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Richard L. Lewis

John R. Anderson Collegiate Professor of Psychology, Linguistics and Cognitive Science

Department of Psychology
University of Michigan
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Ann Arbor, MI 48109

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Research interests

Computational rationality and bounded optimality; psycholinguistics; reinforcement learning; cognitive architecture; working memory; sentence processing; linguistic theory; adaptive control; eye-movements; decision making; computational modeling.

Education

Dec 1993 — PH.D. in Computer Science
Carnegie Mellon University
Thesis: *An Architecturally-based Theory of Human Sentence Comprehension*
Advisors: Allen Newell and Jill Lehman

June 1987 — B.S. in Computer Science, *Summa Cum Laude*
University of Central Florida

Academic positions

University of Michigan

2016– — John R. Anderson Collegiate Professor of Psychology, Linguistics and Cognitive Science
2007–16 — Professor of Psychology & Professor of Linguistics
(*Cognition and Cognitive Neuroscience Area Chair*, 2013–15)

2000–2007 — Associate Professor of Psychology & Associate Professor of Linguistics

The Ohio State University

1995–2000 — Assistant Professor of Computer and Information Science
1999–2000 — Assistant Professor of Linguistics (*courtesy appointment*)

University of Potsdam, Germany

1999 Visiting Professor of Psychology

University of Freiburg, Germany

1996 Visiting Professor, Institute of Computer Science and Social Research

Princeton University

1994–1995 McDonnell Postdoctoral Fellow in Psychology
Advisors: George Miller & Philip Johnson-Laird

Honors

John R. Anderson Collegiate Professorship, University of Michigan 2016.
Fellow, Association for Psychological Science, 2010.
Honorary Faculty Member, Golden Key International Honour Society, University of Michigan Chapter, December 2011 (one of two UM faculty selected by students).
Outstanding Teaching Award, Department of Computer and Information Science, Ohio State University, 1997.
McDonnell Foundation Fellow in Psychology, Princeton University, 1994–95.
National Science Foundation Graduate Fellowship, Carnegie Mellon University, 1988–91.

Teaching experience

Cognitive science, psycholinguistics, computational cognitive modeling, artificial intelligence, statistics for behavioral scientists.

Publications

Refereed articles, chapters and volumes

Guo, X., Singh, S., Lewis, R. L., & Lee, H. (2016). Deep learning for reward design to improve monte carlo tree search in ATARI games. In *25th International Joint Conference on Artificial Intelligence (IJCAI)*. [PDF]

Howes, A., Warren, P. A., Farmer, G., El-Deredy, W., & Lewis, R. L. (2016). Why contextual preference reversals maximize expected value. *Psychological Review*, *123*(4), 368–391. [PDF]

Patil, U., Vasishth, S., & Lewis, R. L. (2016). Retrieval interference in syntactic processing: The case of reflexive binding in english. *Frontiers in Psychology*, *7*. [PDF]

Howes, A., Duggan, G. B., Kalidindi, K., Tseng, Y.-C., & Lewis, R. L. (2015). Predicting short-term remembering as boundedly optimal strategy choice. *Cognitive Science*, 1–32. [PDF]

Jiang, N., Kulesza, A., Singh, S., & Lewis, R. L. (2015). The dependence of effective planning horizon on model accuracy. In *14th International Conference on Autonomous Agents and Multiagent Systems (AAMAS2015)*. [PDF] (**Best Paper Award.**)

Oh, J., Guo, X., Lee, H., Lewis, R. L., & Singh, S. (2015). Action-conditional video prediction using deep networks in atari games. In *Advances in Neural Information Processing Systems (NIPS)*. [PDF]

Guo, X., Singh, S., Lee, H., Lewis, R. L., & Wang, X. (2014). Deep learning for real-time Atari game play using offline monte-carlo tree search planning. In *Advances in Neural Information Processing Systems (NIPS)*. [PDF]

Howes, A., Lewis, R. L., & Singh, S. (2014). Utility maximization and bounds on human information processing. *Topics in Cognitive Science*, *6*(2), 198–203. [PDF]

Jian, N., Singh, S., & Lewis, R. L. (2014, May 5–9). Improving UCT planning via approximate homomorphisms. In A. Lomuscio, P. Scerri, A. Bazzan, & M. Huhns (Eds.), *Proceedings of the 13th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2014)*. Paris, France. [PDF]

Lewis, R. L., Howes, A., & Singh, S. (2014). Computational rationality: Linking mechanism and behavior through utility maximization. *Topics in Cognitive Science*, *6*(2), 279–311. [PDF]

Liu, B., Singh, S., Lewis, R. L., & Qin, S. (2014). Optimal rewards for cooperative agents. *IEEE Transactions on Autonomous Mental Development*, *6*(4), 286–297.

Shvartsman, M., Lewis, R. L., & Singh, S. (2014). Computationally rational saccadic control: An explanation of spillover effects based on sampling from noisy perception and memory. In V. Demberg & T. J. O'Donnell (Eds.), *Proceedings of the 5th Workshop on Cognitive Modeling and Computational Linguistics (CMCL 2014)*. Baltimore, MD. [PDF] (**Best Student Paper Award.**)

Feary, M., Billman, D., Chen, X., Howes, A., Lewis, R. L., Sherry, L., et al. (2013). Linking context to evaluation in the design of safety critical interfaces. In *Proceedings of Human-Computer Interaction International*. [PDF]

Guo, X., Singh, S., & Lewis, R. L. (2013). Reward mapping for transfer in long-lived agents. In *Advances in Neural Information Processing Systems 26 (NIPS)*. [PDF]

Lewis, R. L., Shvartsman, M., & Singh, S. (2013). The adaptive nature of eye-movements in linguistic tasks: How payoff and architecture shape speed-accuracy tradeoffs. *Topics in Cognitive Science*, *5*(3), 583–610. [PDF]

Myers, C. W., Lewis, R. L., & Howes, A. (2013). Bounded optimal state estimation and control in visual search: Explaining distractor ratio effects. In M. Knauff, M. Pauen, N. Sebanz, & I. Wachsmuth (Eds.), *Proceedings of the 35th Annual Meeting of the Cognitive Science Society* (pp. 1049–1054). [PDF]

Bratman, J., Singh, S., Lewis, R. L., & Sorg, J. (2012). Strong mitigation: Nesting search for good policies within search for good reward. In *Proceedings of the11th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2012)*. [PDF]

Liu, B., Singh, S., Lewis, R. L., & Quin, S. (2012). Optimal rewards in multiagent teams. In *Proceedings of the IEEE Conference on Development and Learning*. [PDF] (**Paper of Excellence Award.**)

Atkins, A. S., Berman, M. G., Reuter-Lorenz, P., Lewis, R. L., & Jonides, J. (2011). Resolving semantic and proactive interference in memory over the short-term. *Memory & Cognition*, *39*, 806–817. [PDF]

Bartek, B., Lewis, R. L., Vasishth, S., & Smith, M. R. (2011). In search of on-line locality effects in sentence comprehension. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *37*(5), 1178–1198. [PDF]

Sorg, J., Singh, S., & Lewis, R. L. (2011). Optimal rewards versus leaf-evaluation heuristics in planning agents. In *Proceedings of AAAI-2011 (Conference of the Association for the Advancement Artificial Intelligence)*. [PDF]

Strohminger, N., Lewis, R. L., & Meyer, D. E. (2011). Divergent effects of different positive emotions on moral judgement. *Cognition*, *119*, 295–300. [PDF]

Bratman, J., Shvartsman, M., Lewis, R. L., & Singh, S. (2010). A new approach to exploring language emergence as boundedly optimal control in the face of environmental and cognitive constraints. In D. Salvucci & G. Gunzelmann (Eds.), *Proceedings of the 10th International Conference on Cognitive Modeling*. [PDF] (To appear.)

