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Assistant Professor
Department of Educational Psychology
University of Wisconsin-Madison
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EDUCATION

2010 Ph.D., Psychology, Vanderbilt University, Nashville, TN
2008 M.A., Psychology, Vanderbilt University, Nashville, TN
2001 M.A., Political Science, University of Chicago, Chicago, IL
1997 B.A., Physics, Harvard University, Cambridge, MA

ACADEMIC POSITIONS

Fall 2012 – Assistant Professor
Department of Educational Psychology
University of Wisconsin-Madison

Summer 2010 – Fall 2012 Postdoctoral Researcher
Moreau Postdoctoral Fellowship
Department of Psychology
University of Notre Dame

HONORS AND AWARDS

Moreau Academic Diversity Postdoctoral Fellowship, one of ten competitive two-year postdoctoral appointments awarded by the Provost of The University of Notre Dame, 2010-2012

Hardy Culver Wilcoxon Award, presented by the Peabody College Department of Psychology and Human Development to the graduate student with the most distinguished doctoral dissertation in any area of Psychological Inquiry, 2010.

Julius Seeman Award, presented by the Peabody College Department of Psychology and Human Development to the graduate who exemplifies the department's ideals of scholastic, personal and professional achievement, 2009.

Student Travel Award, Society for Research in Child Development, April 2009.

Vanderbilt University Provost Fellowship, September 2005.

ARTICLES IN REFEREED JOURNALS

Matthews, P. G., & Chesney, D. L. (2015). Fractions as percepts? Exploring cross-format distance effects for fractional magnitudes. *Cognitive psychology*, 78, 28-56.

Byrd, C. E., McNeil, N. M., Chesney, D. L., & Matthews, P. G. (2015). A specific misconception of the equal sign acts as a barrier to children's learning of early algebra. *Learning and Individual Differences*, 38, 61-67.

Chesney, D. L., McNeil, N. M., Matthews, P. G., Byrd, C. E., Petersen, L. A., Wheeler, M. C., ... & Dunwiddie, A. E. (2014). Organization matters: Mental organization of addition knowledge relates to understanding math equivalence in symbolic form. *Cognitive Development*, 30, 30-46.

- Chesney, D. L., & Matthews, P. G. (2013). Knowledge on the line: Manipulating beliefs about the magnitudes of symbolic numbers affects the linearity of line estimation tasks. *Psychonomic Bulletin & Review*, 1-8.
- McNeil, N. M., Chesney, D. L., Matthews, P. G., Fyfe, E. R., Petersen, L. A., Dunwiddie, A. E., & Wheeler, M. C. (2012). It pays to be organized: Organizing arithmetic practice around equivalent values facilitates understanding of math equivalence. *Journal of Educational Psychology*, 104(4), 1109.
- Matthews, P.G., Rittle-Johnson, B., McEldoon, K., & Taylor, R. (2012). Measure for measure: What combining diverse measures reveals about children's understanding of the equal sign as an indicator of mathematical equality. *Journal for Research in Mathematics Education*, 43(3), 316-350.
- Rittle-Johnson, B., Matthews, P. G., Taylor, R. S., & McEldoon, K. L. (2011). Assessing knowledge of mathematical equivalence: A construct-modeling approach. *Journal of Educational Psychology*, 103(1), 85.
- Matthews, P.G., & Rittle-Johnson, B. (2009). In pursuit of knowledge: Comparing self-explanations, concepts, and procedures as pedagogical tools. *Journal of experimental child psychology*, 104(1), 1-21.

