

Lei Yuan

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Department of Psychology and Neuroscience
University of Colorado Boulder
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Academic Positions

- 2020-present Assistant Professor
Department of Psychology and Neuroscience. University of Colorado
Boulder
- 2016-2020 Postdoctoral Fellow
Department of Psychological and Brain Sciences. Indiana University.
- 2010-2016 Graduate Research Assistant
Department of Psychology. Northwestern University.

Education

- 2016 Northwestern University, USA. Ph.D. in Cognitive Psychology
- 2012 Northwestern University, USA. M.S. in Cognitive Psychology
- 2010 Beijing Linye University, China. B.A. in Psychology

Grants

- Submitted
2020 The National Science Foundation Discovery research K-12
- 2017-2020 Ruth L. Kirschstein National Research Service Award (NRSA) Individual
Postdoctoral Fellowship, The National Institutes of Health, USA. Role: P.I.
Proposal received a perfect score and ranked in the top 1%. [\$172,926]

Honors and Awards

- 2017, 2019 Provost's Travel Award for Women in Science, Indiana University,
Bloomington, IN, USA

2010-2016	University Fellowship, Northwestern University, Evanston, IL, USA
2007	National Scholarship, Beijing Linye University, Beijing, China
2007-2010	University Scholarship, Beijing Linye University, Beijing, China

Publications

Submitted / In prep

- Mix, K.S., Bower, C.A, Hancock, G., **Yuan, L.**, & Smith, L.B. (under review). The development of place value concepts: approximation before principles.
- **Yuan, L.**, Prather, R., Mix, K.S., & Smith, L.B. (in prep). The first step to learning place value: A role for physical models?
- **Yuan, L.**, Byrge, L., Mix, K.S., & Smith, L. B. (in prep). Statistical learning and the development of knowledge systems: Regularities, idiosyncrasies, and connections.
- **Yuan, L.**, Johns, E., Mix, K. S., & Smith, L. B. (in prep). Multiple pathways to place value knowledge but prior symbol knowledge matters.
- Mix, K.S., Bower, C., **Yuan, L.**, & Smith, L.B. (in prep). Predictive relations between early place value understanding and multi-digit calculation.

Published

- **Yuan, L.**, Xiang, V., Crandall, D., & Smith, L. B. (2020) Learning the generative principles of a symbol system from limited examples. *Cognition*. <http://doi.org/10.1016/j.cognition.2020.104243>
- **Yuan, L.**, Prather, R. W., Mix, K. S., & Smith, L. B. (2019) Number representations drive number-line estimates. *Child Development*. <https://doi.org/10.1111/cdev.13333>
- **Yuan, L.**, Prather, R. W., Mix, K. S., & Smith, L. B. (2019) Preschoolers and multi-digit numbers: A path to mathematics through the symbols themselves. *Cognition*. <http://doi.org/10.1016/j.cognition.2019.03.013>
- **Yuan, L.**, Xu, L., Yu, C., & Smith, L. B. (2018) Sustained visual attention is more than seeing—The dynamics of gaze during manual actions. *Journal of Experimental Child Psychology*. <http://doi.org/10.1016/j.jecp.2018.11.020>

- **Yuan, L.**, Haroz, S., & Franconeri, S. L. (2018) Perceptual proxies for extracting averages in data visualizations. *Psychonomic Bulletin & Review*. <https://doi.org/10.3758/s13423-018-1525-7>
- **Yuan, L.**, Uttal, D. H., & Gentner, D. (2017) Analogical reasoning in children's understanding of spatial representations. *Developmental Psychology*. <https://doi.org/10.1037/dev0000302>
- **Yuan, L.**, Xu, L., Yu, C., & Smith, L. B. (2017) Seeing is not enough for sustained visual attention. In the proceedings of *the 39th Annual Conference of the Cognitive Science Society*, London, UK.
- **Yuan, L.**, Uttal, D. H. (2017) Analogy lays the foundation for two crucial aspects of symbolic development: intention and correspondence. *Topics in Cognitive Science*. <https://doi.org/10.1111/tops.12273>
- **Yuan, L.**, Uttal, D. H., & Franconeri, S. L. (2016) Are spatial relations encoded by shifting visual attention between objects? *PloS one*, 11(10), e0163141. <https://doi.org/10.1371/journal.pone.0163141>
- Uttal, D. H., & **Yuan, L.** (2014) Using symbols: developmental perspectives. *Wiley Interdisciplinary Reviews: Cognitive Science*. <http://doi.org/10.1002/wcs.1280>

