

# Kyle Mahowald: CV

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*Assistant professor of linguistics at UCSB, computational psycholinguist, Marshall Scholar with interests in computation, cognition, quantitative methods, and NLP.*

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e-mail: [kmahowald@gmail.com](mailto:kmahowald@gmail.com)  
web: [mahowak.github.io](http://mahowak.github.io)

RESEARCH INTERESTS Computational psycholinguistics, quantitative methods, cognitive science, NLP, statistical methods in the sciences, language and communication, language neuro-imaging, historical English, literature, meta-analysis

## ACADEMIC WORK

**University of California, Santa Barbara**, Santa Barbara, CA USA  
Assistant Professor, Linguistics 2020-

- Affiliate Faculty, Cognitive Science Emphasis
- Affiliate Faculty, Center for Responsible Machine Learning
- Affiliate Faculty, Center for Quantitative Methods in the Social Sciences

**Stanford University**, Palo Alto, CA USA  
Postdoctoral Researcher, Computer Science 2019-2020  
• Advisors: Dan Jurafsky, Dan McFarland

## EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA USA  
Ph.D., Brain and Cognitive Sciences 2011-16

- Advisor: Edward Gibson
- Committee: Edward Gibson, Nancy Kanwisher, Joshua Tenenbaum
- GPA: 5.0/5.0
- Thesis: *Cognitive and Communicative Pressures in Natural Language*

**University of Oxford**, Oxford, England UK  
M.Phil with Distinction, General Linguistics and Comparative Philology 2009-11  
Marshall Scholar

- Advisors: Mary Dalrymple, Aditi Lahiri
- Areas of Study (all with Distinction): history and structure of English, morpho-phonology, computational linguistics, general linguistics
- Thesis: *An LFG Approach to Old English Constituent Order* (with Distinction)

**Harvard University**, Cambridge, MA USA  
A.B. Summa Cum Laude, English 2005-09

- Advisors: Daniel Donoghue, Marjorie Garber
- GPA: 3.96/4.00
- Thesis: *A Fairy's Tale: Queen Mab's Journey from Shakespeare to Modernity*

## INDUSTRY EXPERIENCE

**Algorithm Developer, Hudson River Trading**, New York, NY USA 2016-2019

- Performed research in natural language processing and quantitative finance, wrote production code for low latency trading algorithms in C++ and Python

FELLOWSHIPS  
GRANTS AND  
AWARDS

- UCSB Interdisciplinary Humanities Collaborations in the Virtual Classroom Grant (\$1,100) 2020
- NSF Doctoral Dissertation Improvement Grant (\$12,000) 2015-16
- Graduate Student Council Travel Grant 2014
- Angus MacDonald Award for Excellence in Undergraduate Teaching 2014
- AAAS/Science Program for Excellence in Science 2014
- National Defense Science and Engineering Graduate Fellowship 2012-15
- Henry E. Singleton Fund Fellowship 2011-12
- Sigma Xi Scientific Research Society 2012
- Marshall Scholarship (1 of 40 selected nationally) 2009
- Harvard College Research Fellowship 2008
- National Merit Scholarship 2005-09
- Robert Byrd Scholarship 2005-09
- CUNY 2013 Travel Award 2013
- Harvard Bowdoin Prize (Undergraduate Essay), \$10,000 2009
- Harvard Phi Beta Kappa Junior Electee, 1 of 24 elected as junior 2008
- John Harvard Scholar, top 5% in class 2006-09
- United States Presidential Scholar, 1 of 2 selected from each state 2005
- Youngest Sunday New York Times crossword constructor 2004

