Tyler Zarus Knowlton

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Research Interests

Broad: psycholinguistics; language acquisition; semantics; the language-thought relationship
Specific: quantification; conservativity; lexical decomposition; syntactic bootstrapping; argument structure; numerical and event concepts; the language-vision interface; natural logic

Employment

Postdoctoral Research Fellow	2021-

Mind Center for Outreach, Research, and Education (MindCORE)
Advisory committee: Anna Papafragou, John Trueswell, and Florian Schwarz
University of Pennsylvania, Philadelphia, PA

Education and Training

Ph.D. in Linguistics	2016-21

Thesis: The psycho-logic of universal quantifiers
Advisors: Jeffrey Lidz and Paul Pietroski
University of Maryland, College Park, MD

Lab Manager, Vision and Cognition Lab	2015-16

PI: Justin Halberda
Johns Hopkins University, Baltimore, MD

B.A. in Cognitive Science (with honors)	2011-15

Minors in Linguistics, Philosophy, and Psychology
Johns Hopkins University, Baltimore, MD

Grants, Fellowships, and Awards

NSF Doctoral Dissertation Improvement Grant, "Doctoral Dissertation Research: The mental representation and acquisition of the universal quantifiers" (NSF #BCS-2017525) (with Jeffrey Lidz)	2020
Graduate Student Service Award University of Maryland, College of Arts and Humanities	2020
Howard Lasnik Award for Distinguished Teaching by a Graduate Student University of Maryland, Linguistics Department	2020
Jerrold J. Katz Young Scholar Award CUNY Conference on Human Sentence Processing	2019

Publications

Books

Lidz, J. & **Knowlton, T.** (under contract) *A course in first language acquisition.* Oxford University Press.

Papers

Odic, D., **Knowlton, T.**, Wellwood, A., Pietroski, P., Lidz, J., & Halberda, J. (under review) *Seeing 'The Most': perceptual magnitudes efficiently extract the min and max element in a set.*

Knowlton, T., Pietroski, P., Williams, A., Halberda, J., & Lidz, J. (under review) *Psycholinguistic evidence for restricted quantification.*

Knowlton, T., Trueswell, J., & Papafragou, A. (under review) *Non-conservative quantifiers are unlearnable.*

Knowlton, T., Trueswell, J., & Papafragou, A. (under review) *Keeping quantifier meaning in mind: Connecting semantics, cognition, and pragmatics.*

Perkins, L., **Knowlton, T.**, Williams, A., & Lidz, J. (under review) *Thematic content, not number matching, drives syntactic bootstrapping.*

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (under review) *Individuals versus ensembles and "each" versus "every": Linguistic framing affects performance in a change detection task.*

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *New evidence for the unlearnability of non-conservative quantifiers.* Proceedings of the 23rd Amsterdam Colloquium.

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *A mentalistic semantics explains "each" and "every" quantifier use.* Proceedings of the Annual Meeting of the Cognitive Science Society.

Knowlton, T. & Gomes, V. (2022) *Linguistic and non-linguistic cues to acquiring the strong distributivity of "each".* Proceedings of the Linguistic Society of America.

Knowlton, T., Pietroski, P., Halberda, J., & Lidz, J. (2022) *The mental representation of universal quantifiers.* Linguistics and Philosophy.

Knowlton, T., Hunter, T., Odic, D., Wellwood, A., Halberda, J., Pietroski, P., & Lidz, J. (2021) *Linguistic meanings as cognitive instructions.* Annals of the New York Academy of Sciences.

Knowlton, T. & Lidz, J. (2021) *Genericity signals the difference between "each" and "every" in child-directed speech.* Proceedings of the 45th annual Boston University Conference on Language Development.

Knowlton, T., Pietroski, P., Williams, A., Halberda, J., & Lidz, J. (2021) *Determiners are "conservative" because their meanings are not relations: evidence from verification.* Proceedings of Semantics and Linguistic Theory 30.

Volumes Edited

Knowlton, T., Schwarz, F., & Papafragou, A. (Eds.) (2023) *Proceedings of the second Experiments in Linguistic Meaning (ELM 2).* Linguistic Society of America.

