

Molly L. Lewis

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Education

Ph.D., Developmental Psychology, Stanford University, fall 2016

Advisor: Michael C. Frank

Committee: Ellen M. Markman, Noah Goodman, Hyowon Gweon, and Thomas Icard

B.A., Linguistics, Reed College, May 2009

Computational Social Science Summer School, Princeton, New Jersey, summer 2017

Machine Learning Summer School, Tübingen, Germany, summer 2013

Graduate coursework, Psychology Department, University of Illinois at Urbana-Champaign, 2010

Employment

Post-doctoral scholar, co-advised by James Evans (University of Chicago) and Gary Lupyan (University of Wisconsin-Madison), 2017 – present

Lab Coordinator, Communication and Language Lab (PI: Duane Watson), University of Illinois at Urbana-Champaign, 2009 – 2011

Research Interest

My research seeks to understand the psychological mechanisms underlying large scale socio-cultural phenomena. My work has primarily focused on language as a particularly interesting and important case study of socio-cultural regularities. Using language, I have sought to understand how cognitive and pragmatic pressures can lead to patterns in behavior at the level of individuals, and over time, how these pressures can lead to law-like regularities at the level of social groups. I am also interested in the role that the cognitive development in children plays in these dynamics.

Methods

I use a wide range of methods in my research, listed below with selected corresponding citations. Across methods, I am committed in open science practices and make all data, code, and materials publicly available where possible.

Machine learning approaches to big data (Lewis & Lupyan, in press; Lewis & Lupyan, 2018; Lewis & Frank, 2016)

Experimental methods with adults and children (Lewis & Frank, 2016a; Lewis & Frank, 2016b; Lewis & Frank, under review; Lewis & Watson, 2015; Lewis, Sugarman, & Frank, 2014; Frank, Sugarman, Horowitz, Lewis & Yurovsky, 2016)

Meta-analysis (Lewis, Braginsky, Tsuji, Bergmann, Piccinini, Cristia, & Frank, under review; Bergmann, Tsuji, Piccinini, Lewis, Braginsky, Frank & Cristia, in press)

Computational modeling (Lewis & Frank, 2013a; Lewis & Frank, 2013b; Frank, Lewis & MacDonald, 2016)

Longitudinal field studies (Barner, Athanasopoulou, Chu, Lewis, Marchand, Schneider & Frank, 2017)

Honors and Awards

Paula Menyuk Travel Award BUCLD (2015)

Cognitive Science Society Travel Award (2013)

Honorable Mention, NSF Graduate Research Fellowship Program (2013, 2012)

Commended for Excellence in Scholarship, Reed College (2009, 2008, 2007)

Publications

Peer-Reviewed Journal Articles

Lewis, M. & Frank, M. C. (under review). Still suspicious: The suspicious coincidence effect revisited.

Lynn, P., **Lewis, M.** & Lupyan, G. (under review). Shaping semantic networks with transcranial direct current stimulation.

Lewis, M., Braginsky, M., Tsuji, S., Bergmann, C., Piccinini, P., Cristia, A. & Frank, M. C. (under review). A quantitative synthesis of early language acquisition using meta-analysis.

Bergmann, C., Tsuji, S., Piccinini, P., **Lewis, M.**, Braginsky, M., Frank, M. C. & Cristia, A. (in press). Assessing current practices in language acquisition research through meta-analyses. *Child Development*.

Barner, D., Athanasopoulou, A., Chu, J., **Lewis, M.**, Marchand, E., Schneider, R. M., Frank, M. C. (2017). A one-year classroom-randomized trial of mental abacus instruction for first- and second-grade students. *Journal of Numerical Cognition*, 3(3), 540–558.

Lupyan, G. & **Lewis, M.** (2017). From words-as-mappings to words-as-cues: The role of language in semantic knowledge. *Language, Cognition and Neuroscience*.

Lewis, M. & Frank, M. C. (2016). Understanding the effect of social context on learning: A replication of Xu and Tenenbaum (2007b). *Journal of Experimental Psychology: General*, 145(9), e72–e80.

Lewis, M. & Frank, M. C. (2016). Linguistic structure emerges through the interaction of memory constraints and communicative pressures. Commentary on M. Christiansen & N. Chater, The Now-or-Never Bottleneck: A Fundamental Constraint on Language. *Behavioral and Brain Sciences*, 39, 38–39.

Lewis, M. & Frank, M. C. (2016). The length of words reflects their conceptual complexity. *Cognition*, 153, 182–195.

- Frank, M. C., Sugarman, E., Horowitz, A. C., **Lewis, M. L.**, & Yurovsky, D. (2016). Using tablets to collect data from young children. *Journal of Cognition and Development*, 17(1), 1-17.
- Lewis, M.** & Watson, D. G. (2015). Effects of lexical semantics on acoustic prominence. *Language and Cognition*, 7, 1-21.