Obata, M., Lewis, R. L., Epstein, S., Bartek, B., & Boland, J. (2010). Featural analysis and short-term memory retrieval in on-line parsing: Evidence for syntactic, but not phonological, similarity-based interference. In *Proceedings of NELS 41: Conference of the North East Linguistics Society*. Philadelphia. [PDF]

Singh, S., Lewis, R. L., Barto, A. G., & Sorg, J. (2010). Instrinsically motivated reinforcement learning: An evolutionary perspective. *IEEE Transactions on Autonomous Mental Development*. [PDF]

Sorg, J., Singh, S., & Lewis, R. L. (2010a). Reward design via online gradient ascent. In *Advances in Neural Information Processing Systems* (Vol. 23). [PDF]

Sorg, J., Singh, S., & Lewis, R. L. (2010b). Variance-based rewards for approximate Bayesian reinforcement learning. In *Proceedings of the 26th Conference on Uncertainty in Artificial Intelligence*. [PDF] (Also available at http://event.cwi.nl/uai2010/)

Sorg, J., Singh, S., & Lewis, R. L. (2010c). Internal rewards mitigate agent boundedness. In *International Conference on Machine Learning*. Haifa, Israel. [PDF]

Vasishth, S., Suckow, K., Lewis, R. L., & Kern, S. (2010). Short-term forgetting in sentence comprehension: Crosslinguistic evidence from verb-final structures. *Language and Cognitive Processes*. [PDF] (In press.)

Berman, M. G., Jonides, J., & Lewis, R. L. (2009). In search of decay in verbal short-term memory. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, *35*(2), 317–333. [PDF]

Howes, A., Lewis, R. L., & Vera, A. H. (2009). Rational adaptation under task and processing constraints: Implications for testing theories of cognition and action. *Psychological Review*, *116*(4), 717–751. [PDF]

Lustig, C. A., Lewis, R. L., Berman, M. G., Nee, D. E., Moore, K. S., & Jonides, J. (2009). Psychological and neural mechanisms of short-term memory. In G. Berntson & J. T. Cacioppo (Eds.), *Handbook of Neuroscience for the Behavioral Sciences*. Hoboken, NJ: John Wiley. [PDF]

Marinier, R. P., Laird, J. E., & Lewis, R. L. (2009). A computational unification of cognitive behavior and emotion. *Cognitive Systems Research*, *10*(1), 48–69. [PDF]

Singh, S., Lewis, R. L., & Barto, A. G. (2009). Where do rewards come from? In *Proceedings of the Annual Conference of the Cognitive Science Society* (pp. 2601–2606). Amsterdam. [PDF]

Jonides, J., Lewis, R. L., Nee, D. E., Lustig, C. A., Berman, M. G., & Moore, K. S. (2008). The mind and brain of short-term memory. *Annual Review of Psychology*, *59*, 15.1–15.32. [PDF]

Smith, M. R., Lewis, R. L., Howes, A., Chu, A., Green, C., & Vera, A. (2008). More than 8,192 ways to skin a cat: Modeling behavior in multidimensional strategy spaces. In

B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (pp. 1441–1446). Austin, TX. [PDF]

Vasishth, S., Bruessow, S., Lewis, R. L., & Drenhaus, H. (2008). Processing polarity: How the ungrammatical intrudes on the grammatical. *Cognitive Science*, *32*(4), 685–712. [PDF]

Lewis, R. L., Polk, T. A., & Laird, J. E. (Eds.). (2007). *The Proceedings of the Eighth International Conference on Cognitive Modeling.* New York: Psychology Press/Taylor & Francis. [PDF]

Chu, A., Lewis, R. L., & Howes, A. (2007). Evaluating the performance of optimizing constraint satisfaction techniques for cognitive constraint modeling. In R. Lewis, T. Polk, & J. .Laird (Eds.), *The Proceedings of the 8th International Conference on Cognitive Modeling* (pp. 26–31). Ann Arbor, Michigan: Psychology Press/Taylor & Francis. [PDF]

Howes, A., Lewis, R. L., & Vera, A. (2007). Bounding rational analysis: Constraints on asymptotic performance. In W. D. Gray (Ed.), *Integrated Models of Cognitive Systems.* New York: Oxford University Press. [PDF]

Pearson, D., Gorski, N. A., Lewis, R. L., & Laird, J. E. (2007). Storm: A framework for biologically-inspired cognitive architecture research. In R. Lewis, T. Polk, & J. Laird (Eds.), *The Proceedings of the 8th International Conference on Cognitive Modeling.* Psychology Press/Taylor & Francis. [PDF]

Eng, K., Lewis, R. L., Tollinger, I., Chu, A., & Howes, A. (2006). Generating automated predictions of behavior strategically adapted to specific performance objectives. In *Proceedings of the Computer-Human Interaction Conference, CHI 2006.* [PDF] (**Best paper nomination: top 5 per cent of submissions.**)

Lewis, R. L., Vasishth, S., & Van Dyke, J. A. (2006). Computational principles of working memory in sentence comprehension. *Trends in Cognitive Sciences*, *10*, 44–54. [PDF]

Nakayama, M., Vasishth, S., & Lewis, R. L. (2006). Difficulty of certain sentence constructions in comprehension. In *Handbook of east asian psycholinguistics* (Vol. 2). Cambridge, England: Cambridge University Press. [PDF]

Remington, R. W., Lewis, R. L., & Wu, S. (2006). Scheduling mental operations in a multiple-response sequence: Modeling the effects of a strategy to minimize variance in the timing of saccades. In D. Fum, F. Del Missier, & A. Stocco (Eds.), *Proceedings of the International Conference on Cognitive Modeling* (pp. 250–255). Trieste, Italy: Edizioni Goliardiche. [PDF]

Ritter, F. E., Haynes, S. R., Cohen, M., Howes, A., John, B., Best, B., et al. (2006). High-level behavior representation languages revisited. In D. Fum, F. Del Missier, & A. Stocco (Eds.), *Proceedings of the International Conference on Cognitive Modeling (ICCM).* Trieste, Italy: Edizioni Goliardiche.

