

Marsha C. Lovett

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Eberly Center for Teaching Excellence
Carnegie Mellon University

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EMPLOYMENT

2009-present Associate Teaching Professor, Psychology Department, Carnegie Mellon
2004-present Associate Director, Eberly Center for Teaching Excellence
2006-2009 Associate Research Professor, Psychology Department, Carnegie Mellon
2000-2006 Assistant Professor, Psychology Department, Carnegie Mellon
1996-2002 Research Associate, Center for Innovation in Learning, Carnegie Mellon
1994-2000 Postdoctoral Associate, Psychology Department, Carnegie Mellon

EDUCATION

Ph.D. Carnegie Mellon University, Cognitive Psychology, 1994
M.S. Carnegie Mellon University, Cognitive Psychology, 1991
B.A. Princeton University, Cognitive Science, *Summa Cum Laude*, 1989

PROFESSIONAL SERVICE

Executive Committee Liaison to Pittsburgh Science of Learning Center (PSLC)
Steering Committees Program in Interdisciplinary Educational Research (PIER)
Advisory Boards Consortium for the Advancement of Undergraduate Statistics
Education (CAUSE); Concepts of Statistical Inference Curriculum
Editorial Board *Journal of Experimental Psychology: Learning, Memory, and
Cognition* (2006-2008); *Review of Educational Research* (2008-
present)
Grant Reviewer National Science Foundation; AFOSR
Manuscript Reviewer *Cognitive Science*; *Journal of Experimental Psychology: General*;
*Journal of Experimental Psychology: Learning, Memory, and
Cognition*; *Human Factors*; *Memory and Cognition*; *Psychonomic
Bulletin & Review*; *Thinking and Reasoning*; *Journal of Statistics
Education*; *Perception*; *Review of Educational Research*
Conference Organizer 33rd Carnegie Symposium on Cognition: Thinking with Data (2004)
6th International Conference on Cognitive Modeling (2004)

RESEARCH GRANTS

2008-2010 "Improving the Feedback Cycle in Introductory Courses"
Spencer Foundation, \$470,000, Co-Principal Investigator
2008-2010 "Cognitive Robotics: An Innovative Undergraduate Curriculum"
National Science Foundation, \$400,000, Co-Principal Investigator
2007-2009 "Matter & Interactions: Investigating and Improving the Course"
National Science Foundation, \$300,000, Co-Principal Investigator
2005-2008 "Optimal Training System, Phase II"
National Science Foundation, \$250,000, Principal Investigator
2004-2005 "Optimal Training System"
National Science Foundation, \$125,000, Principal Investigator

2002-2005	“Developing Online Courses for an Open-Courseware Initiative,” William & Flora Hewlett Foundation, \$1.9M, Investigator
2002-2005	“Predicting Individual Performance in Complex Environments,” Office of Naval Research, \$598K, Principal Investigator
2001-2002	“The Generation and Refinement of Problem-Solving Strategies,” Berkman Faculty Development Fund, \$2250, Principal Investigator
2000-2004	“Dynamic Scaffolding to Improve Learning and Transfer of Hidden Skills,” National Science Foundation, \$660K, Principal Investigator
2000-2003	“Modeling Individual Differences in Working Memory and Strategy Adaptivity,” National Science Foundation, \$90K, Co-Principal Investigator
2000-2002	“Redesigning Introductory Statistics with a An Intelligent Cognitive Tutor,” PEW Foundation, \$200K, Co-Principal Investigator
1997-2001	“A Next-Generation Learning Environment for Statistical Reasoning,” National Science Foundation, \$690K, Principal Investigator
1997-2001	“A Training Program in Cross-Disciplinary Research and Training,” National Science Foundation, \$600K, Investigator

