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Michael J. Kahana, Ph.D.

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Personal

Born: May 7, 1969, St. Louis, MO
Citizenship: USA
Married to Jessica A. Wachter, Ph.D.
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Children:

Nathan Abraham, April 26, 2006
Joseph Morris, February 29, 2008
Benjamin Aryeh, January 25, 2011
Samuel Tzvi, May 14, 2013
Leah Eta Shari, June 19, 2015

Professional

- 2004 — present, Professor, Department of Psychology, University of Pennsylvania
- 2000 — 2004, Associate Professor, Department of Psychology and Center for Complex Systems, Brandeis University.
- 1994 — 2000, Assistant Professor, Department of Psychology and National Center for Complex Systems, Brandeis University

Education

- 1989 B. A., Case Western Reserve University.
- 1993 Ph.D., University of Toronto (Psychology); (Ph.D. Thesis: *Interactions between item, associative, and serial order information*, B. B. Murdock, chair).
- 1993–1994 Postdoctoral Fellow, Harvard University (Psychology). Individual National Research Service Award (N.I.H. Grant NS09559, Sponsor: W. K. Estes) *A temporal coding model of human memory*

Honors and Awards

- Howard Crosby Warren Medal, *Society of Experimental Psychologists*, 2018.
- Mid-career Award, *Psychonomic Society*, 2018
- Troland Award, *National Academy of Sciences*, 2010.
- Fellow, *Society of Experimental Psychologists*, 2008
- Fellow, *American Psychological Society*, 2010
- Merritt-Putnum Distinguished Lecture — American Epilepsy Society, 2017
- Keynote address, *The 6th International Conference on Memory*, 2016
- Plenary address – 40th Annual Meeting of the Society for Mathematical Psychology, Irvine, CA, 2007
- Plenary address – Computational Cognitive Neuroscience Conference, Houston, 2006

Editorial Activities

- Associate Editor: *Psychological Review*, 2015–
- Associate Editor: *Cognitive Psychology*, 2005 – 2009
- Associate Editor: *Memory & Cognition*, 2001 – 2005
- Guest Editor: *NeuroImage* special issue “New Horizons for Neural Oscillations”, 2014
- Consulting Editor: *Journal of Experimental Psychology: General*, 2008 – 2010
- Consulting Editor: *Journal of Mathematical Psychology*, 2012 –
- Consulting Editor: *Psychonomic Bulletin & Review*, 2005 – 2007.
- Consulting Editor: *Memory & Cognition*, 1997 – 2001.

- Consulting Editor: *Journal of Experimental Psychology: Learning, Memory and Cognition*, 1999 – 2001.

Other Professional Activities

- Founder and Organizer of the Context and Episodic Memory Symposium, an annual meeting since 2002
- Director of graduate studies, Psychology Graduate Group, University of Pennsylvania, 2008-2011
- Chair of the 2010 meeting of the *Society of Experimental Psychologists*
- Member, BBBP-4 (Cognition and Perception) study section, *Centers for Scientific Review, National Institutes of Health*, 2003–2007
- Member, Advisory Board, Princeton Neuroscience Institute, 2012
- Organizer – 39th Annual Meeting of the Society for Mathematical Psychology, 2006
- Member, Advisory Panel. Doris Duke Charitable Foundation, 2005
- Member, Advisory Panel. N.I.H. Silvio O. Conte Center for Neuroscience Research: Cognitive and Neural Mechanisms of Conflict and Control (Princeton University), 2003
- N.I.M.H. First Award, 1996
- **Invited Colloquia:** Albert Einstein College of Medicine, Albert-Ludwigs-Universität Freiburg, Boston University, Brandeis University, Brown University, California Institute of Technology, Carnegie Mellon University, Columbia University (Psychology), Columbia University (Neuroscience), Cornell University, Courant Institute (NYU), Dartmouth College, Donders Institute, Nijmegen, Netherlands, Duke University, Harvard University, Hungarian Academy of Sciences, Indiana University, Jerusalem Brain Institute, Johns Hopkins University, Max Planck Institute-Berlin, McGill University, Monell Research Institute, Montreal Neurological Institute, National Institute of Neurological Disorders and Stroke, New York University, Northwestern University, Ohio State University, Princeton University, Rutgers University, Salk Institute, Shriver Center, Stanford University, Swiss Federal Institute of Technology (EPFL), Syracuse University, Thomas Jefferson University, Tufts University, University of California, Davis, University of California, Irvine, U.C.L.A. School of Medicine, U.C.L.A. Psychology, University of California, San Diego, University of California at San Francisco, University of Delaware, University of Massachusetts at Amherst, University of Toronto, Washington University, Williams College, Yale University.