ARTICLES  
AND  
ARCHIVED  
CONFERENCE  
PROCEEDINGS

- I. Papadimitriou, R. Futrell, E. Chi, K. Mahowald. Deep Subjecthood: Higher-Order Grammatical Features in Multilingual BERT. 2021. *EACL*.
- K. Mahowald, I. Dautriche, M. Braginsky, E. Gibson. 2021 (to appear). Efficient communication and the organization of the lexicon. In *Oxford University Press Handbook of the Mental Lexicon*.
- D. Card, P. Henderson, U. Khandelwal, R. Jia, K. Mahowald, D. Jurafsky. 2020. With little power comes great responsibility. Proceedings of *EMNLP*.
- K. Mahowald, G. Kachergis, M.C. Frank. 2020. What counts as an exemplar model, anyway? A commentary on Ambridge (2020). *First Language*.
- E. Gibson, R. Futrell, S.T. Piantadosi, I. Dautriche, K. Mahowald, L. Bergen, R. Levy. 2019. How efficiency shapes human language. *Trends in Cognitive Science*.
- K. Mahowald, I. Dautriche, E. Gibson, S.T. Piantadosi. 2018. Word forms are structured for efficient use. *Cognitive Science*. doi: 10.1111/cogs.12689.
- Z. Mineroff, I.A. Blank, K. Mahowald, E. Fedorenko. 2018. A robust dissociation among the language, multiple demand, and default mode networks: evidence from inter-region correlations in effect size. *Neuropsychologia*. doi: 10.1016/j.neuropsychologia.2018.09.011
- I. Dautriche\*, K. Mahowald\*, E. Gibson, S.T. Piantadosi. 2017. Words cluster phonetically beyond phonotactic regularities. *Cognition* 163: 128-145. doi: 10.1016/j.cognition.2017.02.001. \*co-first authors
- E. Gibson, C. Tan, R. Futrell, K. Mahowald, L. Konieczny, B. Hemfroth, E. Fedorenko. 2017. Dont underestimate the benefits of being misunderstood. *Psychological Science*: 1-10. doi: 10.1177/0956797617690277.
- E. Gibson, R. Futrell, J. Jara-Ettinger, K. Mahowald, L. Bergen, S. Ratnasingam, M. Gibson, S.T. Piantadosi, B.R. Conway. 2017. Color naming across languages reflects color use. *Proceedings of the National Academy of Sciences*. 114(40): 10785-10790.
- K. Mahowald, A. James, R. Futrell, E. Gibson. 2016. Structural priming is most useful when the conclusions are statistically robust. *Behavioral and Brain Sciences*, E302.

- I. Dautriche, K. Mahowald, E. Gibson, S.T. Piantadosi. 2016. Wordform similarity increases with semantic similarity: an analysis of 100 languages. *Cognitive Science*. doi: 10.1111/cogs.12453
- K. Mahowald, A. James, R. Futrell, E. Gibson. 2016. A meta-analysis of syntactic priming. *Journal of Memory and Language*, 91, 5-27.
- K. Mahowald, E. Fedorenko. 2016. Reliable individual-level neural markers of highlevel language processing: A necessary precursor for relating neural variability to behavioral and genetic variability. *Neuroimage*, 139, 74-93. doi: 10.1016/j.neuroimage.2016.05.073.
- I. Blank, E. Fedorenko, Z. Balewski, and K. Mahowald. 2016. Syntactic processing is distributed across the language network. *Neuroimage*, 127, 307-323.
- K. Mahowald, P. Graff, J. Hartman, and E. Gibson. 2016. SNAP Judgments: A Small N Acceptability Paradigm (SNAP) for Linguistic Acceptability Judgments. *Language*, 92 (3), 619-635.
- R. Futrell, K. Mahowald, E. Gibson. 2015. Large-Scale Evidence of Dependency Length Minimization in 37 Languages. *Proceedings of the National Academy of Sciences*. 112 (33), 10336-10341. doi: 10.1073/pnas.1502134112
- R. Singh, E. Fedorenko, K. Mahowald, E. Gibson. 2015. Presupposition accommodation is costly only in implausible contexts. *Cognitive Science*. Published online before print July, 2015. doi: 10.1111/cogs.12260
- R. Futrell, K. Mahowald, E. Gibson. 2015. Quantifying Word Order Freedom in Dependency Corpora. *Proceedings of Depling 2015*.
- E. Gibson, P. Jacobson, P. Graff, E. Fedorenko, K. Mahowald, S.T. Piantadosi. 2014. A pragmatic account of complexity in definite Antecedent-Contained-Deletion relative clauses. *Journal of Semantics*. 32 (4): 579-618.
- K. Mahowald and E. Gibson. 2013. Short, frequent words are more likely to appear genetically related by chance. Letter to *Proceedings of the National Academy of Sciences*.
- K. Mahowald, E. Fedorenko, S.T. Piantadosi, and E. Gibson. 2013. Info/information theory: speakers choose shorter words in predictive contexts. *Cognition*, 126, 313-318.
- K. Mahowald. 2012. A Naive Bayes Classifier for Shakespeare's second person pronoun. *Literary and Linguistic Computing*. 27 (1): 17-23. doi:10.1093/lc/fqr045
- K. Mahowald. 2011. An LFG Account of Word Order Freezing. In M. Butt and T. H. King, eds., *Proceedings of the LFG11 Conference*. Hong Kong: CSLI Publications: <http://www-csli.stanford.edu/publications>.
- K. Mahowald. 2010. It may nat be: Chaucer, Derrida, and the Impossibility of the Gift. *Studies in the Age of Chaucer*. 32:129-150.

