

Ian M. Lyons

Assistant Professor

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Employment

Assistant Professor

Georgetown University • Psychology
August 2016 – *Present*

Postdoctoral Fellow, Adjunct Professor

University of Western Ontario • Developmental Psychology
October 2012 – July 2016
Advisor Daniel Ansari

Education

PhD University of Chicago (2012) • Psychology (Cognitive) • *Advisor* Sian L. Beilock

BS Brown University (2004) • Cognitive Science • *Honors* (with Steven A. Sloman)

Publications

Peer-Reviewed Articles

- Tiberghien K, De Smedt B, Fias W, Lyons IM (in press). Distinguishing between Cognitive Explanations of the Problem Size Effect in Mental Arithmetic via Representational Similarity Analysis of fMRI Data. *Neuropsychologia*.
- Daker RJ, Cortes RA, **Lyons IM***, Green AE* (*in press*). Creativity Anxiety: Evidence for Anxiety that is Specific to Creative Thinking from STEM to the Arts. *Journal of Experimental Psychology: General*. (*Co-senior-author with Green)
- Hutchison JE, **Lyons IM**, Ansari D (2019). More Similar than Different: Gender Differences in Children's Basic Numerical Skills are the Exception not the Rule. *Child Development*, [90\(1\):66-79](#).
- Sokolowski HM, Hawes Z, **Lyons IM** (2019). What explains sex differences in math anxiety? A closer look at the role of spatial processing. *Cognition*, [182:193-212](#).
- Tiberghien K, Sahan MI, De Smedt B, Fias W, Lyons IM (2019). Disentangling neural sources of problem-size and interference effects in multiplication. *Journal of Cognitive Neuroscience*, [31\(3\):453-67](#).
- Daker RJ, **Lyons IM** (2018). Numerical and Non-Numerical Predictors of First Graders' Number-Line Estimation Ability. *Frontiers in Psychology*, [9:2336](#).
- Lyons IM***, Ramirez G*, Maloney EA, Rendina DN, Levine SC, Beilock SL (2018). Spatial Anxiety: A novel questionnaire with subscales for measuring three aspects of spatial anxiety. *Journal of Numerical Cognition*, [4\(3\)](#). (*Co-first-author with Ramirez)
- Lyons IM**, Beilock SL (2018). Characterizing the Neural Coding of Symbolic Quantities. *NeuroImage*, [178:503-18](#).
- Lyons IM**, Bugden S, Zheng S, De Jesus S, Ansari D (2018). Symbolic Number Skills Predict Growth in Nonsymbolic Number Skills in Kindergarteners. *Developmental Psychology*, [54\(3\):440-57](#).
- Necka EA, Faig KE, Van Hedger K, **Lyons IM**, Dimitroff SJ, Luhmann M, Puts DA, Norman GJ (2018). Women's attention to and memory for fertile- and non-fertile phase women across the menstrual cycle. *Adaptive Human Behavior and Physiology*, [4\(3\):283-305](#).

