

Vita
Kenneth Kotovsky

Address:

Psychology Department
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Professional Employment:

Carnegie-Mellon University Psychology Department:

- Professor & Dir. Undergraduate Studies in Psychology,
2000-Present,
- Associate Professor & Dir. Undergraduate Studies in Psychology,
1989-2000
- Adjunct Professor, 1988-1989,
- Research Associate, 1983-1988.

Community College of Allegheny County, Allegheny Campus:

- Professor of Psychology: 1981-1989.
- Associate Professor of Psychology and Chairperson; Behavioral Sciences
Department, 1976-1981,
- Assistant Professor of Psychology: 1973-1975,
- Assistant Professor of Biology, 1970-1973,
- Instructor of Biology, 1966-1970.

Biophysical Research Laboratory, Eye and Ear Hospital of Pittsburgh:

- U.S. Public Health Service Trainee, 1963-1964.

Stanford Research Institute Control Systems Laboratory:

- Systems Analyst, (Psychophysics & Sensory Physiology), Summers, '62--64.

Education:

Ph.D. Carnegie-Mellon University, Psychology, 1983.

Dissertation: Tower Of Hanoi Problem Isomorphs and Solution Processes.

M.S. Carnegie-Mellon University, Psychology, 1970.

Thesis: An Empirical Test of the Simon and Kotovsky "Concept Former" Model of Human Letter Series Sequence Extrapolation Behavior.

University of Pittsburgh: Graduate study in Physiology, 1963-1966.

B.S. Massachusetts Institute of Technology, Psychology and Natural Science, 1961.
Thesis: The Effects of Word Rarity, Word Structure, and Information Value Per Word on the Identifiability of Tachistoscopically Presented Words.

Grants, Fellowships, Awards

- Xerox Best Paper Award at the *1998 ASME Design Engineering Technical Conferences: Design Theory and Methodology Conference, DETC98/DTM-5673*, Atlanta, GA, September 13-16, 1998.
- Carnegie Mellon University Advising Award, 1996
- National Science Foundation Grant to fund the 1987 Carnegie Symposium on Cognition, (co-PI with David Klahr).
- Office of Naval Research Contract No. N00014-85-K-0696 to study transfer of training in problem solving, 1985-1987 (PI).
- National Science Foundation Supplementary Research Grant to support research at Carnegie-Mellon University on the role of representation in problem solving, 1981.
- National Science Foundation Graduate Fellowship, 1964-1966.
- U.S. Public Health Service Traineeship, 1963.
- Carnegie Research Assistantship, 1961-1963.
- Karl Taylor Compton Award, M.I.T. 1961.
- Air Force Office of Scientific Research Research Contract, Cognitive Approaches to Automated Engineering Design, (co-PI with Jonathan Cagan) 2004-2006
- National Science Foundation Grant, DNI-0627894, Understanding the Role of Impasses and Representation Changes in Creative Design: An Initial Study. 2006-2007

Journal and Grant Reviews

- National Science Foundation, Instrumentation and Laboratory Improvement Program, Panel member, 1988.
- National Science Foundation, Memory and Cognitive Processes Program, occasional grant reviewer.
- Cognitive Psychology, referee.
- Cognitive Science, referee.
- JEP General, referee.
- Journal of Memory and Language, referee.
- Cognition and Instruction, referee.
- American Educational Research Journal, referee.
- Cognitive Science Society, Proceedings of Annual Meeting, referee.
- AAAI, Annual Meeting, referee.
- Journal of Mechanical Design, referee

Publications

Simon, H. A., & Kotovsky, K.; Human Acquisition of Concepts for Sequential Patterns: *Psychological Review*, 1963, 70, 534-546.

Reprinted in: Simon, H.A.; *Models of Thought*, New Haven: Yale University Press, 1979.

Kotovsky, K., & Bliss, J. C.; Tactile Presentation of Visual Information; Institute of Electronic and Electrical Engineers, *Transactions in Military Electronics*, 1963, MIL-7, 108-113.

Kotovsky, K., & Simon, H. A.; Empirical Tests of a Theory of Human Acquisition of Concepts for Sequential Patterns; *Cognitive Psychology*, 1973, 4, 399-424.

Reprinted in: Simon, H.A.; *Models of Thought*, New Haven: Yale University Press, 1979.

Kotovsky, K., Hayes, J. R., & Simon, H. A.; Why Are Some Problems Hard? Evidence From Tower of Hanoi; *Cognitive Psychology*, 1985, 17, 248-294.

Reprinted in: Simon, H.A.; *Models of Thought, Volume Two*, New Haven: Yale University Press, 1989.

Siegler, R., & Kotovsky, K.; Two Levels of Giftedness: Shall Ever the Twain Meet? in R. Sternberg & J. Davidson (Eds). *Conceptions of Giftedness*, New York, N.Y.: Cambridge University Press, 1986.

Reprinted in: Albert, R. S. (Ed). *Genius and Eminence: the Social Psychology of Creativity and Exceptional Achievement*, 2nd ed.] Oxford, U.K.: Pergamon Press, 1992.

