

# Abhilasha A. Kumar

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## Academic Appointments

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<b>Visiting Research Associate</b> Indiana University, Bloomington, IN	2021 - 2022
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## Education

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<b>Ph.D. in Psychological &amp; Brain Sciences</b> Washington University in St. Louis, MO	2016 - 2021
<b>M.A. in Psychological &amp; Brain Sciences</b> Washington University in St. Louis, MO	2016 - 2018
<b>M.A. in Liberal Arts (Computer Science and Psychology)</b> Ashoka University, India	2014 - 2016
<b>Integrated M. Tech in Mathematics &amp; Computing</b> IIT Delhi, India	2009 - 2014

## Fellowships and Awards

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<b>2021 Graduate Student Conference Award</b> 62 <sup>nd</sup> Annual Meeting of the Psychonomic Society	2021
<b>Diverse Intelligences Summer Fellowship, UCLA</b> Templeton World Charity Foundation	2020
<b>Outstanding Assistant to the Instructor Award</b> Washington University in St. Louis, MO	2019
<b>Graduate Certificate in Quantitative Data Analysis</b> Washington University in St. Louis, MO	2019
<b>Three Minute Thesis Winner and Finalist</b> Washington University in St. Louis, MO McDonnell International Symposium, Beijing, China	2018, 2019

## Peer-Reviewed Publications

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shared authorship,



theoretical review,



undergraduate author,






conference paper

12. **Kumar, A.A.**, Steyvers, M., Balota, D.A. (2021). Semantic Memory Search and Retrieval in a Novel Cooperative Word Game: A Comparison of Associative and Distributional Semantic Models. *Cognitive Science*, 45(10), e13053. [[PDF](#)] [[open materials](#)]


11.  **Kumar, A.A.**, Garg, K., Hawkins, R.D. (2021). Contextual Flexibility Guides Efficient Communication in a Cooperative Word Game. In *Proceedings of the 43<sup>rd</sup> Annual Meeting of the Cognitive Science Society*. [[PDF](#)] [[open materials](#)]
10.  **Kumar, A.A.**, Balota, A., Steyvers, M. (2021). A Critical Review of Network-based and Distributional Approaches to Semantic Memory Structure and Processes. Invited Special Issue, *Topics in Cognitive Science*. [[PDF](#)]
9.  **Kumar, A.A.** (2021). Semantic Memory: A Review of Methods, Models, and Current Challenges. *Psychonomic Bulletin & Review*, 28, pp. 40-80. [[PDF](#)]
8. **Kumar, A. A.** (2021). *Modeling Semantic Structure and Spreading Activation in Retrieval Tasks* [Doctoral dissertation]. Washington University in St. Louis. ProQuest Dissertations Publishing. DOI <https://doi.org/10.7936/7784-n595> [[Abstract](#)]
7.  **Kumar, A.A.**, Balota, D.A., De Deyne, S. (2020). Modeling Free Associations Using Distributional Semantic Models and Spreading Activation. *Grace Hopper Conference*. [[PDF](#)]
6. **Kumar, A.A.**, Balota, D.A., Steyvers, M. (2020). Distant Connectivity and Multiple-Step Priming in Large-Scale Semantic Networks. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 46 (12), pp. 2261-2276. [[PDF](#)] [[open materials](#)]
5. **Kumar, A.A.**, Balota, D.A. (2020). Attempted Prime Retrieval is a Double-Edged Sword: Facilitation and Disruption in Repeated Lexical Retrieval. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 46(8), 1505–1532. [[PDF](#)] [[open materials](#)]
4.  **Kumar, A.A.**, Balota, D.A., Steyvers, M. (2019). Distant Concept Connectivity in Network-Based and Spatial Word Representations. In *Proceedings of the 41<sup>st</sup> Annual Meeting of the Cognitive Science Society*, 1348-1354. [[PDF](#)] [[open materials](#)]
3.  **Kumar, A.A.**,  Balota, D.A., Habbert, J., Scaltritti, M., Maddox, G.B. (2019). Converging Semantic and Phonological Information in Lexical Retrieval and Selection in Young and Older Adults. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 45(12), 2267–2289. [[PDF](#)] [[open materials](#)]
2. **Kumar, A.A.**, Hangal, S., Rosen, A.C. (2019). Autobiographical Recall of Personally Familiar Names and Temporal Information in E-mails: An Automatic Analytic Approach using E-mail Communications. *Behavior Research Methods*, 51(4), 1510-1530. [[PDF](#)] [[open materials](#)]
1. Maddox, G.B., Balota, D.A., **Kumar, A.A.**, Millar, P.,  Churchill, L. (2019). The Immediate Benefits and Long-Term Costs of Briefly Presented Primes on Episodic Recollection. *Journal of Memory and Language*. 106, 77-94. [[PDF](#)]

