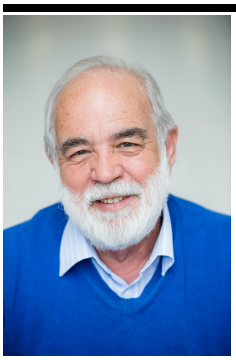
Theodor J Stewart

CV prepared: 20 January 2019



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Date and place of birth: 16 September 1943, Cape Town
Nationality: South African

Education

- B.Sc.(Chemical Engineering), University of Cape Town, December 1963
- Hons.B.Sc.(Operations Research), University of South Africa, May 1972
- M.Sc.(Operations Research), University of South Africa, April 1973 (*Dissertation*: A production scheduling algorithm for the multi-product, multi-facility situation with capacity constraints)
- Ph.D.(Mathematical Statistics), University of South Africa, May 1976 (*Thesis*: Bayes optimal experimental design for determination of a response surface maximum)

Experience

Current position : Emeritus Professor of Statistical Sciences and Senior Research Scholar, University of Cape Town, Rondebosch, 7701, South Africa (formerly Professor of Statistical Sciences 1984–2008, and Head of Department 1989; 1994-1999)

Temporary part-time post (2007–2017): 20% part time Professor of Decision Science, Alliance Manchester Business School, University of Manchester, UK.

Visiting appointments: July-Dec 1993: Visiting Professor in the School of Computer Studies, the University of Leeds; **Sept-Dec 1997**: Visiting Professor, Faculty of Information Technology and Systems, Technical University Delft, The Netherlands; **Apr-June 2002**: Visiting Professor, Institute for Environmental Studies, Free University of Amsterdam; **July-Oct 2002**: Visiting Professor, Leeds University Business School.

1971-1984: National Research Institute for Mathematical Sciences, Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa (Final post: Director and Head, Operations Research and Statistics.)

1967-1971: Sentrachem Group, Johannesburg. (Final post: Plant Superintendent, Formulation, at Klipfontein Organic Products, Chloorkop, Transvaal.)

1964-1967: Corner House Group, Johannesburg (Chemical Engineer, mineral processing plants and laboratories.)

Research and Consulting Interests

- Multiple criteria decision analysis (MCDA) and multi-objective optimization;
- Applications of MCDA to natural resource management; project selection and scheduling;
- Decision theory and Bayesian statistics;
- Applications of linear programming and simulation models in industrial planning.

Graduate Students

Doctoral degree completed:

- J P Strumpfer-PhD-Cape Town (1982): Searching for an object which reacts to search.
- K C Jordi-PhD-Witwatersrand (1985): Interactive multiple objective linear programming.
- P M Q Lay-PhD-Cape Town (1986): Stratifying and ranking the information systems development portfolio.
- J Miller-PhD-Cape Town (1989): The effectiveness of computer–based information systems: Definition and measurement.
- R van den Honert-PhD-Cape Town (1995) Game-theoretic models for mergers and acquisitions
- Dingfei Liu-PhD-Cape Town (2001): An object-oriented approach to structuring multicriteria decision support in natural resource management problems
- A R Joubert-PhD-Cape Town (2003): Multi-attribute value measurement and economic paradigms in environmental decision making
- I N Durbach-PhD-Cape Town (2011): Simplified models for multi-criteria decision analysis under uncertainty
- R Tuyiragize-PhD-Cape Town (2011): Multi-objective Optimization Techniques in Electricity Generation Planning
- B Shavazipour-PhD-CapeTown (2018): Multi-objective optimisation under deep uncertainty

Professional Memberships and Activities

- **Membership of professional societies and bodies**
  - Retired Professional Engineer (South Africa)
  - Chartered Member of ICCSSA (Institute of Certificated and Chartered Statisticians of South Africa)
  - Operations Research Society of South Africa (Fellow, past president and holder of various other offices, including chairmanship of two chapters (Pretoria and Western Cape).
  - South African Statistical Association (Fellow and Past President)
  - The Southern African Institute for Industrial Engineers
  - Institute for Operations Research and the Management Sciences (INFORMS)
  - American Statistical Association