Wu, S., Remington, R. W., & Lewis, R. L. (2006). Modeling the scheduling of eye movements in performing a sequence of discrete tasks. In *Proceedings of the Cognitive Science Society.* [PDF]

Vasishth, S., & Lewis, R. L. (2006a). Symbolic models of human sentence processing. In K. Brown (Ed.), *Encyclopedia of Language and Linguistics, 2nd edition* (Vol. 5, pp. 410–419). Elsevier. [PDF]

Vasishth, S., & Lewis, R. L. (2006b). Argument-head distance and processing complexity: Explaining both locality and anti-locality effects. *Language*, *82*, 767–794. [PDF]

Howes, A., Lewis, R. L., Vera, A., & Richardson, J. (2005). Information-requirements grammar: A theory of the structure of competence for interaction. In *Proceedings of the Cognitive Science Society.* Stresa, Italy. [PDF]

Lewis, R. L., & Vasishth, S. (2005). An activation-based model of sentence processing as skilled memory retrieval. *Cognitive Science*, *29*, 375–419. [PDF]

Nakayama, M., Lee, S.-H., & Lewis, R. L. (2005). Difficulty of processing Japanese and Korean center-embedding constructions. In M. Minami, H. Kobayashi, M. Nakayama, & H. Sirai (Eds.), *Studies in language sciences* (Vol. 4, pp. 99–118). Tokyo: Kurosio Publishers. [PDF]

Vasishth, S., Drenhaus, H., Saddy, D., & Lewis, R. L. (2005). Processing negative polarity. In *Proceedings of the CUNY Sentence Processing Conference.* University of Arizona. [PDF]

Tollinger, I., Lewis, R. L., McCurdy, M., Tollinger, P., Vera, A., Howes, A., et al. (2005). Supporting efficient development of cognitive models at multiple skill levels: Exploring recent advances in constraint-based modeling. In *Proceedings of the Computer-Human Interaction Conference.* Portland, Ore.. [PDF] (**Best paper nomination: top 5 per cent of submissions.**)

Vannest, J., Polk, T. A., & Lewis, R. L. (2005). Dual-route processing of complex words: new fMRI evidence from derivational suffixation. *Cognitive, Affective, and Behavioral Neuroscience*, *5*, 67–76. [PDF]

Vera, A. H., Howes, A., Lewis, R. L., Tollinger, I., Eng, K., & Richardson, J. (2005). A constraint-based approach to understanding the composition of skill. In *Proceedings of the Human-Computer Interaction 2005 Symposium,*. Las Vegas.

Vera, A. H., Tollinger, I., Eng, K., Lewis, R. L., & Howes, A. (2005). Architectural building blocks as the locus of adaptive behavior selection. In *Proceedings of the Cognitive Science Society.* Stresa, Italy. [PDF]

Howes, A., Vera, A., Lewis, R. L., & McCurdy, M. (2004). Cognitive constraint modeling: A formal approach to supporting reasoning about behavior. In *Proceedings of the Cognitive Science Society.* Chicago. [PDF]

Lewis, R. L., Vera, A., & Howes, A. (2004). A constraint-based approach to understanding the composition of skill. In *Proceedings of the International Conference on Cognitive Modeling.* [PDF]

Simen, P., Polk, T. A., Lewis, R. L., & Freedman, E. (2004). A computational account of latency impairments in problem solving by parkinson's patients. In *Proceedings of the International Conference on Cognitive Modeling.* [PDF]

Vasishth, S., & Lewis, R. L. (2004). Modeling sentence processing in act-r. In *Proceedings of the Association for Computational Linguistics.* Barcelona. [PDF]

Vera, A., Howes, A., McCurdy, M., & Lewis, R. L. (2004). A constraint-satisfaction approach to predicting skilled interactive cognition. In *Proceedings of the Computer-Human Interaction Conferece CHI-2004.* Vienna, Austria. [PDF]

Lewis, R. L. (2003). Computational psycholinguistics. In *Encyclopedia of Cognitive Science.* London: Macmillon (Nature Publishing Group). [PDF]

Simen, P., Polk, T. A., & Lewis, R. L. (2003). Universal computation by networks of model cortical columns. In *Proceedings of the International Conference on Cognitive Modeling (ICCM).* [PDF]

Van Dyke, J. A., & Lewis, R. L. (2003). Distinguishing effects of structure and decay on

attachment and repair: A cue-based parsing account of recovery from misanalyzed ambiguities. *Journal of Memory and Language*, *49*, 285–316. [PDF]

Lewis, R. L., & Nakayama, M. (2002). Syntactic and positional similarity effects in the processing of japanese embeddings. In M. Nakayama (Ed.), *Sentence Processing in East Asian Languages*. Stanford, CA: CSLI Publications. [PDF]

Simen, P., Polk, T. A., Lewis, R. L., & Freedman, E. (2002a). Goal management in a recurrent neural network. In *Proceedings of the International Conference on Computational Intelligence* (pp. 566–569). [PDF]

Simen, P., Polk, T. A., Lewis, R. L., & Freedman, E. (2002b). A recurrent neural network model of goal management. In *Proceedings of the International Conference on Computational Intelligence and Neuroscience* (pp. 504–508). [PDF]

Lewis, R. L. (2001a). Cognitive theory, Soar. In *International Encylopedia of the Social and Behavioral Sciences* (pp. 2178–2183). Amsterdam: Pergamon (Elsevier Science). [PDF]

Lewis, R. L. (2001b). Falsifying serial and parallel parsing models: Empirical conundrums and an overlooked paradigm. *Journal of Psycholinguistic Research*, *29*(2), 241–248. [PDF]

Lewis, R. L. (2000). Specifying architectures for language processing: Process, control, and memory in parsing and interpretation. In M. W. Crocker, M. Pickering, & C. Clifton Jr. (Eds.), *Architectures and Mechanisms for Language Processing*. Cambridge: Cambridge University Press. [PDF]

Nakayama, M., & Lewis, R. L. (2000). Similarity interference and scrambling in Japanese. *Korean Journal of Cognitive Science*, *12*, 39–53. [PDF]

Lewis, R. L. (1999a). Accounting for the fine structure of syntactic working memory: Similarity-based interference as a unifying principle. *Behavioral and Brain Sciences*, *22*, 105–106. [PDF]

Lewis, R. L. (1999b). Cognitive modeling, symbolic. In R. A. Wilson & F. C. Keil (Eds.), *The MIT Encyclopedia of Cognitive Science*. Cambridge, MA: MIT Press. [PDF]

Young, R., & Lewis, R. (1999). The Soar cognitive architecture and human working memory. In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control*. New York: Cambridge University Press. [PDF]

Lehman, J. F., Newell, A., & Lewis, R. L. (1998). Architectural influences on language comprehension. In Z. W. Pylyshyn (Ed.), *Constraining Cognitive Theorie: Issues and Options*. Norwood, NJ: Ablex Press.

Lewis, R. L. (1998). Leaping off the garden path: Reanalysis and limited repair parsing. In J. Fodor & F. Ferreira (Eds.), *Reanalysis in sentence processing* (pp. 247–285). Boston: Kluwer Academic. [PDF]

Lewis, R. L. (1996a). Architecture matters: What Soar has to say about modularity. In D. Steier & T. Mitchell (Eds.), *Mind Matters: Contributions to Cognitive and Computer Science in Honor of Allen Newell*. Hillsdale, NJ: Erlbaum. [PDF]

Lewis, R. L. (1996b). Interference in short-term memory: The magical number two (or three) in sentence processing. *Journal of Psycholinguistic Research*, *25*(1), 93–115. [PDF]

Vera, A. H., & Lewis, R. L. (1996). Dissociating performance from learning: An empirical evaluation of a computational model. In *Proceedings of the Eighteenth Annual Conference of the Cognitive Science Society*.