## Manuscripts in Progress

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9.  **Kumar, A.A.**, Lundin, N. B., Jones, M.N. (under review). Mouse-mole-vole: The inconspicuous benefits of phonology during retrieval from semantic memory.
8.  Apse, M., **Kumar, A.A.**, Jones, M.N. (under review). Modeling primed lexical retrieval.
7.  Kovacs, C.J., Wilson, J., **Kumar, A.A.** (under review). Fast and frugal memory search

for communication.

6. **Kumar, A.A.**, Jones, M.N., Willits, J., Kronenberger, W.G., Pisoni, D. (in prep.). Semantic Search and Retrieval in Populations with Cochlear Implants.
5. **Kumar, A.A.**, Balota, D.A. (in prep.). Modeling free associations.
4. **Kumar, A.A.** (in prep.). Misaligned goal preferences account for failures in communication.
3. Apsel, M., **Kumar, A.A.**, Zhang, L., Jones, M.N. (in prep.). searchr: A Python and R-based modeling framework for semantic memory search.
2. Pahinkar, A. S., Mishra, K., **Kumar, A.A.** (in prep.). Evaluating Transformer Models in Creative Language Tasks.
1. Balota, D.A., **Kumar, A.A.**,  Wilson, J., Han, L. (in prep.). Priming Recollection and Recognition in a Free Recall Paradigm.

## Teaching and Mentoring Experience

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### Guest Lecturer, Washington University in St. Louis

Generalized Hierarchical Linear Models, *Hierarchical Linear Models*, April 2019  
Three-level Hierarchical Linear Models, *Hierarchical Linear Models*, March 2019  
Introduction to Data Visualization in R, *Methods in Linguistics Research*, October 2018  
Regression and Statistical Methods in Computational Linguistics, *Introduction to Computational Linguistics*, April 2018  
Confidence Intervals and t-tests, *Introduction to Psychological Statistics*, March 2018  
Memory Distortions and Failures, *Introduction to Psychology*, September 2017

### Assistant to the Instructor, Washington University in St. Louis

*Psychology of Language* (undergraduate-level class), 2020

- Supervised 20+ student projects on language acquisition, semantic models, and speech

*Hierarchical Linear Models* (graduate-level class), 2019

- Created R modules on advanced plotting and constructing complex contrast matrices

*Methods in Linguistics Research* (undergraduate-level class), 2018

- Lectured class of 20+ students on plotting in R; advised students on analysis and research

*Introduction to Psychological Statistics* (undergraduate-level class), 2018

- Advised class of 100+ students on coding-based/statistical projects and assignments

*Introduction to Psychology* (undergraduate-level class), 2017

- Lectured class of 100+ students on false memory and eyewitness testimony

### Research Mentoring, Washington University in St. Louis

*Students and Teachers as Research Scientists* (STARS program, high-school students), 2017

- Mentored 2 high-school students in conducting independent research projects

*Cognitive Psychology Lab*: 15+ undergraduates (research mentoring), 2016-present

- Developed manuals on introductory statistics, experimental software, & analysis protocols
- Trained students to recruit participants, analyze experimental data, and present papers

### Teaching Assistant, Ashoka University, India

*Probability, Statistics & Data Science* (undergraduate-level class), 2016  
*Human-Computer Interaction* (undergraduate-level class), 2015  
*Mathematical Thinking* (undergraduate-level class), 2014