- Operational Research Society

- International Federation of Operational Research Societies (IFORS): Vice-President for 2004-2006; Chair of the Developing Countries Committee (2004–2009); Chairman of the International Programme Committee for the 14th Triennial IFORS Conference held in Vancouver, Canada, July 1996
- International Society on Multiple Criteria Decision Making: President (2004–2008); Chairman of the organizing committee for the 13th International Conference on Multiple Criteria Decision Making, Cape Town, January 1997
- Board Member (2012-2014;2017-2019), MCDM Section, Institute for Operations Research and the Management Sciences (INFORMS)
- Coordinator of the European Special Interest Group on Multicriteria Analysis (ESIGMA), 1996 – 2005
- Founding editor of ORiON, official journal of the Operations Research Society of South Africa (1984-89)
- Member of the Peer Review College, Engineering and Physical Sciences Research Council (UK) 2006–2009 (As a foreign member)
- **Membership of editorial boards**:
  - Editor-in-Chief of the Journal of Multi-Criteria Decision Analysis (Publ. Wiley), 2009-
  - Editorial Board of International Transactions in Operational Research (Publ. Pergamon); African Editor; Special guest editor for papers emanating from the 15th Triennial Conference of the International Federation of Operational Research Societies (held in Beijing, China, August 1999).
  - Associate Editor, ORiON (Journal of the Operations Research Society of South Africa)
  - International Advisory Board of the Journal of the Operational Research Society (Publ. Macmillan)
  - Editorial Board of The Journal of Financial Decision Making (Greece)
  - Editorial Board of Operational Research - An International Journal (Springer)
  - Editorial Advisory Board - International Journal of Strategic Decision Sciences
  - Associate Editor of Omega: The International Journal of Management Science (Publ. Pergamon) – Up to 2009

Honours and Awards

- Fellow of the Royal Society of South Africa
- Fellow of the University of Cape Town
- Member of the Academy of Science of South Africa
- Awarded Gold Medal of the International Society on Multiple Criteria Decision Making (2008)
- Awarded the EURO (Association of European O R Societies) Distinguished Service Medal (2013)

- Fellow and Honorary Life Member of the Operations Research Society of South Africa
- Fellow and Honorary Member of the South African Statistical Association
- Six times winner of the Tom Rozwadowski medal of the Operations Research Society of South Africa: 1978 (with H W Ittmann), 1981, 1984, 1995, 1996 (with L Scott), 2015 (with L Scott)
- Category I Recognition Award of the Operations Research Society of South Africa ("for outstanding contributions to ORSSA and to the profession of Operations Research): 2012

PUBLICATIONS

Books

[1] M. Ehrgott, B. Naujoks, T. J. Stewart, and J. Wallenius, editors. *Multiple Criteria Decision Making for Sustainable Energy and Transportation Systems*, volume 634 of *Lecture Notes in Economics and Mathematical Systems*. Springer, Heidelberg, 2010.

[2] V. Belton and T. J. Stewart. *Multiple Criteria Decision Analysis: An Integrated Approach*. Kluwer Academic Publishers, Boston, 2002.

[3] T. Gal, T. J. Stewart, and T. Hanne, editors. *Multicriteria Decision Making: Advances in MCDM Models, Algorithms, Theory, and Applications*. Kluwer Academic Publishers, Boston, 1999.

[4] T. J. Stewart and R. C. van den Honert, editors. *Trends in Multicriteria Decision Making*. Springer-Verlag, Berlin, 1998.

Refereed Papers and Reports

[1] G. D. Barr, T. J. Stewart, and B. S. Kantor. "Big data" analysis: Putting the data cart before the modelling horse? *Journal of Applied Corporate Finance*, 30(2):40–44, 2018.

[2] K. V. Katsikopoulos, I. N. Durbach, and T. J. Stewart. When should we use simple decision models? a synthesis of various research strands. *Omega, The International Journal of Management Science*, 81:71–25, 2018.

[3] B. Cohen, H. Blanco, N. K. Dubash, S. Dukkipati, R. Khosla, S. Scrieciu, T. Stewart, and M. Torres-Gunfaus. Multi-Criteria Decision Analysis in policy making for climate mitigation and development. *Climate and Development*, 2018. Available on-line.

