

# R. Thomas McCoy

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## EDUCATION

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- 2017–present    Johns Hopkins University: Ph.D. in Cognitive Science  
*Advisors:* Tal Linzen, Paul Smolensky
- 2013–2017      Yale University: B.A. in Linguistics, *summa cum laude*, distinction in the major  
*Advisor:* Robert Frank
- Summer 2016    Institute on Collaborative Language Research (CoLang), University of Alaska Fairbanks
- Summer 2015    Linguistic Summer Institute, University of Chicago

## EMPLOYMENT

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- Summer 2018    JSALT sentence representations team  
Supervisors: Sam Bowman, Ellie Pavlick  
*Developed techniques for analyzing learned sentence representations.*
- Summer 2017    Carnegie Mellon University Low Resource Languages for Emergent Incidents (LORELEI) team  
Supervisor: Patrick Littell  
*Programmed a finite-state morphological analyzer for Oromo.*
- Summer 2017    Chirila project  
Supervisor: Claire Bovern  
*Developed automatic semantic processing techniques for an online database of Australian languages.*
- Summer 2016    Grammar Boot Camp  
Supervisor: Claire Bovern  
*Wrote a sketch grammar of Kuwarra.*
- Summer 2015    Yale Grammatical Diversity Project  
Supervisors: Laurence Horn, Jim Wood, Raffaella Zanuttini, Jason Zentz  
*Edited web pages about regional grammatical phenomena.*

- Summer 2014 Irish lip rounding research  
Supervisor: Ryan Bennett  
*Collected lip rounding measurements from images of Irish speakers.*
- Summer 2014 Linguistic Core Multi-University Research Initiative  
Supervisors: Chris Dyer, Lori Levin  
*Developed an English-to-Malagasy tree-to-string transducer.*
- Summer 2013 Linguistic Core Multi-University Research Initiative  
Supervisors: Chris Dyer, Lori Levin  
*Developed a finite state morphological analyzer for Kinyarwanda.*

## TEACHING

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- Fall 2019 Johns Hopkins University  
Role: Teaching Assistant  
Course: Computational Psycholinguistics  
Lecture Instructor: Tal Linzen  
*Led lab sessions and graded assignments.*
- Spring 2019 Johns Hopkins University  
Role: Teaching Assistant  
Course: Syntax I  
Lecture Instructor: Géraldine Legendre  
*Led review sessions and graded assignments.*
- Fall 2018 Johns Hopkins University  
Role: Teaching Assistant  
Course: Introduction to Computational Cognitive Science  
Lecture Instructor: Tal Linzen  
*Created educational simulations, tutorials, and homeworks in Javascript and Jupyter and taught lectures using these resources.*
- Spring 2018 Johns Hopkins University  
Role: Fieldwork Instructor  
Course: World of Language  
Lecture Instructor: Géraldine Legendre  
*Led two sections of weekly fieldwork sessions complementing lectures.*
- Summer 2015 Linguistic Society of America Summer Institute  
Role: Workshop Co-Instructor  
Course: Linguistic Enigmatography  
Co-Instructor: Lori Levin  
*Developed and co-taught a one-week workshop on creating linguistic puzzles.*

## AWARDS

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- 2019      NeurIPS Travel Grant  
*Grant to fund travel to present work at the NeurIPS workshop on Context and Compositionality in Biological and Artificial Neural Systems.*
- 2019      ICLR Travel Grant  
*Grant to fund travel to present two posters at the 2019 ICLR conference.*
- 2018–2019    Johns Hopkins University Center for Educational Resources Technology Fellowship Grant  
Co-Grantee: Tal Linzen  
*Grant to develop interactive visualizations of concepts in computational cognitive science.*
- 2018–2021    NSF Graduate Research Fellowship  
*Project title: Assessing the capacity of computational models to make linguistic generalizations*
- 2017–2020    Owen Scholars Fellowship  
*Fellowship for outstanding incoming Johns Hopkins PhD students in the natural sciences.*
- 2017      Alpheus Henry Snow Prize  
*Award for the graduating Yale senior who is “adjudged by the faculty to have done the most for Yale by inspiring in his or her classmates an admiration and love for the best traditions of high scholarship.”*
- 2017      Finalist, Rhodes Scholarship
- 2017      Finalist, Marshall Scholarship
- 2016      Hart Lyman Prize  
*Award for the Yale junior who “has made through his/her own efforts the best record intellectually and socially.”*
- 2016      Phi Beta Kappa  
*One of 13 Yale students admitted as juniors.*
- 2013      International Linguistics Olympiad  
*First-place team in the world. Individual bronze medal.*
- 2013      United States Presidential Scholar  
*One of two for Pennsylvania.*