Professional Society Memberships:

- Psychonomic Society
- Society for Neuroscience
- Memory Disorders Research Society
- Society for Cognitive Neuroscience,
- Society for Mathematical Psychology
- Society of Experimental Psychologists

Grant Support

- NIH Grant 4R01 MH55687 *Associative Processes in Episodic Memory*. M. J. Kahana, P.I. May 5, 2016 – January 31, 2021. \$250,000 annual direct costs.
- NSF/CRCNS Grant NSF 1724243 *US-German Research Proposal: Role of place and grid cells and phase precession in human spatial and episodic memory*. J. Jacobs, P.I., M. J. Kahana, Co-P.I. November 1, 2017 – August 31, 2020. \$60,000 annual direct costs.
- NIH Grant 3R01 MH61975 *Electrophysiology of Human Spatial Cognition*. M. J. Kahana, P.I. March 1, 2014 – January 31, 2019. \$263,131 annual direct costs.
- DARPA RAM Cooperative Agreement N66001-14-2-4-032 *Memory Enhancement with Modeling, Electrophysiology, and Stimulation*. M. J. Kahana, P.I. July 16, 2014 – November 18, 2018. \$4,758,025 annual direct costs.
- NIH Grant R21 AG048233 *A model-based approach to understanding memory impairments*. M. J. Kahana, P.I. August 15, 2015 – May 31, 2017. \$150,000 annual direct costs.
- Educational Testing Service Grant *EEG Correlates of Engagement*. M. J. Kahana, P.I. August 15, 2013 – December 31, 2014. \$41,445 annual direct costs.
- NIH Grant 4R01 MH55687 *Associative Processes in Episodic Memory*. M. J. Kahana, P.I. May 1, 2011 – May 4, 2016. \$300,386 annual direct costs.
- NSF grant 1058886 *Retrieved Context Models of Episodic Memory*. M. J. Kahana, P.I. June 1, 2011– May 31, 2014. \$93,600 annual direct costs.
- NIH Grant 2R01 MH61975 *Electrophysiology of Spatial Cognition*. M. J. Kahana, P.I. Sept 26, 2007 – July 31, 2013. \$252,687 annual direct costs.

- NIH Grant 1R21 NS067316 *Intracranial EEG for Neuronal Oscillatory Contingency during Cognitive Tasks*. M. J. Kahana, P.I. September 30, 2009 – August 31, 2012. \$163,228 annual direct costs.
- NIH Grant R90 DA023424 *Integrated Interdisciplinary Training in Computational Neuroscience*. M. J. Kahana, P.I. September 30, 2006 – July 31, 2011. \$296,519 annual direct costs.
- NIH Grant T90 DA022763 *Integrated Interdisciplinary Training in Computational Neuroscience*. M. J. Kahana, P.I. September 30, 2006 – July 31, 2011. \$166,888 annual direct costs.
- NIH Grant 2R01 MH68404 *Short Term Visual Episodic Recognition Memory*. R. Sekuler, P.I., M. J. Kahana, Co-I. June 6 2009 – June 5, 2011.
- Dana Foundation Grant *Intracranial EEG for Theta Rhythm Contingency During Cognitive Tasks*. December, 2007 – February, 2011. \$100,000 annual direct costs.
- NIH/NIMH Grant P50 MH062196. Subproject on Conte Center Grant *Retrieval Dynamics in Item and Source Memory*. October 1, 2005 – August 31, 2011
- NIH Grant 3R01 MH55687 *Associative Processes in Episodic Memory*. M. J. Kahana, P.I. February 1, 2007 – Jan 30, 2011.
- NSF grant SBE 0354378 Subproject 14 on Science of Learning Center Grant *CELEST: A Center for Learning in Education, Science, and Technology*. S. Grossberg P.I. October 1, 2004 – September 30, 2009.
- NIH Grant R01 MH68404 *Short Term Visual Episodic Recognition Memory*, R. Sekuler, P.I., M. J. Kahana, Co-P.I.. April 1, 2004 – March 31, 2009.
- Swartz Foundation Grant 2004/10-04 *Electrophysiology of Human Memory Formation*. M. J. Kahana P.I. November 28, 2003 – November 27, 2004.
- NIH Grant 2R01 MH55687 *Associative Processes in Episodic Memory*. M. J. Kahana, P.I. April 1, 2002 – January 30, 2007.
- NIH Grant R29 MH55687 *Mathematical Models of Human Memory*. M. J. Kahana, P.I., April 1, 1997 – March 30, 2002.
- NIH Grant R01 MH61975 *Using intracranial recordings to study task-dependent theta..* M. J. Kahana, P.I. December 12, 2001 – December 11, 2006.
- AFOSR Grant F49620-03-1-0376 *Model driven study of visual memory*. R. Sekuler, P.I., M. J. Kahana, Co-P.I.. July 1, 2003 – December 31, 2003.
- NIH Grant R01 AG15852 *Aging and the temporal dynamics of self-initiated*