[4] N. Watson, I. Durbach, S. Hendricks, and T. Stewart. On the validity of team performance indicators in rugby union. *International Journal of Performance Analysis in Sport*, 17(4):609–621, 2017.

[5] T. J. Stewart and I. Durbach. Dealing with uncertainties in MCDA. In S. Greco, M. Ehrgott, and R. J. Figueira, editors, *Multiple Criteria Decision Analysis: State of the Art Surveys*, chapter 12, pages 467–496. Springer New York, New York, NY, 2016.

[6] T. J. Stewart. Multiple objective project portfolio selection based on reference points. *Journal of Business Economics*, 86:23–33, 2016.

[7] T. Eikelboom, R. Janssen, and T. J. Stewart. A spatial optimization algorithm for geodesign. *Landscape and Urban Planning*, 144:10–21, 2015.

[8] F. Ahjum and T. J. Stewart. A systems approach to urban water services in the context of integrated energy and water planning: A City of Cape Town case study. *Journal of Energy in Southern Africa*, 25(4):59–70, November 2014.

[9] N. M. Watson, T. J. Stewart, and L. Scott. Decision support for Foodbank South Africa. *ORiON*, 30:1–18, 2014.

[10] T. J. Stewart and R. Janssen. A multiobjective GIS-based land use planning algorithm. *Computers, Environment and Urban Systems*, 46:25–34, 2014. `http://dx.doi.org/10.1016/j.compenvurbsys.2014.04.002`.

[11] F. Weller, L.-A. Cecchini, L. Shannon, R. B. Sherley, R. J. M. Crawford, R. Altwegg, L. Scott, T. J. Stewart, and A. Jarre. A system dynamics approach to modelling multiple drivers of the African penguin population on Robben Island, South Africa. *Ecological Modelling*, 277:38–56, 2014.
http://dx.doi.org/10.1016/j.ecolmodel.2014.01.013.

[12] K. Miettinen, J. Mustajoki, and T. J. Stewart. Interactive multiobjective optimization with NIMBUS for decision making under uncertainty. *OR Spectrum*, 36:39–56, 2014.
http://dx.doi.org/10.1007/s00291-013-0328-5.

[13] T. J. Stewart and R. Janssen. Integrated value function construction with application to impact assessments. *International Transactions in Operational Research*, 20:559–578, 2013.
http://dx.doi.org/10.1111/itor.12016.

[14] R. Janssen, A. R. Joubert, and T. J. Stewart. A multicriteria approach to equitable fishing rights allocation in South Africa's Western Cape. In P. J. H. van Beukering, E. Papyrakis, J. Bouma, and R. Brouwer, editors, *Nature's Wealth: The Economics of Ecosystems Services and Poverty*, chapter 7, pages 155–171. Cambridge University Press, 2013.

[15] T. J. Stewart, S. French, and J. Rios. Integrating multicriteria decision analysis and scenario planning – review and extension. *Omega, The International Journal of Management Science*, 41:679–688, 2013.
http://dx.doi.org/10.1016/j.omega.2012.09.003.

[16] I. N. Durbach and T. J. Stewart. Modelling uncertainty in multi-criteria decision analysis. *European Journal of Operational Research*, 223:1–14, 2012.
http://dx.doi.org/10.1016/j.ejor.2012.04.038.

[17] I. N. Durbach and T. J. Stewart. A comparison of simplified value function approaches for treating uncertainty in multi-criteria decision analysis. *Omega, The International Journal of Management Science*, 40:456–464, 2012.
http://dx.doi.org/10.1016/j.omega.2011.08.004.

[18] I. N. Durbach and T. J. Stewart. An experimental study of the effect of uncertainty representation on decision making. *European Journal of Operational Research*, 214:380–392, 2011.
http://dx.doi.org/10.1016/j.ejor.2011.04.021.

[19] T. J. Stewart. Goal directed benchmarking for organizational efficiency. *Omega, The International Journal of Management Science*, 38:534–539, 2010.
http://dx.doi.org/10.1016/j.omega.2010.01.004.

[20] V. Belton and T. J. Stewart. Problem structuring and MCDA. In M. Ehrgott, J. R. Figueira, and S. Greco, editors, *Trends in Multiple Criteria Decision Analysis*, chapter 8, pages 209–239. Springer, 2010.