BOOK CHAPTERS & CONFERENCE PROCEEDINGS

- Lewis, M.R., Matthews, P., & Hubbard, E. M. (in press). The non-symbolic foundations of fraction understanding. To appear in D. B. Berch, D. C. Geary, & K. Mann Koepke (Eds.), *Development of mathematical cognition: Neural substrates and genetic influences*. San Diego, CA: Academic Press.
- Matthews, P.G., Chesney, D.L., & McNeil, N.M. (2014). Are Fractions Natural Numbers Too? In M. Bello P., Guarini M., McShane M. & Scassellati B. (Eds.) *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 982-987). Austin TX: Cognitive Science Society.
- Lewis, M.R., Matthews, P.G., & Hubbard, E. M. (2014). The neurocognitive roots of fraction knowledge. In P. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 2549-2554) Austin, TX: Cognitive Science Society.
- Matthews, P. G. & Chesney, D. L. (2011). Straightening Up: Number Line Estimates Shift from Log to Linear with Additional Information. In L. Carlson, C. Hölscher, & T. Shipley (Eds.), *Proceedings of the 33rd Annual Conference of the Cognitive Science Society* (pp. 1936-1941). Boston, MA: Cognitive Science Society.
- Matthews, P. G. & Rittle-Johnson, B. (2007). To teach by concept or by procedure? Making the Most of Self-Explanations. In D. S. McNamara & J. G. Trafton (Eds.), *Proceedings of the 29th Annual Meeting of the Cognitive Sciences Society* (pp. 1283-1288). Nashville, TN: Cognitive Science Society.

MANUSCRIPTS UNDER REVIEW OR IN PREPARATION

- Hubbard, E. M., Matthews, P.G., & Samek, A. S. (revisions invited). Using Online Compound Interest Tools to Improve Financial Literacy. *Journal of Economic Education*.
- Lewis, M. R., & Matthews, P. G. (under review). Fractions we can't ignore: The ratio congruity effect. *Cognitive Science*.
- Matthews, P. G., Lewis M. R., & Hubbard, E. M. (revisions invited). Individual Differences in Nonsymbolic Ratio Processing Predict Symbolic Math Performance. *Psychological Science*.

RESEARCH PRESENTATIONS

- Matthews, P. G. (April 2015). An Alternative Route to Fractions Knowledge. In P.G. Matthews & C. Williams (Chairs), *Fractions Learning: One Subject, Multiple Perspectives*. Symposium to be conducted at the meeting of the American Educational Research Association, Chicago.
- Hubbard, E. M., Matthews, P.G., & Samek, A. S. (January, 2015). Using Interactive Compound Interest Visualizations to Improve Financial Literacy. Paper to be presented at the annual Meeting of the American Economic Association, Boston, MA.
- Matthews, P. G. (July, 2014) *The perceptual roots of fraction knowledge: Foundations for understanding magnitude*. Paper presented at the 2nd annual Midwest Meeting on Mathematical Thinking, Madison, WI.
- Lewis, M. R., Matthews, P. G., & Hubbard, E. M. (July, 2014). *The perceptual roots of fraction knowledge: A neurocognitive approach*. Paper presented at the 2nd annual Midwest Meeting on Mathematical Thinking, Madison, WI.
- Ziols, R., Matthews, P.G., Lewis, M.R., Toomarian, E.Y. & Hubbard, E.M. (July, 2014). *Refining fraction constructs: An exploratory study of preference and generalization*. 2nd Annual Midwest Meeting on Mathematical Thinking. Madison, WI.
- Lewis, M.R., Matthews, P.G. & Hubbard, E.M. (May, 2014). *The "Rational Brain System" and fraction learning*. NICHD Mathematical Cognition Conference, Washington, DC.
- Matthews, P. G. (July, 2013). *Perhaps fractions are natural numbers too: A rational approach to number sense*. Paper presented at 1st annual Midwest Meeting on Mathematical Thinking, Minneapolis, MN.
- Lewis, M.R., Matthews, P. G., & Hubbard, E. M. (July, 2013). *Mappings between nonsymbolic ratios and arabic fractions*. Poster presented at the 1st annual Midwest Meeting on Mathematical Thinking, Minneapolis, MN.
- Matthews, P. G. (June, 2013). *Evaluating the interpretation of number line estimation tasks*. Paper presented at a symposium co-organized by P.G. Matthews and E. Amsel on Developmental and Instructional issues in mathematical reasoning, at the 2013 Annual Meeting of the Jean Piaget Society, Chicago, IL.
- Bryd, C. E., McNeil, N. M., Chesney, D. L., Matthews, P. G. (April, 2013). *Children's "arithmetic-specific" interpretation of the equal sign constitutes risk for poor learning of early algebra*. Poster presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Seattle, WA.
- Chesney, D. L., McNeil, N. M., Matthews, P. G., Bryd, C. E., Petersen, L. A., Wheeler, M. C., Fyfe, E. R., & Dunwiddie, A. E. (April, 2013). *Organization matters: Children's mental organization of arithmetic knowledge correlates with understanding of math equivalence*. In B. Rittle-Johnson (Chair), Representation, Concepts, and Problem-Solving: Mathematics. Paper symposium presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Seattle, WA.
- Chesney, D. L., Matthews, P. G., & McNeil, N. M. (May, 2013). *Fraction format affects adults' performance on magnitude comparison problems*. Poster presented at the annual convention for the Association for Psychological Sciences, Washington, D.C.
- Chesney, D. L. & Matthews, P. G. (May, 2012). *Proportions on the Line: Line Estimation Tasks Are Proportion Judgment Tasks*. Poster presented at the annual convention for the Association for Psychological Sciences, Chicago, Illinois.
- Matthews, P. G., Rittle-Johnson, B., Taylor, R. T., & McEldoon, K. L. (April, 2011). *Understanding the equals sign as a gateway to algebraic thinking*. Poster presented at the 2011 Biennial Meeting of the Society for Research in Child Development, Montreal.

