

DANA MILLER - COTTO, Ph.D.

Curriculum Vitae

University of Delaware
College of Education and Human Development
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Newark, DE 19716
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EDUCATION & TRAINING

- May 2017 **Ph.D., Educational Psychology**, Temple University
Advisor: Dr. James P. Byrnes
Dissertation: The role of prior knowledge, executive function, and perceived cognitive load on the effectiveness of faded worked examples in geometry
Committee: Drs. Julie L. Booth, Kristie J. Newton, and Doug Lombardi
- Dec. 2014 **M.Ed., Educational Psychology**, Temple University
Advisor: Dr. James P. Byrnes
- June 2011 **B.A., Psychology**, City University of New York (CUNY) Lehman College
Advisor: Dr. Vincent Prohaska
Honors Research Project: Memory Illusions: Fonts and Serial Positions Assignments

Training in Advanced Quantitative Methods

Institute on Statistical Analysis: Development of Mathematics Competencies in Early Childhood, AERA-NSF (invited)
The Meta-Analysis Training Institute (MATI), IES Instructors: Drs. Terri Pigott, Natasha Beretvas, Elizabeth Tipton, Josh Polanin, and Ryan Williams (invited)
Introduction to Systematic Review and Meta-Analysis, Instructors: Drs. Tianjing Li and Kay Dickersin
Item Response Theory Modeling, Instructor: Dr. Tenko Raykov
Hierarchical Linear Modeling, Instructors: Drs. Stephen Raudenbush and Anthony Bryk
Structural Equation Modeling, Instructor: Dr. Mark Schmitz

Statistical Software Knowledge: SPSS, Stata, R Programming Language

RESEARCH INTERESTS

Math development, executive functions, cognitive science principles of learning, ethnic/racial differences in achievement, cognitive and affective mechanisms underlying mathematics learning, meta-analyses.

ACADEMIC APPOINTMENTS

- 2020 - **Postdoctoral Researcher**
College of Education and Human Development
University of Delaware
Advisor: Dr. Nancy Jordan
- 2017- 2019 **Postdoctoral Research Associate**
Learning Research & Development Center (LRDC)
University of Pittsburgh
Center for Teaching & Learning
Advisor: Dr. Christian Schunn

RESEARCH SUPPORT

My Math Stories: Taking My Place in Our Mathematical World, D. Purpura (PI) and others; **D. Miller-Cotto**

- (Co-Investigator)**, funded by the EF+Math Program via NewSchools Venture Fund, \$4,000,000, total, funded August 1st, 2020 to July 31st, 2024 (funding renewed yearly contingent on progress).
- Aligning Teaching Methods and Students' Learning Needs: Active Learning vs. Traditional Classrooms, A. J. Schikorra (PI), R. Alvarado (Co-PI), **D. Miller-Cotto (Co – PI)**, funded via the University of Pittsburgh's Provost's Personalized Education Grant Program, \$26, 306 total, funded February 1, 2018 to June 30, 2019.
- Memory Illusions: Fonts and Serial Position Assignments, **D. Miller-Cotto (PI)**, V. Prohaska (Co-PI), funded via Psi Chi/Association for Psychological Science, \$5,000 total, funded for Summer 2010.

HONORS, AWARDS, & FELLOWSHIPS

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|-------------|---|
| 2019 - 2020 | Mindset Scholars Network: Inclusive Mathematics Environments Early Career Fellowship [\$10,000] |
| 2019 | Wisconsin Center for Education Research (WCER) Carl A. Grant Lecture Scholar |
| 2017 | Cognitive Development Society (CDS) Diversity Travel Award |
| 2014 - 15 | Future Faculty Fellowship, Temple University [Tuition & Stipend] |
| 2011 - 14 | College of Education Research Assistantship, Temple University [Tuition & Stipend] |
| 2011 | Co-Recipient of the Psi Chi Kay Wilson Officer Team Leadership Award |
| 2011 | The CUNY Lehman College Foundation Scholarship [\$500] |
| 2010 - 11 | Louis Stokes Alliance for Minority Participation (LS-AMP) in STEM via the National Science Foundation Recipient [\$5,000] |

