From **Peter C. Fishburn**, Rm 2C-354, AT&T Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ 07974-2070:

Nontransitive Preferences in Decision Theory

Intransitive preferences have been a topic of curiosity, study and debate over the past 40 years. Many economists and decision theorists insist on transitivity as the cornerstone of rational choice, and even in behavioral decision theory intransitivities are often attributed to faulty experiments, random or sloppy choices, poor judgment, or unexamined biases. But others see intransitive preferences as potential truths of reasoned comparisons and propose representation of preferences that accommodate intransitivities.

This paper offers a partial survey of models for intransitive preferences in a variety of decisional contexts. These include economic consumer theory, multiattribute utility theory, game theory, preference between time streams, and decision making under risk and uncertainty. The survey is preceded by a discussion of issues that bear on the relevance and reasonableness of intransitivity.

From **Martin Gaynor**, Dept. of Health Policy and Management, Johns Hopkins University, 624 North Broadway, Baltimore, MD 21205, and **Paul Kleindorfer**, University of Pennsylvania [address requests to Dr. Gaynor]:

Equilibrium Misperceptions

There has been a growing interest among economists in behavior which appears to be anomalous with respect to the axioms of economic rationality. A number of recent papers have analyzed the effects of agents' misperceptions about the relationship between actions and outcomes. The "rationality" of these misperceptions has not been considered, however. In this paper we prove the existence of an equilibrium with misperceptions in which misperceptions are "rational" and can be sustained.

From **Itzhak Gilboa** and **Robert Lapson**, J. L. Kellogg Graduate School of Management, Northwestern University, Evanston, IL 60208:

Aggregation of Semiorders: Intransitive Indifference Makes a Difference

A semi-order can be thought of as a binary relation P for which there is a utility u representing it in the following sense: xPy iff $u(x) - u(y) > 1$.

Weak orders (for which indifference is transitive) can not be considered a successful approximation of semi-orders; for instance, a utility function representing a semi-order in the manner mentioned above is almost unique, i.e. cardinal and not only ordinal.

In this paper we deal with semi-orders on a product space and their relation to given semi-orders on the original spaces. Following the intuition of Rubinstein we find surprising results: with the appropriate framework, it turns out that a Savage-type expected utility requires significantly weaker axioms than it does in the context of weak orders.

Moreover, our axioms provide a conceptual basis for the weighted average paradigm in general, and, in particular, may be used to justify utilitarianism in a social choice context.

From **Charles M. Harvey**, College of Business Administration, University of Houston, Houston, TX 77204-6282:

Structured Additive-Value Models of Tradeoffs

This paper discusses prescriptive models for an individual's or society's tradeoffs between different objectives. These multivariable models are sufficiently general so that they can represent the issue of the dependence of tradeoffs on the base amounts of the variables and the issue of concern for equity or balance in the distribution of the amounts of the variables. The models also are sufficiently structured so that they provide a practical alternative to multiattribute utility models for those decision problems in which the preference issues are tradeoffs rather than risk attitudes.

From **Craig W. Kirkwood**, Dept. of Decision and Information Systems, Arizona State University, Tempe, AZ 85287-4206:

Estimating the Impact of Uncertainty on a Deterministic Multiattribute Evaluation

A method is presented to estimate the impact of uncertainty on the results of a multiattribute evaluation prior to conducting a complete probabilistic multiattribute utility analysis. The method assumes that a deterministic analysis has been completed using a weighted-additive multiattribute value (evaluation) function and that either an additive or multiplicative utility function is appropriate for the multiattribute utility analysis. These

conditions are widely met in practice, so the method can be used in many practical situations. An approximation procedure is developed to estimate whether the effects of uncertainty about attribute levels could change deterministic evaluation results. An illustrative application demonstrates the use of the procedure to simplify analysis of the effects of uncertainty.

From **Jeffrey E. Kottemann**, Graduate School of Business Administration, University of Michigan, Ann Arbor, MI 48109-1234:

Decisional Conflict and the Perceived Usefulness of Multi-Criteria Decision Making Aids

Over the past two decades, numerous computer-based aids for Multi-Criteria Decision Making (MCDM) have been developed and refined. Despite the development of increasingly sophisticated MCDM methods, experimental evidence indicates that users most often prefer relatively unsophisticated methods. In this note, we describe a model -- relating response mode, decision strategy, the salience of decisional conflict, and user attitudes -- which helps explain such user preferences. We then discuss potential generalization to decision aids for problem formulation, basic implications for decision aid design, and future empirical research needed to test the robustness of previous MDCM study findings.

From **R. Duncan Luce**, Social Science Tower, University of California at Irvine, Irvine, CA 92717, and **Peter C. Fishburn**, AT&T Bell Laboratories, Murray Hill, NJ 07974-2070:

Rank- and Sign-Dependent Linear Utility Models for Finite First-Order Gambles

For finite first-order gambles -- mappings from finite event partitions into a set of pure consequences -- axioms are given that lead to a representation that combines features of prospect theory and the general rank-dependent theories. The axioms include four structural ones that insure a certain richness to the domain of choice. There are four rationality ones: (i) monotonicity of preference with respect to consequences in binary gambles; (ii) preference and joint receipt of gambles from an ordered concatenation structure in which preferences are transitive and both monotonicity and accumulativity of joint receipt hold relative to preference, and, in addition, three special axioms that relate the positive and negative domains; (iii) an accounting equivalence to the effect that indifference obtains between a gamble and its decomposition into subgambles that involve only consequences of the same sign; and (iv) another accounting equivalence that any gamble whose consequences are of one sign is judged indifferent to the joint receipt of the consequence closest to the status quo plus the gamble obtained by "subtracting" that consequence from all of the others. And finally we assume one non-rational decomposition axiom that possibly is descriptive in character. It says in essence that a mixed gamble is thought of as the joint receipt of its positive part pitted against the status quo and of its negative part pitted against the status quo. This important assumption is especially in need of empirical investigation. The resulting representation in a sense includes all previous ones for first-order gambles, including SEU, prospect theory, and rank-dependent theories.

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

Joint Coherence in Games of Incomplete Information

This paper addresses two questions that have been troubling for noncooperative game theory: how do the "rules of the game" (the probabilities and utilities of the players) become common knowledge, and why should the players seek an "equilibrium" solution? It is shown that common knowledge of probabilities and utilities can be achieved in principle through the operation of a market in which the players accept gambles concerning the outcome of the game. A rational (jointly coherent) outcome is defined as one that does not lead to arbitrage in the context of such a market, and rational outcomes are found to be supported by common

prior distributions over states of nature and correlated equilibrium distributions over strategies. Such distributions are generally not unique, and their elements are interpreted as state prices (products of probabilities and marginal utilities) rather than personal probabilities. It is argued that the distinction between individual and strategic rationality can be reduced to a distinction between *ex ante* and *ex post* coherence.