### Tutoring

*Knowledge is Power Program (KIPP) Victory Academy*, St. Louis, Jan-Mar 2020

### **Professional Development in Teaching Program, 2016-2020**

Completed a formalized training program in pedagogy involving 3 mentored experiences

Attended advanced workshops on effective evidence-based teaching practices:

*Philosophy and Implementation of Collaborative Learning*, January 2020

*Applying Cognitive Science to Improve Teaching*, April 2019

*Providing Verbal Feedback to Students*, February 2019

*Who's in Charge Here? Strategies for Managing a Classroom*, August 2017

### **Talks**

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"Understanding Human Language using Games and Machines". *Skype a Scientist Program*, September 2021, Virtual.

"Language Games: A Window into Complex Cognition". *Games for Intelligence Workshop*, 43<sup>rd</sup> Annual Meeting of the Cognitive Science Society, July 2021, Virtual.

"Fostering International Student Participation in Cognitive Science", International Cognitive Science Affinity Group, 43<sup>rd</sup> Annual Meeting of the Cognitive Science Society, July 2021, Virtual.

"Computational Models of Semantic Memory Representation, Search, and Retrieval". *Indiana University*, April 2021 [Invited Talk], Virtual.

"Semantic Memory: Representation, Search, and Retrieval". *Bowdoin College*, November 2020 [Invited Talk], Virtual.

"Computational Models of Semantic Memory". The Stanford Language and Cognition Lab, *Stanford University*, September 2020 [Invited Talk], Virtual.

"Combining Structure and Process Models of Semantic Memory". Computational Behavioral Science Lab. *University of Pennsylvania*, October 2020 [Invited Talk], Virtual.

"Priming for Distant Concepts: Insights from Semantic Networks". Behavior, Brain, and Cognition Brownbag, *Washington University in St. Louis*, October 2019, St. Louis, MO.

"What's in an Abstract?". Institute for Public Health Summer Research Program, *Washington University in St. Louis*. June 2019, St. Louis, MO.

"Distant Connectivity in three 5000-word Semantic Networks in English". *Midwestern Psychological Association*, April 2019, Chicago, IL.

"Lexical Retrieval Inhibition from Semantically Related Retrieval Primes", Aging and Development Brownbag, *Washington University in St. Louis*, December 2018, St. Louis, MO.

"That Word at the Tip of Your Tongue". Public Health and Aging Session, *McDonnell Academy 7<sup>th</sup> International Symposium*, October 2018, Beijing, China.

"Network Path Length as a Measure of Semantic Distance in a 5000-word English Lexicon", Data Blitz at *Show Me State Conference on Cognition*, May 2018, St. Louis, MO.

"Remembering Names from Emails: Cognitive Experiments with Life-Logs (CELL): A Novel Approach to Study Name Retrieval", *Personal Digital Archiving*, March 2017, Stanford University, Palo Alto, CA

"Cognitive Experiments on Life-Logs (CELL): A New Approach to Study Recall of Personally Familiar Proper-Names using Emails", *International Conference on Memory*, July 2016, Budapest, Hungary.

### **Technical Experience**

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**NLP Research Scientist Intern**, Capacity, St. Louis, Oct.-Dec. 2019

Finetuned language model on customer queries to improve question-answering system

Identified semantic features in queries that optimally represent conversation gist

### **Relevant Courses**

*Natural Language Processing (NLP) Specialization*, deeplearning.ai

- Developed NLP-based autocorrect, autocomplete, and part-of-speech tagging algorithms

*Deep Learning Specialization*, deeplearning.ai

- Built shallow and deep neural networks for computer vision applications

*Machine Learning*, Washington University in St. Louis

- Implemented decision trees, random forests, & boosting algorithms for classification problems

*Multivariate Analysis; Hierarchical Linear Models*, Washington University in St. Louis

- Applied linear mixed effects models, clustering, and factor analysis to psychological data

## Analytical and Technical Skills

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**Programming Experience:** R, Python, MATLAB, HTML/CSS, JavaScript