recall A. Wingfield, P.I., M. J. Kahana, Co-P.I. August 1, 1998 – July 30, 2003.

Postdoctoral Supervision

- Dan Kimball, J.D., Ph.D. (Postdoc, 2002 – 2003). Morris Associate Professor, Department of Psychology, *University of Oklahoma*.
- Sean Polyn, Ph.D. (Postdoc, 2005 – 2008). Associate Professor, Department of Psychology, *Vanderbilt University*.
- Christoph Weidemann, Ph.D. (Postdoc, 2006 – 2010). Assistant Professor, Department of Psychology, *Swansea University*
- Kareem A. Zaghoul, M.D. Ph.D. (Postdoc, 2007 – 2008). Assistant Professor, Department of Neurosurgery, *National Institutes of Health and George Washington University*.
- Mijail Serruya, M.D., Ph.D. (Postdoc, 2009 – 2011). Assistant Professor, Department of Neurology, *Jefferson Hospital*.
- Brad Lega, M.D. (Postdoc, 2009 – 2011). Assistant Professor, Department of Neurosurgery, *University of Texas Southwestern, Dallas*.
- Karl Healey, Ph.D. (Postdoc, 2011 – 2016). Assistant Professor, Department of Psychology, *Michigan State University*
- Max Merkow, M.D. (Postdoc, 2013 – 2016). Neurosurgeon, Bayarea Neurosciences, *John Muir Hospital*
- James Kragel, Ph.D. (Postdoc, 2015 – 2018). Postdoctoral fellow, *Northwestern University*.
- Youssef Ezzyat, Ph.D. (Postdoc, 2014 – 2018). Assistant Professor, Department of Psychology, *Swarthmore College*.
- Nora Herweg, Ph.D. (Postdoc, 2017 –).

Doctoral Supervision

- Marc W. Howard, Ph.D. (1995 – 2000). Professor, Psychology, *Boston University*.
- Jeremy B. Caplan, Ph.D. (1997 – 2002). Associate Professor, Psychology, *University of Alberta*.
- Daniel S. Rizzuto, Ph.D. (1997 – 2002). CEO, *Nia Therapeutics*.
- Arne D. Ekstrom, Ph.D. (2001 – 2004). Associate Professor, Psychology and Neuroscience, *University of Arizona*.