Presentations

Conference Talks

Knowlton, T. & Schwarz, F. (2023) *"Every" provides an implicit comparison class when "each" does not.* The 47th annual Penn Linguistics Conference (PLC), University of Pennsylvania.

Knowlton, T., Trueswell, J., & Papafragou, A. (2023) *Non-conservative quantifiers are unlearnable.* Linguistic Society of America (LSA) Annual Meeting, Denver, CO.

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *New evidence for the unlearnability of non-conservative quantifiers.* Workshop on Biases in Language and Cognition, 23rd Amsterdam Colloquium (AC), Amsterdam, Netherlands.

Gomes, V., **Knowlton, T.**, Papafragou, A., & Trueswell, J. (2022) *Differentiating universal quantifiers by differentiating their domains.* Boston University Conference on Language Development (BUCLD) 47, Boston University.

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *A mentalistic semantics explains "each" and "every" quantifier use.* 44th Annual Meeting of the Cognitive Science Society (CogSci), Toronto, Canada.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2022) *Universal quantification without language? Ten-month-old infants represent the exhaustivity of a relation in visually presented events.* Symposium on The Language of Thought, 3rd Joint Conference of the Society for Philosophy and Psychology and the European Society of Philosophy and Psychology (SPP/ESPP), Milan, Italy.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2022) *On the origins of universal quantification: 10-month-old infants represent the exhaustivity of multi-agent intentional*

actions. XXIII International Congress of Infant Studies (ICIS) Biennial Congress, Ottawa, Canada.

Knowlton, T. & Gomes, V. (2022) *Linguistic and non-linguistic cues to acquiring the strong distributivity of "each".* Linguistic Society of America (LSA) Annual Meeting, Washington, DC.

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (2021) *Evaluating "each"- (but not "every"-) sentences encourages encoding individual properties.* 34th CUNY Conference on Human Sentence Processing, University of Pennsylvania.

Knowlton, T. & Lidz, J. (2021) *Bootstrapping universal quantifiers: the role of genericity.* Linguistic Society of America (LSA) Annual Meeting, San Francisco, CA.

Knowlton, T. & Lidz, J. (2020) *Genericity signals the difference between "each" and "every" in child-directed speech.* Boston University Conference on Language Development (BUCLD) 45, Boston University.

Knowlton, T., Pietroski, P., Williams, A., Halberda, J., & Lidz, J. (2020) *Memory for cardinality supports a non-relational account of conservativity.* Experiments in Linguistic Meaning (ELM) 1, University of Pennsylvania.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2020) *An investigation of the origins of logical quantification: infants' (and adults') representations of exhaustivity in collective or individual complex actions.* Symposium on Learning 'hard words', XXII International Congress of Infant Studies (ICIS) Biennial Congress, Glasgow, Scotland.

Knowlton, T., Pietroski, P., Williams, A., Halberda, J., & Lidz, J. (2020) *Conservative meanings with only one set: evidence from verification.* 33rd CUNY Conference on Human Sentence Processing, University of Massachusetts Amherst.

Knowlton, T., Pietroski, P., Halberda, J., & Lidz, J. (2019) *The mental representation of universal quantifiers: evidence from verification.* 32nd CUNY Conference on Human Sentence Processing, University of Colorado Boulder.

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (2018) *Acquiring the universal quantifiers: every part together or each part on its own?* Boston University Conference on Language Development (BUCLD) 43, Boston University.

Invited Talks

Knowlton, T. (2022) *Non-conservative quantifiers are unlearnable (and what that means for semantic theory).* The Psycholinguistics Workshop, University of Massachusetts Amherst.

Knowlton, T. (2022) *Every universal is first-orderizable, but only "each" is first-orderized.* Cognitive Semantics and Quantities Workshop, University of Amsterdam.

Knowlton, T. (2021) *The psycho-logic of "each" and "every".* LingLangLunch, Brown University.

Knowlton, T. (2021) *The psycho-logic of universal quantifiers.* Linguistics Colloquium, University of Southern California.

Knowlton, T. (2019) *The psychological treatment of (universal) quantification.* Integrated Language Sciences and Technology Seminar, University of Pennsylvania.