**Experimental Platforms:** Psychopy, JSPsych, Qualtrics, E-Prime, Collector

**Qualitative Research Methods:** Individual/group interviews, observation, think-aloud protocols

**Quantitative Research Methods:** Survey design/sampling, hypothesis testing, online experiments (RTs), game-based designs

**Modeling Experience:** Word embedding algorithms, sentiment analysis, foraging/random walk models, network analysis, machine learning

## Professional Service and Affiliations

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**Professional Service:** CogSci Conference Committee (Cognitive Science Society);

International Affinity Group Committee (Cognitive Science Society)

**Ad hoc Reviewer:** Cognitive Science; Journal of Experimental Psychology: General;

Psychological Science; Journal of Experimental Psychology: Learning, Memory, and

Cognition; Topics in Cognitive Science; Psychological Review; Journal of Memory and

Language; Behavior Research Methods; Frontiers in Artificial Intelligence; Psychological Research

**Member:** Cognitive Science Society (CSS); Psychonomic Society; Women in Cognitive Science

(WiCS); Women in Network Science (WiNS); Graduate Women in Science

## Poster Presentations

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**Kumar, A.A.** (November 2021). Probing Memory Representations through an Interactive Language Game, *Trends in Psychology Summit 2021*, Virtual.

**Kumar, A.A.**, Balota, D.A., (November 2021). Modeling Distributional Structure and Spreading Activation in Retrieval Tasks, *Psychonomic Society 62nd Annual Meeting*, Psychonomic Society, Virtual.

**Kumar, A.A.**, Balota, D.A., (November 2020). Searching Semantic Memory for Conceptual Associates, *Psychonomic Society 61st Annual Meeting*, Psychonomic Society, Virtual.

**Kumar, A.A.**, Balota, D.A., Steyvers, M. (November 2019). Evaluating Association Networks and Distributional Semantic Models in a Cooperative Word Game, *Psychonomic Society 60th Annual Meeting*, Psychonomic Society, Montreal, Canada.



Albertina, E., **Kumar, A.A.**, Balota, D.A. (April 2019). Comparing Semantic Models using a Cooperative Word Game. *Undergraduate Research Symposium*, Washington University in St. Louis, MO.



Mutchler, Z., **Kumar, A.A.**, Balota, D.A. (April 2019). The Benefits and Costs of Repeated Retrieval from Semantic Memory. *Undergraduate Research Symposium*, Washington

University in St. Louis, MO.

**Kumar, A.A.**, Balota, D.A., Steyvers, M. (November 2018). Distant Semantic Network Connectivity and Semantic Priming: Evidence from a 5000-word Semantic Network, *Psychonomic Society 59th Annual Meeting*, Psychonomic Society, New Orleans, LA.



Albertina, E., **Kumar, A.A.**, Balota, D.A. (October 2018). Investigating Network Connectivity for Distant Concepts using a 5000-word Semantic Network in English. *Undergraduate Research Symposium*, Washington University in St. Louis, MO.



Steiner, R., **Kumar, A.A.**, Balota, D.A. (May 2018). Effects of Priming on Immediate and Delayed Episodic Memory Retrieval. *Mind, Brain, and Behavior Symposium*, Washington University in St. Louis, MO.

**Kumar, A.A.**, Balota, D.A. (May 2018). Prime Retrieval Failure Disrupts Lexical Retrieval to Definitions in Younger and Older Adults, *2018 Cognitive Aging Conference*, Atlanta, GA.

**Kumar, A.A.**, Balota, D.A., Habbert, J., Scaltritti, M., Maddox, G.B. (November 2017). Priming Lexical Retrieval to Definitions in Younger and Older Adults, *Psychonomic Society 58th Annual Meeting*, Psychonomic Society, Vancouver, British Columbia, Canada.

**Kumar, A.A.**, Hangal, S., Piratla, V., Rosen, A.C. (July 2017). Whom Did I Send This Message To: An Automatic Analytic Approach to 59000 Email Communications, *2017 Leading Edge Workshop: Beyond the Lab: Using Big Data to Discover Principles of Cognition*, Psychonomic Society, Madison, WI.