

Sean Matthew Polyn, Ph.D.
Curriculum Vitae

A. Contact information

Sean Matthew Polyn

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B. Degrees earned

- B.A. (1995-1999) University of Virginia, Echols Interdisciplinary Program
- Ph.D. (2000-2005) Princeton University, May 2005. Psychology and Neuroscience.
Ph.D. Thesis: Neuroimaging, behavioral, and computational investigations of memory targeting. Jonathan D. Cohen and Kenneth A. Norman, co-advisors

C. Employment history

- Post-doctoral Fellow University of Pennsylvania, Department of Psychology
2005-2009 Mentor: Michael J. Kahana
- Assistant Professor Vanderbilt University, Department of Psychology
2009-present Center for Integrative & Cognitive Science
Vanderbilt Brain Institute

D. Honors and Awards

- Dean's List, University of Virginia, Fall 1995-Spring 1998
- Echols Scholar, University of Virginia, 1995-1998
- Bachelor of Arts with Distinction, January 1999
- Departmental Teaching Prize – Princeton University Psychology Department,
Academic year 2003–04

Junior Faculty Teaching Fellowship, 2010, *Center for Teaching*, Vanderbilt University.

E. Research

2. Articles in refereed journals

Manning, J. M., Polyn, S. M., Baltuch, G., Litt, B., Kahana, M. J. (2011) Oscillatory patterns in temporal lobe reveal context reinstatement during memory search. *Proceedings of the National Academy of Sciences USA*, 108 (31), 12893–12897.

Sederberg, P. B., Gershman, S. J., Polyn, S. M., and Norman, K. A. (2011) Human memory reconsolidation can be explained using the Temporal Context Model. *Psychonomic Bulletin and Review*, 18 (3), 455–468.

Polyn, S. M., Erlichman, G., & Kahana, M. J. (2011) Semantic cuing and the scale-invariance of recency and contiguity. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 27 (3), 766–775.

Lohnas, L. J., Polyn, S. M., & Kahana, M. J. (2011) Contextual variability in free recall. *Journal of Memory and Language*, 64, 249–255.

Polyn, S. M., Norman, K. A., & Kahana, M. J. (2009) Task context and organization in free recall. *Neuropsychologia*, 47 (11), 2158-2163.

Polyn, S. M., Norman, K. A., & Kahana, M. J. (2009) A context maintenance and retrieval model of organizational processes in free recall. *Psychological Review*, 116 (1), 129-156.

Polyn, S. M. & Kahana, M. J. (2008) Memory search and the neural representation of context. *Trends in Cognitive Science*, 12 (1), 24-30.

Norman, K. A., Polyn, S. M., Detre, G. J., and Haxby, J. V. (2006) Beyond mind reading: Multi-voxel pattern analysis of fMRI data. *Trends in Cognitive Science*, 10 (9), 424-430.

Norman, K. A., Newman, E., Detre, G., and Polyn, S. M. (2006) How inhibitory oscillations can train neural networks and punish competitors. *Neural Computation*, 18, 1577-1610.

Polyn, S. M., Natu, V. S., Cohen, J. D., and Norman, K. A. (2005) Category-specific cortical activity precedes retrieval during memory search. *Science*, 310, 1963-1966.

Polyn S., Levy W.B. (2001) Dynamic control of inhibition improves performance of a hippocampal model. *Neurocomputing*, 38-40, 823-829.

Polyn S., Wu X.B., Levy W.B. (2000) Entorhinal / dentate excitation of CA3: A critical variable in hippocampal models. *Neurocomputing*, 32-33, 493-499.

3. Book chapters

Kahana, M. J., Howard, M. W., & Polyn, S. M. Associative Processes in Episodic Memory. In H. L. Roediger, III, editor, *Cognitive psychology of memory. Vol. 2 of Learning and memory: A comprehensive reference, 4 vols. (J. Byrne, Editor)*. Elsevier, Oxford, 2008.

Norman, K. A., Detre, G. J., and Polyn, S. M. Computational models of episodic memory. In R. Sun, editor, *The Cambridge Handbook of Computational Psychology*. Cambridge University Press, Cambridge, 2008.

6. Under review or revision

Polyn, S. M., Kragel, J. E., Morton, N. W., McCluey, J. D., Cohen, Z. D. (*in revision*) Relating a computational model of memory search to the dynamics of task-sensitive neural patterns in free recall. *Neuropsychologia*.

7. Research grants received

National Science Foundation Graduate Research Fellowship, 2000-2003. NSF Fellowship grant. Funded.

Predocctoral National Research Service Award. Prefrontal and medial temporal contributions to memory. National Institute of Mental Health (F31 MH070177). Award dates: 09/29/2003–05/31/2005. Funded.

Postdoctoral National Research Service Award. Prefrontal and medial temporal contributions to memory. National Institute of Mental Health (F32 MH078513). Award dates: 07/01/2006–06/30/2009. Funded.