Knowlton, T. (2018) *Are natural language quantifiers first- or second-order?* McDonnell Network Focused Workshop on "The Development of Set and Quantifier Representations", Johns Hopkins University.

Conference Posters / Lightning Talks

Knowlton, T. & Schwarz, F. (2023) *"Every" provides an implicit comparison class when "each" does not.* 36th Annual Conference on Human Sentence Processing (HSP), University of Pittsburgh.

Cesana-Arlotti, N., Icard, T., **Knowlton, T.**, Lidz, J., Pietroski, P., & Halberda, J. (2023) *The slower they swim, the faster they fly! Can preverbal infants learn antitonic functions?* Budapest CEU Conference on Cognitive Development (BCCCD) 23, Budapest, Hungary.

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *Non-conservative quantifiers are unlearnable.* Boston University Conference on Language Development (BUCLD) 47, Boston University.

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *A psycho-semantic explanation of "each" and "every" quantifier use.* Experiments in Linguistic Meaning (ELM) 2, University of Pennsylvania.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2022) *Universal quantification without language? Ten-month-old infants represent the universality of visually presented properties.* Experiments in Linguistic Meaning (ELM) 2, University of Pennsylvania.

Knowlton, T., Trueswell, J., & Papafragou, A. (2022) *Psycho-semantic representations explain "each" and "every" quantifier use.* 35th Annual Conference on Human Sentence Processing (HSP), University of California, Santa Cruz.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2021) *An investigation of the origins of logical quantification: infants' (and adults') representations of exhaustivity in collective or individual complex actions.* Society for Philosophy and Psychology (SPP) 47th Annual Meeting, Princeton University.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2021) *Representing the exhaustivity of collective and individual actions: an investigation of universal quantification in adults and infants.* 12th Dubrovnik Conference on Cognitive Science, Virtual.

Knowlton, T., Pietroski, P., Williams, A., Halberda, J., & Lidz, J. (2020) *Determiners are 'conservative' because their meanings are not relations: evidence from verification.* Semantics and Linguistic Theory (SALT) 30, Cornell University.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2020) *An investigation of the origin of logical quantification: infants' and adults' representations of collective and distributive actions in complex visual scenes.* 42nd Annual Meeting of the Cognitive Science Society, Virtual.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., & Halberda, J. (2020) *Who's chasing whom? Adults' and infants' engagement of quantificational concepts ("each" and "all") when representing visual chasing events.* Vision Sciences Society (VSS) 20th Annual Meeting, Virtual.

Cesana-Arlotti, N., **Knowlton, T.**, Lidz, J., Pietroski, P., & Halberda, J. (2019) *Concepts of universal quantification ("each" and "all") may support infant and adult understanding of collective and distributive actions.* Cognitive Development Society (CDS) 2019 Biennial Meeting, Louisville, KY.

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (2019) *A novel memory task reveals early understanding of quantifier meanings.* Society for Research in Child Development (SRCD) 2019 Biennial Meeting, Baltimore, MD.

Knowlton, T., Pietroski, P., Halberda, J., & Lidz, J. (2019) *Representational format and universal quantifiers.* Linguistic Society of America (LSA) Annual Meeting, New York, NY.

Perkins, L., **Knowlton, T.**, Williams, A., & Lidz, J. (2018) *Matching number vs. linking roles: using 3-participant scene percepts to understand infants' bootstrapping.* Boston University Conference on Language Development (BUCLD) 43, Boston, MA.

Knowlton, T., Perkins, L., Williams, A., & Lidz, J. (2018) *Getting a grip on infants' event representations: participant number in* TAKE *and* PICK-UP. XXI International Congress of Infant Studies (ICIS) Biennial Congress, Philadelphia, PA.

Knowlton, T., Wong, A., Halberda, J., Pietroski, P., & Lidz, J. (2018) *Different determiners, different algorithms: two majority quantifiers in Cantonese bias distinct verification strategies.* 31st CUNY Conference on Human Sentence Processing, University of California, Davis.

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (2017) *Sentences, centers, and sets: set selection and the meanings of more and most.* Cognitive Development Society (CDS) Biennial Meeting, Portland, OR.