REFEREED JOURNAL ARTICLES

- Miller-Cotto, D.**, & Schunn, C.D. (2020). Mind the Gap: How a Large-Scale Course Re-Design in Economics Reduced Performance Gaps. *Journal of Experimental Education*. doi: 10.1080/00220973.2020.1805717
- Wang, M.T., Smith, L.V., **Miller-Cotto, D.**, & Huguley, J.P. (2020). Parental ethnic-racial socialization practices and children of color's academic outcomes: A meta-analytic review. *Child Development*. doi: 10.1111/cdev.13254
- Miller-Cotto, D.**, & Auxter, A. E. (2019). Testing the ecological validity of faded worked examples in algebra. *Educational Psychology*. doi: 10.1080/01443410.2019.1646411
- Miller-Cotto, D.**, & Byrnes, J. P. (2019). What's the best way to characterize the relationship between working memory and achievement?: An initial examination of competing theories. *Journal of Educational Psychology*, 112(5), 1074–1084. doi: 10.1037/edu0000395
- Byrnes, J.P., Wang, A. H., & **Miller-Cotto, D.** (2019). Children as mediators of their own cognitive development in kindergarten. *Cognitive Development*, 50, 80-97. doi: 10.1016/j.cogdev.2019.03.003
- Barbieri, C. A., **Miller-Cotto, D.**, & Booth, J. L. (2019). Lessening the load of misconceptions: Design-based principles for algebra learning. *Journal of the Learning Sciences*, 28, 1-37. doi: 10.1080/10508406.2019.1573428
- Byrnes, J. P., **Miller-Cotto, D.**, & Wang, A. H. (2018). Children as mediators of their own development: The case of learning science in kindergarten and first grade. *Journal of Cognition and Development*, 19, 248 – 277.
- Miller-Cotto, D.**, & Byrnes, J. P. (2016). Ethnic/racial identity and academic achievement: A

meta-analytic review. *Developmental Review*, 41, 51-70. doi: 10.1016/j.dr.2016.06.003

Byrnes, J. P., & **Miller-Cotto, D.** (2016). The growth of mathematics and reading skills in segregated and diverse schools: An opportunity-propensity analysis of a national database. *Contemporary Educational Psychology*, 46, 34-51. doi: 10.1016/j.cedpsych.2016.04.002

BOOK CHAPTERS

Booth, J. L., McGinn, K. M., Barbieri, C., Begolli, K. N., Chang, B., **Miller-Cotto, D.**, Young, L. K., & Davenport, J. L. (2017). Evidence for cognitive science principles that impact learning in mathematics. In D. C. Geary, D. B. Berch, R. J. Ochsendorf & K. M. Koepke (Eds.), *Acquisition of complex arithmetic skills and higher-order mathematics concepts Vol 3* (pp. 297–325). Oxford, UK: Elsevier.

MANUSCRIPTS UNDER REVIEW/IN REVISION

Barbieri, C.A., & **Miller-Cotto, D.** (revise, resubmit). The importance of adolescents' sense of belonging to mathematics for algebra learning. Invited to revise, resubmit to *Learning and Individual Differences* on September 28th, 2020.

Miller-Cotto, D., & Lewis, N.A. (revision resubmitted). Am I a “Math Person”? How classroom cultures shape math identity among Black and Latinx students. Revision submitted to *Educational Psychologist* on December 2nd, 2020.

Miller-Cotto, D., Smith, L.V., & Wang, A.H. (revise, resubmit). Understanding working memory and mathematics development for ethnically/racially minoritized children through family academic socialization practices. Invited to revise, resubmit to *Developmental Psychology* on November 16th, 2020.

Miller-Cotto, D. (under review). Examining working memory, cognitive load, and prior knowledge to explain mechanisms underlying the guidance fading effect in middle school math. Submitted for peer review on December 5th, 2020.

Zhang, H., **Miller-Cotto, D.**, & Jordan, N.C. (under review). Exploring co-development of executive functions and math achievement using cross-lagged panel model with fixed effects. Submitted for peer review on November 21st, 2020.

