

Kelley Durkin, PhD

Vanderbilt University
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AREAS OF SPECIALIZATION

My research focuses on evaluating educational programs and how ideas from cognitive science and psychology can be applied in educational settings to improve children's learning. I use quantitative and qualitative analyses to investigate how children's knowledge changes over time.

EDUCATION

2012 *Ph.D., Developmental Psychology, Vanderbilt University*
2009 *M.S., Developmental Psychology, Vanderbilt University*
2007 *B.A., Psychological and Brain Sciences, Education minor, Dartmouth College*

EMPLOYMENT

July 2018 – Present Research Assistant Professor
Department of Teaching and Learning
Department of Psychology and Human Development
Vanderbilt University

November 2015 – June 2018 Research Associate
Peabody Research Institute
Vanderbilt University

August 2013 – October 2015 Postdoctoral Associate
Cognition and Data Science Lab
University of Louisville and Rutgers University-Newark

September 2012 – July 2013 Postdoctoral Fellow
Mathematics Education
Harvard University

FELLOWSHIPS

August 2007 – May 2012 ExpERT Predoctoral Training Fellowship
Institute of Education Sciences

GRANT SUPPORT

- 2018-2021 *A Longitudinal Study Predicting Postsecondary STEM Readiness Among Low-Income Minority Students*
National Science Foundation 1760225
Role: PI
Amount Awarded to Vanderbilt: \$1,499,997
- 2018-2020 *Development and Research in Early Childhood Mathematics (DREME)*
Heising-Simons Foundation
Role: PI
Amount Awarded to Vanderbilt: \$706,829
- 2016-2020 *Collaborative Research: Leveraging Comparison and Explanation of Multiple Strategies (CEMS) to Improve Algebra Learning*
National Science Foundation 1561286
Role: Investigator
Amount Awarded to Vanderbilt: \$570,083
- 2019-2024 *EMT en Espanol: Comprehensive Early Intervention to Support School Readiness Skills for Spanish-Speaking Toddlers with Language Delays*
Institute of Education Sciences R324A190177
Role: Statistical Analyst
Amount Awarded to Vanderbilt: \$3,285,441

ARTICLES IN REFEREED JOURNALS AND BOOK CHAPTERS

- Rittle-Johnson, B., Star, J. R., **Durkin, K.**, & Loehr, A. (2019). Compare and discuss to promote deep learning. In Manalo, E. (Ed.). *Deeper Learning, Communicative Competence, and Critical Thinking: Innovative, Research-Based Strategies for Development in 21st Century Classrooms*. New York, NY: Routledge.
- Lipsey, M. W., Farran, D. C., & **Durkin, K.** (2018). Effects of the Tennessee Prekindergarten Program on children's achievement and behavior through third grade. *Early Childhood Research Quarterly, 45*, 155-176.
- Murray, E., **Durkin, K.**, Chao, T., Star, J. R., & Vig, R. (2018). Exploring connections between content knowledge, pedagogical content knowledge, and the opportunities to learn mathematics: Findings from the TEDS-M data. *Mathematics Teacher Education and Development, 20*, 40-22.
- Durkin, K.**, Star, J. R., & Rittle-Johnson, B. (2017). Using comparison of multiple strategies in the mathematics classroom: Lessons learned and next steps. *ZDM Mathematics Education, 49*, 585-597.

Rittle-Johnson, B., Loehr, A. L., & **Durkin, K.** (2017). Promoting self-explanation to improve mathematics learning: A meta-analysis and instructional design principles. *ZDM Mathematics Education*, 49, 599-611.

Durkin, K., & Shafto, P. (2016). Epistemic trust and education: Effects of informant reliability on student learning of decimal concepts. *Child Development*, 87, 154-164.

Rittle-Johnson, B., Star, J. R., & **Durkin, K.** (2016). The power of comparison in mathematics instruction: Experimental evidence from classrooms. In D. C. Geary, D. B. Berch, R. J. Ochsendorf, & K. Mann Koepke (Eds.), *Acquisition of Complex Arithmetic Skills and Higher-Order Mathematics Concepts* (Vol. 3, *Mathematical Cognition and Learning*, pp. 273-295). San Diego, CA: Elsevier Academic Press.

Star, J. R., Rittle-Johnson, B., & **Durkin, K.** (2016). Comparison and explanation of multiple strategies: One example of a small step forward for improving mathematics education. *Policy Insights from the Behavioral and Brain Sciences*, 3, 151-159.