- Kelly Addis, Ph.D. (2000 – 2004). Thesis Title: *Constraining models of serial learning*.
- Per Sederberg (2001 – 2006). Associate Professor, Department of Psychology, *University of Virginia*.
- Grace Hwang, Ph.D. (2002 – 2005). Engineer, *Mitre Corporation*.
- Marieke van Vugt, Ph.D. (2003 – 2008). Assistant Professor, Cognitive Science, *University of Groningen*.
- Joshua Jacobs, Ph.D. (2004 – 2008). Assistant Professor, Bioengineering, *Columbia University*.
- Jeremy R. Manning, Ph.D. (2006 – 2011). Assistant Professor, Psychological and Brain Sciences, *Dartmouth University*.
- Lynn Lohnas, Ph.D. (2007 – 2012). Assistant Professor, Department of Psychology, *Syracuse University*.
- John Burke, M.D./Ph.D. (2010 – 2013). Resident in Neurosurgery, *U.C.S.F*
- Ashwin Ramayya M.D./Ph.D. (2011 – 2014). Resident in Neurosurgery, *University of Pennsylvania*.
- Nicole Long, Ph.D. (2010 – 2015). Assistant Professor, Department of Psychology, *University of Virginia*.
- Ethan Solomon (2015 –). Bioengineering M.D./Ph.D. Student, *University of Pennsylvania*.
- Rivka Cohen (2016 –). Psychology Ph.D. Student, *University of Pennsylvania*.
- Logan Fickling (2016 –). Neuroscience Ph.D. Student, *University of Pennsylvania*.
- Daniel Schonhaut (2018 –). Neuroscience Ph.D. Student, *University of Pennsylvania*.

Other Trainees

- Etan Cohen, Director/Screenwriter.
- Emily Dolan, Ph.D., Evaluation Coordinator, *VA Puget Sound*.
- Gennady Erlikhman, Ph.D., Postdoctoral Fellow, *University of Nevada, Reno*.
- Lynne Gauthier, Ph.D., Assistant Professor, *Ohio State University*.
- Aaron S. Geller, M.D., Resident Physician (Neurology), *New York University*.

- Roger Khazan, Ph.D., Associate Group Leader, *MIT Lincoln Laboratory*.
- Matt P. Kirschen, M.D., Ph.D., Assistant Professor of Critical Care Medicine, *Children's Hospital of Pennsylvania*.
- Igor Korolev, D.O., Ph.D. Resident Physician (Psychiatry), *University of Miami Hospital*.
- Richard Lawrence, Ph.D., *U.C. Berkley*.
- Eben Lazarus, Assistant Professor of Finance, *MIT*.
- Ningcheng Li, M.D., *Yale University*.
- Jonathan Miller, Ph.D. Postdoctoral Fellow, *Columbia University*
- Matt Mollison, Ph.D. Data Scientist, *Silicon Valley Data Science*.
- Neal Morton, Ph.D. Postdoctoral Fellow, *University of Texas at Austin*.
- Ehren Newman, Ph.D. Assistant Professor, *Indiana University*.
- Peter Pantelis, Ph.D. Postdoctoral Researcher, *Indiana University-Bloomington*.
- Eric Pressman, Usability Group Sr. Team Lead, *MathWorks*.
- Colin Sauder, Postdoctoral Fellow, *University of Texas*.
- Greg Schwartz, Ph.D. Assistant Professor, *Northwestern University*.
- Yevgeniy Sirotin, Ph.D. Human Factors Scientist, *Scitor Corporation*.
- Alec Solway, Ph.D. Assistant Professor, *University of Maryland*.
- Jessica Spencer, M.D., Associate Professor, *Emory School of Medicine*.
- Michelle Tully Tine, Ph.D. Associate Professor, *Dartmouth College*.
- Daniil Utin, Research Staff, *MIT Lincoln Laboratory*.
- Brad Wyble, Ph.D. Associate Professor, *Penn State University*.
- Robert Yaffe, Ph.D. Software Engineer, *Google*.
- Franklin Zaromb, Ph.D. Research Scientist, *ETS*.

Monographs

- Kahana, M. J. (2012). *Foundations of Human Memory*. Oxford University Press. 2nd Edition under contract with OUP.

Working Papers

1. Aka, A. & Kahana, M.J. *Predicting recall of words and lists*. Manuscript submitted for publication.
2. Broitman, A.W., Kahana, M.J., & Healey, M.K. *Modeling retest effects in*

a longitudinal measurement burst study of memory. Manuscript submitted for publication.