Lewis, R. L. (1994). Task specification language, or theory of human memory? *Behavioral*

and Brain Sciences, *17*(4), 67–75.

Lewis, R. L., & Vera, A. H. (1994). Non-declarative learning in an interactive task. In *CHI '94 Research Symposium*.

Lewis, R. L. (1993a). An architecturally-based theory of sentence comprehension. In *Proceedings of the Fifteenth Annual Conference of the Cognitive Science Society* (pp. 108–113). [PDF]

Lewis, R. L. (1993b). *An architecturally-based theory of human sentence comprehension*. Unpublished doctoral dissertation, Carnegie Mellon University. [PDF]

Steier, D. M., Lewis, R. L., Lehman, J. F., & Zacherl, A. L. (1993, June). Combining multiple sources of knowledge in an integrated intelligent system. *IEEE Expert*, *8*(3), 3–4. [PDF]

Vera, A. H., Lewis, R. L., & Lerch, F. J. (1993). Situated decision-making and recognition-based learning: Applying symbolic theories to interactive tasks. In *Proceedings of the fifteenth annual conference of the cognitive science society.* [PDF]

Lewis, R. L. (1992). *Recent developments in the NL-Soar garden path theory* (Tech. Rep. No. CMU-CS-92-14). School of Computer Science, Carnegie Mellon University. [PDF]

Lehman, J. F., Lewis, R. L., & Newell, A. (1991). Integrating knowledge sources in language comprehension. In *Proceedings of the Thirteenth Annual Conference of the Cognitive Science Society* (pp. 46–66). [PDF] (Also in P. S. Rosenbloom, J. E. Laird, and A. Newell, eds., *The Soar Papers: Research on Integrated Intelligence*, MIT Press, Cambridge, MA, 1993.)

Lewis, R. L., Huffman, S. B., John, B. E., Laird, J. E., Lehman, J. F., Newell, A., et al. (1990). Soar as a unified theory of cognition: Spring 1990. In *Proceedings of the twelfth annual conference of the cognitive science society* (pp. 103–042). [PDF] (Also in P. S. Rosenbloom, J. E. Laird, and A. Newell, eds., *The Soar Papers: Research on Integrated Intelligence*, MIT Press, Cambridge, MA, 1993.)

Lewis, R. L., Newell, A., & Polk, T. A. (1989). Toward a Soar theory of taking instructions for immediate reasoning tasks. In *Proceedings of the Eleventh Annual Conference of the Cognitive Science Society* (pp. 514–521). [PDF] (Also in P. S. Rosenbloom, J. E. Laird, and A. Newell, eds., *The Soar Papers: Research on Integrated Intelligence*, MIT Press, Cambridge, MA, 1993.)

Polk, T. A., Newell, A., & Lewis, R. L. (1989). Toward a unified theory of immediate reasoning in Soar. In *Proceedings of the Eleventh Annual Conference of the Cognitive Science Society* (pp. 50–13). (Also in P. S. Rosenbloom, J. E. Laird, and A. Newell, eds., *The Soar Papers: Research on Integrated Intelligence*, MIT Press, Cambridge, MA, 1993.)

Moshell, J. M., Hughes, C. E., Lacy, L. W., Lewis, R. L., & Blower, D. (1988). Action graphics: An interactive spreadsheet-based animation system for simulation and training. In B. Clymer & V. Amico (Eds.), *Proceedings of the Simulators V Conference* (Vol. 19, pp. 47–78). The Society for Computer Simulation International.

Lewis, R. L. R. L., Hughes, C. E., Lacy, L. W., & Moshell, J. M. (1987). *CFCL: Central Florida Common Lisp Object System* (Tech. Rep.). Department of Computer Science, The University of Central Florida.

Moshell, J. M., Hughes, C. E., Lacy, L. W., Lewis, R. L., & Blower, D. (1987a, August). A spreadsheet-based visual language for freehand sketching of complex motions. In *Proceedings of the 1987 Workshop on Visual Languages.*

Moshell, J. M., Hughes, C. E., Lacy, L. W., Lewis, R. L., & Blower, D. (1987b). An educational

animation system based on class inheritance. In *Proceedings of the Conference of the National Computer Graphics Association* (pp. 59–62).

Moshell, J. M., & Lewis, R. L. (1986). *The Action Graphics freehand animation system* (Tech. Rep.). Department of Computer Science, The University of Central Florida.

Technical reports

Lewis, R. L. (1992). *Recent developments in the NL-Soar garden path theory* (Tech. Rep. No. CMU-CS-92-14). School of Computer Science, Carnegie Mellon University. [PDF]

Lewis, R. L. R. L., Hughes, C. E., Lacy, L. W., & Moshell, J. M. (1987). *CFCL: Central Florida Common Lisp Object System* (Tech. Rep.). Department of Computer Science, The University of Central Florida.

Moshell, J. M., & Lewis, R. L. (1986). *The Action Graphics freehand animation system* (Tech. Rep.). Department of Computer Science, The University of Central Florida.

Local academic and administrative service

Intra-departmental service (University of Michigan)

Area chair, *Cognition and Cognitive Neuroscience*, 2013–15
Department of Psychology Executive Committee.
Department of Psychology Augmented Executive Committee.
Department of Psychology Statistics Task Force.
Department of Psychology Undergraduate Studies Committee.
Department of Psychology Web Task Force.
Department of Psychology Promotion and Tenure Committees (multiple).
Department of Psychology Space and Facilities Committee.
Department of Psychology Search Committees (multiple, including Cognition and Cognitive Neuroscience, Biopsychology, Quantiative, Psycholinguistic).
Cognition and Cognitive Neuroscience Admissions Chair.
Cognition and Cognitive Neuroscience Forum Committee Chair.
Cognition and Cognitive Neuroscience Recruitment Chair.

Cognitive Science initiatives (University of Michigan)

Member of *Cognitive Science Task Force* (predecessor to the undergraduate major, grad certificate, and Weinberg Institute committees) (2010).
Member of committee to develop the *Cognitive Science Undergraduate Concentration*, and one of chief architects of the proposal (2011-13).
Member of committee to develop the *Cognitive Science Graduate Certificate*, and one of chief architects of the proposal (2009–15).
Founding member of the *Weinberg Institute for Cognitive Science Executive Committee* (2014–15).
Founding member of the *Cognitive Science Undergraduate Major Steering Committee* (at 62 majors after 1 year) (2014–15).
Lead organizer of the *Weinberg Cognitive Science Symposium* on "Rationality and its Bounds" (2012–13).
Member of organizing committee for *Weinberg Cognitive Science Symposium* on "The Cognitive Science of Moral Minds" (2014–15), the inaugural event for the Weinberg Institute.
Developer of new *Introduction to Cognitive Science* gateway course for the new undergraduate major, taught now five times (including two pilots) to over 600 students, with instructor ratings 4.7–4.9/5 (2011-15).