JOURNAL  
ARTICLES  
IN PROGRESS

Mahowald K., James, A., Futrell. R., Gibson E. 2021 (in progress). Replicating a fundamental finding in psycholinguistics: syntactic priming. (Letter of Intent accepted for special issue of *JML*).

Mahowald, K., Isola, P., Fedorenko, E., Gibson, E., and Oliva, A. 2018. Memorable words are monogamous: The role of synonymy and homonymy in word recognition memory. *PsyArXiv*. 10.31234/osf.io/p6kv9.

## THESES

- K. Mahowald. 2016. Cognitive and communicative pressures in natural language. Ph.D. thesis. Massachusetts Institute of Technology.
- K. Mahowald. 2011. An LFG Approach to Old English. Master's thesis. Oxford University.
- K. Mahowald. 2009. A Fairy's Tale: Queen Mab's Journey from Shakespeare to Modernity. Harvard College.

REFEREED  
PRESENTATIONS

- K. Mahowald, I. Papadimitriou, D. Jurafsky, R. Futrell. 2021 Accessibility-Based Constraints on Morphosyntax in Corpora of 54 Languages. CUNY Conference on Human Sentence Processing, CUNY 2021.
- M. Yen, I. Blank, K. Mahowald. 2021. Competing Effects of Syntax and Animacy in Priming of Relative Clause Attachment. CUNY Conference on Human Sentence Processing, CUNY 2021.
- N. Rezaii, K. Mahowald, R. Ryskin, B. Dickerson, E. Gibson. 2021. Syntactic Rule Frequency as a Measure of Syntactic Complexity: Insights from Primary Progressive Aphasia. CUNY Conference on Human Sentence Processing, CUNY 2021.
- K. Mahowald, D. Jurafsky, M. Norris. 2021 [accepted]. Concord begets concord: a Bayesian model of nominal concord. Linguistics Society of America Conference 2021.
- I. Papadimitriou, R. Futrell, E. Chi, K. Mahowald. 2021. Multilingual BERT, ergativity, and grammatical subjecthood. SCiL 2021.
- I. Papadimitriou, R. Futrell, E. Chi, K. Mahowald. 2020. Multilingual BERT learns abstract case representations. EMNLP 2020: SIGTYP.
- K. Mahowald, A. James, R. Futrell, E. Gibson. 2016. A meta-analysis of syntactic priming in language production. Annual CUNY Conference on Human Sentence Processing, CUNY 2016. Gainesville, FL. March 3-5, 2016.
- K. Mahowald, I. Dautriche, E. Gibson, A. Christophe, E. Gibson. 2014. Efficient phonological clustering in the mental lexicon. Ninth International Conference on the Mental Lexicon. Niagara-on-the-Lake, Ontario, Canada. September 30-October 2, 2014.
- I. Dautriche, K. Mahowald, E. Gibson, A. Christophe, E. Gibson. 2014. Lexical clustering in efficient language design. AMLaP 2014 (Architectures and Mechanisms for Language Processing). Edinburgh, UK. September 3-6, 2014.
- K. Mahowald, P. Graff, J. Hartman, E. Gibson. 2014. SNAP Judgments: Small N Acceptability Paradigm (SNAP) for linguistic judgments. AMLaP 2014 (Architectures and Mechanisms for Language Processing). Edinburgh, UK. September 3-6, 2014.
- K. Mahowald, A. Jacobs, A. Fahimipour, M. Kleiman-Weiner. 2013. Measure for Measure: Quantifying Shakespearean Drama. Links 2013. MIT Media Lab. July 22-23, 2013.
- K. Mahowald. 2011. An LFG Account of Word Order Freezing. Sixteenth International LFG Conference. Hong Kong. July 16-19, 2011.