Peer-Reviewed Conference Proceedings

- Lewis, M.** & Lupyan, G. (in press). Language use shapes cultural norms: Large scale evidence from gender. *Proceedings of the 39th Annual Meeting of the Cognitive Science Society*.
- Lewis, M.** & Frank, M. C. (2016). Linguistic niches emerge from pressures at multiple timescales. *Proceedings of the 38th Annual Meeting of the Cognitive Science Society*.
- Frank, M. C., **Lewis, M.**, & MacDonald, K. (2016). A performance model for early word learning. *Proceedings of the 38th Annual Meeting of the Cognitive Science Society*.
- Lewis, M.** & Frank M. C. (2016). Learnability pressures influence the encoding of information density In the lexicon. In S.G. Roberts, C. Cuskley, L. McCrohon, L. Barcelo-Coblijn, O. Feher & T. Verhoef (eds.) *The Evolution of Language: Proceedings of the 11th International Conference*.
- Lewis, M.** & Frank, M. C. (2015). Conceptual complexity and the evolution of the lexicon. *Proceedings of the 37th Annual Meeting of the Cognitive Science Society*.
- Lewis, M.**, Sugarman, E., & Frank, M. C. (2014). The structure of the lexicon reflects principles of communication. *Proceedings of the 36th Annual Meeting of the Cognitive Science Society*.
- Lewis, M.** & Frank, M. C. (2013). Modeling disambiguation in word learning via multiple probabilistic constraints. *Proceedings of the 35th Annual Meeting of the Cognitive Science Society*.
- Lewis, M.** & Frank, M. C. (2013). An integrated model of concept learning and word-concept mapping. *Proceedings of the 35th Annual Meeting of the Cognitive Science Society*.

Presentations

Conference Presentations

- Lewis, M.** & Lupyan, G. (April, 2018). What 50 million drawings can tell us about shared meaning. Poster presented at the 12th International Conference of the Evolution of Language, Toruń, Poland.
- Lewis, M.**, Braginsky, M., Tsuji, S., Bergmann, C., Piccinini, P., Cristia, A. & Frank, M. C. (July, 2017). A quantitative synthesis of early language acquisition using meta-analysis. Poster at the Beyond the Lab: Using Big Data to Discover Principles of Cognition Conferences. Madison, Wisconsin.
- Lewis, M.** & Frank, M. C. (2016, August). Linguistic niches emerge from pressures at multiple timescales. Poster presented at the 38th annual meeting of the Cognitive Science Society, Philadelphia, Pennsylvania.
- Tsuji, S., **Lewis, M.**, Bergmann, C., Cristia, A., Braginsky, M., Piccinini, P., Frank, M. C. & Cristia, A. (2016, May). MetaLab: Supporting Power Analysis and Experimental Planning in Developmental Research. Poster at the 2016 ICIS Conference. New Orleans, Louisiana.

- Lewis, M.** & Frank, M. C. (2016, March). Learnability pressures influence the encoding of information density in the lexicon. Talk presented at the 11th International Conference of the Evolution of Language, New Orleans, Louisiana.
- Tsuji, S., Bergmann, C., Cristia, A., **Lewis, M.**, Braginsky, M., & Frank, M. C. (2016, January). MetaLab: Power Analysis and Experimental Planning in Developmental Research Made Easy. Poster at the 2015 Budapest CEU Conference on Cognitive Development. Budapest, Hungary.
- Lewis, M.**, Braginsky, M., Bergmann, C., Tsuji, S., Cristia, A. & Frank, M. C. (2015, November). MetaLab: A tool for power analysis and experimental planning in developmental research. Talk presented at the 40th annual meeting of the Boston University Child Language Development, Boston, Massachusetts.
- Lewis, M.** & Frank, M. C. (2015, July). Conceptual complexity and the evolution of the lexicon. Talk presented at the 37th annual meeting of the Cognitive Science Society, Pasadena, California.
- Lewis, M.** & Frank, M. C. (2015, March). A meta-analytic approach to understanding the disambiguation effect. Poster presented at the 2015 Biennial Meeting of the Society for Research in Child Development, Philadelphia, Pennsylvania.
- Lewis, M.** & Frank, M. C. (2014, July). The structure of the lexicon reflects principles of communication. Talk presented at the 36th annual meeting of the Cognitive Science Society, Quebec City, Canada.
- Lewis, M.** & Frank, M. C. (2014, June). Understanding the psychological sources of communicative behavior. Talk presented at the 40th annual meeting of the Society for Philosophy and Psychology, Vancouver, Canada.
- Lewis, M.** (2013, September). Modeling disambiguation in word learning via multiple probabilistic constraints. Poster presented at Machine Learning Summer School, Tübingen, Germany.
- Lewis, M.** & Frank, M. C. (2013, August). An integrated model of concept learning and word-concept mapping. Talk presented at the 35th annual meeting of the Cognitive Science Society, Berlin, Germany.
- Lewis, M.** & Frank, M. C. (2013, August). Modeling disambiguation in word learning via multiple probabilistic constraints. Talk presented at the 35th annual meeting of the Cognitive Science Society, Berlin, Germany.
- Lewis, M.** & Watson, D. G. (2013, July). Say it like you mean it: Lexical meaning influences prosody. Talk presented at the Embodied and Situated Language Processing Conference, Potsdam, Germany.
- Lewis, M.** & Watson, D. (2011, September). Say it like you mean it: Lexical meaning influences prosody. Talk presented at the annual meeting of Architectures and Mechanisms for Language Processing, Paris, France.