[21] T. J. Stewart, A. Joubert, and R. Janssen. MCDA framework for fishing rights allocation in South Africa. *Group Decision and Negotiation*, 19:247–265, 2010. http://dx.doi.org/10.1007/s10726-009-9159-9.

[22] I. N. Durbach and T. J. Stewart. Using expected values to simplify decision making under uncertainty. *OMEGA: International Journal of Management Science*, 37:312–330, 2009.
http://dx.doi.org/10.1016/j.omega.2007.02.001.

[23] J.-B. Yang, B. Y. H. Wong, D.-L. Xu, and T. J. Stewart. Integrating DEA-oriented performance assessment and target setting using interactive MOLP methods. *European Journal of Operational Research*, 195:205–222, 2009.
http://dx.doi.org/10.1016/j.ejor.2008.01.013.

[24] T. Stewart, O. Bandte, H. Braun, N. Chakraborti, M. Ehrgott, M. Göbelt, Y. Jin, H. Nakayama, S. Poles, and D. Di Stefano. Real-world applications of multiobjective optimization. In J. Branke, K. Deb, K. Miettinen, and R. Słowiński, editors, *Multiobjective Optimization – Interactive and Evolutionary Approaches*, chapter 11. Springer, 2008.

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`http://dx.doi.org/10.1068/b33071`.

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[33] I. Durbach and T. J. Stewart. Integrating scenario planning and goal programming. *Journal of Multi-Criteria Decision Analysis*, 12:261–271, 2003.

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[35] D. Liu and T. J. Stewart. Integrated object-oriented framework for MCDM and DSS modelling. *Decision Support Systems*, 38:421–434, 2004.

[36] T. J. Stewart, R. Janssen, and M. van Herwijnen. A genetic algorithm approach to multiobjective land use planning. *Computers and Operations Research*, 32:2293–2313, 2004.

[37] D. Liu and T. J. Stewart. Object-oriented decision support system modelling for multicriteria decision making in natural resource management. *Computers and Operations Research*, 31:985–999, 2004.

[38] A. Joubert, T. J. Stewart, and R. Eberhard. Evaluation of water supply augmentation and water demand management options for the City of Cape Town. *Journal of Multi-Criteria Decision Analysis*, 12:17–25, 2003.

[39] J. C. J. H. Aerts, M. van Herwijnen, and T. J. Stewart. Using simulated annealing and spatial goal programming for solving a multi site land use allocation problem. In C. M. Fonseca, P. J. Fleming, E. Zitzler, K. Deb, and L. Thiele, editors, *Evolutionary Multi-Criterion Optimization*, pages 448–463. Springer, 2003.

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[41] T. J. Stewart and F. B. Losa. Towards reconciling outranking and value measurement practice. *European Journal of Operational Research*, 145:645–659, 2003.

[42] T. J. Stewart, A. Joubert, and D. Liu. Group decision support methods to facilitate participative water resource management. Technical Report 863/1/01 (ISBN 1 86845 734 6), Water Research Commission, 2001.

[43] D. Nichols, T. Stewart, and D. Von Hippel. Planning approaches. Thematic Review V.1, World Commission on Dams, Cape Town, www.dams.org, 2000.

[44] B. E. Malyon and T. J. Stewart. Soft-OR and multicriteria decision analysis for group decision support: a case study in fisheries management. In Y. Y. Haimes and R. E. Steuer, editors, *Research and Practice in Multiple Criteria Decision Making*, pages 445–457. Springer, 2000.

[45] T. J. Stewart. Concepts of interactive programming. In T. Gal, T. J. Stewart, and T. Hanne, editors, *Multicriteria Decision Making: Advances in MCDM Models, Algorithms, Theory, and Applications*, chapter 10. Kluwer Academic Publishers, 1999.

[46] T. J. Stewart. Evaluation and refinement of aspiration-based methods in MCDM. *European Journal of Operational Research*, 113:643–652, 1999.

[47] V. Belton and T. J. Stewart. DEA and MCDA: Competing or complementary approaches? In N. Meskens and M. Roubens, editors, *Advances in Decision Analysis*, pages 87–104. Kluwer Academic Publishers, 1999.