REFEREED  
POSTERS

- T.I. Regev, J. Affourtit, X. Chen, L. Bergen, K. Mahowald, E. Fedorenko. 2020. Sensitivity of high-level language processing brain regions to phonological information. Society for the Neurobiology of Language 2020.
- S. Ratnasingam, E. Gibson, R. Futrell, J. Jara-Ettinger, K. Mahowald, L. Bergen, S.T. Piantadosi, B. Conway. 2017. Statistical variations in the power spectrum of daylight over a day predict communicative efficiency of color-language. VSS.

- K. Mahowald, M. Kline, E. Fedorenko, E. Gibson. 2015. Informativity and efficient compression of sentences. Annual CUNY Conference on Human Sentence Processing, CUNY 2015. Los Angeles, CA. March 19-21, 2014.
- K. Mahowald, S.T. Piantadosi, M. Alper, E. Gibson. 2015. Lexical items are privileged slots for meaning. Annual CUNY Conference on Human Sentence Processing, CUNY 2015. Los Angeles, CA. March 19-21, 2014.
- R. Futrell, K. Mahowald, E. Gibson. 2014. CLIQS: Cross-Linguistic Investigations in Quantitative Syntax. AMLaP 2014 (Architectures and Mechanisms for Language Processing). Edinburgh, UK. September 3-6, 2014.
- K. Mahowald, P. Isola, E. Fedorenko, A. Oliva, E. Gibson. 2014. An information-theoretic account of word memorability. AMLaP 2014 (Architectures and Mechanisms for Language Processing). Edinburgh, UK. September 3-6, 2014.
- K. Mahowald, E. Fedorenko. Reliable individual-level neural markers of language activity. Neurobiology of Language 2014. Amsterdam. August 27-29, 2014.
- E. Gibson, P. Jacobson, P. Graff, K. Mahowald, E. Fedorenko, S.T. Piantadosi. Pragmatic influences on the processing of ACD relative clauses. 27th Annual CUNY Conference on Human Sentence Processing, CUNY 2014. Columbus, OH. March 13-15, 2014.
- R. Futrell, K. Mahowald, S.T. Piantadosi, E. Gibson. Efficient Communication Forwards and Backwards. 27th Annual CUNY Conference on Human Sentence Processing, CUNY 2014. Columbus, OH. March 13-15, 2014.
- K. Mahowald, S.T. Piantadosi, E. Gibson. 2013. Lexical clustering in efficient language design. 26th Annual CUNY Conference on Human Sentence Processing, CUNY 2013. Columbia, SC. March 22, 2013.
- K. Mahowald, T.J. O'Donnell, and J.B. Tenenbaum. 2013. Filling in the blanks in morphological productivity: a word completion task. 26th Annual CUNY Conference on Human Sentence Processing, CUNY 2013. Columbia, SC. March 23, 2013.
- K. Mahowald, E. Fedorenko, S.T. Piantadosi, E. Gibson. 2012. Info/information theory: speakers actively choose shorter word in predictive contexts. 25th Annual CUNY Conference on Human Sentence Processing, CUNY 2012. New York. March 16, 2012.