Other cross-department/college service (University of Michigan)

Member of steering committee for 2012 LSA Theme Semester on *Language: The Human Quintessence*.
Member of committee to develop Language & Mind subconcentration in Department of Linguistics; committee received a *Whitaker Grant for the Development of Undergraduate Education* (2004–06).
Steering committee for Center for Cognitive Architecture (2007-09).
LS&A Information Technologies Committee (2006–07).
Promotion and tenure committees for Department of Linguistics (multiple).

Thesis committee member for Department of Linguistics (multiple).
Thesis committee member/co-chair for Department of Electrical Engineering and Computer Science (multiple).
Thesis committee member for Department Philosophy (2).

External professional service

Reviewing service for other institutions

External review committee for *Rice University Department of Psychology*, Fall 2013.
Multiple external promotion and tenure cases (including *Princeton University*, *Tufts University*, *University of California, San Diego*, *University of Southern California*, *University of Illinois*, *Rice University*, *Manchester University*, *University of Massachusetts*, *Ohio State University*, *Northwestern University* , *York University*…).
National Science Foundation (including *College of Reviewers for the Perception, Action and Cognition Program*, 2014–).
Air Force Office of Research
Office of Naval Research
National Institutes of Health

Journal boards

2011– *Psychological Review*, editorial board
2006–2008 *Language Learning*, editorial board
2001–2006 *Cognitive Science*, board of reviewers

Reviewing service

AMLAP (Architectures and Mechanisms for Language Processing Conference)
AAAI (National Conference on Artificial Intelligence)
Cambridge University Press
Cognition
Cognitive Psychology
Cognitive Science
Cognitive, Affective, and Behavioral Neuroscience
Cognitive Science Society
CUNY Sentence Processing Conference
International Conference on Cognitive Modeling (ICCM)
Kluwer Academic Publishers
Language and Cognitive Processes
Language Learning
Journal of Experimental Psychology: Learning, Memory & Cognition
Journal of Memory and Language
Journal of Psycholinguistic Research
Oxford University Press
Proceedings of the National Academy of Sciences
Psychological Review
Psychological Science

Psychonomic Bulletin & Review
Wiley Interdisciplinary Reviews: Cognitive Science

Conferences and workshops organized

International Conference on Cognitive Modeling, July 24–27, 2007, Ann Arbor.
Workshop on Reanalysis in Sentence Processing, March 18, 1998, New Brunswick, NJ.
17th North American Soar Workshop, June 27–29, 1997, Columbus, Ohio.

Invited presentations

2013–2016 Computational Rationality in Minds and Machines. *Microsoft Research*. Redmond, Washington. March, 2016.

Computational Rationality and Choice. *The Origins and Future of Pattern Processing and Intelligence: From Brains to Machines.* The Origins Project. Arizona State University, Tempe. March, 2016.

Combining Bounds and Rational Analysis for Explanation in Cognitive Science. *Workshop on Bounded Rationality, NIPS 2015 (Neural Information Processing Conference)*. Montreal. December, 2015.

Computational Rationality: Three Vignettes. *Drexel University, Department of Psychology Colloquium*. March, 2015.

Integrating the Continuous & Discrete Over Time: Theoretical and Empirical Challenges in Understanding the Sequential Dynamics of Sentence Processing, *Gradient Symbolic Computation Workshop: The Continuous and Discrete in Sentence Process*. Johns Hopkins University. November, 2014.

What Are Boundedly Rational Mechanisms for Language, Perception, and Action? *Johns Hopkins University*, *Departments of Computer Science and Cognitive Science Colloquium*. October, 2014.

What Are Rational Mechanisms for Language, Perception, and Action? *Saarland University*, *Computational Linguistics Colloquium*. January, 2014.

Language as a Computationally Rational Response Functoin *AAAI Fall Symposium on Integrated Cognition*. November, 2013.

What Does Integrated Cognition Theory Look Like? *AAAI Fall Symposium on Integrated Cognition*, November, 2013.

Optimal Control Approaches to Language Processing. **Keynote presentation** at *Cognitive Modeling and Computational Linguistics* (CMCL-2013), Sofia, Bulgaria. August, 2013.

2011–2012 Combining Optimal Control and Estimation with Theories of Cognitive Architecture. *Chief Scientist's Colloquium Series,* Air Force Research Labs, Wright Patterson Air Force Base, Dayton, Ohio. August, 2012.

Human Behavior as an Adaptation to Mental Architecture. *Reinforcement Learning Symposium* (celebrating Andrew Barto's retirement), University of Massachusetts. July, 2012.

Optimal Control Approaches to Language. *University of Maryland Linguistics MayFest*. May, 2012.

Short-term Memory and Optimal Discrimination in Sentence Processing. *30th European Workshop on Cognitive Neuropsychology.* January, 2012.

Similarity-based Interference and Optimal Discrimination in Sentence Processing. *SUNY Stony Brook*, Linguistics Colloquium. November, 2011.

A Cue-based Retrieval Theory of Working Memory in Language Processing: Core Computational Principles and Implications for Individual Differences. *Academy of Aphasia*, Montreal, October, 2011.

Bounded Optimality in Language, Thought and Action. *SUNY Buffalo*, Cognitive Science Colloquium. March, 2011.

Bounded Optimality in Language, Thought and Action. *Michigan State University*, Linguistics Colloquium. February, 2011.

2005–2010

Where Do Rewards Come From? *Symposium on AI-Inspired Biology* (held at *The Thirty Sixth Annual Convention of the Society for the Study of Artificial Intelligence and Simulation of Behaviour*), Liecester, UK. March, 2010.

Bounded Optimality in Language and Action: Rational Behavior Under Cognitive Constraint. *University of Arizona*. February, 2010.

Short-term Memory in Language and its Adaptive Control. *Cognitive Science Conference Symposium on Language and Memory*, Amsterdam. July, 2009.

Cognitively Bounded Rational Analysis and Optimal Control. *International Conference on Cognitive Modeling Symposium on Rational Explanations*, Manchester. July, 2009.

Adaptive Control of Language and Action: Boundedly Rational Behavior Under Cognitive Constraint. *University of Potsdam*, Germany. January, 2009.

The Adaptive Nature of Human Performance: Models of Boundedly Rational Control. *Air Force Research Labs*, Mesa, Arizona, December, 2008.

The Surprising Nature of Working Memory in Language Comprehension, **Keynote Address**, COGFEST-2008, *The Ohio State University*, May, 2008.

Deriving a Theory of Verb-final Processing: The Adaptive Control of Working Memory. *Max Planck Institute for Human Cognitive and Brain Science*, Leipzig, Germany, December, 2007.

The Surprising Nature of Working Memory in Language Comprehension. Department of Psychology, *Rice University,* April, 2007.

The Surprising Nature of Working Memory in Language Comprehension. Department of Linguistics, *University of Maryland*, April, 2006.

The Surprising Nature of Working Memory in Language Comprehension. **Keynote Address**, *International Conference on Cognitive Modeling*, Trieste, Italy, April, 2006.