- Vogel SE, Haigh T, Sommerauer G, Spindler M, Brunner C, **Lyons IM**, Grabner RH (2017). Processing the order of symbolic numbers: a reliable and unique predictor of arithmetic fluency. [*Journal of Numerical Cognition*, 3\(2\):288-308.](#)
- Sasanguie D, **Lyons IM**, De Smedt B, Reynvoet B (2017). Unpacking symbolic number comparison and its relation with arithmetic in adults. [*Cognition*, 165:26-38.](#)
- Lyons IM**, Vogel S, Ansari D (2016). On the Ordinality of Numbers: A review of neural and behavioral studies. [*Progress in Brain Research*, 227:187-221.](#)
- Lyons IM**, Ansari D (2015). Foundations of children's numerical and mathematical skills: The roles of symbolic and nonsymbolic representations of numerical magnitude. [*Advances in Child Development and Behavior*, 48:93-116.](#)
- Wang Z, Lukowski SL, Hart SA, **Lyons IM**, Thompson LA, Kovas Y, Mazzocco MM, Plomin R, Petrill SA (2015). Is Math Anxiety Always Bad for Math Learning? The Role of Math Motivation. [*Psychological Science*, 26\(12\):1863-76.](#)
- Necka EA, Sokolowski HM, **Lyons IM** (2015). The role of self-math overlap in understanding math anxiety and the relation between math anxiety and math performance. [*Frontiers in Psychology*, 6:1543.](#)
- Lyons IM**, Ansari D (2015). Numerical Order Processing in Children: From reversing the distance-effect to predicting arithmetic. [*Mind, Brain and Education*, 9\(4\):207-21.](#)
- Lyons IM**, Nuerk HC, Ansari D (2015). Rethinking the Implications of Numerical Ratio Effects for Understanding the Development of Representational Precision and Numerical Processing across Formats. [*Journal of Experimental Psychology: General*, 144\(5\): 1021-35.](#)
- Lyons IM**, Ansari D, Beilock SL (2015). Qualitatively different coding of symbolic and nonsymbolic numbers in the human brain. [*Human Brain Mapping*, 36\(2\): 475-88.](#)
- Lyons IM**, Price GR, Vaessen A, Blomert L, Ansari D (2014). Numerical Predictors of Arithmetic Success in Grades 1-6. [*Developmental Science*, 17\(5\):714-26.](#)
- Lyons IM**, Huttenlocher J, Ratliff KR (2014). The influence of cue-reliability and cue-representation on spatial reorienting in young children. [*Journal of Cognition and Development*, 15\(3\):402-13.](#)
- Wang Z, Hart S, Kovas Y, Lukowski S, Soden B, Thompson L, Plomin R, McLoughlin G, **Lyons IM**, Petrill S (2014). Who's Afraid of Math? Two Sources of Genetic Variance for Mathematical Anxiety. [*Journal of Child Psychology and Psychiatry*, 55\(9\):1056-64.](#)

- Lyons IM**, Beilock SL (2013). Ordinality and the Nature of Symbolic Numbers. [*Journal of Neuroscience*, 33\(43\):17052-61.](#)
- Lyons IM**, Beilock SL (2012). Math Hurts: Math anxiety predicts pain network activation in anticipation of doing math. [*PLoS: ONE*, 7\(10\):e48076.](#)
- Lyons IM**, Ansari D, Beilock SL (2012). Symbolic Estrangement: Evidence against a strong association between numerical symbols and the quantities they represent. [*Journal of Experimental Psychology: General*, 141\(4\):635-41.](#)
- Lyons IM**, Beilock SL (2012). Mathematics Anxiety: Separating the math from the anxiety. [*Cerebral Cortex*, 22\(9\):2102-10.](#)
- Lyons IM**, Beilock SL (2011). Numerical ordering ability mediates the relation between number-sense and arithmetic competence. [*Cognition*, 121\(2\):256-61.](#)
- Lyons IM**, Mattarella-Micke A, Cieslak M, Nusbaum HC, Small SL, Beilock SL (2010). The role of personal experience in the neural processing of action-related language. [*Brain & Language*, 112\(3\):214-22.](#)
- Lyons IM**, Beilock SL (2009). Beyond Quantity: Individual Differences in Working Memory and the Ordinal Understanding of Numerical Symbols. [*Cognition*, 113\(2\):189-204.](#)
- Lyons IM**, Ansari D (2009). The Cerebral Basis of Mapping Nonsymbolic Numerical Quantities onto Abstract Symbols: An fMRI training study. [*Journal of Cognitive Neuroscience*, 21\(9\):1720-35.](#)
- Beilock SL, **Lyons IM**, Mattarella-Micke A, Nusbaum HC, Small SL (2008). Sports experience changes the neural processing of action language. [*Proceedings of the National Academy of Sciences \(USA\)*, 106\(36\):13269-73.](#)
- Ansari D*, **Lyons IM***, van Eimeren L, Xu F (2007). Linking visual attention and number processing in the brain: The role of the temporoparietal junction in small and large number processing, [*Journal of Cognitive Neuroscience*, 19\(11\):1845-53.](#) (*Co-first-author with Ansari)