[48] T. J. Stewart. Measurements of risk in fisheries management. *ORiON*, 14:1–15, 1998.

[49] T. J. Stewart and A. Joubert. Conflicts between conservation goals and land use for exotic forest plantations in South Africa. In E. Beinat and P. Nijkamp, editors, *Multicriteria Analysis for Land Use Management*, pages 17–31. Kluwer Academic Publishers, Dordrecht, 1998.

[50] W. H. H. Sauer, A. J. Penney, C. Erasmus, B. Q. Mann, S. L. Brouwer, S. J. Lamberth, and T. J. Stewart. An evaluation of attitudes and responses to monitoring and management measures for the South African boat-based linefishery. *South African Journal of Marine Science*, 18:147–163, 1997.

[51] T. J. Stewart, A. Joubert, L. Scott, and T. Low. Multiple criteria decision analysis: Procedures for consensus seeking in natural resources management. Technical Report 512/1/97 (ISBN 1 86845 318 9), Water Research Commission, 1997.

[52] T. J. Stewart. Convergence and validation of interactive methods in MCDM: simulation studies. In M. H. Karwan, J. Spronk, and J. Wallenius, editors, *Essays in Decision Making*, pages 7–18. Springer-Verlag, Berlin, 1997.

[53] T. J. Stewart. Future trends in MCDM. In J. Climaco, editor, *Multicriteria Analysis*, pages 590–595. Springer-Verlag, Berlin, 1997.

[54] T. J. Stewart. Scenario analysis and multicriteria decision making. In J. Climaco, editor, *Multicriteria Analysis*, pages 519–528. Springer-Verlag, Berlin, 1997.

[55] C. A. Bana e Costa, T. J. Stewart, and J.-C. Vansnick. Multicriteria decision analysis: some thoughts based on the tutorial and discussion sessions of the ESIGMA meetings. *European Journal of Operational Research*, 99:28–37, 1997.

[56] T. J. Stewart. Robustness of additive value function methods in MCDM. *Journal of Multi-Criteria Decision Analysis*, 5:301–309, 1996.

[57] T. J. Stewart. Relationships between data envelopment analysis and multicriteria decision analysis. *Journal of the Operational Research Society*, 47:654–665, 1996.

[58] T. J. Stewart and L. Scott. A scenario-based framework for multicriteria decision analysis in water resources planning. *Water Resources Research*, 31:2835–2843, 1995.

[59] T. J. Stewart. Simplified approaches for multi-criteria decision making under uncertainty. *Journal of Multi-Criteria Decision Analysis*, 4:246–258, 1995.

[60] R. Melville-Smith, P. C. Goosen, and T. J. Stewart. The spiny lobster *Jasus lalandii* off the South African coast: inter-annual variations in male growth and female fecundity. *Crustaceana*, 68:174–183, 1995.

[61] C. G. Troskie, D. O. Chalton, T. J. Stewart, and M. Jacobs. Detection of outliers and influential observations in regression analysis using stochastic prior information. *Communications in Statistics – Theory and Methods*, 23:3453–3476, 1994.

[62] T. J. Stewart. Data envelopment analysis and multiple criteria decision analysis: A response. *OMEGA: International Journal of Management Science*, 22:205–206, 1994.

[63] T. J. Stewart, L. Scott, and K. Iloni. Scenario based multicriteria policy planning for water management in South Africa. Technical Report 296/1/93 (ISBN 1 874858 97 7), Water Research Commission, 1993.

[64] T. J. Stewart. Use of piecewise linear value functions in interactive multicriteria decision support: A monte carlo study. *Management Science*, 39:1369–1381, 1993.

[65] T. J. Stewart. A critical survey on the status of multiple criteria decision making theory and practice. *OMEGA: International Journal of Management Science*, 20:569–586, 1992.

[66] V. Lotfi, T. J. Stewart, and S. Zionts. An aspiration-level interactive model for multiple criteria decision making. *Computers and Operations Research*, 19:671–681, 1992.

[67] R. C. van den Honert and T. J. Stewart. A game theoretic model for mergers and acquisitions. *European Journal of Operational Research*, 59:275–287, 1992.

[68] T. J. Stewart. A multicriteria decision support system for R&D project selection. *Journal of the Operational Research Society*, 42:17–26, 1991.