Invited Departmental and Meeting Talks

- "Second-language learner text as a window into cross-linguistic semantics" (2018, January). 5th Science of Science Meeting, University of Chicago - Northwestern University.
- "A Quantitative Synthesis of Language Development Using Meta-Analysis." (2017, November). Developmental Brownbag, Department of Psychology, University of Chicago.
- "A Quantitative Synthesis of Language Development Using Meta-Analysis." (2016, September). Cognitive and Developmental Brownbag, Department of Psychology, University of Wisconsin-Madison.

- "A Quantitative Synthesis of Language Development Using Meta-Analysis." (2016, June). Developmental Brownbag, Department of Psychology, Stanford University.
- "Cognitive mechanisms shape linguistic structure." (2016, March). The Knowledge Lab, University of Chicago.
- "The role of communicative pressures in shaping the lexicon." (2014, December). Laboratoire de Sciences Cognitives et Psycholinguistique, ENS, Paris, France.
- "The length of words reflects their cognitive complexity." (2015, February,). Cognitive-Neuroscience Talk Series, Department of Psychology, Stanford University.
- "The length of words reflects cognitive complexity." (2014, October). Lightning talk presented at the Stanford Psychology Colloquium Series, Department of Psychology, Stanford University.
- "The structure of the lexicon reflects principles of communication." (2014, April). Developmental Brownbag, Department of Psychology, Stanford University.
- "The structure of the lexicon reflects principles of communication." (2014, February). Cognitive Talk Series, Department of Psychology, Stanford University.
- "Multiple routes to solving the mapping problem." (2013, August). Informatics Group, University of Edinburgh.
- "Modeling disambiguation in word learning via multiple probabilistic constraints." (2013, May). Stanford-Berkeley-Santa Cruz Developmental Psychology Conference, UC Berkeley.
- "An integrative model for word-concept mapping." (2012, September). Lightning talk presented at Bay Area Bayesians, UC Berkeley.
- "Formalizing the problem of reference." (2012, June). Developmental Brownbag Series, Department of Psychology, Stanford University.
- "Saying it like you mean it: Evidence for sound symbolism in language production." (2010, November). Cognitive Brownbag Series, Department of Psychology, University of Illinois at Urbana-Champaign.

Professional Activities and Service

Student Representative, Graduate Admissions Committee, 2014-2015

Co-organizer of Stanford Developmental Talk Series, 2013-2014

Student Representative, Faculty Search Committee, 2012-2013

Peer reviewer for Proceedings of the Annual Meeting of the Cognitive Science Society, 2012 - 2017

Peer reviewer for Evolution of Language Evolution Conference, 2017

Ad-hoc reviewer for Psychonomic Bulletin & Review, Cognitive Science, Psychological Review, Cognition, Behavioral Research Methods

Teaching

Organized and co-lead pre-conference workshop at the Annual Cognitive Science Conference, "Meta-Analytic Methods for Cognitive Scientists" (Co-instructors: Sho Tsuji and Christina Bergmann), August 2016, Philadelphia, Pennsylvania.

Teaching Assistant, Introduction to Symbolic Systems (Instructors: Dan Lassiter and Thomas Icard), fall 2015

Co-head Teaching Assistant, Introduction to Statistical Methods (Instructor: Ewart Thomas), winter 2015

Co-primary Instructor, Language and Thought, summer 2014

Guest lecture, Introduction to Developmental Psychology (Instructor: Michael C. Frank), spring 2014

Teaching Assistant, Introduction to Statistical Methods (Instructor: Ewart Thomas), winter 2013

Teaching Assistant, Introduction to Developmental Psychology (Instructor: Michael C. Frank), fall 2012, spring 2014

Taught intern workshop on the meta-analysis method, Center for Study of Language and Information, summer 2015

Mentorship

Allison Durkin (Yale University, CSLI intern; summer 2015)

Andres Camperi (Stanford University, CSLI intern; summer 2015)

Marlene Ade (Raising Interest in Science and Engineering program; summer 2015)

Ben Morris (Reed College, CSLI intern; summer 2014)

Elise Sugarman (Stanford University, undergraduate thesis advisor; 2013-2014)

Liza Benabbas (Raising Interest in Science and Engineering program; summer 2013)

Mia Kirkendoll (Raising Interest in Science and Engineering program; summer 2012)

Grants

01.11.2016 – 31.05.2017 SMART Grant for the MetaLab Project (Website: metalab.stanford.edu) Funding amount: \$29,100; Co-Investigators: Christina Bergmann, Sho Tsuji, Page Piccinini, Mika Braginsky, Alejandrina Cristia, Michael C. Frank