Chapters and Commentaries

- Ansari D, **Lyons IM** (2016). [Cognitive Neuroscience and Mathematics Learning: How far have we come? Where do we need to go?](#) *ZDM Mathematics Education*, 48(3): 379-383.
- Lyons IM** (2015). [Numbers and Number Sense](#). In: Wright JD (editor-in-chief), *International Encyclopedia of the Social & Behavioral Sciences, 2nd edition*. Vol 17: 46-56. Oxford: Elsevier.
- Beilock SL, **Lyons IM** (2008). [Expertise and the mental simulation of action](#). In: Markman KD, Klein WMP, Suhr JA (Eds.), *The Handbook of Imagination and Mental Simulation*, Psychology Press.

Grants and Fellowships

International Visiting Scholars Fellowship

Ghent University
€3,800 (2015)

Banting Postdoctoral Fellowship

Natural Sciences and Engineering Research Council (Canada)
\$140,000 CAD (2014)

University Research Grant

University of Western Ontario, Office of the Vice President, Social Sciences Faculty
\$30,000 CAD (2013)

William Rainey Harper Fellowship

University of Chicago, Social Sciences Division
\$20,000 USD (2011)

Century/Psychology Fellowship

University of Chicago, Psychology Department
\$60,000 USD (2006)

Fulbright Fellowship *China*

Fulbright Foundation
\$16,000 USD (2004)

Awards and Distinctions

APS Rising Star Award

Association for Psychological Science (2015)

Robert J. Glushko Dissertation Prize

Cognitive Science Society

\$10,000 USD (2014)

Trainee Oral Presentation Award

Organization for Human Brain Mapping

\$700, \$700 (2007, 2013)

Starkey Duncan Award *Outstanding Graduate Student Teaching*

University of Chicago, Psychology Department (2011)

John Dewey Lectureship Prize

University of Chicago, Psychology Department

\$5000 USD (2010)

Invited Lectures

Georgetown University – Integrated Program in Neuroscience *Using*

Neuroimaging Data to Test Cognitive Hypotheses about Numerical Processing (Apr 2019)

Katholieke Universiteit (KU) Leuven *Using Neuroimaging Data to Test Cognitive*

Hypotheses about Numerical Processing (Mar 2019)

University of Graz *Characterizing the Neural Coding of Symbolic Quantities* (Apr 2018)

Temple University *The Symbolic Number System* (Mar 2017)

University of Maryland, College Park *The Symbolic Number System* (Nov 2016)

Northwestern University *The Symbolic Number System* (May 2016)

Katholieke Universiteit (KU) Leuven *Ordinality and the Nature of Symbolic*

Numbers (June 2015)

Ghent University *Ordinality and the Nature of Symbolic Numbers* (June 2015)

Ryerson University *Mathematics Anxiety: Math, Anxiety, and the Brain* (Feb 2013)

Conference Talks *Invited or Competitive Selection*

International Convention of Psychological Science *Using fMRI Data to Examine the Problem-Size Effect in Multiplication* (Mar 2019)

Mathematical Cognition and Learning Society *Kindergarteners Reliably Mis-Classify Ordered Sequences of Non-Adjacent Numbers* (Apr 2018)

Mathematical Cognition and Learning Society *Spatial Anxiety – A novel tool with applications for STEM education* (Apr 2018)

American Psychological Association, Cognitive Science and Public Policy Symposium *Readiness and Teaching of Early Numeracy Skills in Kindergarten* (Aug 2017)

Spatial Intelligence and Learning Center, Space and Mathematics: What's the Connection? *Networks of Number Skills: Number-line judgments in context* (Nov 2015)

Cognitive Science Society, Glushko Dissertation Prize Lecture *Ordinality and the Nature of Symbolic Numbers* (July 2014)