3. Ezzyat, Y., Randazzo, M. & Kahana, M. J. *Spectral tilt underlies mathematical problem solving.* Manuscript submitted for publication.
4. Gifford, A.M., Sperling, M.R., Sharan, A.D., Gorniak, R.J., Williams, R.B., Kahana, M.J., & Cohen, Y.E. *Neuronal phase tracks dynamic changes in acoustic spectral regularity.* Manuscript submitted for publication.
5. Halderman, L.K., Finn, B., Long, N.M., Lockwood, J.R. & Kahana, M.J. *EEG correlates of engagement during assessment.* Manuscript submitted for publication.
6. Healey, M.K., & Kahana, M.J. *Age-related changes in the neural dynamics of memory encoding.* Manuscript submitted for publication.
7. Healey, M.K., Long, N.M., & Kahana, M.J. *Contiguity in episodic memory.* Manuscript submitted for publication.
8. Herweg, N.A., Sharan, A.D., Sperling, M.R., Brandt, A., Schulze-Bonhage, A. & Kahana, M.J. *Reactivated spatial context guides episodic recall.* Manuscript submitted for publication.
9. Kucewicz, M.T., Saboo, K., Berry, B.M., Kremen, V., Miller, L.R., Khadjevand, F., Inman, C., Wanda, P., Sperling, M.R., Gorniak, R., Davis, K.A., Jobst, B.C., Lega, B., Sheth, S.A., Rizzuto, D.S., Iyer, R., Kahana, M.J. & Worrell, G.A. *Human verbal memory encoding is hierarchically distributed in a continuous processing stream.* Manuscript submitted for publication.
10. Lohnas, L.J., Davachi, L., & Kahana, M.J. *Neural fatigue influences memory encoding in the human hippocampus.* Manuscript submitted for publication.
11. Phan, T.D., Wachter, J.A., & Kahana, M.J. *Multivariate stochastic volatility modeling of neural data.* Manuscript submitted for publication.
12. Solomon, E.A., Stein, J.M., Das, S., Gorniak, R., Sperling, M.R., Worrell, G., Inman, C., Lega, B., Jobst, B.C., Rizzuto, D.S., & Kahana, M. J. *Functional wiring of the human medial temporal lobe.* Manuscript submitted for publication.

Refereed Journal Articles

1. Solomon, E.A., Kragel, J.E., Gross, R.E., Lega, B., Sperling, M.R., Worrell, G., Sheth, S.A., Zaghoul, K.A., Jobst, B.C., Stein, J.M., Das, S., Gorniak, R., Inman, C., Seger, S., Rizzuto, D.S., & Kahana, M.J. (2018).

Medial temporal lobe functional connectivity predicts stimulation-induced theta power. *Nature Communications*, in press.

2. Arora, A., Lin, J., Gasperian, A., Stein, J., Maldjian, J., Kahana, M.J. & Lega, B. (2018). Comparison of logistic regression, support vector machines, and deep learning classifiers for predicting memory encoding success using human intracranial EEG recordings. *Journal of Neural Engineering*, in press.
3. Long, N.M., & Kahana, M.J. (2018). Hippocampal contributions to serial-order memory. *Hippocampus*, in press.
4. Weidemann, C.T., Kragel, J.E., Lega, B.C., Worrell, G.A., Sperling, M.R., Sharan, A.D., Jobst, B.C., Khadjevand, F., Davis, K.A., Wanda, P. A., Kadel, A., Rizzuto, D.S., & Kahana, M.J. (2018). Neural activity reveals interactions between episodic and semantic memory systems during retrieval. *Journal of Experimental Psychology: General*, in press.
5. Kahana, M.J., Aggarwal, E. & Phan, T.D. (2018). The variability puzzle in human memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, in press.
6. Weidemann, C.T., & Kahana, M.J. (2018). Dynamics of brain activity reveal a unitary recognition signal. *Journal of Experimental Psychology: Learning, Memory and Cognition*, in press.
7. Kuhn, J.R., Lohnas, L.J., & Kahana, M.J. (2018). A spacing account of negative recency in final free recall. *Journal of Experimental Psychology: Learning, Memory and Cognition*, in press.
8. Kucewicz, M.T., Berry, B.M., Kremen, V., Miller, L.R., Khadjevand, F., Ezzyat, Y., Stein, J.M., Wanda, P., Sperling, M.R., Gorniak, R., Davis, K.A., Jobst, B.C., Gross, R.E., Lega, B., Stead, S.M., Rizzuto, D.S., Kahana, M.J. & Worrell, G.A. (2018). Electrical stimulation modulates high gamma activity and human memory performance. *eNeuro*, in press.
9. Herweg, N.A. & Kahana, M.J. (2018). Spatial representations in the human brain. *Frontiers in Human Neuroscience*, 12, 297.
10. Ezzyat, Y., Sperling, M.R., Sharan, A.D., Lega, B.C., Burks, A., Gross, R.E., Jobst, B.C., Davis, K.A., Worrell, G.A., Stein, J.M., Gorniak, R., Das, S.R., Rizzuto, D.S., & Kahana, M.J. (2018). Closed-loop stimulation of temporal cortex rescues functional networks and improves memory. *Nature Communications*, 9(1), 365.
11. Kucewicz, M.T., Berry, B.M., Miller, L.R., Khadjevand, F., Ezzyat, Y., Stein, J.M., Kremen, V., Brinkmann, B.H., Wanda, P., Sperling, M.R., Gorniak, R., Davis, K.A., Jobst, B.C., Gross, R.E., Lega, B., Van Gompel,

