Cory Shain

Curriculum Vitae

Contact

Cory A. Shain
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Bio

I study language learning and processing in the mind and brain using experimental methods, computational cognitive models, and deep learning. I received my BA (2009), MA (2009), and PhD (2021) in linguistics from Ohio State, where I studied under William Schuler and Micha Elsner. I am currently a postdoctoral researcher in Brain & Cognitive Sciences with Evelina Fedorenko at MIT.

Positions

2021 – present. Postdoctoral researcher, Brain & Cognitive Sciences, MIT

Education

2016 – 2021. PhD in Linguistics, The Ohio State University
2009. MA in Linguistics, The Ohio State University
2009. BA in Linguistics, minor in International Studies, The Ohio State University

Under-Review/In-Prep

Shain, C.; and Schuler, W. (under review). A deep learning approach to analyzing continuous-time systems. https://arxiv.org/abs/2209.12128.

Shain, C.; Paunov, A.; Chen, X. ; Lipkin, B. ; Fedorenko, F. (under review). No evidence of theory of mind reasoning in the human language network. https://www.biorxiv.org/content/10.1101/2022.07.18.500516v1.

Shain, C.; Kean, H.; Lipkin, B.; Affourti, J.; Siegelman, M.; Mollica, F.; Fedorenko, E. (in prep). 'Constituent length' effects in fMRI do not provide evidence for abstract syntactic processing. https://www.biorxiv.org/content/10.1101/2021.11.12.467812v1.

Journal Articles

Shain, C.; Blank, I.; Fedorenko, E.; Gibson, E.; Schuler, W (early access). Robust effects of working memory demand during naturalistic language comprehension in language-selective cortex. *Journal of Neuroscience*.

Fedorenko, E.; and **Shain, C.** (2021). Similarity of computations across domains does not imply shared implementation: The case of language comprehension. *Current Directions in Psychological Science*, 30(6): 526-534.

Shain, C.; and Schuler, W. (2021). Continuous-time deconvolutional regression for psycholinguistic modeling. *Cognition*, 215: 104735.

Wehbe, L.; Blank, I.; **Shain, C.**; Futrell, R.; Levy, R.; von der Malsburg, T.; Smith, N.; Gibson, E.; and Fedorenko, E. (2021). Incremental language comprehension difficulty predicts activity in the language network but not the multiple demand network. *Cerebral Cortex*, 31(9): 4006-4023.

Shain, C.; Blank, I.; van Schijndel, M.; Fedorenko, E.; and Schuler, W. (2020). fMRI reveals language-specific predictive coding during naturalistic sentence comprehension. *Neuropsychologia*, 138: 107307.

Elsner, M.; Sims, A. D.; Erdmann, A.; Hernandex, A.; Jaffe, E.; Jin, L.; Johnson, M. B.; Karim, S.; King, D. L.; Lamberti Nunes, L.; Oh, B.; Rasmussen, N.; **Shain, C.**; Antetomaso, S.; Dickinson, K. V.; Diewald, N.; McKenzie, M.; and Stevens-Guille, S (2019). Modeling morphological learning, typology, and change: What can the neural sequence-to-sequence framework contribute? *Journal of Language Modeling*, 7(1): 53-98.

Shain, C., and Tonhauser, J. (2010). The synchrony and diachrony of differential object marking in Paraguayan Guaraní. *Language Variation and Change*, 22(03), 321–346.

Conference Papers

Shain, C. (2021). CDRNN: Discovering complex dynamics in human language processing. In *Proceedings of the Joint Conference of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing*.

Shain, C.; and Elsner, M. (2020). Acquiring language from speech by learning to remember and predict. In *Proceedings of the 24th Conference on Computational Natural Language Learning*: 195-214. **Best Paper Award.**

Jaffe, E.; **Shain C.**; and Schuler, W. (2020). Coreference information guides human expectations during natural reading. In *Proceedings of the 28th International Conference on Computational Linguistics*: 4587-4599.

Shain, C. (2019). A large-scale study of the effects of word frequency and predictability in naturalistic reading. In *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers)*: 4086-4094.

Shain, C.; and Elsner, M. (2019). Measuring the perceptual availability of phonological features during language acquisition using unsupervised binary stochastic autoencoders. In *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers)*: 69-85.

Shain, C.; and Schuler, W. (2018). Deconvolutional time series regression: A technique for modeling temporally diffuse effects. In *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing*: 2679-2689.

Shain, C.; van Schijndel, M.; and Schuler, W. (2018). Deep syntactic annotations for broad-coverage psycholinguistic modeling. In *Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC 2018)*.