American Educational Research Association *Numerical Predictors of Arithmetic Skills in Early Elementary and Middle School* (Apr 2013; Lyons IM, Price GR, Vaessen A, Blomert L, Ansari D)

Organization for Human Brain Mapping *Analogue Coding of Nonsymbolic Numbers and Digital Coding of Symbolic Numbers in the Human Brain* (June 2013; Lyons IM, Ansari D, Beilock SL)

Cognitive Science Society *Symbolic Estrangement: Evidence against a strong association between number sense and number symbols* (July 2011; Lyons IM, Beilock SL)

Organization for Human Brain Mapping *The Neural Correlates of Mapping Numerical Quantities onto Abstract Symbols* (June 2007; Lyons IM, Ansari D)

Service

Community Talks/Panels

- AP Psychology Teaching Workshop – Fairfax School District (October, 2018)
- Junior Science and Humanities Regional Symposium – Keynote (March, 2018)
- Academic Job Interview Panel • University of Western Ontario (April 2015)
- Postdoctoral Experience Panel • University of Chicago (January, 2015)
- Banting Postdoctoral Fellowship Panel • University of Western Ontario (June 2014)
- Speaker: *Scholars to Leaders Talk Series* • University of Western Ontario (Nov 2014)
- Professional Development Lecture • *Learning and Brain Plasticity* • Sir Frederick Banting High School (Nov 2012)

Journal Reviewer

Acta Psychologica • American Educational Research Association (AERA) Open • Applied Neuropsychology: Child • Brain and Behavioral Functions • Brain and Language • Brain Imaging and Behavior • British Journal of Developmental Psychology • Canadian Journal of Experimental Psychology • Cognition • Cognitive Development • Cognitive, Affective and Behavioral Neuroscience • Cognitive Psychology • Cognitive Science • Cortex • Developmental Psychology • Developmental Science • Educational Psychology • Experimental Psychology • Frontiers in Human Neuroscience • Frontiers in Cognitive Psychology • Human Brain Mapping • Journal of Cognition and Development • Journal of Cognitive Neuroscience • Journal of Experimental Child Psychology • Journal of Experimental Psychology: General • Journal of Experimental Psychology: Human Perception and Performance • Journal of Experimental Psychology: Learning, Memory and Cognition • Journal of Numerical Cognition • Language, Learning and Development • Learning and Individual Differences • Learning and Instruction • Mind, Brain and Education • Nature Communications • NeuroImage • Neuron • Neuropsychologia • PLoS One • Proceedings of the National Academy of Sciences USA • Proceedings of the Royal Society B • Psychological Research • Psychological Science • Psychonomic Bulletin and Review • Quarterly Journal of Experimental Psychology • Thinking and Reasoning

Grant Reviewer

Flanders Research Foundation (Fonds Wetenschappelijk Onderzoek – Vlaanderen, FWO) • Israel Science Foundation • Natural Sciences and Engineering Research Council (NSERC) of Canada – Biological Systems and Functions • National Science Foundation (NSF) – Education and Human Resources Core Research Program (Grants Panel and Ad Hoc Reviewer)

Teaching

Courses

Mind, Brain and Education (Graduate) *Lecturer* (Georgetown University)
Research Methods and Statistics *Lecturer* (Georgetown University)
Cognitive Psychology *Lecturer* (Georgetown University, University of Chicago)
The Mind *Lecturer* (University of Chicago)

Student Degree Advising

Current

Rich Daker *PhD Student* (Georgetown University)
Jane Hutchison *PhD Student* (Georgetown University)

Previous

Taylor Annett *Honor's Thesis* (University of Western Ontario)
Hye-Sang Chang *Master's Thesis* (University of Chicago)
Nivetha Govinaraju *Scholar's Elective Thesis* (University of Western Ontario)
Jenna Horwitz *Honor's Thesis* (University of Western Ontario)
Sonia Lahr-Pastor *Honor's Thesis* (University of Chicago)
Robert Nanni *Scholar's Elective Thesis* (University of Western Ontario)
Danielle Rendina *Master's Thesis* (University of Chicago)