- J., Stead, S.M., Rizzuto, D.S., Kahana, M.J., & Worrell, G.A. (2018). Evidence for verbal memory enhancement with electrical brain stimulation in the lateral temporal cortex. *Brain*, 141, 971-978.
12. Solomon, E.A., Kragel, J.E., Sperling, M.R., Sharan, A., Worrell, G., Kucewicz, M., Inman, C.S., Lega, B., Davis, K.A., Stein, J.M., Jobst, B.C., Zaghoul, K.A., Sheth, S.A., Rizzuto, D.S., & Kahana, M.J. (2017). Widespread theta synchrony and high-frequency desynchronization underlies enhanced cognition. *Nature Communications*, 8(1), 1704.
 13. Lin, J.J., Rugg, M., Das, S.R., Stein, J.M., Rizzuto, D.S., Kahana, M.J., & Lega, B.C. (2017). Theta band power increases in the posterior hippocampus predict successful episodic memory encoding in humans. *Hippocampus*, 27, 1040-1053.
 14. Kragel, J.E., Ezzyat, Y., Sperling, M.R., Gorniak, R.J., Worrell, G.A., Berry, B.M., Inman, C.S., Lin, J., Davis, K.A., Das, S.R., Stein, J.M., Jobst, B.C., Zaghoul, K.A., Sheth, S.A., Rizzuto, D.S., & Kahana, M.J. (2017). Similar patterns of neural activity predict memory function during encoding and retrieval. *NeuroImage*, 155, 60-71.
 15. Ramayya, A.G., Pedisch, I., Levy, D.F., Lyalenko, A., Wanda, P., Rizzuto, D., Baltuch, G.H., & Kahana, M.J. (2017). Proximity of Substantia Nigra Microstimulation to Putative GABAergic Neurons Predicts Modulation of Human Reinforcement Learning. *Frontiers in Human Neuroscience*, 11.
 16. Long, N.M., Sperling, M.R., Worrell, G.A., Davis, K.A., Gross, R.E., Lega, B.C., Jobst, B.C., Sheth, S.A., Zaghoul, K.A., Stein, J.M., & Kahana, M.J. (2017). Contextually mediated spontaneous retrieval is specific to the hippocampus. *Current Biology*, 27(7), 1074-1079.
 17. Kucewicz, M.T., Berry, B.M., Kremen, V., Brinkmann, B.H., Sperling, M.R., Sharan, A.D., Jobst, B.C., Gross, R.E., Lega, B.C., Sheth, S.A., Stein, J.M., Das, S.R., Stead, M.S., Rizzuto, D.S., Kahana, M.J., & Worrell, G.A. (2017). Dissecting gamma frequency activity during human memory processing. *Brain*, 140(5), 1337-1350.
 18. Ezzyat, Y., Kragel, J.E., Burke, J.F., Levy, D.F., Lyalenko, A., Wanda, P., O'Sullivan, L., Hurley, K.B., Busygin, S., Pedisch, I., Sperling, M.R., Worrell, G.A., Kucewicz, M.T., Davis, K.A., Lucas, T.H., Inman, C.S., Lega, B.C., Jobst, B.C., Sheth, S.A., Zaghoul, K.A., Jutras, M.J., Stein, J.M., Das, S.R., Gorniak, R.J., Rizzuto, D.S., & Kahana, M.J. (2017). Direct brain stimulation modulates encoding states and memory performance in humans. *Current Biology*, 27(9), 1251-1258.
 19. Long, N.M., & Kahana, M.J. (2017). Modulation of task demands suggests that semantic processing interferes with the formation of episodic

associations. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 43(2), 167-176.