Durkin, K., & Rittle-Johnson, B. (2015). Measuring misconceptions: Revealing changing decimal fraction knowledge. *Learning and Instruction*, 37, 21-29.

Star, J. R., Pollack, C., **Durkin, K.**, Rittle-Johnson, B., Newton, K., Lynch, K., & Gogolen, C. (2015). Learning from comparison in algebra. *Contemporary Educational Psychology*, 40, 41-54.

Star, J.R., Newton, K., Pollack, C., Kokka, K., Rittle-Johnson, B., & **Durkin, K.** (2015). Student, teacher, and instructional characteristics related to students' gains in flexibility. *Contemporary Educational Psychology*, 41, 198-208.

Adams, D., McLaren, B. M., **Durkin, K.**, Mayer, R. E., Rittle-Johnson, B., Isotani, S., & Van Velsen, M. (2014). Using erroneous examples to improve mathematics learning with a web-based tutoring system. *Computers in Human Behavior*, 36, 401-411.

Star, J. R., Chen, J. A., Taylor, M. W., **Durkin, K.**, Dede, C., & Chao, T. (2014). Studying technology-based strategies for enhancing motivation in mathematics. *International Journal of STEM Education*. doi:10.1186/2196-7822-1-7.

McEldoon, K. L., **Durkin, K.**, & Rittle-Johnson, B. (2013). Is self-explanation worth the time? A comparison to additional practice. *British Journal of Educational Psychology*, 83, 615-632.

Durkin, K., & Rittle-Johnson, B. (2012). The effectiveness of using incorrect examples to support learning about decimal magnitude. *Learning and Instruction*, 22, 206-214.

Rittle-Johnson, B., Star, J. R., & **Durkin, K.** (2012). Developing procedural flexibility: Are novices prepared to learn from comparing procedures? *British Journal of Educational Psychology*, 82, 436-455.

Rittle-Johnson, B., Star, J. R., & **Durkin, K.** (2009). The importance of prior knowledge when comparing examples: Influences on conceptual and procedural knowledge of equation solving. *Journal of Educational Psychology, 101*, 836-852.

MANUSCRIPTS UNDER REVIEW

Farran, D. C., & **Durkin, K.** (under revised review). Prekindergarten classrooms in public school buildings: Consequences and concerns.

Rittle-Johnson, B., Farran, D. C., & **Durkin, K.** (under revised review). Marginalized students' perspectives on instructional strategies in middle school mathematics classrooms.

MANUSCRIPTS IN PREPARATION

Durkin, K., Rittle-Johnson, B., & Star, J. R. (in preparation). Effects of comparing and discussing multiple strategies on students' learning of linear equation solving.

Durkin, K., Lipsey, M. W., Farran, D. C., & Wiesen, S. E. (in preparation). Effects of the Tennessee Prekindergarten Program on children's achievement and behavior at sixth grade.

CONFERENCE PRESENTATIONS

Rittle-Johnson, B., Hickendorff, M., Star, J. R., **Durkin, K.**, & Loehr, A. M. (2020, April). Comparing and explaining examples of multiple strategies to promote algebra learning: Instructional features that predict learning. Paper to be presented at the annual meeting of the American Educational Research Association (AERA), San Francisco, CA.

Rittle-Johnson, B., Lachowicz, M., **Durkin, K.**, & Farran, D. C. (2020, April). Early math trajectories predicting math knowledge for ages 11-15: A longitudinal investigation with urban youth. Poster to be presented at the annual meeting of the American Educational Research Association (AERA), San Francisco, CA.

Durkin, K., Lipsey, M. W., & Farran, D. C. (2020, March). Updates on the effects of the Tennessee Prekindergarten Program on children's achievement and behavior through sixth grade. Paper to be presented at the annual meeting of the Society for Research on Education Effectiveness (SREE), Arlington, VA.

Shero, M., **Durkin, K.**, Rittle-Johnson, B., & Star, J. R. (2020, January). Teacher beliefs surrounding comparison in algebra instruction. Poster presented at the annual meeting of TN STEM Education Research, Cookeville, TN.

Loehr, A. M., **Durkin, K.**, Rittle-Johnson, B., & Star, J. R. (2019, April). Impact of comparison and explanation of multiple strategies on learning and flexibility in algebra classrooms. Paper presented at the annual meeting of the American Educational Research Association (AERA), Toronto, Canada.

Rittle-Johnson, B., Star, J., **Durkin, K.**, & Loehr, A. (2018, May). Comparing solution strategies to promote algebra learning and flexibility. Invited speaker at the 8th East Asia Regional Conference on Mathematics Education, Taipei, Taiwan.