MANUSCRIPTS IN PREPARATION [only manuscripts with initial drafts and beyond are included here]

Miller-Cotto, D., Booth, J. L., Chang, B. L., Cromley, J. G., Newcombe, N. S., & Williams, T.A. (in prep). Sketching and verbal self-explanation: Do they help middle school children solve math and science problems?

Miller-Cotto, D., Hallinen, N. R., & Booth, J. L. (in prep). Sketching as a tool to offload information from visuo-spatial working memory in middle school math.

PRESENTATIONS

Miller-Cotto, D., Hall, G., Putzeys, S. (under review). Early experiences and school readiness: A within and between exploration of the Opportunity Propensity Model. *Submitted for presentation to the 2021 Society for Research in Child Development Biennial Meeting.*

Zhang, H., **Miller-Cotto, D.**, Jordan, N.C. (under review). Exploring Co-development of Executive Functions and Math Achievement Using Cross-lagged Panel Model with Fixed Effects. *Submitted for presentation to the 2021 Society for Research in Child Development Biennial Meeting.*

Miller-Cotto, D., Smith, L.V., Wang, A.H. (under review). Understanding Executive Function and

Mathematics Development for Racially Minoritized Children through Family Academic Socialization Practices. *Submitted for presentation to the 2021 Society for Research in Child Development Biennial Meeting.*

- Miller-Cotto, D.**, & Lewis Jr., N. (accepted). Mathematics identity for Black and Latinx Students: A literature synthesis. Accepted for presentation to the 2021 American Educational Research Association 2021, Virtual meeting.
- Barbieri, C.A., **Miller-Cotto, D.** (accepted). The relationship between adolescents' sense of belonging to mathematics and learning. Accepted for presentation to the 2021 American Educational Research Association 2021 meeting, Virtual meeting.
- Miller-Cotto, D.** & Wang, A. H. (2020, Apr 17 - 21) *Testing the Integrative Theory in Predicting School Readiness and Executive Function Skills for Minority and Other Kindergarten Children Using Structural Equation Modeling* [Poster Session]. AERA Annual Meeting San Francisco, CA <http://tinyurl.com/u66rtwk> (Conference Canceled)
- Wang, A. H. & **Miller-Cotto, D.** (2020, Apr 17 - 21) *Family Social Capital, Family Routines, and School-Readiness Skills of Asian American, Black, and Latinx Kindergarten Children* [Paper Session]. AERA Annual Meeting San Francisco, CA <http://tinyurl.com/qvg5x7p> (Conference Canceled)
- Miller-Cotto, D.**, Hallinen, N.R., & Booth, J.L. (July 2019). The role of sketching and visuo-spatial working memory in science accuracy. To be presented to the Cognitive Science Society 2019 Meeting, Montreal, QB.
- Miller-Cotto, D.** (June 2019). Working memory: Reliability analysis of measures within mathematics in grade school age children in the United States. Pre-registration presented to the 2nd annual Mathematical Cognition & Learning Society, Ottawa, ON.
- Barbieri, C.A., **Miller-Cotto, D.**, & Booth, J. L. (April 2019) Error prevalence and visual signaling cues: Design based principles for algebra learning. Paper presented to the American Educational Research Association, Toronto, ON.
- Miller-Cotto**, Booth, J. L., Chang, B. L., Cromley, J. G., Newcombe, N. S., & Williams, T.A. (March 2019). A comparison of sketching and self-explanation when solving math and science problems. Paper presented to the Society for Research in Child Development (SRCD), Baltimore, MD.
- Barbieri, C.A., & **Miller-Cotto, D.** (March 2019). The relationship between adolescents' sense of belonging to the mathematics community and algebra performance. Paper presented at the 2019 International Convention of Psychological Science (ICPS), Paris, France.
- Byrnes, J.P., & **Miller-Cotto, D.** (2018, July). Testing theories of working memory and mathematics achievement. Poster presented to the Cognitive Science Society 2018 Meeting, Madison, WI.
- Miller-Cotto, D.**, & Schunn, C.D. (2018, June). Examining flipping in a calculus class: Does it work, and for whom? Poster presented to the International Workshop on Advanced Learning Sciences 2018, Pittsburgh, PA.
- Miller-Cotto, D.**, Barbieri, C., & Booth, J. L. (2018, April). Examining the impact of signaling cues and self-explanations on algebraic knowledge and learning. Paper presented at the 2018 Annual Meeting of the American Educational Research Association, New York, NY.