INVITED  
PRESENTATIONS

- K. Mahowald. 2020. A BERT's eye view of linguistics. Trace. Modesto, California [remote]. August 21, 2020.
- K. Mahowald. 2020. Understanding linguistic structure through computational models of language. Linguistics Department. University of California, Santa Cruz [remote]. June 18, 2020.
- K. Mahowald 2020. Computation and Language. Apple, Inc. Cupertino, California [remote]. April 17, 2020.
- K. Mahowald. 2020. Computational and communicative pressures in language. Linguistics Department. Boston University. February 20, 2020.
- K. Mahowald. 2020. Cognitive pressures in language. Linguistics. University of Texas Austin. February 17, 2020.
- K. Mahowald. 2020. Cognitive and communicative pressures in language. Department of Psychology, Department of Language Sciences. University of Wisconsin Madison. February 3, 2020.

- K. Mahowald. 2020. Human language as a window into cognition. Department of Psychology. University of California Berkeley. January 29, 2020.
- K. Mahowald. 2020. Communicative pressures in language. Linguistics Department. University of California Santa Barbara. January 23, 2020.
- K. Mahowald. 2020. Cognitive and communicative pressures in language. Language and Cognition Talk Series. Stanford University. January 16, 2020.
- K. Mahowald. 2019. NLP, Communication, and Language. NLP Lunch. Stanford University. October 31, 2019.
- K. Mahowald. 2019. Cognitive and communicative pressures in natural language. Department of Linguistics and Department of Computer Science. McGill University. March 14, 2019.
- K. Mahowald. 2019. Cognitive and communicative pressures in language. School of Philosophy, Psychology, and Language Sciences. Edinburgh University. February 28, 2019.
- K. Mahowald. 2019. Cognitive and communicative pressures in language. Department of Linguistics. University of Florida. February 5, 2019.
- K. Mahowald. 2019. Cognitive and communicative pressures in language. Department of Linguistics. Northwestern University. January 31, 2019.
- K. Mahowald. 2015. Four mini-talks in psycholinguistics. CogLunch. Department of Brain and Cognitive Sciences. MIT. May 12, 2015.
- K. Mahowald. 2014. Efficient structure in the lexicon. Mini-Symposium on the Neural and Cognitive Mechanisms of Language. Department of Psychology. Harvard University. December 4, 2014.
- K. Mahowald. 2014. Efficient lexical structure. Department of Brain and Cognitive Sciences. Invited Talk. University of Rochester. October 3, 2014.
- K. Mahowald. 2014. Learning and organizational structure of the lexicon. Stanford Language and Cognition Lab Meeting. Stanford University. May 13, 2014.
- K. Mahowald, A. Jacobs, A. Fahimipour, E. Pechenick, M. Kleiman-Weiner. 2013. Measure for Measure: Quantifying Shakespeare. Santa Fe Complex Systems Summer School. Santa Fe Institute. June 28, 2013.
- K. Mahowald. 2013. Finding structure in the lexicon. CogLunch. MIT. April 9, 2013.
- K. Mahowald. 2013. Efficient lexical design. Tedlab Lab Meeting. MIT. April 8, 2013.
- M. Frank, K. Mahowald, and E. Gibson. 2012. Syntactic and lexical alternations in noisy environments. MIT Summer Research Program, 2012.
- K. Mahowald. 2011. Computationally classifying the second person pronoun in Early Modern English. Tedlab Lab Meeting. MIT. October 4, 2011.
- K. Mahowald. 2011. Word order freezing in Old English. Oxford Syntax Working Group. Oxford. February 23, 2011.
- K. Mahowald. 2010. Verb clusters in Old English. 3rd South of England LFG Meeting. SOAS, London. October 23, 2010.