Durkin, K., Loehr, A. M., Rittle-Johnson, B., & Star, J. (2018, April). Effects of encouraging comparison and explanation of multiple strategies on instructional practices in algebra classrooms. Roundtable presentation at the annual meeting of the American Educational Research Association (AERA), New York, NY.

Loehr, A. M., Rittle-Johnson, B., Star, J. R., Kang, J. M., & **Durkin, K.** (2017, October). Assessing conceptual understanding of algebra. Poster presented at the Cognitive Development Society (CDS), Portland, OR.

Durkin, K., & Farran, D. C. (2017, April). Child gain and classroom practices: First year results from 139 pre-K classrooms funded by the Preschool Development Grants. Poster presented at the biennial meeting of the Society for Research in Child Development, Austin, TX.

Farran, D. C., **Durkin, K.**, & Ziegler, J. (2017, April). Mathematics development from pre-K through 7th grade in urban, high poverty students. Paper presented at the biennial meeting of the Society for Research in Child Development, Austin, TX.

Loehr, A., Rittle-Johnson, B., & **Durkin, K.** (2017, April). Promoting self-explanation to improve mathematics learning: A meta-analysis. Poster presented at the biennial meeting of the Society for Research in Child Development, Austin, TX.

Lipsey, M. W., Farran, D. C., & **Durkin, K.** (2017, March). State test scores and retention data for the TNVPK full randomized sample in 3rd grade. Paper presented at the annual meeting of the Society for Research on Educational Effectiveness, Washington, DC.

Durkin, K., Caglar, L. R., Bonawitz, E., & Shafto, P. (2015, July). Explaining choice behavior: The intentional selection assumption. *Proceedings of the 37th annual conference of the Cognitive Science Society*.

Durkin, K., & Shafto, P. (2015, June). Epistemic trust and education: Informant reliability affects learning of decimal concepts. Paper presented at the annual meeting of the Jean Piaget Society, Toronto, Canada.

Durkin, K., & Shafto, P. (2015, April). Epistemic trust and education: Effects of informant reliability on student learning of decimal concepts. Poster session presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Durkin, K., Landrum, A. R., Savage, P., Eglian, M., & Shafto, P. (2015, March). Avoiding hasty conclusions: Manipulating informant expertise to avoid conceptual entrenchment. Poster session presented at the biennial meeting of the Society for Research in Child Development, Philadelphia, PA.

Durkin, K., & Rittle-Johnson, B. (2013, August). Measuring misconceptions: Revealing the nature of changing decimal fraction knowledge. Paper presented at the biennial meeting of the European Association for Research on Learning and Instruction, Munich, Germany.

Star, J. R., Rittle-Johnson, B., **Durkin, K.,** Newton, K., Pollack, C., Lynch, K., & Gogolen, C. (2013, March). The impact of a comparison curriculum in Algebra I: A randomized experiment. Paper presented at the annual meeting of the Society for Research on Educational Effectiveness, Washington, DC.

Durkin, K., Pollack, C., Star, J. R., & Rittle-Johnson, B. (2012, March). Differences in fidelity of implementation measures: What videos and surveys reveal about algebra instruction. Paper presented at the annual meeting of the Society for Research on Educational Effectiveness, Washington, DC.

Durkin, K., Rittle-Johnson, B., & Star, J. R. (2011, August). Procedural flexibility matters for student achievement: How procedural flexibility relates to other outcomes. Paper presented at the biennial meeting of the European Association for Research on Learning and Instruction, Exeter, England.

Durkin, K., & Rittle-Johnson, B. (2011, August). The effectiveness of comparing incorrect and correct examples. Paper presented at the biennial meeting of the European Association for Research on Learning and Instruction, Exeter, England.

Durkin, K., Rittle-Johnson, B., & Ramsey, R. (2011, April). Comparing incorrect and correct examples in algebra classrooms. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Durkin, K., Rittle-Johnson, B., & Star, J. R. (2011, April). Procedural flexibility matters for student achievement: The relationship between procedural flexibility and standardized tests. Paper presented in a roundtable session at the annual meeting of the American Educational Research Association, New Orleans, LA.

McEldoon, K. L., **Durkin, K.,** & Rittle-Johnson, B. (2011, April). Is the benefit of self-explanation simply added time on task? Paper presented in the symposium we organized "Using Cognitive Science to Inform Mathematics Instruction" at the biennial meeting of the Society for Research in Child Development, Montreal, Canada.