Explaining the Bounds on the Adaptation of Skilled Interactive Behavior. Center for Human-Machine Interaction, *Berlin Technical University*, December, 2005.

Toonology: The New Yorker Cartoon Meets Modern Psychological Science. *General Motors Warren R&D Cente*r, September, 2005.

Toonology: Modern Science meets the New Yorker Cartoon. *National Alliance for the Mentally Ill of Washtenaw Count*y, Annual Meeting, June 2005.

2001–2004

Sentence Processing as Skilled Memory Retrieval. *University of Potsdam*, Germany. December, 2004.

Sentence Processing as Skilled Memory Retrieval. *NASA Ames Research Center*, Cognitive Group, December, 2004.

Sentence Processing as Skilled Memory Retrieval. Rumelhart Award Symposium, *Cognitive Science Conference*, Chicago, August, 2004.

Parsing as Working Memory Retrieval. Workshop on Computational Models of Sentence Processing, *University of the Saarland*, Germany. July, 2003.

Scalable Cognitive Modeling Through Compositional Reuse.*Office of Naval Research Conference on Affordable Human Behavior Modeling*, Arlington, VA. With John, B. E, Lewis, R. L., Matessa, M., Remington, R., Vera, A, April, 2003.

Learning in ACT-R: Chunking Revisited. Symposium on Advances in Cognitive Architectures,*Stanford University*, March 2003.

Parsing as Working Memory Retrieval. Department of Cognitive Science, *Johns Hopkins University*, February, 2003.

Parsing as Memory Retrieval. TEAP-2002 Tagung Experimental Arbeitender Psychologen, *Chemnitz*, special session on Dynamical Models of Language Processing, March 2002.

Parsing as Memory Retrieval. Institute for Research in Cognitive Science, *University of Pennsylvania*, March, 2002.

Toward Detailed Models of Sentence Processing Constrained by ERP Data. Workshop on Analyzing and Modelling Event-Related Brain Potentials: Cognitive and Neural Approaches. *Potsdam University*, Germany, November 2001.

Does the Mind Need a Bottleneck? Toward a functional analysis of bottlenecks, executive processes, and control structure. *NASA Ames Research Center*, Cognitive Group, November 2001.

ACT-R and Language Processing: Opportunities, Challenges, and the Linguistic Killer Bees. *ACT-R Post-Graduate Summer School*, July 2001.

Building a UTC from the top-down: What cognitive architectures might have to offer theories of executive function in cognitive neuroscience. Soar Workshop 21, *University of Michigan*, May 2001.

Working Memory for Syntactic Processing: Serial Order Information and Cue-based Retrieval. Department of Psychology, *Michigan State University*, February 2001.

1998-2000 A Theory of Short-Term Memory Retrieval in Sentence Processing. Institute of Cognitive Science, *University of Lousiana at Lafayette*, October, 2000.

Sentence Processing as Memory Retrieval: A Computational Model of Race-based Parsing in a Limited Working Memory. Language Technologies Institute, School of Computer Science,*Carnegie Mellon University*, February, 2000.

A Theory of Short-Term Memory Retrieval in Sentence Processing. Department of Psychology, *Carnegie Mellon University*, February, 2000.

Sentence Processing as Memory Retrieval: A Computational Model of Race-based Parsing in a Limited Working Memory. Department of Psychology, *University of Michigan* February, 2000.

A Theory of Short-Term Memory Retrieval in Sentence Processing. Department of Psychology, *University of Michigan*, February, 2000.

In Search of Fully Lexical Parsing. Department of Psychology, *Potsdam University*, December, 1999.

Determinants of Processing Complexity in Japanese: New Theory and Data. (with Mineharu Nakayama), *International East Asian Psycholinguistics Workshop, Ohio State University*, July, 1999.

Computational and Psychological Foundations of Sentence Processing. Seminar at Departments of Psychology and Linguistics, *Potsdam University*, June, 1999.

What Will It Take to Determine Whether Human Parsing is Serial or Parallel? *The CUNY Sentence Processing Conference*, New York City, March 1999.

Sentence Comprehension with Limited Working Resources: Cognitive and Computational Foundations. Department of Psychology, *Carnegie Mellon University*, December 9, 1998.

Limited Repair Parsing. *Workshop on Reanalysis in Sentence Processing*, New Brunswick, NJ, March 18, 1998.

1995-1997 Interference in Working Memory: The Magical Number Two or Three in Sentence Comprehension. Department of Psychology and Cognitive Science Center, *Hong Kong University*, November 26, 1997.

A Soar Perspective on Working Memory. (With Richard Young), *Symposium on Models of Working Memory, University of Colorado, Boulder*, July 10, 1997.

Interference in Working Memory: The Magical Number Two in Sentence Processing. *Symposium for Computational and Neural Bases of Language, University of Michigan Psychology Department*, Ann Arbor, May 16, 1997.

Computational Architectures for Human Sentence Processing. Seminar course presented at the Institute for Computer Science and Social Research, *University of Freiburg*, Germany, December 17–19, 1996.

Identifying Cognitive Architectures and Their Programs. Department of Psychology, *University of Freiburg*, Germany, December 18, 1996.

Uncovering the Architecture of Sentence Comprehension: Powerful Processing with Limited Working Memory. Department of Computational Linguistics, *University of the Saarland*, Germany, December 16, 1996.

An introduction to the Soar cognitive architecture. Institute for Artificial Intelligence, *University of the Saarland*, Germany, December 16, 1996.

Uncovering the Architecture of Sentence Comprehension: Powerful Processing with Limited Working Memory. Center for Cognitive Science, *University of Freiburg*, Germany, December 17, 1996.

Uncovering the Architecture of Sentence Comprehension: Powerful Processing with Limited Working Memory. Department of Psychology, *University of Michigan*, Ann Arbor, November 13, 1996.

Architectural requirements for intelligence and language processing: A Soar-based perspective. *Conference on Intelligent systems: A Semiotic Perspective, National Institute of Standards and Technology (NIST)*, Gaithersburg, MD, October 20–23, 1996.

A Theory of the Architecture of Sentence Comprehension. Department of Electrical Engineering and Computer Science, *University of Michigan*, Ann Arbor, February 20, 1996.

Interference in Short-term Memory: The Magical Number Two in Sentence Processing. Interdisciplinary Center for Cognitive Studies, *University of Potsdam*, Germany, October 14, 1995.

Identifying Cognitive Architecture. Interdisciplinary Center for Cognitive Studies, *University of Potsdam*, Germany, October 13, 1995.

A Theory of the Architecture of Sentence Comprehension. *Rutgers University Center for Cognitive Science*, New Brunswick, New Jersey, April 25, 1995.

A Theory of the Architecture of Sentence Processing. Departments of Psychology and Linguistics, *University of Massachusetts*, Amherst, April 17, 1995.

Simple Destructive Repair: A Theory of Revision in Parsing. Department of Linguistics, *City University of New York*, April 5, 1995.

1992–1994 Building psychological theories with cognitive architectures. Cognitive Architectures Workshop, Interdisciplinary Center for Cognitive Studies, *University of Potsdam*, Germany, July 8–11, 1994.