CONFERENCE/SYMPOSIUM-RELATED GRANTS

2003-2004	33 rd Carnegie Symposium on Cognition: Thinking with Data,” National Science Foundation, \$37K, Principal Investigator
2003-2004	“Thinking with Data Symposium,” Office of Naval Research, \$10K, Principal Investigator
2003-2004	“Thinking with Data: Education, Development, & Practice,” National Institute of Child Health and Human Development, \$5K, Principal Investigator
2003-2004	“Sixth International Conference on Cognitive Modeling,” Army Research Lab, \$10K, Principal Investigator
2003-2004	“Sixth International Conference on Cognitive Modeling,” Air Force Office of Scientific Research, \$5K, Principal Investigator
2003-2004	“Sixth International Conference on Cognitive Modeling,” Air Force Research Laboratory, \$5K, Principal Investigator
2003-2004	“Sixth International Conference on Cognitive Modeling,” Office of Naval Research, \$10K, Principal Investigator
2003-2004	“Sixth International Conference on Cognitive Modeling,” National Science Foundation, \$10K, Principal Investigator

HONORS and AWARDS

2001	Outstanding Professor Award, National Society of Collegiate Scholars
1991	Visiting Scholar, University of California, Berkeley
1989-1992	National Science Foundation Graduate Research Fellowship
1989	George A. Miller Award for outstanding student in Cognitive Science
1989	Inducted into <i>Phi Beta Kappa</i>
1988	George Wood Prize for highest academic record, Princeton University

REFEREED PUBLICATIONS

- Rosenberg-Lee, M., Lovett, M. C., & Anderson, J. R. (2009). Neural correlates of arithmetic calculation strategies. *Cognitive, Affective, & Behavioral Neuroscience*, 9, 270-285.
- Lovett, M. C., Meyer, O., & Thille, C. (2008). Open Learning Initiative: Testing the accelerated learning hypothesis in Statistics. *Journal of Interactive Media in Education*. [special issue printing top papers from the OpenLearn Conference 2008]
- DiPietro, M., Norman, M., Lovett, M., et al. (2008). Purposeful consultations: A framework for balancing theory, tips, and time. *To Improve the Academy*.
- Lovett, M. C. (2005). A Strategy-Based Interpretation of Stroop. *Cognitive Science*, 29, 493-524.
- Nellen, S., & Lovett, M. C. (2004). Towards a theory of balancing exploration and exploitation in probabilistic environments. *Proceedings of the 6th International Conference on Cognitive Modeling*, Mahwah, New Jersey: Erlbaum.
- Chang, N., Koedinger, K., & Lovett, M. C. (2003). Learning spurious correlations instead of deeper relations. *Proceedings of the 25th Annual Conference of the Cognitive Science Society*, Boston, MA: Cognitive Science Society.
- Lovett, M. C. (2002). Modeling selective attention: not just another model of Stroop. *Cognitive Systems Research*, 3, 67-76. [special issue printing top papers from International Conference on Cognitive Modeling]
- Lovett, M. C., & Meyer, O. (2002). Implementing a cognitive tutor in a statistical reasoning course: Getting the big picture. *Proceedings of the Seventh International Conference on the Teaching of Statistics*.
- Brown, J., & Lovett, M. (2001). The effects of reducing information on a modified prisoner's dilemma game. In J. D. Moore & K. Stenning (Eds.) *Proceedings of the 23rd Annual Conference of the Cognitive Science Society* (pp. 162-167). Mahwah, New Jersey: Erlbaum.
- Daily, L. Z., Lovett, M. C., & Reder, L. M. (2001). Modeling individual differences in working memory performance: A source activation account in ACT-R. *Cognitive Science*, 25, 315-353. [lead article]
- Lovett, M. C. (2001). Modeling selective attention: Not just another model of Stroop. In E. M. Altmann, A. Cleeremans, C. D. Schunn, & W. D. Gray (Eds.), *Proceedings of the 2001 Fourth International Conference on Computational Modeling* (pp. 151-156). Mahwah, NJ: Erlbaum.
- Schunn, C. D., Lovett, M. C., & Reder, L. M. (2001). Awareness and working memory in strategy adaptivity. *Memory & Cognition*, 29, 254-266.
- Lovett, M. C., Daily, L. Z., & Reder, L. M. (2000). A source activation theory of working memory: Cross-task prediction of performance in ACT-R. *Cognitive Systems Research*, 1, 99-118.
- Lovett, M. C., & Greenhouse, J. B. (2000). Applying cognitive theory to statistics instruction. *The American Statistician*, 54, 196-206.
- Lovett, M. C., & Schunn, C. D. (2000). The importance of frameworks for directing empirical questions: Reply to Goodie and Fantino (2000). *Journal of Experimental Psychology: General*, 129, 453-456.
- Lovett, M. C., & Schunn, C. D. (1999). Task representations, strategy variability, and base-rate neglect. *Journal of Experimental Psychology: General*, 128, 107-130. [lead article]
- Anderson, J. R., Lebiere, C., Lovett, M. C., & Reder, L. R. (1998). ACT-R: A higher-level account of processing capacity. *Behavioral and Brain Sciences*, 21, 831-832.
[Commentary on Halford, G., Wilson, W., & Phillips, S. (1998). Processing capacity defined by relational complexity: Implications for comparative, developmental and cognitive psychology. *Behavioral and Brain Sciences*, 21, 803-864.]
- Gluck, K. A., Shute, V. J., Anderson, J. R., & Lovett, M. C. (1998). Deconstructing a computer-based tutor: Striving for better learning efficiency in Stat Lady. In B. P. Goettl, H. M. Half, C. L. Redfield, & V. J. Shute (Eds.) *Intelligent Tutoring Systems, Lecture Notes in Computer Science Volume 1452*. New York: Springer.
- Lovett, M. C. (1998). Cognitive task analysis in service of intelligent tutoring systems design: A case study in statistics. In B. P. Goettl, H. M. Half, C. L. Redfield, & V. J. Shute (Eds.) *Intelligent Tutoring Systems, Lecture Notes in Computer Science Volume 1452* pp. 234-243. New York: Springer.