- Miller-Cotto, D.,** & Byrnes, J. P. (2018, April). Examining additional constructs to test the guidance fading effect. Poster presented at the 2018 Annual Meeting of the American Educational Research Association, New York, NY.
- Miller-Cotto, D.** (2017, October). Testing the faded worked example effect with cognitive load theory: It works, but for whom? Poster presented at the Cognitive Development Society Conference, Portland, OR.
- Miller-Cotto, D.,** Auxter, A. E., Byrnes, J. P., & Newton, K. J. (2017, April). Too much of a good thing: When faded worked examples decrease performance in algebra. Poster presented at the Society for Research in Child Development Biennial Meeting, Austin, TX.
- Miller-Cotto, D.,** Barbieri, C., & Booth, J. L. (2016, May). Increasing spatial contiguity to reduce students' misconceptions about algebra. Poster presented at the Fourth Annual Mathematical Cognition Conference, Fort Worth, TX.
- Miller-Cotto, D.,** Chang, B. L., Booth, J. L., Cromley, J. G., & Newcombe, N. S. (2016, April). The effects of sketching and self-explanation on students' monitoring use in problem solving. Poster presentation at the Bringing Cognitive Science Research to the Classroom Conference, Arlington, VA.
- Miller-Cotto, D.,** David, S., Booth, J. L., Cromley, J. G., & Newcombe, N. S. (2016, April). Self-explaining encourages student monitoring in math and science problem solving. Poster presentation at the National Consortium for Instruction and Cognition Annual Meeting, Washington, D.C.
- Miller-Cotto, D.,** Auxter, A. E., Byrnes, J. P., & Newton, K. J. (2016, March). Examining the use of faded worked examples in real world classrooms. Poster presentation at the Eastern Psychological Association Conference, New York, NY.
- Miller-Cotto, D.,** Auxter, A. E., Byrnes, J. P., & Newton, K. J. (2016, February). Instruction, fading, and self-explanation: Increasing far transfers with schema-based instruction in college algebra. Paper presentation at the Eastern Educational Research Association Annual Conference, Hilton Head Island, SC.
- Miller-Cotto, D.,** & Menzies, C. M. (2015, April). Student-teacher racial incongruence and teacher perceptions' of student achievement: Testing ethnic identity as a buffer. Paper presentation at the American Educational Research Association annual meeting, Chicago, IL.
- Miller-Cotto, D.,** & Booth, J. L. (2015, March). Contiguity and self-explanations: Reducing student misconceptions about algebra. Poster presentation for the Society for Research on Child Development Biennial Meeting, Philadelphia, PA.
- Miller-Cotto, D.,** & Byrnes, J. P. (2015, March). Ethnic/racial identity and academic achievement: A meta-analysis. Poster presentation at the Society for Research on Child Development Biennial Meeting, Philadelphia, PA.
- Miller-Cotto, D.,** & Byrnes, J. P. (2014, October). Cognitive and socio-emotional development

in schools that vary in diversity: An opportunity-propensity analysis of a national database. Poster Presentation at the Sixth Annual Temple University Graduate Fellows Research Symposium, Philadelphia, PA.

Miller-Cotto, D., & Byrnes, J. P. (2013, April). Diversity and academic achievement in American schools. Poster presentation at the Society for Research in Child Development Biennial Meeting, Seattle, WA.

Miller, D., & Prohaska, V. (2011, March). Memory illusions: Fonts and serial position assignments. Poster presentation at the Eastern Psychological Association Conference, Cambridge, MA.