- 2019 Paul Soulos, R. Thomas McCoy, Tal Linzen, and Paul Smolensky. Discovering the compositional structure of vector representations with Role Learning Networks. In *NeurIPS 2019 Workshop on Context and Compositionality in biological and artificial neural systems*. [https://context-composition.github.io/camera\\_ready\\_papers/soulos\\_neurips\\_camera\\_ready.pdf](https://context-composition.github.io/camera_ready_papers/soulos_neurips_camera_ready.pdf).
- 2019 R. Thomas McCoy, Ellie Pavlick, and Tal Linzen. Right for the Wrong Reasons: Diagnosing Syntactic Heuristics in Natural Language Inference. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*. <https://www.aclweb.org/anthology/P19-1334/>
- 2019 Samuel R. Bowman, Ellie Pavlick, Edouard Grave, Benjamin Van Durme, Alex Wang, Jan Hula, Patrick Xia, Raghavendra Pappagari, R. Thomas McCoy, Roma Patel, Najoung Kim, Ian Tenney, Yinghui Huang, Katherin Yu, Shuning Jin, and Berlin Chen. Can You Tell Me How to Get Past Sesame Street? Sentence-Level Pretraining Beyond Language Modeling. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*. <https://www.aclweb.org/anthology/P19-1439/>
- 2019 Najoung Kim, Roma Patel, Adam Poliak, Alex Wang, Patrick Xia, R. Thomas McCoy, Ian Tenney, Alexis Ross, Tal Linzen, Benjamin Van Durme, Samuel R. Bowman, Ellie Pavlick. Probing What Different NLP Tasks Teach Machines about Function Word Comprehension. In *Proceedings of the Eighth Joint Conference on Lexical and Computational Semantics (\*SEM 2019)*. <https://www.aclweb.org/anthology/S19-1026/>.  
**Best paper award at \*SEM 2019.**
- 2019 R. Thomas McCoy, Tal Linzen, Ewan Dunbar, and Paul Smolensky. RNNs implicitly implement tensor-product representations. In *International Conference on Learning Representations 2019*. <https://openreview.net/forum?id=BJx0sjC5FX>
- 2019 Ian Tenney, Patrick Xia, Berlin Chen, Alex Wang, Adam Poliak, R. Thomas McCoy, Najoung Kim, Benjamin Van Durme, Samuel R. Bowman, Dipanjan Das, and Ellie Pavlick. What do you learn from context? Probing for sentence structure in contextualized word representations. In *International Conference on Learning Representations 2019*. <https://openreview.net/forum?id=SJzSgnRcKX>
- 2018 R. Thomas McCoy, Robert Frank, and Tal Linzen. Revisiting the poverty of the stimulus: hierarchical generalization without a hierarchical bias in recurrent neural networks. In *Proceedings of the 40th Annual Conference of the Cognitive Science Society*. <https://arxiv.org/abs/1802.09091>
- 2018 Patrick Littell, R. Thomas McCoy, Na-Rae Han, Shruti Rijhwani, Zaid Sheikh, David Mortensen, Teruko Mitamura, and Lori Levin. Parser combinators for Tigrinya and Oromo morphology. In *Language Resources and Evaluation Conference (LREC) 2018*. <https://www.aclweb.org/anthology/L18-1611>

- 2018 R. Thomas McCoy and Robert Frank. Phonologically Informed Edit Distance Algorithms for Word Alignment with Low-Resource Languages. In *Proceedings of the Society for Computation in Linguistics (SCiL) 2018*, pages 102-112. <http://www.aclweb.org/anthology/W18-0311>
- 2017 Jungo Kasai, Bob Frank, R. Thomas McCoy, Owen Rambow, and Alexis Nasr. TAG parsing with neural networks and vector representations of supertags. In *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*, pages 1712-1722. <https://www.aclweb.org/anthology/D17-1180/>
- 2017 Dan Friedman\*, Jungo Kasai\*, R. Thomas McCoy\*, Robert Frank, Forrest Davis, and Owen Rambow. Linguistically Rich Vector Representations of Supertags for TAG Parsing. In *Proceedings of the 13th International Workshop on Tree Adjoining Grammars and Related Formalisms*, pages 122-131. <http://www.aclweb.org/anthology/W17-6213>  
\*Equal contribution.

## PEER-REVIEWED JOURNAL ARTICLES

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- 2020 R. Thomas McCoy, Robert Frank, and Tal Linzen. Does syntax need to grow on trees? Sources of hierarchical inductive bias in sequence-to-sequence networks. Accepted to *TACL*.