Jaffe, E.; **Shain, C.**; and Schuler, W. (2018). Coreference and Focus in Reading Times. In *Proceedings of the 8th Workshop on Cognitive Modeling and Computational Linguistics (CMCL 2018)*: 1-9.

Elsner, M.; **Shain, C.** (2017). Speech segmentation with a neural encoder model of working memory. In *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*: 1070-1080.

Mahler, T.; Cheung, W.; Elsner, M.; King, D.; de Marneffe, M.; **Shain, C.**; Stevens-Guille, S.; and White, M. (2017). Breaking NLP: Using morphosyntax, semantics, pragmatics and world knowledge to fool sentiment analysis systems. In *Proceedings of the First Workshop on Building Linguistically Generalizable NLP Systems*: 33-39.

Shain, C.; Bryce, W.; Jin, L.; Krakovna, V.; Doshi-Velez, F.; Miller, T.; Schuler, W.; and Schwartz, L. (2016). Memory-Bounded Left-Corner Unsupervised Grammar Induction on Child-Directed Input. In *Proceedings of the 26th International Conference on Computational Linguistics*: 964-975.

Shain. C.; van Schijndel, M.; Futrell, R.; Gibson, E.; and Schuler, W. (2016). Memory access during incremental sentence processing causes reading time latency. In *Proceedings of the Workshop on Computational Linguistics for Linguistic Complexity (CL4LC)*: 49-58.

Peer-reviewed conference abstracts

Shain, C.; Blank, I.; Fedorenko, E.; Gibson, E.; Schuler, W (2021). Robust effects of working memory demand during naturalistic language comprehension in language-selective cortex. In *13th Annual Meeting of the Society for the Neurobiology of Language*.

Shain, C.; and Elsner, M. (2021). Modeling effects of incremental memory and prediction pressures on phoneme learning from speech. In *34th Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; and Schuler, W. (2021). Analyzing complex human sentence processing dynamics with CDRNNs. In *34th Annual CUNY Conference on Human Sentence Processing*.

Tuckute, G.; **Shain, C.**; Blank, I.; Wang, M.; and Fedorenko, E. (2020). Linguistic and conceptual processing are dissociated during sentence comprehension. In *12th Annual Meeting of the Society for the Neurobiology of Language*.

Mollica, F.; **Shain, C.**; Affourtit, J.; Kean, H.; Siegelman, M.; and Fedorenko, E. (2020). Another look at the constituent structure of sentences in the human brain. In *12th Annual Meeting of the Society for the Neurobiology of Language*.

Shain, C.; Blank, I.; van Schijndel, M.; Fedorenko, E.; and Schuler, W. (2020). Prediction in the language network is sensitive to syntactic structure. In *33rd Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; and Schuler, W. (2020). Controlling for human response latency with continuous-time deconvolutional regression. In *33rd Annual CUNY Conference on Human Sentence Processing*.

Jaffe, E.; **Shain, C.**; and Schuler, W. (2020). Coreference information guides human expectations during naturalistic reading. In *33rd Annual CUNY Conference on Human Sentence Processing*.

Shain, C. (2019). A large-scale deconvolutional study of predictability and frequency effects in naturalistic reading. In *32nd Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; and Elsner, M. (2019). Computer modeling suggests patterns of perceptual availability of phonological structure during infant language acquisition. In *32nd Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; Blank, I.; van Schijndel, M.; Schuler, W.; and Fedorenko, E. (2019). fMRI reveals language-specific predictive coding during naturalistic sentence comprehension. In *32nd Annual CUNY Conference on Human Sentence Processing*.

Jaffe, E.; **Shain, C.**; and Schuler, W. (2018). Coreference and focus in broad-coverage stimuli. In *31st Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; and Schuler, W. (2018). Modeling psycholinguistic effect timecourses with deconvolutional time series regression. In *31st Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; Futrell, R.; van Schijndel, M.; Gibson, E.; Schuler, W.; and Fedorenko, E. (2018). Evidence of semantic processing difficulty in naturalistic reading. In *31st Annual CUNY Conference on Human Sentence Processing*.

Elsner, M.; and **Shain, C.** (2017). Word segmentation with neural net working memory. In *Midwest Speech and Language Days 2017*.

Shain, C.; van Schijndel, M.; Futrell, R.; Gibson, E.; and Schuler, W. (2017). Retrieving structures from memory causes difficulty during incremental processing. In *30th Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; Bryce, W.; Jin, L.; Krakovna, V.; Doshi-Velez, F.; Miller, T.; Schuler, W.; and Schwartz, L. (2017). Modeling syntax acquisition via cognitively-constrained unsupervised grammar induction. In *30th Annual CUNY Conference on Human Sentence Processing*.