Organized Conference Symposium

- Learning Before School. *Biannual Meeting of the Society for Research in Child Development*, Baltimore, MD, March 2019

Conference and Invited Talks

- **Yuan, L.**, Prather, R., Mix, K., & Smith, L. B. (2021) When and how Physical Models Benefit the Learning of Symbolic Multi-digit Numbers. *Biannual Meeting of the Society for Research in Child Development*, Baltimore, MD, April 2021.
- **Yuan, L.**, Xiang, V., Crandall, D., & Smith, L.B. (2021) Learning the generative principles of a linguistic system from limited examples. *The 34th Annual CUNY Conference on Human Sentence Processing*. March 2021.
- **Yuan, L.** (2021) Fast and far generalization from sparse data. *The Institute of Cognitive Science Colloquium Series*. University of Colorado Boulder.
- **Yuan, L.** (2020) Fast and far generalization from sparse data. *Stanford University*.

- **Yuan, L.** (2020) Fast and far generalization from sparse data. *University of Colorado Boulder*.
- **Yuan, L.** (2020) Fast and far generalization from sparse data. *Carnegie Mellon University*.
- **Yuan, L.** (2020) Fast and far generalization from sparse data. *University of Wisconsin Madison*.
- **Yuan, L.** (2020) Fast and far generalization from sparse data. *Syracuse University*.
- **Yuan, L.** (2019) Fast and far generalization from sparse data. *University of Texas Dallas*.
- **Yuan, L.** (2019) Fast and far generalization from sparse data. *University of Kentucky*.
- **Yuan, L., Smith, L. B., & Mix, K. S.** (2019) Learning numbers as a system of symbols and their relations. *Biannual Meeting of the Cognitive Development Society*, Louisville, KY, October 2019.
- **Yuan, L. & Smith, L. B.** (2019) Big numbers and small kids: Preschoolers' learning of multi-digit numbers. *Biannual Meeting of the Society for Research in Child Development*, Baltimore, MD, March 2019.
- **Yuan, L., Xu, L., Yu, C., & Smith, L. B.** (2017) Seeing is not enough for sustained visual attention. Talk given at *the 39th Annual Conference of the Cognitive Science Society*, London, UK.
- **Yuan, L.** (2016) Relational representation from spatial symbols. *Indiana University, Developmental Seminar*, 2016.
- **Yuan, L., Franconeri, S. L., & Uttal, D. H.** (2015) Guiding attention to children's graph comprehension. *University of Chicago, Developmental Psychology Brownbag*, 2015.
- **Yuan, L., Uttal, D. H., & Gentner, D.** (2012) Analogy facilitates children's map learning. *Midwestern Psychological Association Annual Meeting*, Chicago, IL, May 2012.
- **Yuan, L., Uttal, D. H., & Gentner, D.** (2012) The effect of analogy and relational language on young children's map learning. *International Conference on Spatial Cognition*, Rome, Italy, August 2012.
- **Yuan, L., Uttal, D. H., & Gentner, D.** (2012) The effect of analogy and relational language on young children's map learning. *Spatial Cognition*, Munich, Germany, August 2012.

- **Yuan, L.,** Uttal, D. H., & Gentner, D. (2012) Analogy facilitates children's map learning. *NSF's Annual Inter-Science of Learning Center Conference*, San Diego, CA, 2012.

Conference Posters

- **Yuan, L.,** & Smith, L. B. Staggering individual differences in preschoolers' multi-digit number knowledge. *Biannual Meeting of the Society for Research in Child Development*, Baltimore, MD, March 2019.
- Novack, M., **Yuan, L.,** Uttal, D. H., & Franconeri, S. L. How relational language promotes relational representation: The role of visual attention. *Biannual Meeting of the Society for Research in Child Development*, Baltimore, MD, March 2019.
- **Yuan, L.,** & Smith, L. B. Rapid generalization from statistical learning. *Interdisciplinary Advances in Statistical Learning*, Bilbao, Spain, June 2017.
- **Yuan, L.,** & Smith, L. B. The Generalizability of Statistical Learning. *Biannual Meeting of the Society for Research in Child Development*, Austin, TX, April 2017.
- **Yuan, L.,** Franconeri, S. L., & Uttal, D. H. Guiding attention to children's graph comprehension. *Biannual Meeting of the Society for Research in Child Development*, Philadelphia, PA, March 2015.
- **Yuan, L.,** Uttal, D. H., & Gentner, D. The effect of analogy and iconicity on young children's map learning. *Biannual Meeting of the Cognitive Development Society*, Memphis, TN, October 2013.
- **Yuan, L.,** Uttal, D. H., & Franconeri, S. L. Low capacity for visual spatial relation memory. *Annual Meeting of the Vision Science Society*, Naples, FL, May 2013.
- **Yuan, L.,** Sauter, M., Uttal, D. H., & Gentner, D. Map in a snap: Can comparison facilitate preschoolers' understanding of maps? *The 33rd Annual Conference of the Cognitive Science Society*, Boston, MA, July 2011.