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (2017) *Distinguishing first- from second-order specifications of each, every, and all.* Mid-Atlantic Colloquium of Studies in Meaning (MACSIM) 7, Georgetown University.

Knowlton, T., Halberda, J., Pietroski, P., & Lidz, J. (2017) *Set selection and storage reflect differences in quantifier meanings.* McDonnell Network Plenary Workshop on "The Ontogenetic Origins of Combinatorial Thought", University of California, San Diego.

Perkins, L., **Knowlton, T.**, Hirzel, M., Dudley, R., Williams, A., & Lidz, J. (2017) *Linguistic and conceptual structure in verb learning.* McDonnell Network Plenary Workshop on "The Ontogenetic Origins of Combinatorial Thought", University of California, San Diego.

Teaching and Mentorship

Teaching Experience

University of Pennsylvania

Coordinator, CLAPS (Cognition, Language, And Perception Seminar)   Fall 2022
Lead ∼15 person graduate seminar

University of Maryland

Instructor of Record, Language and Thought (LING449T)   Spring 2020
Designed and taught 11-student seminar

TA, Grammar and Meaning (LING410; Instructor: Valentine Hacquard)   Fall 2019
Responsible for grading, office hours, reviewing p-sets in class, once teaching ∼25 student lecture

TA, Child Language Acquisition (LING444; Instructor: Jeffrey Lidz)   Spring 2019
Responsible for grading, office hours, helping write exams, once teaching ∼20 student lecture

TA, Language and Mind (LING240; Instructor: Tonia Bleam)   Fall 2018
Responsible for grading, office hours, review sessions, twice teaching ∼50 student lecture

TA, Introductory Linguistics (LING200; Instructor: Tonia Bleam)   Spring 2018
Responsible for weekly discussion section of ∼30 students, grading, office hours

Mentorship Experience

University of Pennsylvania

Cognitive science independent study co-mentor Responsible for co-supervising 2 undergraduate independent projects	2022-
MindCORE Step-Ahead Mentorship Program	2021-

University of Maryland

Undergraduate mentor, Project on Children's Language Learning Responsible for mentoring 7 undergraduate research assistants and supervising their end-of-term poster presentations	2018-21
High school summer intern mentor, Project on Children's Language Learning Responsible for mentoring 1 high school research assistant and supervising their final paper & science fair poster presentation	2019

Johns Hopkins University

Undergraduate mentor, Vision and Cognition Lab Responsible for mentoring 5 undergraduate research assistants and supervising their term papers	2015-16

Academic Activities

Service

University of Pennsylvania

Volunteer, DivE In (Diversity and Equity Initiative) Weekend	2022
Host, Behind the CV: Stories from Faculty	2022
MindCORE Outreach Committee	2021
ELM2 Organizing Committee	2021-22

University of Maryland

Linguistics Colloquium Committee	2019-21
Mayfest 2020: Hindsight Organizing Committee (postponed due to COVID-19)	2019-20
Developmental Science Workshop Co-organizer (with Z. Ovans & M. Hirzel), *Endless Possibilities: The Development of Possibility and Necessity in Cognition, Language, and Society*	2018-19
Chair, Language Science Outreach Committee	2018-19
Winter Storm 10 Planning Committee	2017-18
Co-chair (with S. Thivierge), Linguistics Graduate Student Association	2017-18
Career fair coordinator, Language Science Outreach Committee	2016-18
Winter Storm 9 Planning Committee	2016-17
SALT27 Organizing Committee	2016-17

Ad Hoc Reviewing

Manuscripts

Cognitive Science
Journal of Memory and Language (x3)
Language Learning and Development
Natural Language Semantics
PLOS One

Conference Abstracts/Papers

Budapest CEU Conference on Cognitive Development (2023)
Penn Linguistics Conference (2022)
Experiments in Linguistic Meaning (2022)
Annual Conference on Human Sentence Processing (2022, 2023)
Annual Meeting of the Cognitive Science Society (2020, 2021, 2022, 2023)

Professional Memberships

Cognitive Science Society	2020-
Society for Research in Child Development	2019-
International Congress of Infant Studies	2017-
Cognitive Development Society	2017-
Linguistic Society of America	2015-

[updated 3/2/2023]