- Lovett, M. C.** (1997). Modeling individual differences in a digit working memory task. *Proceedings of the Nineteenth Annual Conference of the Cognitive Science Society*. pp. 460-465. Mahwah, NJ: Erlbaum.
- Lovett, M. C., & Anderson, J. R.** (1996). History of success and current context in problem solving: Combined influences on operator selection. *Cognitive Psychology*, *31*, 168-217.
- Lovett, M. C., & Anderson, J. R.** (1995). Making heads or tails out of selecting problem-solving strategies. In J. D. Moore & J. F. Lehman (Eds.) *Proceedings of the Seventeenth Annual Conference of the Cognitive Science Society*, pp. 265-270. Hillsdale, NJ: Erlbaum.
- Lovett, M. C., & Anderson, J. R.** (1994). Effects of solving related proofs on memory and transfer in geometry problem solving. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *20*(2), 366-378.
- Lovett, M. C.** (1992). Learning by problem solving versus by examples: The benefits of generating and receiving information. *Proceedings of the Fourteenth Annual Conference of the Cognitive Science Society*. pp. 956-961. Hillsdale, NJ: Erlbaum.
- Hickman, A. K., & **Lovett, M. C.** (1991). Partial match and search control via internal analogy. *Proceedings of the Thirteenth Annual Conference of the Cognitive Science Society*. Hillsdale, NJ: Erlbaum.

OTHER ARTICLES

- Lovett, M. C., Meyer, O., & Thille, C.** (2010). In search of the “perfect” blend between an instructor and an online course for teaching introductory statistics. *Proceedings of the Eighth International Conference on the Teaching of Statistics*.
- Lovett, M. C.** (2003). Problem Solving. In L. Nadel (Ed.), *Encyclopedia of the Cognitive Sciences*. London: Macmillan.
- Lovett, M. C.** (2002). Problem Solving. In H. Pashler, & D. Medin (Eds.) *Stevens' Handbook of Experimental Psychology. Volume 2: Memory and Cognitive Processes* (pp. 317-362). New York: Wiley.
- Lovett, M. C.** (2001). Cognitive theory, ACT. To appear in *The International Encyclopedia of the Social and Behavioral Sciences*. The Netherlands: Elsevier.
- Lovett, M. C.** (1998). A review of ‘Instructional Design: International Perspectives. Volume 1: Theory, Research and Models’. *Journal of Educational Computing Research*, *18*, 197-202.
- Lovett, M. C.** (1996). Are the new methods better?: A cognitive psychologist’s view on evaluating methods for teaching statistics. In *Proceedings of the Joint Statistical Meetings, Section on Education*. American Statistical Association: Reston, VA.