Prohaska, V., Barbieri, C., **Miller, D.**, Monforte, P., & Orengo, D. (2011, March). Two heads are not always better than one. Poster presentation at the Eastern Psychological Association Conference, Cambridge, MA.

INVITED TALKS AND LECTURES

Miller-Cotto, D. (November 2020). *The development of executive functions and mathematics: An Integrative Theory Perspective*. Occidental College Cognitive Science Speaker series.

Miller-Cotto, D. (October 2020). *Understanding working memory and mathematics development for ethnic/racial minority children through family practices*. Kent State University Cognitive Science Brown Bag series.

Miller-Cotto, D. (September 2020). *Applying the Integrative Theory to mathematics and executive function: Predicting school readiness for Asian-American, Black, and Latinx children*. University of Maryland Developmental Science Colloquium series.

Miller-Cotto, D. (October 2019). *Examining sketching as a tool to offload working memory in math*. Scholars of Color Lecture Series, Rossier School of Education, University of Southern California.

Miller-Cotto, D. (May 2019). *Toward an understanding of working memory and math performance inside and outside the classroom*. Carl A. Grant Scholars Lecture Series, Wisconsin Center for Education Research, University of Wisconsin – Madison.

Miller-Cotto, D. (November 2018). *Working memory and achievement: An exploration of competing theories*. Developmental Psychology Brown Bag, Department of Psychology, University of Pittsburgh.

Miller-Cotto, D. (October 2018). *In and outside the classroom: How is working memory related to math ability?* Educational Psychology Colloquium, Department of Human Development and Quantitative Methods, University of Maryland.

Miller-Cotto, D. (January 2018). *Sketching and self-explanation: A comparison of two cognitive based strategies used to improve sixth graders' problem solving in math and science*. Pitt Cognitive Brown Bag Series, Learning Research & Development Center, University of Pittsburgh.

Miller-Cotto, D. (October 2017). *Sketching and verbal self-explanation: Do they help middle school children solve math and science problems?* School of Education Graduate Colloquium Series, University of Pittsburgh.

Miller-Cotto, D. (March 2017). *Characteristics of students who benefit from faded worked examples in geometry*. Educational Research Seminar series, Temple University.

Miller-Cotto, D. (February 2017). *Testing the ecological validity of faded worked examples in a developmental mathematics classroom*. Temple Institute for Learning and Education Sciences (TILES) series, Temple University.

RESEARCH EXPERIENCE

2020 – present **Postdoctoral Researcher**, NSF Early Fractions Project
College of Education and Human Development
University of Delaware
Principal Investigators: Drs. Nancy Jordan, Nora Newcombe, Christina Barbieri

2019 - 2020 **Research Scientist**, Neuroscape Research Center (20% effort appointment)
Weill Institute for Neurosciences & Kavli Institute for Fundamental Neuroscience
Project iLead Network
University of California San Francisco
Principal Investigator: Dr. Melina Uncapher

2017 – 2019 **Postdoctoral Research Associate**, Schunn Lab
Learning Research & Development Center, University of Pittsburgh
Principal Investigator: Dr. Christian D. Schunn

2015 - 2017 **Research Assistant**, Sketching and Self-Explanation in Math and Science
Department of Psychological Studies in Education, Temple University
Principal Investigators: Drs. Julie L. Booth, Jennifer Cromley, and Nora Newcombe

2011- 2014 **Research Assistant**, Cognitive and Social Predictors of Achievement, Mathematical Performance and Problem Solving
Department of Psychological Studies in Education, Temple University
Advisor: Dr. James P. Byrnes

2010 - 2011 **Research Assistant**, Parenting and Executive Function Study
Department of Psychology, CUNY Lehman College
Principal Investigator: Dr. Keith R. Happaney

2009 - 2011 **Research Assistant**, Learning and Memory Lab
Department of Psychology, CUNY Lehman College
Principal Investigator: Dr. Vincent Prohaska

TEACHING EXPERIENCE

Fall 2020 **Guest Lecturer**, Developmental Psychology and Social Justice, University of Pennsylvania, Janay M. Garret, Lecturer

