Timothy John O'Donnell

CONTACT INFORMATION

Department of Linguistics
McGill University
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RESEARCH INTERESTS

Bayesian models of language learning and processing. Lexical semantics. Lexicon acquisition. Grammar induction. Probabilistic models of phonology and morphology. Computational Semantics. Parsing. Mathematical linguistics. Formal language theory. Probabilistic programming. Universal inference algorithms.

EMPLOYMENT

McGill University, Montréal, QC, Canada
Assistant Professor: Department of Linguistics, 2017–Present

Massachusetts Institute of Technology, Cambridge, MA
Research Scientist: Brain and Cognitive Sciences, 2015–2016
Post-Doctoral Fellow: Brain and Cognitive Sciences, 2011–2015

Harvard University, Cambridge, MA
Research Assistant: Harvard University Cognitive Evolution Laboratory, 2004-2005

BBN Technologies, Inc., Cambridge, MA
Intern in Speech and Language Department, Summer 2005
Intern in Speech and Language Department, Summer 2003

University of Edinburgh, Edinburgh, UK
Research Fellow: Division of Informatics, 2001–2003

Lernout and Hauspie, Inc., Boston, MA and Wemmel, Belgium
Development Engineer (speech recognition technology), 1999–2001

Eloquent Technology, Inc., Ithaca, NY
Development Assistant (speech synthesis technology), 1997–1999

EDUCATION

Harvard University, Cambridge, MA

Ph.D., Psychology, 2011

Dissertation Title: Productivity and Reuse in Language

Committee: Jesse Snedeker (Advisor), Steven Pinker, Joshua B. Tenenbaum, Mark Johnson, Noah D. Goodman

Cornell University, Ithaca, NY

B.A., Linguistics, Cognitive Studies Concentration, 1999

HONORS AND AWARDS

2011 Cognitive Science Society computational modeling prize for language

GRANTS

Air Force Office of Scientific Research: Bayesian Program Learning and Concept Induction (2015-2018). PI: Joshua Tenenbaum

Technische Universität Dresden Junior Research Fellow (2015-2016).

MIT Intelligence Initiative: Representation, Inference, and Natural Language. Postdoctoral Fellowship (2012–2014).

MIT Intelligence Initiative: Language research: Connecting Computer Science, Psychology and Linguistics. Postdoctoral funding(2011–2012). PIs: Ted Gibson (Brain and Cognitive Sciences); Regina Barzilay (Computer Science and Artificial Intelligence Laboratory); Irene Heim (Linguistics).

Robots Bootstrapped through Learning from Experience. PIs: Mark Steedman, Rüdiger Dillmann, Tamim Asfour (MIT and Edinburgh Work Package).

Books

[1] T. J. O'Donnell. (2015). *Productivity and Reuse in Language: A Theory of Linguistic Computation and Storage*. MIT Press. Cambridge, MA. **[blurbs]**

[2] N. D. Goodman, J. B. Tenenbaum, and T.J. O'Donnell. Probabilistic Models of Cognition, Chapters 5, 12. (Online Textbook).

Refereed Conference and Journal Articles

[3] R. Futrell, A. Albright, P. Graff, and **T. J. O'Donnell***. (2017). A generative model of phonotactics. *Transactions of the Association for Computational Linguistics*

[4] J. K. Hartshorne, T. J. O'Donnell, Y. Sudo, M. Uruwashi, M. Lee, and J Snedeker. (2016). Psych verbs, the linking problem, and the acquisition of language. *Cognition*. 157:268-288

[5] M.-T. Luong†, T. J. O'Donnell†, and N. D. Goodman. (2015). Evaluating models of computation and storage in human sentence processing. *Proceedings of the Sixth Worshop on Cognitive Aspects of Computational Language Learning*, Lisbon, Portugal, 14–21.

[6] C. Lee, T. J. O'Donnell, and J. R. Glass. (2015). Unsupervised lexicon discovery from acoustic input. *Transactions of the Association for Computational Linguistics*. 3:389–403.

[7] T. Linzen and T. J. O'Donnell. (2015). A model of rapid phonotactic generalization. *Proceedings of Empirical Methods in Natural Language Processing (EMNLP 2015)*, Lisbon, Portugal, 1126–1131.

[8] J. K. Hartshorne, T. J. O'Donnell, and J. B. Tenenbaum. (2015). The causes and consequences explicit in verbs. *Language, Cognition, and Neuroscience*, 30(6):716–734.

[9] J. J. M. O'Connor, P. J. Fraccaro, K. Pisanski, C. C. Tigue, T. J. O'Donnell and D. R. Feinberg. (2014). Social dialect and men's voice pitch influence women's mate preferences. *Evolution and Human Behavior*, 35(5):368-375.

