Dave F. Kleinschmidt

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Research interests

Sensation and perception in a non-stationary world. My work uses behavioral, computational, and neural approaches to understand how sensory systems deal with semi-predictable variability across contexts. I am particularly—but not exclusively—interested in speech and language.

Education

2010–present **Ph.D. Brain and Cognitive Sciences**, *University of Rochester*, Rochester, NY.
Advisors: T. Florian Jaeger (primary), Rajeev Raizada

2005–2009 **BA Mathematics, concentration Cognitive Science**, *Williams College*, Williamstown, MA, *Summa cum laude*, highest honors in Cognitive Science.
Senior thesis advisor: Safa Zaki

Publications

Papers

in press **Kleinschmidt, D. F.**, Jaeger, T. F., A re-evaluation of selective adaptation: Fatiguing feature detectors, or distributional learning? *Psychonomic Bulletin & Review*.

2015 **Kleinschmidt, D. F.**, Jaeger, T. F., Robust speech perception: Recognize the familiar, generalize to the similar, and adapt to the novel. *Psychological Review*, *122*(2). doi:10.1037/a0038695

2014 Salverda, A. P., **Kleinschmidt, D. F.**, Tanenhaus, M. K., Immediate effects of anticipatory coarticulation in spoken-word recognition. *Journal of Memory and Language*, *71*(1), 145–163. doi:10.1016/j.jml.2013.11.002

Zaki, S. R., **Kleinschmidt, D. F.**, Procedural memory effects in categorization: Evidence for multiple systems or task complexity? *Memory & cognition*, *42*(3), 508–24. doi:10.3758/s13421-013-0375-9

2011 Croft, W., Bhattacharya, T., **Kleinschmidt, D. F.**, Smith, D. E., Jaeger, T. F., Greenbergian universals, diachrony, and statistical analyses. *Linguistic Typology*, *15*(2), 433–453. doi:10.1515/LITY.2011.029

Conference Proceedings Papers

2015 **Kleinschmidt, D. F.**, Raizada, R., Jaeger, T. F., Supervised and unsupervised learning in phonetic adaptation. In R. Dale, C. Jennings, P. Maglio, T. Matlock, D. Noelle, A. Warlaumont, & J. Yoshimi (Eds.), *Proceedings of the 37th annual conference of the cognitive science society*. Austin, TX: Cognitive Science Society.

2012 **Kleinschmidt, D. F.**, Fine, A. B., Jaeger, T. F., A belief-updating model of adaptation and cue combination in syntactic comprehension. In N. Miyake, D. Peebles, & R. P. Cooper (Eds.), *Proceedings of the 34th annual conference of the cognitive science society* (pp. 599–604). Austin, TX: Cognitive Science Society.

Kleinschmidt, D. F., Jaeger, T. F., A continuum of phonetic adaptation: Evaluating an incremental belief-updating model of recalibration and selective adaptation. In N. Miyake, D. Peebles, & R. P. Cooper (Eds.), *Proceedings of the 34th annual conference of the cognitive science society* (pp. 605–10). Austin, TX: Cognitive Science Society.

2011   **Kleinschmidt, D. F.**, Jaeger, T. F., A Bayesian belief updating model of phonetic recalibration and selective adaptation. In *Proceedings of the 2nd ACL workshop on cognitive modeling and computational linguistics*. Stroudsburg, PA: Association for Computational Linguistics.

Submitted and in preparation

submitted   Pajak, B., Fine, A. B., **Kleinschmidt, D. F.**, Jaeger, T. F., *Learning additional languages as hierarchical inference: Insights from L1 processing*. Manuscript submitted for publication.

Presentations

2015   **Kleinschmidt, D. F.**, Jaeger, T. F., Raizada, R., *Informativity in adaptation: supervised and unsupervised learning of linguistic cue distributions*. Poster presented at the 28th Annual CUNY Sentence Processing Conference, Los Angeles, CA.

2014   Jaeger, T. F., **Kleinschmidt, D. F.,** *Efficient language understanding in a variable world: prediction and adaptation*. Talk jointly presented at the 21st Annual Meeting of the Cognitive Neuroscience Society, Boston, MA.

      Jaeger, T. F., **Kleinschmidt, D. F.,** *Speech perception and adaptation as inference under uncertainty*. Plenary talk jointly presented at the 15th Australasian International Speech Science and Technology Conference, Christchurch, NZ.

2013   **Kleinschmidt, D. F.**, Jaeger, T. F., *Speech perception, the lack of invariance, and adaptation: a computational level analysis*. Poster presented at the Workshop on Current Issues and Methods in Speaker Adaptation, Columbus, OH.

      Kleinschmidt, D. F., Jaeger, T. F., *Speech perception, the lack of invariance, and adaptation: a computational level analysis*. Poster presented at the LSA Institute 2013 Workshop: How the brain accommodates variability in linguistic representations, Columbus, OH.

      Salverda, A. P., **Kleinschmidt, D. F.**, Tanenhaus, M. K., *Immediate effects of anticipatory coarticulation in spoken-word recognition*. Talk presented at the 54th Annual Meeting of the Psychonomic Society, Toronto, ON, Canada.

