

R. Thomas McCoy

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EDUCATION

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| 2017–present | Johns Hopkins University: Ph.D. in Cognitive Science
<i>Advisors:</i> Tal Linzen, Paul Smolensky |
| 2013–2017 | Yale University: B.A. in Linguistics, <i>summa cum laude</i> , distinction in the major
<i>Advisor:</i> 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/Fall 2020 | Microsoft Research internship
Supervisor: Asli Celikyilmaz
<i>Analyzing text generation systems.</i> |
| Summer 2018 | JSALT sentence representations team
Supervisors: Sam Bowman, Ellie Pavlick
<i>Developed techniques for analyzing learned sentence representations.</i> |
| Summer 2017 | Carnegie Mellon University Low Resource Languages for Emergent Incidents (LORELEI) team
Supervisor: Patrick Littell
<i>Programmed a finite-state morphological analyzer for Oromo.</i> |
| Summer 2017 | Chirila project
Supervisor: Claire Bower
<i>Developed automatic semantic processing techniques for an online database of Australian languages.</i> |
| Summer 2016 | Grammar Boot Camp
Supervisor: Claire Bower
<i>Wrote a sketch grammar of Kuwarra.</i> |

Summer 2015	Yale Grammatical Diversity Project Supervisors: Laurence Horn, Jim Wood, Raffaella Zanuttini, Jason Zentz <i>Edited web pages about regional grammatical phenomena.</i>
Summer 2014	Irish lip rounding research Supervisor: Ryan Bennett <i>Collected lip rounding measurements from images of Irish speakers.</i>
Summer 2014	Linguistic Core Multi-University Research Initiative Supervisors: Chris Dyer, Lori Levin <i>Developed an English-to-Malagasy tree-to-string transducer.</i>
Summer 2013	Linguistic Core Multi-University Research Initiative Supervisors: Chris Dyer, Lori Levin <i>Developed a finite state morphological analyzer for Kinyarwanda.</i>

TEACHING

Spring 2020	Johns Hopkins University Role: Teaching Assistant Course: Foundations of Cognitive Science Lecture Instructor: Paul Smolensky <i>Led one seminar discussion and graded assignments.</i>
Fall 2019	Johns Hopkins University Role: Teaching Assistant Course: Computational Psycholinguistics Lecture Instructor: Tal Linzen <i>Led lab sessions and graded assignments.</i>
Spring 2019	Johns Hopkins University Role: Teaching Assistant Course: Syntax I Lecture Instructor: Géraldine Legendre <i>Led review sessions and graded assignments.</i>
Fall 2018	Johns Hopkins University Role: Teaching Assistant Course: Introduction to Computational Cognitive Science Lecture Instructor: Tal Linzen <i>Created educational simulations, tutorials, and homeworks in Javascript and Jupyter and taught lectures using these resources.</i>
Spring 2018	Johns Hopkins University Role: Fieldwork Instructor Course: World of Language Lecture Instructor: Géraldine Legendre <i>Led two sections of weekly fieldwork sessions complementing lectures.</i>

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

2021 Sweitzer Fellow
 Fellowship awarded by the Johns Hopkins Department of Cognitive Science to one graduate student.

2020 Finalist: Facebook Fellowship
 One of four finalists in the Natural Language Processing category; two of the four finalists received fellowships.

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.

PEER-REVIEWED PROCEEDINGS PAPERS

- 2021 R. Thomas McCoy, Jennifer Culbertson, Paul Smolensky, and Géraldine Legendre. Infinite use of finite means? Evaluating the generalization of center embedding learned from an artificial grammar. In *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*. <https://psyarxiv.com/r8ct2>
- 2020 Michael Lepori and R. Thomas McCoy. Picking BERT's Brain: Probing for Linguistic Dependencies in Contextualized Embeddings Using Representational Similarity Analysis. In *Proceedings of the 28th International Conference on Computational Linguistics (COLING)*. <https://aclanthology.org/2020.coling-main.325/>
- 2020 Paul Soulos, R. Thomas McCoy, Tal Linzen, and Paul Smolensky. Discovering the compositional structure of vector representations with Role Learning Networks. In *Proceedings of the Third BlackboxNLP Workshop on Analyzing and Interpreting Neural Networks for NLP*. <https://aclanthology.org/2020.blackboxnlp-1.23.pdf>.
- 2020 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. In *Proceedings of the Third BlackboxNLP Workshop on Analyzing and Interpreting Neural Networks for NLP*. <https://aclanthology.org/2020.blackboxnlp-1.21.pdf>.
- 2020 R. Thomas McCoy, Erin Grant, Paul Smolensky, Thomas L. Griffiths, and Tal Linzen. Universal linguistic inductive biases via meta-learning. In *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*. <https://arxiv.org/pdf/2006.16324.pdf>
- 2020 Michael Lepori, Tal Linzen, and R. Thomas McCoy. Representations of Syntax [MASK] Useful: Effects of Constituency and Dependency Structure in Recursive LSTMs. In *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*. <https://arxiv.org/pdf/2005.00019>
- 2020 Junghyun Min, R. Thomas McCoy, Dipanjan Das, Emily Pitler, and Tal Linzen. Syntactic data augmentation increases robustness to inference heuristics. In *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*. <https://arxiv.org/pdf/2004.11999>

- 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

- 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. *TACL*. https://www.mitpressjournals.org/doi/full/10.1162/tac1_a_00304

PEER-REVIEWED ABSTRACTS

- 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

- 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 JOURNAL ARTICLES

- 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

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

- 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.

INVITED TALKS

- 2021 USC ISI Natural Language Seminar. April 15, 2021.
Universal Linguistic Inductive Biases via Meta-Learning.
- 2020 DeepMind language reading group. December 7, 2020.
Analyzing the syntactic inductive biases of sequence-to-sequence networks.
- 2020 Berkeley NLP Seminar. October 16, 2020.
Analyzing the syntactic inductive biases of sequence-to-sequence networks.
- 2020 NLP With Friends seminar series. August 12, 2020.
Universal Linguistic Inductive Biases via Meta-Learning.

SERVICE

- 2020–present Johns Hopkins CogSci Representation and Diversity Committee.
- 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).

MENTORING: UNDERGRADUATE RESEARCH ASSISTANTS

- 2020–present Adi Yedetore
- 2019–2020 Michael Lepori

REVIEWING

- 2021 Conference reviewer: EMNLP 2021.
- 2020 Conference reviewer: CoNLL 2020.
- 2020 Conference reviewer: EMNLP 2020. Recognized as an outstanding reviewer.
- 2020 Conference reviewer: ACL 2020.

- 2019 Conference reviewer: CoNLL 2019.
2018 Conference reviewer: CoNLL 2018.
2018 Conference reviewer: ACL 2018. Recognized as a top reviewer.

OUTREACH

- 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

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

SKILLS

- 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

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