[10] A. Almoammer, J. Sullivan, C. Donlan, F. Marušič, R. Žaucer, T. J. O'Donnell, and D. Barner. (2013). Grammatical morphology as a source of early number word meanings. *Proceedings of the National Academy of Science*, 110:18448–18453.

[11] L. Bergen, E. Gibson, **T. J. O'Donnell***. (2013) Arguments and modifiers from the learner's perspective. In *Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics (ACL 2013)*, Sofia, Bulgaria, 115–119.

[12] M. Fullwood and **T. J. O'Donnell***. (2013) Learning non-concatenative morphology. In *Proceedings of the 4th Annual Workshop on Cognitive Modeling and Computational Linguistics (CMCL 2013)*, Sofia, Bulgaria, 21–27.

† Indicates co-first-authorship.
* Bold indicates senior author and primary supervisor on project.

[13] T. J. O'Donnell, J. Snedeker, J. B. Tenenbaum, and N. D. Goodman. (2011). Productivity and reuse in language. In *Proceedings of the Thirty-Third Annual Conference of the Cognitive Science Society*, Boston, MA, 1613–1618.

[14] M. Troyer, T. J. O'Donnell, E. Fedorenko, and E. Gibson. (2011). Storage and computation in syntax: Evidence from relative clause priming. In *Proceedings of the Thirty-Third Annual Conference of the Cognitive Science Society*, Boston, MA, 336–341.

[15] E. Conwell, T. J. O'Donnell, and J. Snedeker. (2010). Frozen chunks and generalized representations: The case of the English dative alternation. In *Proceedings of 35th Annual Boston University Conference on Language Development*, Boston, MA, 132–144.

[16] J.K. Hartshorne, T. J. O'Donnell, Y. Sudo, M. Uruwashi, and J. Snedeker (2010). Linking meaning to language: Linguistic universals and variation. In *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, Portland, OR, 1186–1191.

[17] M. D. Hauser, D. Barner, and T. J. O'Donnell. (2007). Evolutionary linguistics: A new look at an old landscape. *Language Learning and Development*, 3(2):101–132.

[18] T. J. O'Donnell, M. D. Hauser, and W. T. Fitch. (2005). Using mathematical models of language experimentally. *Trends in Cognitive Sciences*, 9(6):284–289.

[19] J. Carletta, J. Kilgour, T. J. O'Donnell, S. Evert, and H. Voormann. (2003). The NITE object model library for handling structured linguistic annotation on multimodal data sets. In *Proceedings of the EACL Workshop on Language Technology and the Semantic Web (NLPXML-2003)*, Budapest, Hungary.

Articles Submitted

[20] K. Mahowald, J. B. Tenenbaum, and **T. J. O'Donnell**[*]. (Submitted). Quantifying the availability bias through linguistic productivity.

[21] L. Bergen, E. Gibson, and **T. J. O'Donnell**[*]. (Submitted). A learnability analysis of argument and modifier structure.

Refereed Conference Presentations

[22] R. Futrell, A. Albright, P. Graff, and T. J. O'Donnell. (2015). A Generative Interpretation of Feature Hierarchies. North East Computational Phonology Workshop (NECPHON 2015)

[23] J. K. Hartshorne, T. Gerstenberg, T. J. O'Donnell, and J. B. Tenenbaum. (2014). Language understanding and common sense reasoning. *Annual Meeting of the Psychonomics Society*, Long Beach, California.

[24] J. K. Hartshorne, T. J. O'Donnell, Yasutada Sudo, Miki Uruwashi, and J. Snedeker (2012). Linking event structure to language: Linguistic universals and variation. *Maryland's First Annual Interdisciplinary Research Symposium on Events (PHLING)*, College Park, MD.

[25] T. J. O'Donnell. (2011). Productivity and Reuse in Language. *Workshop: Empirically Examining Parsimony and Redundancy in Usage-based Models at the 2011 Linguistic Society of America*, Pittsburgh, PA.

[26] T. J. O'Donnell and W. Zuidema. (2004). Mathematical Linguistics and Language Evolution. *Proceedings of the 5th International Conference on the Evolution of Language*, Leipzig, Germany.

Refereed Conference Posters

[27] T. J. O'Donnell and K. Smith (2015). Evidence for an irregularization bias in morphological

[*] Bold indicates senior author and primary supervisor on project.

learning. *Proceedings of the 40th Annual Boston University Conference on Language Development*, Boston, MA.

[28] R. Futrell, A. Albright, P. Graff, and T. J. O'Donnell (2016). A generative model of phonotactics. *Proceedings of the 90th Annual Meeting of the Linguistic Society of America (LSA 2016)*, Lisbon, Portugal.