BOOKS AND EDITED PROCEEDINGS

- Ambrose, S. A., Bridges, M. W., DiPietro, M., **Lovett, M. C.**, & Norman, M. K. (in press). *How Learning Works: Seven Research-Based Principles for Smart Teaching*. San Francisco, CA: Jossey-Bass.
- Lovett, M. C. & Shah, P.** (2007) *Thinking with Data: 33rd Carnegie Symposium on Cognition*. Mahwah, New Jersey: Erlbaum.
- Lovett, M. C., Schunn, C. D., Lebiere, C., & Munro, P.** (2004) *Proceedings of the Sixth International Conference on Cognitive Modeling*, Mahwah, New Jersey: Erlbaum.

BOOK CHAPTERS

- Lovett, M.C., & Chang, C.** (2007). Data-analysis skills: What and how are students learning? In M. Lovett, & P. Shah (Eds.) *Thinking with Data*. Mahwah, NJ: Erlbaum.
- Lovett, M. C., & Anderson, J. R.** (2005). Thinking as a production system. In K. Holyoak, and R. Morrison (Eds), *The Cambridge Handbook on Thinking*. Cambridge.
- Lovett, M. C.** (2001). A Collaborative convergence on studying reasoning processes: A case study in statistics. In S. Carver, & D. Klahr (Eds.) *Cognition and instruction: Twenty-five years of progress* (pp. 347-384). Mahwah, NJ: Erlbaum.

- Lovett, M. C., Reder, L. M., & Lebiere, C. (1999).** Modeling working memory in a unified architecture: An ACT-R perspective. In A. Miyake & P. Shah (Eds.) *Models of Working Memory*. pp. 135-182. Cambridge, MA: Cambridge.
- Lovett, M. C. (1998).** Choice. In J. R. Anderson & C. Lebiere (Eds.) *Atomic Components of Thought*. Mahwah, NJ: Erlbaum.
- Anderson, J. R., Lebiere, C., & **Lovett, M. C. (1998).** Performance. In J. R. Anderson & C. Lebiere (Eds.) *Atomic Components of Thought*. Mahwah, NJ: Erlbaum.
- Reiser, B. J., Kimberg, D. Y., **Lovett, M. C., & Ranney, M. (1992).** Knowledge representation and explanation in GIL, an intelligent tutor for programming. In J. Larkin & R. Chabay (Eds.) *Computer Assisted Instruction and Intelligent Tutoring Systems: Shared Goals and Complementary Approaches* pp. 111-149. Hillsdale, NJ: Erlbaum.
- Reiser, B. J., Ranney, M., **Lovett, M. C., & Kimberg, D. Y. (1989).** Facilitating students' reasoning with causal explanations and visual representations. In D. Bierman, J. Breuker, & J. Sandberg (Eds.), *Proceedings of the Fourth International Conference on Artificial Intelligence and Education*. Springfield, VA: IOS.

SELECTED CONFERENCE PRESENTATIONS & INVITED ADDRESSES (2010-2002)