- Matthews, P. G. (August, 2010). *Are Hindu-Arabic Numerals Concrete or Abstract Symbols?* Poster presented at the 32nd Annual Conference of the Cognitive Science Society. Portland, OR.
- Rittle-Johnson, B., Matthews, P. G., Taylor, R. T., & McEldoon, K. L. (March, 2010). *Understanding the Equals Sign as a Gateway to Algebraic Thinking.* Paper presented at a symposium conducted at the 2010 Conference of the Society for Research in Educational Effectiveness. Washington, DC.
- Matthews, P. G. & Rittle-Johnson, B. (April, 2009). *Dual Dimensions for Concreteness?* Paper presented at a symposium chaired by P.G. Matthews on Unpacking concreteness – understanding how symbol choice affects learning and transfer, at the 2009 Biennial Meeting of the Society for Research in Child Development, Denver, CO.
- Rittle-Johnson, B., Matthews, P. G. & Saylor, M. M. (April, 2009). *Promoting explanations to support mathematics learning.* Paper presented at a symposium held at the 2009 Biennial Meeting of the Society for Research in Child Development, Denver, CO.
- Taylor, R. S., Rittle-Johnson, B., Matthews, P. G. & McEldoon, K. L. (March, 2009). *Mapping children's understanding of mathematical equivalence.* Paper presented at a symposium conducted at the 2009 Conference of the Society for Research in Educational Effectiveness. Crystal City, VA.
- Matthews, P. G. & Rittle-Johnson, B. (June, 2008). *In search of transfer: Concrete may lay a weak foundation.* Poster presented at the 2008 Institute of Education Sciences Research Conference. Washington, D.C.
- Go, S. C., Matthews, P. G., Rittle-Johnson, B., & Carr, T. H. (November, 2007). *When adults think like kids about equality: schema activation and time pressure in mathematical problem solving.* Paper presented at the 2007 Annual Meeting of the Psychonomic Society. Long Beach, CA.
- Matthews, P. G., & Rittle-Johnson, B. (June, 2007). *Concepts or procedures? Making the most of self-explanations.* Poster presented at the 2007 Institute of Education Sciences Research Conference. Washington, D.C.
- Matthews, P. G., & Rittle-Johnson, B. (April, 2007). *Concepts or procedures? Optimizing the use of self-explanations to Correct Misconceptions.* Paper presented at a symposium conducted at the 2007 Biennial Meeting of the Society for Research in Child Development, Boston, MA.
- Cordray, D. S., Hurley, S. M., & Matthews, P. G. (April, 2006). *The ExpERT Program.* Poster presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