[29] T. Linzen, and T. J. O'Donnell (2016). A model of rapid phonotactic generalization. *Proceedings of the 90th Annual Meeting of the Linguistic Society of America (LSA 2016)*, Lisbon, Portugal.

[30] T. Linzen, and T. J. O'Donnell (2015). A model of rapid phonotactic generalization. *Workshop on Computational Phonology and Morphology (COMPMORPHON)*, Chicago, IL.

[31] R. Futrell, A. Albright, P. Graff, and T. J. O'Donnell (2015). A generative model of phonotactics. *Workshop on Computational Phonology and Morphology (COMPMORPHON)*, Chicago, IL.

[32] J. K. Hartshorne, T. Gerstenberg, T. J. O'Donnell, and J. B. Tenenbaum. (2014). Language understanding and common sense reasoning. *Architectures and Mechanisms in Language Processing (AMLaP)*, Edinburgh, UK.

[33] V. Plesničar, T. Razboršek, J. Sullivan, A. Almoammer, C. Donlan, D. Barner, T. J. O'Donnell, R. Žaucer, and F. Marušič. (2013). Number morphology as a source of early mathematical content. *Syntax, Phonology, and Language Analysis (SinFonIJA) 6*, Novi Sad, Serbia.

[34] D. Barner, F. Marušič, T. J. O'Donnell, V. Plesničar, T. Razboršek, J. Sullivan and R. Žaucer. (2013). Language as a source of numerical concepts. *Formal Approaches to Slavic Linguistics 22*, Hamilton, ON, Canada.

[35] D. Barner, T. Razboršek, V. Plesničar, J. Sullivan, T. J. O'Donnell, R. Žaucer, and L. Marušič. (2013). Language as a source of numerical concepts. *Biennial Meeting of the Society for Research in Child Development*, Seattle, WA.

[36] K. Mahowald, T. J. O'Donnell, and J.B. Tenenbaum. (2013) Filling in the blanks in morphological productivity: A word completion task. *The 26th annual CUNY Sentence Processing Conference*, Columbia, SC.

[37] Barner, D., Marušič, F., O'Donnell, T., Plesničar, V., Razboršek, T. Sullivan, J., Žaucer, R. (2013). Language as a source of numerical concepts. *39th Incontro di Grammatica Generativa*, Modena and Reggio Emilia, Emilia-Romagna, Italy.

[38] T. J. O'Donnell, J. Snedeker, J. B. Tenenbaum, and N. D. Goodman. (2011). Productivity and Reuse in Language: a Developmental Study. *Proceedings of the Thirty-Third Annual Conference of the Cognitive Science Society*, Boston, MA.

[39] T. J. O'Donnell, M. Thothathiri, and J. Snedeker. (2010). Priming of Natural Language Structures by Artificial Language Stimuli. *The 23rd Annual CUNY Conference on Human Sentence Processing*, New York, NY.

[40] T. J. O'Donnell, N. D. Goodman, J. Snedeker, and J. B. Tenenbaum. (2009). Computation and Reuse in Language Learning. *The 34th Annual Boston University Conference on Language Development*, Boston, MA.

[41] W. Zuidema and T. J. O'Donnell. (2006). Beyond the Argument from Design. *Proceedings of the 6th International Conference on the Evolution of Language*, Rome, Italy.

Technical Reports and Tutorials

[42] D. Wingate, C. Diuk, T. J. O'Donnell, and J. Tenenbaum, S. Gershman. (2013). Compositional Policy Priors. Technical Report MIT-CSAIL-TR-2013-007, Massachusetts Institute of Technology—Computer Science and Artificial Intelligence Laboratory, 2013.

[43] N. D. Goodman, J. B. Tenenbaum, T. J. O'Donnell and the Church Working Group. 2011). Probabilistic Models of Cognition (tutorial).
`http://projects.csail.mit.edu/church/wiki/Probabilistic_Models_of_Cognition`

[44] N. D. Goodman, J. B. Tenenbaum, T. J. O'Donnell and the Church Working Group. (2010). Probabilistic Models of Cognition (tutorial) for *the European Summer School of Logic, Language and Information.*
`http://projects.csail.mit.edu/church/wiki/ESSLLI_Tutorial`

[45] T. J. O'Donnell, N. D. Goodman, and J. B. Tenenbaum. (2009). Fragment grammars: Exploring Computation and Reuse in Language. Technical Report MIT-CSAIL-TR-2009-013, Massachusetts Institute of Technology—Computer Science and Artificial Intelligence Laboratory, 2009.