Kotovsky, K.; Consciousness Raising About Consciousness; a review of *Cognitive Psychology: An Essay in Cognitive Science*, by George Mandler, *Contemporary Psychology*, 1986, 31, 579-580.

Kotovsky, K., & Fallside, D. F.; Representation and Transfer in Problem Solving; in D. Klahr & K. Kotovsky (Eds). *Complex Information Processing; The Impact of Herbert A. Simon*, Hillsdale, NJ: Erlbaum, 1989.

Kotovsky, K., & Simon, H. A.; Why Are Some Problems Really Hard: Explorations in the Problem Space of Difficulty; *Cognitive Psychology*, 22, 143-183, 1990.

Kotovsky, K. Problem Solving; in Squire, L. (Ed). *Encyclopedia of Learning and Memory*, New York, Macmillan Publishing Company, 1992.

Kotovsky, K.; Herbert A. Simon (Biography); Sternberg, R. (Ed.) *Encyclopaedia of Intelligence*, New York, MacMillan Publishing Company, 1994.

Ishida, Y. & Kotovsky, K.; Symmetry Analysis on Symmetry Cognition on Multi-Level Figures; Computers & Mathematics with Applications. Vol. 30, No. 7, pp 93-102, 1995. Pergamon.

Cagan, J., and Kotovsky, K.; Simulated Annealing and the Generation of the Objective Function: A Model of Learning During Problem Solving. Computational Intelligence, 13:4, pp534-581, 1997.

Reber, P., and Kotovsky, K.; Implicit Learning in Problem Solving; The Role of Working Memory Capacity. Journal of Experimental Psychology, General, 126:2, pp178-203, 1997.

Campbell, M., J. Cagan, and K. Kotovsky, A-Design: Theory and Implementation of an Adaptive, Agent-Based Method of Conceptual Design, in: Artificial Intelligence in Design '98, (J. S. Gero and F. Sudweeks, eds), Kluwer Academic Publishers, Dordrecht, 1998, pp. 579-598.

Campbell, M., J. Cagan, and K. Kotovsky, A-Design: An Agent-Based Approach to Conceptual Design in a Dynamic Environment, Research in Engineering Design, 11:3, 172-192, 1999.

Campbell, M., J. Cagan, and K. Kotovsky, Agent-Based Synthesis of Electro-Mechanical Design Configurations, ASME Journal of Mechanical Design, 122:1, pp 61-69, 2000.

Cagan, J., Kotovsky, K., Simon, H. A., Scientific Discovery and Inventive Engineering Design: Cognitive and Computational Similarities. Formal Engineering Design Synthesis, Antonsin, E. and Cagan, J. eds. Cambridge University Press, Cambridge, pp442-465, 2001.

Klahr, D. & Kotovsky, K., A life of the mind: Remembering Herb Simon. APS Observer 14, no. 4: 2001.

Cronin, M. A., Argote, L., & Kotovsky, K. Specialization and Coordination of Cognition in Group Problem Solving (under review, Journal of Applied Psychology)

Kotovsky, K. " Problem-solving, Large/Small, Hard/Easy, Conscious/Non-conscious Problem-space/Problem-solver,: The Issue of Dichotomization. In J. Davidson & R. Sternberg (Eds.), The Psychology of Problem Solving, Cambridge University Press. 2003.

Campbell, M., Cagan, J., and Kotovsky, K. The A-Design Approach to Managing Automated Design Synthesis, Research in Engineering Design, Vol. 14, 1. pp, 12-24, 2003.

Moss, J., Cagan, J., & Kotovsky, K. Learning from Design Experience in an Agent-Based Design System. Research in Engineering Design, 2004.

Moss, J., Kotovsky, K. & Cagan, The Role of Functionality in the Mental Representations of Engineering Students: Some Differences in the Early Stages of Expertise. *Cognitive Science*, 30, 65-93

Moss, J., Kotovsky, K., & Cagan, J. The Influence of Open Goals in Acquiring Problem Relevant Information (under review).

Olson, J., Cagan, J. & Kotovsky, K., Simulating Collaborative Dynamics in the Design of Complex Engineering Systems. under review, *Management Science*.

Conference Proceedings and Abstracts

Kotovsky, K. & Bliss, J. C.; Tactile Presentation of Visual Information; Bionics Symposium, March, 1963, Dayton, Ohio.

Kotovsky, K. and Kushmerick, N.: Processing Constraints and Problem Difficulty: A Model; Proceedings of the 13th Annual Meeting of the Cognitive Science Society, August, 1991, Chicago, IL. pp. 790-795.

Reber, P., and Kotovsky, K.; Learning and Problem Solving Under a Memory Load. Proceedings of the 14th Annual Meeting of the Cognitive Science Society; 1992. Bloomington, IN. pp. 1068-1073.