Shain, C.; van Schijndel, M.; Gibson, E.; and Schuler, W. (2016). Exploring memory and processing through a gold-standard annotation of Dundee. In *29th Annual CUNY Conference on Human Sentence Processing*.

Theses

Shain, C. (2021). *Language, time, and the mind: Understanding human language processing using continuous-time deconvolutional regression*. PhD Thesis: The Ohio State University.

Shain, C. (2009). *The distribution of differential object marking in Paraguayan Guaraní*. MA Thesis: The Ohio State University. (Available at https://etd.ohiolink.edu/!etd.send_file?accession=osu1243450139).

Works in progress

A Sketch of the Phonology and Morphology of Iyasa. (Available at http://go.osu.edu/iyasaphon).

Iyasa Webonary. 1700+ entries. French and English interfaces. (Available at http://go.osu.edu/ykowebonary).

Invited talks

Incremental story comprehension in the human brain (Online). Language and Cognition talk series, Harvard University. September 20, 2022.

Incremental story comprehension in the human brain (Online). Department of Linguistics, Cornell University. September 16, 2022.

Prediction and memory in human language comprehension: Evidence from naturalistic fMRI (Online). Centre for Language Studies, Radboud University. December 7, 2020.

Studying how language comprehension unfolds over time (Online). Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology. September 16, 2020.

Localizing incremental linguistic prediction in the mind (Online). Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology. May 7, 2019.

Discovering psycholinguistic effect timecourses with deconvolutional time series regression. Department of Cognitive Science, Johns Hopkins University. November 7, 2018.

Unsupervised machine learning as acquisition modeling. Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology. August 16, 2017.

Media appearances

Episode 16 of the Language Neuroscience Podcast: Robust effects of working memory demand during naturalistic language comprehension in language-selective cortex. October 4, 2021.

Honors and awards

2017. NSF Graduate Research Fellowship Program Honorable Mention

Grants and fellowships

2016. University Fellowship, The Ohio State University

Teaching experience

2017, Autumn. LING 2000, Introduction to Linguistics
2018, Spring. LING 2000, Introduction to Linguistics

Service

Journal reviewing:

2022. *iScience*
2022. *Proceedings of the National Academy of Sciences* (secondary reviewer)
2022. *NeuroImage*
2022. *Neurobiology of Language*
2022. *Brain Structure and Function*
2022. *Language and Speech*
2022. *Language, Cognition & Neuroscience*
2021. *Journal of Neuroscience*
2021. *NeuroImage*
2021. *Proceedings of the National Academy of Sciences* (secondary reviewer)
2021. *Cognitive Science*
2021. *Language Resources and Evaluation*
2020. *NeuroImage*
2020. *Nature Scientific Reports* (secondary reviewer)
2018. *Cognitive Science*

Conference reviewing:

2022. Conference on Empirical Methods in Natural Language Processing (EMNLP)
2022. Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics (AACL)
2022. International Conference on Computational Linguistics (COLING)
2022. ACL rolling review
2022. Meeting of the Cognitive Science Society
2022. Cognitive Modeling and Computational Linguistics workshop (CMCL)
2021. ACL rolling review
2021. Conference on Computational Natural Language Learning (CoNLL)
2021. Cognitive Modeling and Computational Linguistics workshop (CMCL)
2021. Meeting of the North American Association for Computational Linguistics (NAACL)
2020. Conference on Computational Natural Language Learning (CoNLL)
2020. Cognitive Modeling and Computational Linguistics workshop (CMCL)
2020. International Conference on Computational Linguistics (COLING)
2020. Meeting of the Association for Computational Linguistics (ACL), **outstanding reviewer**
2020. AAAI Conference on Artificial Intelligence (AAAI)
2019. Context and Compositionality in Biological and Artificial Neural Systems workshop
2019. Empirical Methods in Natural Language Processing conference (EMNLP)
2019. Cognitive Modeling and Computational Linguistics workshop (CMCL)
2018. International Conference on Computational Linguistics (COLING), **outstanding reviewer**
2018. Cognitive Modeling and Computational Linguistics workshop (CMCL)

Administrative:

2017 – 2021. Laboratory and Computing Committee, member
2016 – 2021. Web Committee, member
2017. MidPhon22 Organizing Committee, webmaster

2016 – 2017. Speakers' Committee, member

Language competence

English, native
French, conversant
Spanish, intermediate