[69] T. J. Stewart. A review of simple multiple criteria decision analytic procedures which are implementable on spreadsheet packages. *ORiON*, 5:24–51, 1989.

[70] T. J. Stewart. Non-parametric empirical Bayes estimation of quantiles. *South African Statistical Journal*, 22:105–130, 1988.

[71] T. J. Stewart. Interactive utility assessment in multicriteria decision analysis using implicit tradeoff information. *Journal of the Operational Research Society*, 39:285–297, 1988.

[72] T. J. Stewart. Experience with prototype multicriteria decision support systems for pelagic fish quota determination. *Naval Research Logistics*, 35:719–731, 1988.

[73] T. J. Stewart and M. Brent. Decision support system for pelagic fish management policy generation. In G. K. Rand, editor, *Operational Research '87*, pages 119–129. North Holland, 1988.

[74] T. J. Stewart. An interactive multiple objective linear programming method based on piecewise linear additive value functions. *IEEE Transactions on Systems, Man and Cybernetics*, SMC-17:79–88, 1987.

[75] T. J. Stewart. Pruning of decision alternatives in multiple criteria decision making, based on the UTA method for estimating utilities. *European Journal of Operational Research*, 28:79–88, 1987.

[76] L. P. Fatti and T. J. Stewart. Quality control in export coal. *Journal of the Operational Research Society*, 37:1073–1080, 1986.

[77] T. J. Stewart. Experience with a Bayesian bootstrap method incorporating prior information. *Communications in Statistics: Theory and Methods*, 15:3205–3225, 1986.

[78] T. J. Stewart. A combined logistic regression and Zionts-Wallenius methodology for multiple criteria linear programming. *European Journal of Operational Research*, 24:295–304, 1986.

[79] T. J. Stewart. Optimizing search with positive information feedback. *Naval Research Logistics Quarterly*, 32:263–274, 1985.

[80] T. J. Stewart. Inferring preferences in multiple criteria decision analysis using a logistic regression model. *Management Science*, 30:1067–1077, 1984.

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[82] T. J. Stewart. An interactive approach to multiple criteria decision making based on statistical inference. *IEEE Transactions on Systems, Man and Cybernetics*, SMC-11:733–740, 1981.

[83] T. J. Stewart. Statistical approaches to multiple criteria decision making. In J. P. Brans, editor, *Operational Research '81*, pages 421–430. North Holland, Dordrecht, 1981.

[84] T. J. Stewart. Optimal selection from a random sequence with observation errors. *Naval Research Logistics Quarterly*, 28:393–406, 1981.

[85] T. J. Stewart. A two-cell model of search for an evading target. *European Journal of Operational Research*, 8:369–378, 1981.

[86] T. J. Stewart. The secretary problem with an unknown number of options. *Operations Research*, 29:130–145, 1981.

[87] T. J. Stewart. A descriptive approach to multiple criteria decision making. *Journal of the Operational Research Society*, 32:45–53, 1981.

[88] T. J. Stewart. Experience with a branch-and-bound algorithm for constrained searcher motion. In K. B. Haley and L. D. Stone, editors, *Search Theory and Applications*, pages 247–253. Plenum, New York, 1980.

[89] T. J. Stewart. Search for a moving target when searcher motion is restricted. *Computers and Operations Research*, 6:129–140, 1979.

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Note: The papers numbered [68] and [87] were subsequently republished in Samuel Eilon (Editor), *Management Science: An Anthology*, Volume III, Dartmouth Publishing Company Series on *History of Management Thought* (1996).

Other Publications

[1] T. J. Stewart. Value measurement theory and league tables. *South African Journal of Science*, 110(3/4):5–6, 2014. Letter to the Editor.

[2] T. J. Stewart. Multicriteria decision analysis. In M. Lovric, editor, *International Encyclopedia of Statistical Science*, pages 872–875. Springer, 2010. `http://dx.doi.org/10.1007/978-3-642-04898-2`.

[3] T. Stewart. Multiattribute utility functions. In E. Melnick and B. Everitt, editors, *Encyclopedia of Quantitative Risk Assessment and Analysis*, pages 1114–1119. John Wiley & Sons Ltd, Chichester, UK, 2008.

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