Durkin, K. (2011, March). The self-explanation effect when learning mathematics: A meta-analysis. Paper presented at the annual meeting of the Society for Research on Educational Effectiveness, Washington, DC.

Durkin, K., Rittle-Johnson, B., & Star, J. R. (2010, August). Immediate introduction to multiple procedures supports procedural flexibility in equation solving. Poster session presented at the annual meeting of the Cognitive Science Society, Portland, OR.

Durkin, K., & Rittle-Johnson, B. (2010, June). Comparing incorrect and correct examples: The effects of practice and instructional explanations. Poster session presented at the IES annual research conference, Washington, DC.

Rittle-Johnson, B., Star, J. R., & **Durkin, K. (2010, April).** Developing procedural flexibility: When should multiple solution methods be introduced? Paper presented at the annual meeting of the American Educational Research Association, Denver, CO.

Rittle-Johnson, B., Star, J. R., & **Durkin, K. (2009, August).** Using comparison to support flexibility: The effects of different comparison types and prior knowledge. Symposium conducted at the biennial meeting of the European Association for Research on Learning and Instruction, Amsterdam, The Netherlands.

Durkin, K., & Rittle-Johnson, B. (2009, June). Comparing incorrect and correct examples when learning about decimals and the effects on explanation quality. Poster session presented at the IES annual research conference, Washington, DC.

Rittle-Johnson, B., Star, J. R., & **Durkin, K. (2009, June).** Prior knowledge matters: An aptitude x treatment interaction when learning mathematics from comparison. Poster session presented at the IES annual research conference, Washington, DC.

Durkin, K., & Rittle-Johnson, B. (2009, April). Comparison of correct and incorrect examples when learning decimal fractions. Poster session at the biennial meeting of the Society for Research in Child Development, Denver, CO.

Rittle-Johnson, B., Star, J.R., & **Durkin, K. (2009, October).** Pathways to flexibility: Leveraging comparison and prior knowledge. Paper presented at the biennial meeting of the Cognitive Development Society, San Antonio, TX.

Durkin, K., & Rittle-Johnson, B. (2008, June). Comparison of incorrect examples in math learning. Poster session presented at the IES annual research conference, Washington, DC.

TEACHING

PSY-PC 2110	Introduction to Statistical Analysis Undergraduate Course Overall Instructor Rating Mean 4.79 (out of 5)	Vanderbilt University Fall 2018
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PSY 611	Advanced Statistics II Doctoral Course Overall Instructor Rating Mean 4.71 (out of 5)	University of Louisville Spring 2015
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EDUC 3110	Psychological Foundations of Education Graduate Course Co-Instructor Leigh Wadsworth Overall Instructor Rating Mean 4.37 (out of 5)	Vanderbilt University Summer 2012
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RESEARCH ADVISING

Spring 2020	Supervising 2 undergraduate students and 2 master's students doing research assistantships
Fall 2019	Supervised 4 undergraduate students and 2 master's students doing research assistantships
Fall 2018-Summer 2019	Supervised 7 undergraduate students, 2 master's students, and 1 doctoral student doing research assistantships
Fall 2017-Summer 2018	Supervised 6 undergraduate students, 1 master's student, and 1 doctoral student doing research assistantships
Fall 2016-Spring 2017	Supervised 2 undergraduate students, 1 master's student, and 1 doctoral student doing research assistantships
Fall 2013-Spring 2014	Advised Divine-Favour Anene's Undergraduate Honors Thesis University of Louisville

OTHER PROFESSIONAL SERVICES

Consultant (PI: Bruce McLaren, Carnegie Mellon University), "AdaptErrEx: Exploring the Learning Benefits of Erroneous Examples and Their Dynamic Adaptations within the Context of Middle School Mathematics" grant from Institute of Education Sciences, 9/09-8/12.

Ad-hoc reviewer for *Child Development*, *Journal of Educational Psychology*, *Journal for Research in Mathematics Education*, *Learning and Instruction*, *Cognition and Instruction*, *Cognition*, *British Journal of Educational Psychology*, *Instructional Science*, *Educational Psychology*, and *Applied Cognitive Psychology*.

UNIVERSITY SERVICE

Vanderbilt Undergraduate Thesis Committee member for Jeci Wise, April 2012

Psychology Department Representative, Vanderbilt Graduate Student Council, 2009-2011

Developmental Psychology Representative, Peabody Graduate Student Council, 2008-2009