8. Research grants currently under review

Project title: Prefrontal and medial temporal contributions to episodic memory. National Institute of Mental Health (R01 MH090080-01A1). Sean Polyn, Principal Investigator. Proposed award period: 04/2011–2015. Under review. Scored 17th percentile.

9. Invited presentations

Context and Episodic Memory Symposium, “Neural correlates of memory targeting in free recall.” New Orleans, LA, Nov. 2003.

Context and Episodic Memory Symposium, “Memory targeting in free recall.” Philadelphia, PA, March 2005.

Center for Functional Neuroimaging, University of Pennsylvania School of Medicine, "Tracking memory search and retrieval in an fMRI study of free recall." Philadelphia, PA, Feb. 2006.

Pattern classification minisymposium at Vision Science Society conference, "Tracking category-specific stimulus representations during memory search." Sarasota, FL, May, 2007.

Context and Episodic Memory Symposium, "The interaction of task context and temporal context in free recall." Tampa, FL, Jan., 2008.

Spatial Cognition workshop, "Mental travel through space and time: Spatial organization in free recall." Freiburg, Germany, Sept., 2008. All costs covered.

Memory Disorders Research Society meeting, "Models of context and memory." Chapel Hill, NC, Sept., 2009.

Context and Episodic Memory Symposium, "Extending the context maintenance and retrieval model of free recall." Philadelphia, PA, Apr., 2010.

Winter Conference on the Neurobiology of Learning and Memory, "Memory search and the neural representation of context." Park City, UT, Jan., 2011.

11. Conference presentations

Polyn, S., Wu, X. B., Levy, W. B. Entorhinal / dentate excitation of CA3: A critical variable in hippocampal models. (1999, July) Eighth Annual Computational Neuroscience Meeting.

Polyn S., Levy W. B. Dynamic control of inhibition improves performance of a hippocampal model. (2000, July) Ninth Annual Computational Neuroscience Meeting.

Polyn, S. M., Norman, K. A., Cohen, J. D. Connectionist modeling of source memory phenomena. (2002, November) Society for Neuroscience 32nd Annual Meeting.

Polyn, S. M., Norman, K. A. & Cohen, J. D. Modeling prefrontal and medial temporal contributions to episodic memory. (2003, March) Tenth Annual Meeting of the Cognitive Neuroscience Society.

Polyn, S. M., Nystrom, L. E., Norman, K. A., Haxby, J. V., Gobbini, M. I. & Cohen, J. D. (2004). Using neural network algorithms to investigate distributed patterns of brain activity in fMRI. Human Brain Mapping conference, Budapest, Hungary.

Polyn, S. M., Cohen, J. D. & Norman, K. A. (2004) Detecting distributed patterns in an fMRI study of free recall. Society for Neuroscience conference, San Diego, CA.

- Norman, K. A., Newman, E. L., Detre, G. J. & Polyn, S. M. (2004). How theta oscillations can train neural networks and punish competitors. Cognitive Neuroscience conference, San Francisco, CA.
- Norman, K. A., Newman, E. L., Detre, G. J. & Polyn SM (2004). How inhibitory oscillations can train neural networks and punish competitors. Computational and Systems Neuroscience conference, Cold Spring Harbor, NY.
- Lenartowicz, A., Detre, G. J., Polyn, S. M., Chein, J., Yeung, N., Nystrom, L. E., Norman, K. A. & Cohen, J. D. (2005) Characterization of brain states during task-switching using a neural network classifier. Cognitive Neuroscience Society conference, New York, NY.
- Polyn, S. M., Detre, G. J., Takerkart, S., Natu, V., Benharrosh, M., Singer, B., Cohen, J. D., Haxby, J. V. & Norman, K. A. (June, 2005) A Matlab-based toolbox to facilitate multi-voxel pattern classification of fMRI data. Annual Meeting of the Organization of Human Brain Mapping, Toronto, Canada.
- Polyn, S. M., Norman, K. A., & Kahana, M. J. (Nov., 2006) Tracking the stimulus representation in an fMRI study of free recall. Society for Neuroscience conference, Atlanta, GA.
- Polyn, S. M., Morton, N. W., Kogen, D. K., Norman, K. A., & Kahana, M. J. (Nov., 2006) Task effects on memory accessibility in free recall. Psychonomic Society annual meeting, Houston, TX.
- Polyn, S. M., Norman, K. A., & Kahana M. J. (July, 2006) Context and episode in a model of human memory. Society for Mathematical Psychology meeting, Vancouver, BC.
- Polyn, S. M., Morton, N. W., Kogen, D., Norman, K. A., & Kahana, M. J. (May., 2007) Task context and memory accessibility in free recall. Cognitive Neuroscience conference, New York, NY.
- Polyn S. M., & Kahana M. J. (2007) The interaction of task context and temporal context in memory search. Society for Mathematical Psychology conference, Irvine, CA.
- Miller J. F., Polyn S. M., & Kahana M. J. (2007) Clustering by spatial proximity during memory search. Society for Mathematical Psychology conference, Irvine, CA.
- Polyn, S. M., Koshkin, V. S., Morton, N. W & Kahana, M. J. (2007) Tracking category-related neural patterns during free recall using scalp EEG. Society for Neuroscience conference, San Diego, CA.