- Lovett, M. C. (2010).** Incorporating Visualizations and Computer Simulations into your Teaching. Consortium for the Advancement of Undergraduate Statistics Education, Jan, 2010, webinar.
- Lovett, M. C., & delMas, R. (2008).** Setting the stage for students' conceptual change in statistics. Consortium for the Advancement of Undergraduate Statistics Education, June, 2008 webinar.
- Lovett, M. C. (2008).** Teaching metacognition. Educause Learning Initiative, May, 2008 webinar.
- Lovett, M. C. (2008).** Teaching metacognition. Teaching Excellence Mini-conference, Ohio State University. April, 2008.
- Lovett, M. C. (2008).** How students learn. Open Learning Interplay Symposium. Pittsburgh, PA. March, 2008.
- Lovett, M. C. (2008).** Teaching metacognition. Educause Annual Meeting, San Antonio, TX. (featured speaker) (January 2008).
- Thille, C., & **Lovett, M. C. (2007).** Measuring the effectiveness of the OLI statistics course in accelerating student learning. OpenLearn2007, London, England, December, 2007.
- Lovett, M. C. (2007).** How students learn. Talk presented at California Polytechnic Institute at San Luis Obispo, December, 2007.
- Rosenberg-Lee, M., **Lovett, M. C., & Anderson, J. R. (2007).** Neural correlates of strategies: an fMRI study of multi-digit mental multiplication. In Society for Neuroscience Abstracts, 33. San Diego, CA, November 2007.
- Bridges, M., Norman, M., **Lovett, M. C., et al. (2007).** Purposeful consultations: A framework for balancing theory, tips and time. 32nd Annual Conference of the Professional and Organizational Development Network in Higher Education, Pittsburgh, PA, October, 2007.
- Lovett, M. C., & DiPietro, M. (2007).** Innovative pedagogies to engage students and enhance learning. Talk presented at CCAC. Pittsburgh, PA, June, 2007.
- Lovett, M. C. (2007).** Understanding and evaluating educational research methods. Talk presented at CCAC. Pittsburgh, PA, June, 2007.
- Rosenberg-Lee, M., & **Lovett, M. C. (2006).** Does Practice and Knowledge Equal Knowledge and Practice? Poster presented the 28th Annual Meeting of the Cognitive Science Society, Vancouver, Canada, July 2006.
- Rosenberg-Lee, M., & **Lovett, M. C. (2005).** Procedural Practice in Complex Domains, Classroom and Laboratory Perspectives. Poster presented at the 11th Biennial Meeting of the European Association for Research on Learning and Instruction, Nicosia, Cyprus August 2005.
- Lovett, M. C., & Reder, L. M., Lebiere, C., & Rehling, J. (2005).** Predicting and explaining individual performance in a complex, dynamic task. ONR grantee meeting, Pittsburgh, June, 2005.
- Lovett, M. C. (2005).** Strategy choice across the continuum. University of Florida, Gainesville, Florida, February, 2005.

- Lovett, M. C. & Chang, N.** Data-analysis skills: What and how are students learning? Presented at the 33rd Carnegie Symposium on Cognition: Thinking with Data, June 2004.
- Lovett, M. C.** Taking our models seriously: Applying cognitive science to statistics instruction. Invited address, The Anderson Center for Innovation in Undergraduate Education, Rensselaer Polytechnic Institute, May, 2004.
- Nellen, S., & Lovett, M. C.** Towards a theory of balancing exploration and exploitation in probabilistic environments. Sixth International Conference on Cognitive Modeling, Pittsburgh, August, 2004.
- Lovett, M. C., Lebiere, C., Reder, L., Demiral, B.** Predicting performance in complex tasks. ONR workshop, Pittsburgh, November, 2003.
- Rehling, J., Lovett, M. C., et al.** Estimating working memory to predict across-task performance. 5th International Conference on Cognitive Modeling, Bamberg, Germany, April, 2003.
- Lovett, M. C.** Where do problem-solving strategies come from? 24th Annual Conference of the Cognitive Science Society, Fairfax, VA, August, 2002.
- Greenhouse, J. B., & Lovett, M. C., & Meyer, O.** Practice, practice, practice: Applying cognitive theory to statistics instruction. Joint Statistical Meetings, New York, NY, August, 2002.
- Meyer, O., & Lovett, M. C.** Implementing a computerized tutor in a statistical reasoning course: Getting the big picture. Joint Statistical Meetings, New York, NY, August, 2002.
- Lovett, M. C., & Meyer, O.** Implementing a cognitive tutor for introductory statistics. University of Massachusetts at Amherst, Amherst, MA, July, 2002.
- Lovett, M. C., Lebiere, C., & Reder, L. M.** Evidence for a single working memory resource pool. Quebec '02 Conference on Working Memory, Quebec City, Quebec, July, 2002.
- Lovett, M. C.** Studying (and improving!) how students learn statistics. PEW Workshop, Pittsburgh, PA, June, 2002.
- Lovett, M. C.** Taking cognitive models seriously. Naval Research Laboratory, Arlington, VA, March, 2002.