

**DANA MILLER - COTTO, Ph.D.**

**Curriculum Vitae**

University of Delaware  
School of Education and Human Development  
Willard Hall Education Building  
Newark, DE 19716  
danamillercotto.com | damcotto@udel.edu

**EDUCATION & TRAINING**

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- 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 Studio

**RESEARCH INTERESTS**

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cognitive and affective mechanisms that underlie mathematics learning and achievement, mathematics development, executive functions, ethnic/racial differences in achievement, opportunity gap, meta-analyses.

**ACADEMIC APPOINTMENTS**

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- 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**

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Am I a “Math Person”? How Classroom Cultures Shape Math Identity Among Black and Latinx Students  
**D. Miller-Cotto (PI)**, funded via The Mindset Scholars Network, \$10,000 total,

funded May 2019 February 2020.

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 Fellow
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**

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**Miller-Cotto, D.**, & Schunn, C.D. (in press). 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

**Miller-Cotto, D.**, & Byrnes, J. P. (2020). 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

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

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

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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

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Barbieri, C.A., & **Miller-Cotto, D.** (under review). The importance of adolescents' sense of belonging to mathematics for algebra learning. Manuscript submitted for peer review on June 29<sup>th</sup>, 2020.

**Miller-Cotto, D.**, & Lewis, N.A. (revise and resubmit). Am I a “Math Person”? How classroom cultures shape math identity among Black and Latinx students. Invited to revise, resubmit to *Educational Psychologist* on July 25<sup>th</sup>, 2020.

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

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**Miller-Cotto, D.** (in prep). Assessing working memory, cognitive load, and prior knowledge to explain mechanisms underlying the guidance fading effect in middle school math.

**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.

**Miller-Cotto, D.**, Smith, L.V. & Wang, A.H. (in prep). Applying the Integrative Theory to mathematics and executive function skills to predict developmental outcomes for Asian-American, Black, and Latino kindergarten children: Do family practices matter?

### PRESENTATIONS

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**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**

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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). *An Introduction to Systematic Reviews and Meta-Analyses*. Advanced Research Design for Causal Inference, Department of Evaluation, Measurement, and Statistics, University of Delaware.

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

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- 2020 – present **Postdoctoral Researcher**, NSF Early Fractions Project  
School of Education and Human Development  
University of Delaware  
Principal Investigators: Drs. Nancy Jordan, Nora Newcombe, Christina Barbieri
- 2019 - 2020 **Postdoctoral Scholar**, Neuroscape Research Center (Part Time)  
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

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- 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**

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Stephanie David, College of Education, Temple University, Undergraduate Research Assistant, 2015 – 2017.  
Erin Ogozaly, College of Education, Temple University, Undergraduate Research Assistant, 2016.

## **SERVICE**

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### **Ad-Hoc Reviewer**

British Journal of Educational Psychology, Child Development, Cognitive Research: Principles and Implications, Contemporary Educational Psychology, Journal of Experimental Education, 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 –

### **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**

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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**

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American Psychological Association (APA: Division 15)

American Educational Research Association (Division C: Learning & Instruction)

Mathematical Cognition and Learning Society (MCLS)

Society for Research on Child Development (SRCD)

### **ACADEMIC REFERENCES**

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

Dr. James P. Byrnes, Professor  
Educational Psychology and Applied Developmental Science  
Temple University  
(215) 204 – 2813  
[jpbyrnes@temple.edu](mailto:jpbyrnes@temple.edu)

Dr. Nora S. Newcombe, Laura H. Connell Professor of Psychology  
Department of Psychology  
Temple University  
(215) 204 – 6944  
[newcombe@temple.edu](mailto:newcombe@temple.edu)

Dr. Christian D. Schunn, Professor, Senior Research Scientist  
Learning Research & Development Center  
University of Pittsburgh  
(412) 624 – 8807  
[schunn@pitt.edu](mailto:schunn@pitt.edu)