Morton, N. W, Polyn, S. M. & Kahana, M. J. (2007) Tracking encoding task context during free recall using scalp EEG. Society for Neuroscience conference, San Diego, CA.

Polyn S. M., Norman K. A., & Kahana M. J. (2008) Context maintenance and retrieval: A model of episodic and semantic organization in free recall. Society for Mathematical Psychology meeting, Washington, DC.

Morton, N. W, Burke, J. F., Hollidge, B. S., Polyn, S. M., Kahana, M. J. (Jul., 2008) Recency and contiguity in a temporal-context model of paired-associate learning. Society for Mathematical Psychology meeting, Washington DC.

Polyn, S. M., & Kahana, M. J. (Nov., 2008) Bridging cognitive and neural theories of memory search with the Context Maintenance and Retrieval model. Society for Neuroscience conference, Washington, DC.

Polyn, S. M., Morton, N. W, & Kahana, M. J. (Oct., 2009) Unraveling subsequent memory: Tracking category-specific and category-general neural patterns using scalp EEG. Society for Neuroscience conference, Chicago, IL.

Polyn, S. M., Erlichman, G. & Kahana, M. J. (Nov., 2009) The persistence of recency: Extending context-based models of free recall. Psychonomic Society annual meeting, Boston, MA.

Lohnas, L. J., Polyn, S. M. & Kahana, M. J. (Nov., 2009) Encoding variability revisited in the spacing and lag effects of free recall. Psychonomic Society annual meeting, Boston, MA.

Lohnas, L. J., Polyn, S. M. & Kahana, M. J. (Apr., 2010) A computational model of interlist effects in free recall. Context and Episodic Memory Symposium, Philadelphia, PA.

Morton, N. W & Polyn, S. M. (Apr., 2010) Illuminating the dynamics of memory search: Tracking category-related oscillations during free recall. Context and Episodic Memory Symposium, Philadelphia, PA.

Morton, N. W & Polyn, S. M. (Nov., 2010) Illuminating the dynamics of memory search: Tracking category-related oscillations during free recall. Society for Neuroscience meeting, San Diego, CA.

Cohen, Z. D., Morton, N. W & Polyn, S. M. (Nov., 2010) Using the context maintenance and retrieval model to interpret task-related neural activity in free recall. Society for Neuroscience meeting, San Diego, CA.

Manning, J. R., Polyn, S. M. & Kahana, M. J. (Nov., 2010) A neural signature of mental time travel. Society for Neuroscience meeting, San Diego, CA.

Polyn, S. M., Morton, N. W & Kahana, M. J. (Nov., 2010) Using intracranial oscillatory patterns to bridge cognitive and neural theories of memory search. Society for Neuroscience meeting, San Diego, CA.

F. Teaching-related activities

Teaching

Fall 2005, Guest Lecturer, Princeton University
“Pattern classification”
Graduate level multivariate statistics (Prof. Andrew Conway)

Spring 2008, Guest Lecturer, University of Pennsylvania
“Context and the organization of memory”
Foundations of Human Memory (Prof. Michael J. Kahana)

Fall 2009, Guest Lecturer, Vanderbilt University
“The hippocampus: Insights into memory”
NURO 340 Systems Neuroscience

Spring 2010, Instructor, Vanderbilt University
PSY 208 Principles of Experimental Design

Fall 2010, Instructor, Vanderbilt University
PSY 208 Principles of Experimental Design

Fall 2010, Guest Lecturer, Vanderbilt University
“The hippocampus: Insights into memory”
NURO 340 Systems Neuroscience

Spring 2010, Instructor, Vanderbilt University
PSY 282 Special Topics in Cognitive Psychology: Foundations of Human Memory

Graduate student committees

Jennifer Richler (doctoral candidate)
Ana Van Gulick (graduate student)
Neal Morton* (graduate student)

* Graduate student in my laboratory

Undergraduate research projects supervised

Kristen McCabe (undergraduate student; Neuroscience major)
Zachary Roth (undergraduate student; volunteer in lab)
Andrew Underhill (undergraduate student; volunteer in lab)
Peter Cheng (undergraduate student; volunteer in lab)

G. Academic service

To department

December, 2009. Participated in a workshop on Professional Development for graduate students and post-doctoral fellows.

To profession

Ad Hoc Journal Reviewer: Brain Research; Cognitive Psychology; Hippocampus; Human Brain Mapping; Journal of Experimental Psychology: Learning, Memory, & Cognition; Memory & Cognition; Neuroimage; Neuropsychologia; Psychological Review; Psychonomic Bulletin & Review; Science.

Reviews for other organizations: The Wellcome Trust; Medical Research Council, UK; External examiner for Memorial University, Canada.

Professional Society Memberships:

Cognitive Neuroscience Society
Memory Disorders Research Society
Psychonomic Society
Society for Mathematical Psychology
Society for Neuroscience

References

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August 3rd, 2011

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