## PEER-REVIEWED ABSTRACTS

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- 2019 R. Thomas McCoy and Tal Linzen. Non-entailed subsequences as a challenge for natural language inference. *Proceedings of the Society for Computation in Linguistics (SCiL) 2019*. <https://scholarworks.umass.edu/scil/vol2/iss1/46/>

## PAPERS REVIEWED BY ABSTRACT

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- 2017 R. Thomas McCoy. English comparatives as degree-phrase relative clauses. In *Proceedings of the Linguistic Society of America* 2, 26:1-7. <https://journals.linguisticsociety.org/proceedings/index.php/PLSA/article/download/4078/3775>

## NON-PEER-REVIEWED PREPRINTS

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- 2019 R. Thomas McCoy, Junghyun Min, and Tal Linzen. BERTs of a feather do not generalize together: Large variability in generalization across models with similar test set performance. arXiv preprint. <https://arxiv.org/abs/1911.02969>.

## NON-PEER-REVIEWED JOURNAL ARTICLES

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- 2019 R. Thomas McCoy. Touch down in Pittsburghese. *Yale Working Papers in Grammatical Diversity*. <https://elischolar.library.yale.edu/cgi/viewcontent.cgi?article=1002&context=ygdp>.

## WORK IN PREPARATION

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Susan Hanson, Claire Bower, and R. Thomas McCoy. A Dictionary and Sketch Grammar of Kuwarra.

Rebecca Everson, R. Thomas McCoy, and Claire Bower. Creating a semantic database for Pama-Nyungan languages.

## UNPUBLISHED CONFERENCE PRESENTATIONS

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- 2018 R. Thomas McCoy, Robert Frank, and Tal Linzen. Investigating hierarchical bias in the acquisition of English question formation with recurrent neural networks. Poster presentation, *2018 Legrain conference: Learning Language in Humans and in Machines*, Paris, France, July 5-6.
- 2018 Robert Frank, R. Thomas McCoy, and Tal Linzen. Neural network syntax in the age of deep learning: the case of question formation. Oral presentation, *Society for Computation in Linguistics*, Salt Lake City, Utah, January 5.
- 2017 Patrick Littell, R. Thomas McCoy, and Lori Levin. The North American Computational Linguistics Olympiad. Oral presentation, in *Datablitz: Getting High School Students into Linguistics: Current Activities and Future Directions*, *Linguistic Society of America Annual Meeting*, Austin, Texas, January 7.

## SERVICE

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- 2019 Conference reviewer: CoNLL 2019.
- 2018 Conference reviewer: CoNLL 2018.
- 2018 Conference reviewer: ACL 2018. Named as a top reviewer.
- 2016–2017 Computational Linguistics at Yale (CLAY) reading group: Co-organizer.
- 2015–2017 Yale Undergraduate Linguistics Society: Co-founder (2015), president (2015–2016), treasurer (2016–2017).

## OUTREACH

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- 2013-present North American Computational Linguistics Olympiad (NACLO). National level: Problem writer (12 problems to date) and member of the 7-person NACLO Core governing committee for the national U.S. contest. Local level: Co-founder and co-organizer of the Yale contest site (2013–2017); co-organizer of the Johns Hopkins contest site (2017-present); organizer of pre-contest practice sessions at both sites.
- 2018–2019 International Linguistics Olympiad (IOL): Problem writer.

- 2016 Yale Grammatical Diversity Project: Authored two webpages describing regional grammatical phenomena (*All the further* and *Subject contact relatives*).
- 2013–2017 Linguistics teaching initiatives: Designed and taught a one-lecture linguistics class to high school students in connection with the separate programs Splash, Sprout, and Math Mornings. Presented 8 times to groups ranging from 25 to 50 students.

## PROFESSIONAL MEMBERSHIPS

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- 2015–present Linguistic Society of America (LSA).  
2017–present Association for Computational Linguistics (ACL).  
2018–present Cognitive Science Society.

## SKILLS

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- Programming languages Python, PyTorch, JavaScript, Haskell, C, Java, R, Scheme.
- Natural languages English (native), Bahasa Indonesia (conversational), Old English (basic reading ability), Old Norse (basic reading ability), Latin (basic reading ability).

## COURSEWORK

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*Undergraduate GPA: 4.0 Graduate GPA: 4.0*

**Computational Linguistics:** Language and Computation I, Language and Computation II, Formal Foundations of Linguistic Theories, Computing Meaning

**Natural Language Processing:** Natural Language Processing, Machine Learning: Linguistic and Sequence Modeling

**Syntax:** Syntax I, Syntax II, Grammatical Diversity in US English

**Phonetics/Phonology:** Phonetics, Phonology I, Phonology II, The Phonetics/Phonology Interface

**Semantics:** Semantics I, Semantics II

**Computer Science:** Data Structures and Programming Techniques, Computational Tools for Data Science

**Mathematics:** Multivariable Calculus, Discrete Mathematics, Probability and Statistics, Advanced Statistical Methods

**Other relevant courses:** Linguistic Field Methods