20. Horak, P.C., Meisenhelter, S., Song, Y., Testorf, M.E., Kahana, M.J., Viles, W.D., Bujarski, K.A., Connolly, A.C., Robbins, A.A., Sperling, M.R., Sharan, A.D., Worrell, G.A., Mille, L.R., Gross, R.E., Davis, K.A., Roberts, D.W., Lega, B.C., Sheth, S.A., Zaghoul, K.A., Stein, J.M., Das, S.R., Rizzuto, D.S., & Jobst, B.C. (2017). Interictal epileptiform discharges impair word recall in multiple brain areas. *Epilepsia*, 58(3), 373-380.
21. Merkow, M.B., Burke, J.F., Ramayya, A.G., Sharan, A.D., Sperling, M.R. & Kahana, M.J. (2017). Stimulation of the human medial temporal lobe between learning and recall selectivity enhances forgetting. *Brain Stimulation*, 10(3), 645-650.
22. Jacobs, J., Miller, J.F., Lee, S.A., Coffey, T., Watrous, A.J., Sperling, M.R., Sharan, A.D., Worrell, G.A., Berry, B.M., Jobst, B.C., Davis, K.A., Gross, R.E., Sheth, S.A., Ezzyat, Y., Das, S.R., Stein, J.M., Gorniak, R.J, Kahana, M.J., & Rizzuto, D.S. (2016). Direct electrical stimulation of human entorhinal region and hippocampus impairs memory. *Neuron*, 92(5),983-990.
23. Weidemann, C.T., & Kahana, M.J. (2016). Assessing recognition memory using confidence ratings and response times. *Royal Society open science*, 3(4),150670.
24. Healey, M.K., & Kahana, M.J. (2016). A four-component model of age-related memory change. *Psychological Review*, 123(1), 23-69.
25. Merkow, M.B., Burke, J.F., & Kahana, M.J. (2015). The human hippocampus contributes to both the recollection and familiarity components of recognition memory. *Proceedings of the National Academy of Sciences*, 112(46), 14378-14383.
26. Long, N.M., & Kahana, M.J. (2015). Successful memory formation is driven by contextual encoding in the core memory network. *NeuroImage*, 119, 332-337.
27. Ramayya, A.G., Pedisich, I., & Kahana, M.J. (2015). Expectation modulates neural representations of valence throughout the human brain. *NeuroImage*, 115, 214-223.
28. Greenberg, J.A., Burke, J.F., Haque, R., Kahana, M. J., & Zaghoul, K.A. (2015). Decreases in theta and increases in high frequency activity underlie associative memory encoding. *NeuroImage*, 114, 257-263.
29. Long, N.M., Danoff, M.S., & Kahana, M.J. (2015). Recall dynamics reveal

the retrieval of emotional context. *Psychonomic Bulletin & Review*, 22(5), 1328-1333.

30. Lohnas, L.J., Polyn, S.M., & Kahana, M.J. (2015). Expanding the scope of memory search: Modeling intralist and interlist effects in free recall. *Psychological Review*, 122(2), 337-363.
31. Burke, J.F., Merkow, M.B., Jacobs, J., Kahana, M.J., & Zaghoul, K.A. (2015). Brain computer interface to enhance episodic memory in human participants. *Frontiers in Human Neuroscience*, 8, 1-10.
32. Burke, J.F., Ramayya, A.G., & Kahana, M.J. (2015). Human intracranial high-frequency activity during memory processing: neural oscillations or stochastic volatility? *Current Opinion in Neurobiology*, 31, 104-110.
33. Lega, B.C., Burke, J.F., Jacobs, J., & Kahana, M.J. (2014). Slow theta-to-gamma phase-amplitude coupling in human hippocampus supports the formation of new episodic memories. *Cerebral Cortex*, 26(1), 268-278.
34. Merkow, M.B., Burke, J.F., Stein, J.M., & Kahana, M.J. (2014). Prestimulus theta in the human hippocampus predicts subsequent recognition but not recall. *Hippocampus*, 24, 1562-1569.
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