An Architecturally-based Theory of Human Sentence Comprehension. Plenary Symposium in Honor of Allen Newell, *Fifteenth Cognitive Science Conference*, Boulder, Colorado, June 19, 1993.

An Architecturally-based Theory of Human Sentence Comprehension. The Cognitive Science Laboratory, *Princeton University*, March 29, 1993.

Architecture Matters. *The Mind Matters Symposium in Honor of Allen Newell, Carnegie Mellon University*, Pittsburgh, October 26, 1992.

1989–1991 Language Comprehension in a Continuously Learning Integrated Architecture. Computer Science Department, *University of Central Florida*, Orlando, June 24, 1991.

NL-Soar as a Cognitive Model. *Fourth European Workshop on Soar, Twente University*, Enschede, The Netherlands, January, 1991.

NL-Soar: Language Comprehension in Soar. *European Soar Workshop and Tutorial, The University of Groningen*, The Netherlands, June 19, 1989.

Conference presentations (not listed above in publications)

2010-2012 Shvartsman, M., Lewis, R. L. and Singh, S. (March 2012) "The Adaptive Nature of Eye-movement Control in Linguistics Tasks". In *Proceedings of the CUNY Sentence Processing Conference*. New York, NY.

Patil, U., Vasishth, S. and Lewis, R. L. (March 2011) "Early retrieval interference in syntax-guided antecedent search". In *Proceedings of the CUNY Sentence Processing Conference*. Stanford, CA.

Shvartsman, M., Lewis, R. L. Singh, S., Smith, M. & Bartek, B. (March 2011). "Predicting Task Performance from Individual Variation in Eye-Movement Control Strategies." In *Proceedings of the CUNY Sentence Processing Conference*. Stanford, CA.

Lewis, R. L. and Badecker, W. (March 2010). "Short-term memory in Sentence Production and its Adaptive Control." In *Proceedings of the CUNY Sentence Processing Conference*. New York, NY.

Bartek, B., Lewis, R. L. and Vasishth, S. (March 2010). "Distinguishing Effects of Expectation and Integration in Non-local Dependencies." In *Proceedings of the CUNY Sentence Processing Conference*. New York, NY.

Strohminger, N., Lewis, R.L. and Meyer D.E. (January 2010). "The Politics of Purity." *Society for Personality and Social Psychology*, Las Vegas, NV.

2007–2009 Strohminger, N., Lewis, R. L., and Meyer D.E. (February 2009). "What Would Seinfeld Do? Divergent effects of different positive emotions on moral judgment". *Society for Personality and Social Psychology*, Tampa, FL.

Strohminger, N., Lewis, R.L., and Meyer D.E. (June 2008). "The Differential Effect of Positive Social Emotions on Moral Decisions: An eyetracking study". *Social and Affective Neuroscience Society Annual Meeting*, Boston, MA.

Strohminger, N., Lewis, R.L., and Meyer D.E. (July 2008). "Positive Emotions and Moral Decisions". *Cognitive Science Institute: Minds and Societies*, Montreal, Canada.

Bartek, B., Lewis, R. L., Vasishth, S., and Smith, M. (2007). "Linking Working Memory with SPR and Eyetracking Measures" In *Proceedings of the CUNY Sentence Processing Conference*. San Diego, CA.

Fernandez-Salgueiro, G., Chen, L. Lewis, R. L., and Epstein, S. (2007). "The When and How of Positing Null Subjects (pro): The Timing and Surprising Interaction of Syntactic and Semantic Constraints." In *Proceedings of the CUNY Sentence Processing Conferenc*e. San Diego, CA.

Badecker, W. and Lewis, R. L. (2007) "A New Theory and Computational Model of Working Memory in Sentence Production: Agreement Errors as Failures of Cue-based Retrievals. In *Proceedings of the CUNY Sentence Processing Conference*, San Diego, CA.

Patil, Umesh, Bartek, B. and Lewis, R. L. (2007). "The Interplay of Locality and Surprisal" In *Proceedings of the CUNY Sentence Processing Conference*. San Diego, CA.

2004–2006 Lewis, R. L. (2006). The surprising nature of working memory in sentence comprehension: Insights from cognitive architectures and psycholinguistics. *Proceedings of the International Conference on Cognitive Modeling*, April, 2006, Trieste, Italy.

Vasishth, S., Bruessow, S. Lewis, R. L., Drenhaus, H., and Saddy, D. (2006). "Processing constraints on negative and positive polarity." In *Proceedings of the CUNY Sentence Processing Conference*, New York City, March 2006. CUNY.

Suckow, K., Vasishth, S., Lewis, R. L. and Smith, M. (2006). "Interference and memory overload during parsing of grammatical and ungrammatical embeddings." In *Proceedings of the CUNY Sentence Processing Conference*, New York City, March 2006. CUNY.

Suckow, K., Vasishth, S., and Lewis, R. L. (2005). "Interference and memory overload during parsing." In *Proceedings of AMLaP 2005,* Ghent, Belgium, September 2005. Ghent University.

Knoeferle, P., Vasishth, S., Crocker, M. W., and Lewis, R. L. (March 2005). "Effects of NP-type, NP-similarity, and cleft-type in reading German sentences." *Seventeenth Annual CUNY Sentence Processing Conference*, Tucson, AZ.

Lewis, R. L. and Vasishth, S. (March 2005). "Toward zero-parameter predictions of reading times: A new computational theory of sentence comprehension as skilled working memory retrieval." *Seventeenth Annual CUNY Sentence Processing Conference*, Tucson, AZ.

Lewis, R. L. and Vasishth, S. (March 2005). "A hypothesis about serial order information in parsing (that yields a novel explanation of center-embedding difficulty)." *Seventeenth Annual CUNY Sentence Processing Conference*, Tucson, AZ.

Vasishth, S., Drenhaus, H., Saddy, D., and Lewis, R. L. (March 2005). "Processing negative polarity." Seventeenth Annual CUNY Sentence Processing Conference, Tucson, AZ.

Vannest, J., Newman, A., Polk, T. A., Lewis, R. L., Newport, E., Bavelier, D. (April 2004). "fMRI evidence that some, but not all derived words are decomposed during lexical access." *Meeting of the Cognitive Neuroscience Society*, San Francisco.

2001–2003 Vannest, J., Polk, T.A. and Lewis, R. L. (March 2003). "Decompositional Processing of Derived Words: an fMRI study". *Meeting of the Cognitive Neuroscience Societ*y, New York.

Vasishth, S. and Lewis, R. L. (March 2003). "Decay and interference in human sentence processing: Parsing in a unified theory of cognition." *Sixteenth Annual CUNY Sentence Processing Conference*, MIT, Cambridge, MA.

Lewis, R. L., Vannest, J. and Polk, T.A (March 2003). "Bilateral effects of varying syntactic working memory load: An fMRI study of reading center-embedding and garden path

sentences." *Meeting of the Cognitive Neuroscience Society*, New York.

Vannest, J., Lewis, R. L. and Polk, T.A. (March 2003). "Imaging the neural correlates of processing difficulty incenter-embeddings and garden paths: What matters is structural working memory load, not ambiguity." *Sixteenth Annual CUNY Sentence Processing Conference*, MIT, Cambridge, MA.