Invited talks

Productivity, Reuse, and Competition between Generalizations. *Competition Workshop, Linguistics Society of America Summer Institute.* July, 2015

Productivity, Reuse, and Competition between Generalizations. *University of Rochester, Department of Psychology, Computation and Language Laboratory.* July, 2015

Productivity, Reuse, and Lexicon Learning. *Tufts University, Department of Psychology.* June, 2015

Productivity, Reuse, and Lexicon Learning. *University of California Berkeley, Department of Psychology.* June, 2015

Productivity, Reuse, and Lexicon Learning. *Stanford University, Department of Computer Science, NLP Group.* June, 2015

Productivity and Reuse in Language. *New York University, Department of Linguistics, Morphology Group Seminar.* February, 2015

Productivity and Reuse in Language. *Syntaxzirkel, Zentrum für Algemeine Sprachwissenschaft, Berlin.* January, 2015

Productivity and Reuse in Language. *Technishce Universität Dresden, Musik, Mathematik, Kognition Seminar Series.* January, 2015

A Theory of Linguistic Computation and Storage. *University of Amsterdam, Speech, Language, Music, Art, Reasoning and Thought (SMART) Cognitive Science Seminar Series.* July, 2014

Productivity and Reuse in Lexical Learning. *Northeastern University Sentence Processing Laboratory.* February, 2014

Productivity and Reuse in Language: Non-parametric Bayesian Models of Lexical Acquistion. *Brown Department of Applied Mathematics, Pattern Theory Lunch.* February, 2014

Fragment Grammars: Productivity and Reuse in Language. *Institute for Pure and Applied Mathematics Graduate Summer School in Probabilistic Models of Computation.* July, 2011

Commentary on: Learning and Linguistic Competence by Roni Katzir. *Cornell Workshop on Grammar Induction.* May, 2010.

Computation and Reuse in Language. *Institute for Logic Language and Computation.* August, 2009.

Bayesian Models for Cognition and Language. *École Normale Supérieure.* July, 2009

Computation and Reuse in Language. *University of Edinburgh Language Evolution and Computation Research Unit.* June, 2009

Computation and Reuse in Language Learning. *Harvard University Artificial Intelligence Research Group.* October, 2008.

Modeling Computation and Reuse in Language Learning. *Brown Laboratory for Linguistic Information Processing.* September, 2008.

Structure and Reuse in Language Learning. *Tufts University.* August, 2008.

Computation and Reuse in Language. *Cornell University Department of Linguistics.* April, 2008.

Computational Homologies in Language. *Birdsong, Speech and Language: Converging Mechanisms.* April, 2007.

Teaching

Instructor
Spring 2011, MIT, *Computational Cognitive Science* (w/ Joshua B. Tenenbaum)
Fall 2005, Harvard College, *How to Design a Communication System: Human, Animal and Artificial Languages* (w/ Andrew Nevins)

Guest Lecturer
Spring 2015, MIT, *Cognitive Core Graduate Class* (Ted Gibson)
Spring 2014, MIT, *Cognitive Core Graduate Class* (Ted Gibson)
Fall 2013, MIT, *Computational and Mathematical Linguistics* (Martin Rohrmeier)
Spring 2012, MIT, *Topics in Computational Phonology and Morphology* (Adam Albright)
Fall 2012, MIT, *Morphology* (David Pesetsky and Adam Albright)

Tutorials
Spring 2015, Technische Universität Dresden, *Probabilistic Models of Cognition*
Fall 2010, Cornell University, *Computation Cognitive Science and Probabilistic Programming* (w/ Noah Goodman)

Teaching Assistant
Spring 2008, *Harvard College*, The Human Mind (Prof. Steven Pinker)
Fall 2007, *Harvard College*, Introduction to Statistics
Summer 2006, *Harvard Extension School*, Introduction to Linguistics (Prof. Andrew Nevins)
Spring 2003, *University of Edinburgh*, Introduction to Theoretical Computer Science

Organizing

2015, 6th Annual Association for Computational Linguistics Workshop on Cognitive Modeling and Computational Linguistics (CMCL2015)

2014, 5th Annual Association for Computational Linguistics Workshop on Cognitive Modeling and Computational Linguistics (CMCL2014)

Reviewing

Cognition, Cognitive Science, TopiCS in Cognitive Science, Language and Speech, Behavioral Re-

search Methods, Annual Conference of the Cognitive Science Society, EVOLANG: Conference on The Evolution of Language, Annual Conference on Neural Information Processing Systems, CMCL: Cognitive Modeling and Computational Linguistics, Annual Meeting of the European Association for Computational Linguistics, Annual Meeting of the Association for Computational Linguistics