CONFERENCE ORGANIZING RESPONSIBILITIES

- Co-host with Sashank Varma and Edward Hubbard (July, 2014). 2nd Annual Midwest Meeting on Mathematical Thinking, Madison, WI.
- Co-host with Sashank Varma (July, 2013). 1st Annual Midwest Meeting on Mathematical Thinking, Minneapolis, MN.

RESEARCH SUPPORT

Current

- NSF REAL Grant #1420211: Using Nonsymbolic Ratios to Promote Fraction Knowledge: A Neurocognitive Approach, co-PI (\$499,997, 2014 - 2017).
- NIH R03 Grant HD081087: Delimiting and Leveraging Children's Natural Sense of Proportion, PI (\$150,500, 2014 - 2016).

NSF DGE Grant # 1545481: LUCID: A project-focused cross-disciplinary graduate training program for data-enabled research in human and machine learning and teaching, co-PI (\$2,999,767, 2015 – 2020).

TEACHING

Ed Psych 331, Development – Childhood through Adolescence, University of Wisconsin-Madison
Ed Psych 506, Exploring the Number Sense, University of Wisconsin-Madison
Ed Psych 711, The Development of Mathematical Thinking, University of Wisconsin-Madison
Psy 301, Experimental Psychology I: Statistics, University of Notre Dame
Social Sciences 151, Classics of Social and Political Thought, University of Chicago
Social Sciences 152, Classics of Social and Political Thought, University of Chicago

MENTORING

UW Undergraduate Research Scholar advisees
 Brian Brito (2012), Catherine Finedore (2012)
Mentor for 13 University of Wisconsin Undergraduate Research Assistants
Doctoral Advisor for Ronald Hopkins (Fall 2014 – Present)
Mentor for Chancellor’s Scholar Denzel Bibbs (Fall 2014 – Present)
Masters and Prelim Committee Member for Hsun-yu Chan (2012) and Jichan Kim (2014)
Dissertation Committee Member for Noelle Crooks (Psychology, 2014) and Pooja Sidney
 (Psychology)

PROFESSIONAL SERVICE

Editorial Board Member for Journal of Research in Mathematics Education (Spring 2014 – Present)
Ad hoc reviewer for Acta Psychologica; American Educational Research Association; Canadian Journal of Experimental Psychology; Cognitive Science Society; Cognitive Development; Instructional Science; Journal of Cognition and Instruction; Journal of Educational Psychology; Journal of Experimental Child Psychology; Journal of Experimental Psychology: Applied, Journal of Experimental Psychology, Learning memory and Cognition; Journal of Learning and Individual Differences; Journal of Learning and Instruction; Journal of Research on Educational Effectiveness; Journal for Research in Mathematics Education; Journal of Urban Mathematics Education; NIH ad-hoc panel reviewer; NSF ad-hoc panel reviewer; Science

DEPARTMENTAL AND UNIVERSITY SERVICE

Departmental Recruitment, Admissions, Fellowships, and Awards Committee (Fall 2014 - Present)
Departmental Delegate to the University Senate (Fall 2014 - Present)
Coordinating Committee Member for Wisconsin Ideas in Education Series (Spring 2014 - Present)
Departmental Faculty and Staff Honors Committee (Fall 2013 – Spring 2014)
Departmental Student Affairs Committee (Fall 2012 – Spring 2013)

SPECIAL INVITATIONS

White House Office of Science and Technology Policy (OSTP) Workshop: Bridging Neuroscience and Learning (January, 2015)
NICHD Third Annual Math Cognition Conference: Typical and Atypical Learning of Complex Arithmetic Skills and Higher-Order Math Concepts (May 2015)