

# Dave F. Kleinschmidt

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## Education

- 2010–2016 **Ph.D. Brain and Cognitive Sciences**, *University of Rochester*, Rochester, NY.  
*Perception in a Variable but Structured World: The Case of Speech Perception*. Committee: T. Florian Jaeger (advisor), Richard Aslin, Lori Holt, Jeffrey Runner (chair)
- 2005–2009 **B.A. Mathematics, concentration Cognitive Science**, *Williams College*, Williamstown, MA,  
*Summa cum laude*, highest honors in Cognitive Science.  
Senior thesis advisor: Safa Zaki

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## Appointments

- 2018 **Assistant Professor of Psychology**, *Rutgers University*, New Brunswick.
- 2016–2018 **C.V. Starr Fellow**, *Princeton Neuroscience Institute*.
- 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.

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## Publications

### Papers

- 2019 Kleinschmidt, D. F. [Dave F.]. Structure in talker variability: How much is there and how much can it help? *Language, Cognition and Neuroscience*, 34(1), 43–68. doi:10.1080/23273798.2018.1500698
- 2018 Kleinschmidt, D. F. [Dave F.], Weatherholtz, K., & Jaeger, T. F. Sociolinguistic perception as inference under uncertainty. *Topics in Cognitive Science*, 10(4), 818–834. doi:10.1111/tops.12331
- 2016 Kleinschmidt, D. F. [Dave F.], & Jaeger, T. F. Re-examining selective adaptation: Fatiguing feature detectors, or distributional learning? *Psychonomic Bulletin & Review*, 23(3), 678–691. doi:10.3758/s13423-015-0943-z
- Pajak, B., Fine, A. B., Kleinschmidt, D. F., & Jaeger, T. F. Learning additional languages as hierarchical probabilistic inference: Insights from first language processing. *Language Learning*, 66(4), 900–944. doi:10.1111/lang.12168
- 2015 Kleinschmidt, D. F. [Dave 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. [Dave 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

## Submitted and in preparation

in preparation **Kleinschmidt, D. F. [Dave F]**, Emberson, L. L., Doko, D., Edelman, S., & Raizada, R. D. S. *How the brain transforms its representational space to learn to solve a linearly inseparable task.*

**Kleinschmidt, D. F. [Dave F]**, & Jaeger, T. F. *Inferring listeners' prior beliefs about unfamiliar talkers.* doi:10.13140/RG.2.1.3803.4405

**Kleinschmidt, D. F. [Dave F]**, Raizada, R., & Jaeger, T. F. *Neural mechanisms of rapid adaptation to unfamiliar talkers via distributional learning.*

## Conference Proceedings Papers

2018 **Kleinschmidt, D. F. [Dave F]**. Learning distributions as they come: Particle filter models for online distributional learning of phonetic categories. In T. T. Rogers, X. Rau, X. Zhu, & C. Kalish (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 1933–1938). doi:10.31234/osf.io/dymc8

2016 **Kleinschmidt, D. F. [Dave F]**, & Jaeger, T. F. What do you expect from an unfamiliar talker? In J. Trueswell, A. Papafragou, D. Grodner, & D. Mirman (Eds.), *Proceedings of the 38th annual meeting of the cognitive science society*, Austin, TX: Cognitive Science Society.

2015 **Kleinschmidt, D. F. [Dave 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. [Dave 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. [Dave 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. [Dave 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.

## Presentations

2018 **Kleinschmidt, D. F. [Dave F]**. *A formula for bridging the table-matrix divide*. Talk presented at JuliaCon2018, London, UK. [www.davekleinschmidt.com/juliacon2018/slides.html](http://www.davekleinschmidt.com/juliacon2018/slides.html)

**Kleinschmidt, D. F. [Dave F]**, & Hemmer, P. *A sequential Bayesian model for learning and memory in multi-context environments*. Talk presented at the 51st annual meeting of the Society for Mathematical Psychology, Madison, WI. <http://www.davekleinschmidt.com/dots-contexts-recall-prediction/mathpsych-2018-slides.slides.html>

2017 **Kleinschmidt, D. F. [Dave F]**. *The ideal adapter: Life-long, hierarchical distributional learning*. Talk presented at ICON symposium "Models of category formation and adaptation: distributional learning of speech and language", Amsterdam, NL.

2016 **Kleinschmidt, D. F. [Dave F]**, & Jaeger, T. F. *What do you expect from an unfamiliar talker?* Talk presented at the conference on Sociolinguistic Variation and Language Processing, Blacksburg, VA.

**Kleinschmidt, D. F. [Dave F]**, & Jaeger, T. F. *What do you expect from an unfamiliar talker?* Talk presented at LabPhon15, Ithaca, NY.

**Kleinschmidt, D. F. [Dave F]**, Raizada, R., & Jaeger, T. F. *Neural mechanisms for coping with talker variability by rapid distributional learning*. Talk presented at the Society for the Neurobiology of Language meeting, London, UK.

**Kleinschmidt, D. F. [Dave F]**, Weatherholtz, K., & Jaeger, T. F. *How informative is dialect about vowel distributions?* Poster presented at the LabPhon15 workshop on higher-order structure in speech variability, Ithaca, NY.

- 2015 **Kleinschmidt, D. F. [Dave 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. [Dave 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. [Dave 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. [Dave 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. [Dave 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. [Dave 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. [Dave 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. [Dave 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. [Dave F]**. *Efficient coding of speech in the auditory cortex*. Poster presented at the 2nd Annual Neurobiology of Language Conference, San Diego, CA.

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## Invited Talks

- 2018 **Cognitive Brown Bag series**, Villanova University, February 8, 2018.
- 2017 **Psychology Dept. Perception/Action/Cognition seminar**, University of Connecticut, October 30, 2017.
- 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 Mellon 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.

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## 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.

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## Honors and Awards

- **Outstanding Dissertation Award (Natural Sciences)**, University of Rochester, 2017
- **Glushko Prize for Outstanding Doctoral Dissertations/theses in Cognitive Science**, Cognitive Science Society, 2017
- **Highest rated student abstract**, 2016 Meeting of the Society for the Neurobiology of Language
- **NIH F31 Ruth L. Kirschstein National Research Service Award (NRSA) Individual Pre-doctoral 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.

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## 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 evaluation 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`.

## Reviewing

Ad hoc reviewer for *Acta Psychologica*; *Annual Meeting of the Cognitive Science Society*; *Attention, Perception, & Psychophysics*; *Cognition*; *Journal of the Acoustical Society of America*; *Journal of Experimental Psychology*; *Journal of Memory & Language*; *Language*; *Language and Cognitive Processes*; *MIT Press*; *NSF SBE*; *PLoS One*; and *Topics in Cognitive Science*

## Mentoring

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