Ishida, Y. & Kotovsky, K. Order of Difficulty in Symmetry Recognition of Multi-Level Figures; Circular of the Society for Science on Form, Vol. 9 No. 2., pp 43-46. Tohoku University, Japan, Oct. 1994. ISSN 0915-6089.

Kotovsky, K., Fujimori, Y., Garcia de Osuna, Gottlieb, J. The Strategic Unconscious: Some Problem-Solving Evidence. American Psychological Society, 10th Annual Meeting, Washington, D.C. May 1998.

Gongaware, M. & Kotovsky, K. The Elicitation of Problem-Solving Behavior During Dream States. American Psychological Society, 10th Annual Meeting, Washington, D.C. May 1998.

Ogline, J., Kelly, J. Rode, J., Kotovsky, K. Experiencing Time. American Psychological Society, 10th Annual Meeting, Washington, D.C. May 1998.

Campbell, M., Cagan, J., and Kotovsky, K. Agent-Based Synthesis of Electro-Mechanical Design Configurations, in: Proceedings of the 1998 ASME Design Engineering Technical Conferences: Design Theory and Methodology Conference, DETC98/DTM-5673, Atlanta, GA, September 13-16, 1998. (Winner: Xerox Best Paper Award)

Garcia de Osuna, J. and Kotovsky, K. Implicit Processes in Sentence Generation, 1999 Annual Meeting of the Association for the Scientific Study of Consciousness, London, Ontario, Canada. June 4-7, 1999.

Kotovsky, K. & Garcia de Osuna, J.; The Strategic Unconscious: Some Problem-Solving and Game-Playing Evidence. Annual Meeting of the Association for the Scientific Study of Consciousness, London, Ontario, Canada. June 4-7, 1999.

Rogier, T., Garcia de Osuna, J. and Kotovsky, K.; Headwaters of the stream of consciousness. Annual Meeting of the Association for the Scientific Study of Consciousness, London, Ontario, Canada. June 4-7, 1999.

Kotovsky, K. & Garcia de Osuna, J.; No Longer Zombies. Tucson 2000: Toward a Science of Consciousness, Annual Meeting of the Association for the Scientific Study of Consciousness, Tucson, Arizona, April 10-15, 2000.

Campbell, M., J. Cagan, and K. Kotovsky, "Learning from Design Experience: TABOO/TODO Guidance", Proceedings of the 2001 ASME Design Engineering Technical Conferences: Design Theory and Methodology Conference, DETC2001/DTM-21687, September 9-12, Pittsburgh, PA, 2001.

Moss, J., Kotovsky, K., & Cagan, J. Cognitive Principles in a Computational Engineering Design methodology. In W. Gray and C. Schunn (Eds.), Proceedings of the Twenty-Fourth Annual Conference of the Cognitive Science Society, Mahwah, NJ. (2002)

Moss, J., Cagan, J., & Kotovsky, K. Learning from Design Experience in an Agent-Based Design system. Paper presented at the Workshop in Agents in Design, Boston, MA. (2002)

Cronin, M. A., Argote, L., & Kotovsky, K. Specialization and Coordination of Cognition in Group Problem Solving. Presented at the Annual Meeting of the American Academy of Management, Denver, CO, 2002.

Moss, J., Kotovsky, K., & Cagan, J. Cognitive Principles in a Computational Engineering Design methodology. In W. Gray and C. Schunn (Eds.), Proceedings of the Twenty-Fourth Annual Conference of the Cognitive Science Society, Mahwah, NJ. (2002)

Moss, J., Cagan, J., & Kotovsky, K. Learning from Design Experience in an Agent-Based Design System. Paper presented at the Workshop on Agents in Design, Boston, MA. (2002).

Moss, J., Kotovsky, K., Cagan, J. Knowledge Representation in Engineering Design: An Initial Investigation. Proceedings of the Twenty-Fifth Annual Conference of the Cognitive Science Society, Boston, MA. (2003).

Moss, J., Kotovsky, K., Cagan, J. Cognitive Investigations into Knowledge Representation in Engineering Design. Design Computation and Cognition Conference, MIT, Cambridge, MA. (2004)

Kotovsky, K., & Moss, J. Mapping Learning Principles to Knowledge Structures: Disciplinary Knowledge & Skill, Implications for Undergraduate Learning Within and Across Majors, Reinvention Center Conference on Integrating Research into Undergraduate Education: The Value Added”, Washington, D.C. Nov. 2004

Edited Books

Klahr, D., & Kotovsky, K. (Eds.); Complex Information Processing: The Impact of Herbert A. Simon, Hillsdale, NJ: Erlbaum, 1989.

Fischhoff, B., Kotovsky, K., Tuma, H., & Bielak, J (Eds.), A Two State Solution in the Middle East: Prospects and Possibilities. Pittsburgh, PA CMU Press (1993).

Biographies

--Who's Who in Science and Engineering
--Who's Who in the World

Memberships

--American Psychological Association
--American Psychological Society
--Cognitive Science Society
--Association for the Scientific Study of Consciousness
--Phi Kappa Phi Honorary Society