Teaching Experience

Instructor:

2021 Fall	Research Methods Proseminar, University of Colorado Boulder
2021 Spring	Advanced Cognitive Psychology, University of Colorado Boulder

2017-2019 Supervised Research, Indiana University
 2015 Summer Developmental Psychology, Northwestern University

Guest Lecturer:

2017, 2018 Grant Writing Course, Indiana University
 2017 Fall Statistical Consulting, Indiana University
 2015 Spring Cognitive Processes in Social Psychology, Northeastern University
 2014 Fall Cognitive Psychology, Northeastern University

Teaching Assistant:

2013 Fall Statistics, Northwestern University
 2012 Fall Research Methods, Northwestern University
 2011 Fall Advanced Introduction to Psychology, Northwestern University
 2011 Spring Cognitive Science, Northwestern University
 2010 Winter Cognitive Psychology, Northwestern University

Research Mentees:***University of Colorado Boulder***

Doctoral Students' Committees: Jennifer Weber, Chelsea Brown

Indiana UniversityMasters' student:

Violet Xiang Current graduate student at Stanford University

Undergraduate students:

Ivy Sullivan Current teacher at Teach for America also in grad school (full scholarship)
 Ella Tommer Current post-bac at an NIA lab at Johns Hopkins Medical School
 Haley Meekhof Current doctoral student at IUPUI School of Health and Rehabilitation Sciences
 Kesha Kandoi Current doctoral student at Indiana University School of Medicine
 Emily Johns Current doctoral student at University of Missouri
 Joseph Stoica Current MS student at Indiana University Department of Statistics
 Blanca Saldivar Current EdS student at the Chicago School of Professional Psychology

Hannah Hanscom, Olivia Long, Erin DeCocq, Kate Wood, Arianna Scott, Elizabeth Berquist, Cindy You, Oliver (Mel) Allen, William Belden, Alexandra Lucas.

High school students: Shaina Pennington, Anna Kim, Bria Ooley.

Northwestern University*Undergraduate students:*

Thidar Khine, Stephanie Chang, T.J. Butler, Matt Hong, Ellen Reynolds

Quantitative Skills

Proficient in programming and statistical analysis software, e.g., R, Matlab, Python

Longitudinal and time series data analysis

Eye tracking (and multi-sensory tracking) data analysis and visualizations

Deep learning, e.g., Convolutional Neural Networks, Recurrent Neural Networks

Advanced statistical modeling, e.g., Linear Mixed Effect model (LMM)

Adaptive psychophysical methods

Ad-Hoc Reviewing

Cognition, Cognitive Science, Developmental Psychology, Developmental Review, Child Development, Psychonomic Bulletin & Review, Journal of Cognition and Development, British Journal of Developmental Psychology, The Annual Conference of the Cognitive Science Society

Service and Outreach

2021	CU Boulder Outreach Awards (submitted)
2020	CU Boulder Departmental Awards Committee
2019	Organizer and presenter at a site event for the #GIRLBOSS series for Girls Inc. Indiana University
2019	Recruiter at Child Fair event, Bloomington, Indiana
2018, 2019	Host and mentor for high school students for the STEM summer program, Indiana University
2017	Recruiter at Farmer's Market, Bloomington, Indiana
2015	Volunteer for the Schuler Scholar Program, Northwestern University
2014	Volunteer at the "Science of a Cocktail Party" event, Illinois Science Council
2013	Recruiter at Parent/child workshop event, Evanston Public Library
2012	Volunteer organizer at graduate students' recruitment events, Northwestern University

Past and Current Professional Affiliations

Society for Research in Child Development, Cognitive Development Society, Cognitive Science Society, Vision Science Society, American Educational Research Association