Polk, T. A., Simen, P., Lewis, R. L., Freedman, E. (March 2003). "Modeling Executive Control, Problem Solving, and Sequencing in Neural Networks." Meeting of the Cognitive Neuroscience Society, New York.

Vannest, J., Lewis, R.L. and Polk, T.A. (November 2002) "Neural Correlates of Sentence Processing Difficulty". *Annual Meeting of the Society for Neuroscience*, Orlando.

Polk, T. A., Simen, P., Lewis, R. L., Freedman, E. (November 2002). "An Explicit Model of Executive Control in Complex Cognition." *Annual Meeting of the Society for Neuroscience*, Orlando.

Lewis, R. L. and Nakayama, M. (2001). The Representation of Serial Order Information in Sentence Processing: Insights from Work on Short Term Memory and Implications for Processing Complexity. *Fourteenth Annual CUNY Sentence Processing Conferencee*, University of Pennsylvania, Philadelphia.

Boland, J. E. and Lewis, R. L. (2001). Distinguishing Generation and Selection of Modifier Attachments: Implications for Lexicalized Parsing and Competition *Fourteenth Annual CUNY Sentence Processing Conference*, University of Pennsylvania, Philadelphia.

1998–2000 Van Dyke, J. and Lewis, R. L. (2000). Distinguishing effects of decay and interference on attachment and reanalysis in temporarily ambiguous sentences. *Thirteenth Annual CUNY Sentence Processing Conference*, University of San Diego, California.

Polk, T.A, Lewis, R.L. and Hamilton, J.P. (1999) An explicit model of executive control and deficits. *Journal of Cognitive Neuroscience*, Special Supplement: 60.

Lewis, R. L. (1999). Attachment Without Competition: A Computational Model of Raced-based Parsing in a Limited Working Memory. *Twelfth Annual CUNY Sentence Processing Conference*, New York.

Polk, T. A., Lewis, R. L., and Hamilton, P. (1998). An Attractor Modulation Theory of Prefrontal Control and Deficits. *Annual Meeting of the Society for Neuroscience*, November, 1998.

Boland, J. and Lewis, R. L. (1998). The Lexical Generation of Syntax and its Implications. *Annual Meeting of the Psychonomics Society*, November, 1998.

Lewis, R.L. (1998). New Architecture for Sentence Processing: Non-competitive Ambiguity Resolution and Interference-limited Working Memory. *Architectures and Mechanisms for Language Processing Conference (AMLaP-98)*, Freiburg, Germany.

Lewis, R. L. (1998). Working memory in sentence processing: Proactive and retroactive interference in parsing. *Eleventh Annual CUNY Sentence Processing Conference*, New Brunswick, NJ.

Van Dyke, Julie, and Lewis, R. L. (1998). The role *of interference in vrecovery from misanalysis of garden path sentences. Eleventh Annual CUNY Sentence Processing Conference*, Rutgers University, New Brunswick, NJ.

1993–1997 Lewis, R. L. (1997). Reanalysis and Limited Repair Parsing. *Tenth Annual CUNY Sentence Processing Conference*, University of Southern California, Santa Monica, CA.

Lewis, R.L. (1995). The Structural Garden Path Hypothesis: A point of Convergence in Recent Successful Garden Path Theories. *Architectures and Mechanisms for Language*

Processing Conference (AMLaP-95), Edinburgh, Scotland.

Lewis, R. L. (1993). Predicting processing breakdown on embedded constructions in an architecturally-based comprehension theory. *Sixth Annual CUNY Sentence Processing Conference*, University of Massachusetts, Amherst, MA.

Research funding

(*Submitted*) Toward a Scientific Understanding of the Human Capacity for Cognitive Control: Computationally Rational Models of Prospective Memory, The John Templeton Foundation/Princeton University, $442K, 2015–2018 (with Satinder Singh).

Combining Reinforcement Learning and Deep Learning Methods to Address High-dimensional Perception, Partial Observability and Delayed Reward, National Science Foundation, $500K, 2015–2018 (with Honglak Lee and Satinder Singh).

Language Processing as Bounded Optimal Control of Memory, Perception and Action, National Science Foundation, $406K, 2012–2016 (with Satinder Singh).

Towards Understanding Robust Individual & Collaborative Monitoring, Air Force Research Labs (Wright-Patterson), $109K, 2012–2015.

EAGER: On the Optimal Rewards Problem, National Science Foundation (with Satinder Singh), $200K, 2011–2013.

Human-Automation Interaction for New Flight Deck Technologies:The Development and Application of Bounded Optimal Control Approaches to Human Performance Modeling for Aviation, $146K, NASA/FAA, 2012–2013.

Building Flexible, Robust, and Autonomous Agents, National Science Foundation, $1.3M, July 2009–June 2013. Co-PI with Satinder Singh, John Laird, and Thad Polk.

Human-automation Interaction Methods for Evaluation of New Technologies, $86K,FAA, 2010–2011.

Toward Adaptive Cognitive Models of Attention and Situation Awareness, $130K, NASA, August 2009–July 2010.

Affordable Cognitive Modeling for Interface Design, Workload Design, and Procedure Development: Automating the Application of Psychological Theory, $806K, Office of Naval Research, October 2005–April 2009.

Extending the Soar Cognitive Architecture, $1M, DARPA, Fall 2005–Fall 2006. Co-PI with John Laird (EECS, Michigan).

Development and Application of a Compositional Parametric Approach to Human Performance Prediction, $371K, NASA, January 2005–December 2006.

Toward Parametric Compositional Modeling of Heterogeneous Interactive tasks, $167K, NASA, June 2004–June 2007.

Toward an Applied Psychological Theory of Behavior Composition: Language Processing in Multitasking Contexts, $297K, NASA, May 2004–July 2007.

Scalable Cognitive Modeling Through Compositional Reuse, Office of Naval Research, $675K total, awarded to University of Michigan ($236K), Carnegie Mellon, and NASA Ames. November 2002—October 2005. With Bonnie John (CMU), Alonso Vera, Mike Matessa, and Roger Remington (NASA Ames).

Computational Models and Coordinated Neuroimaging of Learning and Cognitive Function, $1.2M, September 1998–August 2003, National Science Foundation. (with Walter Schneider, PI, University of Pittsburgh).

Establishing Ohio State as a Major Center for Language Processing Research, Ohio State Center for Cognitive Science, Department of Linguistics, and Department of Computer and Information Science, $100K, December 1999–December 2001. With Shari Speer, Department of Linguistics.

Computational and Psycholinguistic Explorations of Working Memory in Japanese Sentence Comprehension, Ohio State Interdisciplinary Seed Grant, $57K, July 1999–June 2001. With JJ Nakayama, Department of East Asian Languages and Literature, Ohio State University.

Computational and Psycholinguistic Explorations of Ambiguity Resolution in Natural Language Processing, Ohio State Office of Research, $18K, January 1996–July 1997.

Professional affiliations

AAAI (American Association for Artificial Intelligence)
APS (American Psychological Society)
ACL (Association for Computational Linguistics)
ACM (Association for Computing Machinery)
Cognitive Science Society