Spring 2019 **Guest Lecturer**, Advanced Research Design for Causal Inference
University of Delaware, Drs. Christina A. Barbieri and Henry May, Lead Professors

Spring 2017 **Adjunct Instructor**, Child Development: Birth to Nine Years, Temple University

Spring 2014 **Adjunct Instructor**, Cognitive Development, Temple University

Fall 2013 **Teaching Assistant & Guest Lecturer**, Cognitive Development, Temple University

Fall 2013 **Assistant Course Developer**, Multivariate Statistics, Temple University,
Dr. Jennifer G. Cromley, Lead Professor

MENTORING

Stephanie David, College of Education, Temple University, Undergraduate Research Assistant, 2015 – 2017.
Erin Ogozaly, College of Education, Temple University, Undergraduate Research Assistant, 2016.
Haobai Zhang, College of Education and Human Development, University of Delaware, Graduate Researcher, 2020 – present.

SERVICE

Ad-Hoc Reviewer

British Journal of Educational Psychology, Child Development, Cognitive Research: Principles and Implications, Contemporary Educational Psychology, Journal of Experimental Education, Journal of Experimental Child Psychology, Journal of the Learning Sciences, Journal of Research in Education, Learning and Instruction, Mathematics Education Research Journal, PLOS One

Committee Member

APA Division 15 (Educational Psychology)
Early Career Educational Psychologists Committee, 2019 –
Mathematical Cognition and Learning Society (MCLS)
Policy and Practice Co-Chair, 2020 -

Conference Activities

Panelist, Professional Development Workshop: Rock the Postdoc: How to Find, Obtain, and Thrive in a Postdoctoral Position, Society for Research in Child Development Biennial Meeting, March 2019.

Symposium organizer and co-chair, *2019 International Convention of Psychological Science*, Symposium (March 2019): Cross-cultural Factors Relating to the Mathematical Cognition of Diverse Populations Across the Globe.

Conference Reviewer

American Psychological Association: Division 15 (Ed Psych)
American Educational Research Association (Division C: Learning and Instruction/1c Mathematics;
SIG Early Education and Child Development
European Association for Learning and Instruction
Pittsburgh Regional Faculty Symposium
Society for Research in Child Development

Consulting Editor

Journal of Experimental Education, 2019 –
Contemporary Educational Psychology, 2020 –

Grant Reviewer

Review Panelist, National Science Foundation, Spring 2019, Spring 2020
Reviewer, Psi Chi Graduate Student Research Grants, 2017 –
Reviewer, Spencer Foundation, Lyle Spencer Research Award, Fall 2020
Reviewer, Bill & Melinda Gates Foundation: Balance the Equation:
A Grand Challenge for Algebra 1, Fall 2020

Service to the Institution

Chair, Proposal Review Board, CUNY Lehman College Scholarship Day, 2011
Panelist, Tactics 101: Surviving and Thriving in Your PhD Program, Temple University, Spring 2015
Diversity and Inclusion Committee, Learning Research and Development Center (LRDC),
University of Pittsburgh, 2018 – 2019

OUTREACH

Invited Speaker, (May 2020) “What are executive functions and what does it have to do with how my child learns?” TeenSHARP Parent Night, Wilmington, Delaware.

PROFESSIONAL AFFILIATIONS

American Psychological Association (APA: Division 15 Educational Psychology)
American Educational Research Association (Division C: Learning & Instruction)
Mathematical Cognition and Learning Society (MCLS)
Society for Research on Child Development (SRCD)
SPARK Society

ACADEMIC REFERENCES

Dr. Julie L. Booth, Professor
Educational Psychology and Applied Developmental Science
Temple University
(215) 204 – 6223
julie.booth@temple.edu

Dr. James P. Byrnes, Professor
Educational Psychology and Applied Developmental Science
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Dr. Nora S. Newcombe, Laura H. Connell Professor of Psychology
Department of Psychology
Temple University
(215) 204 – 6944
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Dr. Christian D. Schunn, Professor, Senior Research Scientist
Learning Research & Development Center (LRDC)
Department of Psychology
University of Pittsburgh
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