## TEACHING

### University of California Santa Barbara

- Thesis supervisor to undergraduate senior in computational linguistics 2020-2021
- Instructor, LING 226 Cognitive Foundations of Language Fall 2020
- Instructor, LING 127 Psychology of Language Winter 2021
- Instructor, LING 104 Statistical Methods in Linguistics Spring 2021
- Instructor of record for UCSB Linguistics Inclusive teaching initiative for LING 226, LING 127, LING 104 2020-2021

### Massachusetts Institute of Technology

- Teaching assistant, MIT 9.59 Lab in Psycholinguistics 2014
  - Received perfect student evaluations.
  - Refined statistics curriculum developed in 2013.
  - Held regular lectures instructing students in R and statistics.
- Teaching assistant, MIT 9.59j Lab in Psycholinguistics 2013
  - Designed and taught data analysis section of lab course. Held regular lectures instructing students in R and statistics.
  - Helped students design, run, and analyze their own psycholinguistics experiments.
  - Won Angus McDonald Award for Undergraduate Teaching.
- Guest lecturer 2011-16
  - ‘Language algorithms and AI Ethics’, UC Santa Cruz PHIL 190 Ethics of Data and Technology, Fall 2020
  - ‘Cognitive Science: Language’, UCSB 200A, Fall 2020
  - ‘Language and information’, MIT 9.012, Spring 2015
  - ‘Sound Structure and Communication’, MIT 9.012 Cognitive Science (graduate class), Spring 2013
  - ‘Language and Information Theory’, MIT 9.59j Lab in Psycholinguistics, Spring 2013
  - ‘Introduction to Language’, MIT 9.65 Cognitive Processes, Spring 2013
- Research supervisor 2011-
  - Supervised student for MIT Summer Research Program, 2012
  - Supervised ~ 5 students for UROP (MIT’s undergraduate research program)
  - Instructed and advised students in research methods, experimental design, and writing.

## SERVICE AND DIVERSITY WORK

### Services

- Participant, Undocumented Student Services Mentoring Program
- Member, UCSB Linguistics Inclusive Teaching Initiative
- Committee member, Committee on Climate, Diversity, and Inclusion, Stanford University NLP Group
- Committee member, UCSB National Scholarships Selection Committee
- Reader, Marshall Scholarship Selection Committee, Boston Region
- Member, MIT Distinguished Fellowship Committee
- Volunteer fellowships panelist, Harvard Office of Career Services

### Editing

- Guest editor, *Open Mind*

### Invited reviewer

- *Ad-hoc reviewer, NSF Education*
- *Science*
- *Entropy*
- *Science Advances*
- *Cognitive Science*

- *Memory & Cognition*
- *Journal of Experimental Psychology: Learning, Memory, and Cognition*
- *Open Mind*
- *Journal of Memory and Language*
- *Topics in Cognitive Science*
- *Cognition*
- *Literary and Linguistic Computing*
- Cogsci conference
- *CUNY Sentence Processing Conference 2017, 2018*
- *Events in Language and Cognition 2016*

### Department

- 2012-2013 CogLunch Organizer for MIT Brain and Cognitive Sciences

### NON-ACADEMIC POSITIONS

- Freelance puzzle construction, published in NYT, WSJ, LA Times, GAMES Magazine, Universal Press Syndicate, Chicago Tribune, etc., 2004-
- Spirit Airlines in-flight crossword constructor, 2004-2010
- Founder and President of Harvard College Crossword Society, 2007-2009
- Co-chair of Boston Crossword Tournament, over 200 participants, 2009
- Co-chair of Harvard Crossword Tournament, over 100 participants, 2009
- Treasurer of Harvard Lifestyle Improvement and Fitness Education, mentored inner-city students in fitness and health, 2007
- Peer Advising Fellow, mentored incoming freshmen, 2006-2007
- Assistant to New York Times crossword editor Will Shortz, 2006
- Research assistant, Advanced Medical Treatment Centers, 2005

### COMPUTER EXPERTISE

R, Python, Stan, C++, UNIX tools, Amazon Mechanical Turk, L<sup>A</sup>T<sub>E</sub>X, git

### LANGUAGES

English (native), Spanish (good), French (basic), Middle English (reading), Old English (reading)

### REFERENCES

#### **Professor Edward Gibson**

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#### **Professor Steven T. Piantadosi**

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#### **Professor Evelina Fedorenko**

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#### **Professor Aditi Lahiri**

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