2012   **Kleinschmidt, D. F.**, Fine, A. B., Jaeger, T. F., *A Bayesian belief-updating model of syntactic expectation adaptation*. Poster presented at the 25th CUNY Sentence Processing Conference, New York, NY.

      Kleinschmidt, D. F., Jaeger, T. F., *Evaluation of a Bayesian belief-updating model for the time course of linguistic adaptation*. Poster presented at the 25th CUNY Sentence Processing Conference, New York, NY.

2011   Zaki, S. R., **Kleinschmidt, D. F.,** *Response location effects in categorization: evidence for multiple systems or task complexity?* Poster presented at the 52nd Annual Meeting of the Psychonomic Society, Seattle, WA.

2010   **Kleinschmidt, D. F.,** *Efficient coding of speech in the auditory cortex*. Poster presented at the 2nd Annual Neurobiology of Language Conference, San Diego, CA.

Honors and Awards

- **NIH F31 Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship**, 2015–2016.
- **Best student presentation**, 2013 LSA Summer Institute Workshop: "How the brain accommodates variability in linguistic representations".
- **Best student talk**, 2011 Architectures and Mechanisms of Language Processing (AMLaP) Conference.
- **National Science Foundation, Graduate Research Fellowship**, 2010–2014.
- **Sproull Fellowship**, University of Rochester, 2010–2015.
- **Baggett Fellowship**, University of Maryland Linguistics Department post-bac. research fellowship, 2009–2010.
- Member, **Phi Beta Kappa** honors society, inducted 2008.
- **Dean's List**, Williams College, 2005–2009.

- ○ **Tyng Scholarship**, Williams College, 2005–2009.
- ○ **National Merit Scholar**, 2005.
- ○ Maine Educational Association **Clyde Russel Scholarship**, 2005.

Invited Talks

2014 **New Zealand Institute of Language, Brain, and Behavior Seminar**, *University of Canterbury*, December 9, 2014.

Cognition and Language Workshop, *Stanford University*, October 2, 2014.

Psychology Department Seminar, *Carnegie Melon University*, July 22, 2014.

Language Processing Brown Bag Seminar, *Beckman Institute, University of Illinois*, March 6, 2014.

Cognitive Science Colloquium, *Tufts University*, February 13, 2014.

Research Appointments

2009–2010 **Baggett Fellow**, *University of Maryland, Linguistics Department*.
Post-baccalaureate research fellowship. Advised by Bill Idsardi.

2006–2009 **Research Assistant**, *Williams College, Department of Psychology*.
Supervised by Safa Zaki.

Teaching

February 2014 **Guest Lecturer: Introduction to Cognitive Science**, *Tufts University*.
Presented lecture on computational modeling in the cognitive sciences, with an emphasis on statistical (Bayesian) models.

Spring 2013 **Teaching assistant: Foundations of Cognitive Science**, *University of Rochester*.
Lectured, conducted recitations, designed assessments, and graded for large introductory class for the Brain and Cognitive Science Department.

Spring 2012 **Teaching assistant: Cognition**, *University of Rochester*.
Lectured, designed assessments, and graded for introductory cognitive neuroscience course.

Spring 2011 **Teaching assistant: Cognition**, *University of Rochester*.
Lectured, designed assessments, and graded for introductory cognitive neuroscience course.

Spring 2009 **Teaching assistant: Ergodic Theory**, *Williams College*.
Graded problem sets and conducted group work sessions for senior seminar.

Service

Statistics outreach

I've worked to advance statistical literacy among cognitive scientists, psychologists, and linguists, via presentations at workshops and tutorials on statistical methods.

2014 Tutorial on simulation-based methods for understanding mixed models. *SST 2014 Tutorial: Regression and mixed effects models*

2013 Co-organized UR BCS Department statistics and data analysis working group with Steve Piantadosi.

2011 *Preparing data for analysis using R*, presentation with Alex B. Fine at University of Rochester BCS workshop on mixed-effects regression analysis for cognitive scientists.

2010 *ANOVA and Mixed-Effects Models in R for Language Scientists*, presentation at University of Maryland Linguistics Dept. Winter Storm language sciences workshop.

Open source software

I've contributed to a number of open source software projects. I've made substantial contributions to:

- **JuliaStats**: Statistical computing in the Julia language. Contributed model formula parsing and evalutaion domain-specific language code to regression modeling functionality in DataFrames.jl and GLM.jl.
- **Gadfly.jl**: Data visualization in Julia, based on the grammar of graphics.

And contributed minor bug fixes and improvements to **latexdiff**, **lolcommits**, a node.js **mturk API**, and **FAAV/FAVE**.

Mentoring

Spring 2012 Supervised three undergraduate independent study students (jointly with one other graduate student).

Reviewer for

- *Attention, Perception, & Psychophysics*
- *Journal of Memory & Language*
- *Language*
- *Language and Cognitive Processes*
- *PLoS One*
- *Annual Meeting of the Cognitive Science Society*
- *MIT Press*