

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

**Curriculum Vitae**

Neuroscape Research Center  
675 Nelson Rising Lane  
San Francisco, CA 94158  
University of California San Francisco  
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**EDUCATION**

- 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. James P. Byrnes, 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

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**RESEARCH INTERESTS**

mathematics development, opportunity gaps, executive functions, STEM education, cognitive science principles of learning, socio-ecological theories of development, systematic reviews and meta-analyses

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**APPOINTMENTS**

- 2019 - **Research Scientist**  
EF+Math Program, NewSchools Venture Fund
- 2019 - **Postdoctoral Scholar**  
Neuroscape Research Center (Cognitive Neurosciences: Educational Neuroscience)  
University of California San Francisco  
Advisor: Dr. Melina Uncapher
- 2017- 2019 **Postdoctoral Research Associate**  
Learning Research & Development Center (LRDC), University of Pittsburgh  
Center for Teaching & Learning  
Advisor: Dr. Christian Schunn

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**RESEARCH SUPPORT**

- 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.

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**HONORS, AWARDS, & FELLOWSHIPS**

- 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.**, & Auxter, A. E. (in press). Testing the ecological validity of faded worked examples in algebra. *Educational Psychology*. doi: 10.1080/01443410.2019.1646411
- Miller-Cotto, D.**, & Byrnes, J. P. (in press). What's the best way to characterize the relationship between working memory and achievement?: An initial examination of competing theories. *Journal of Educational Psychology*. doi: 10.1037/edu0000395
- Wang, M.T., Smith, L.V., **Miller-Cotto, D.**, & Huguley, J.P. (2019). Parental ethnic-racial socialization practices and children of color's academic outcomes: A meta-analytic review. *Child Development*. doi: 10.1111/cdev.13254
- 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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- Balta, N., Amendum, S., & **Miller-Cotto, D.** (in revision). Job embedded professional development and student achievement: A meta-analysis. Revision invited from *Journal of Teacher Education* on May 4<sup>th</sup>, 2019.
- Miller-Cotto, D.**, Booth, J. L., Chang, B. L., Cromley, J. G., Newcombe, N. S., & Williams, T.A. (in revision). Sketching and verbal self-explanation: Do they help middle school children solve math and science problems? Revision invited from *Cognitive Research: Principles and Implications* on June 1<sup>st</sup>, 2019.

**Miller-Cotto, D.,** Hallinen, N. R., & Booth, J. L. (under review). Sketching as a tool to offload information from visuo-spatial working memory in middle school math and science problem solving. Manuscript submitted for peer review on July 12<sup>th</sup>, 2019

**Miller-Cotto, D.,** & Schunn, C.D. (in revision). Mind the Gap: How a Large-Scale Course Re-Design in Economics Reduced Performance Gaps. Revision invited from *Journal of Experimental Education* on August 28<sup>th</sup>, 2019.

### **MANUSCRIPTS IN PREPARATION**

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Barbieri, C.A., & **Miller-Cotto, D.** (in prep). The relationship between adolescents' sense of belonging to the mathematics community and algebra performance [working title].

**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.,** & Wang, A.H. (in prep). Testing the integrative theory in predicting school readiness and executive function skills for ethnic minority children using structural equation modeling.

Wang, A.H., & **Miller-Cotto, D.** (in prep). Do leisure activities predict mathematics achievement and executive functions of Asian-American, Black, and Latino kindergarten children?

### **PRESENTATIONS**

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Barbieri, C.A., & **Miller-Cotto, D.** (submitted). The importance of adolescents' sense of belonging to the mathematics community for algebra learning. Paper submitted to the American Educational Research Association (AERA) Annual Meeting, San Francisco, CA.

**Miller-Cotto, D.,** & Wang, A.H. (submitted). Testing the integrative theory in predicting school readiness and executive function skills for ethnic minority and other kindergarten children using SEM. Paper submitted to the American Educational Research Association (AERA) Annual Meeting, San Francisco, CA.

Wang, A.H., & **Miller-Cotto, D.** (submitted). Family social capital, family routines, and school readiness skills of Asian-American, Black, and Latinx kindergarten children. Paper submitted to the American Educational Research Association (AERA) Annual Meeting, San Francisco, CA.

**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 Ppresentation 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.** (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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- 2019 - **Postdoctoral Scholar**, Neuroscape Research Center  
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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### Editorial Board Member

Journal of Experimental Education, 2019 -

### **Ad-Hoc Reviewer**

Child Development, 2018  
Cognitive Research: Principles and Implications, 2017, 2018  
Journal of Experimental Education, 2015, 2018, 2019  
Journal of Research in Education, 2016  
Learning and Instruction, 2013  
PLOS One, 2018

### **Committee Member**

AP Division 15 (Educational Psychology) Early Career Educational Psychologists Committee

### **Grant Reviewer**

*Review Panelist*, National Science Foundation, EHR Core Research (ECR):  
Fundamental Research in STEM Education, 2019  
*Reviewer*, Psi Chi Graduate Student Research Grants, 2017 –

### **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

### **Conference Activities**

Symposium organizer and co-chair, *2020 American Educational Research Association (AERA)*,  
Symposium (submitted): The Interplay between Cognitive, Motivational, and Attitudinal Processes  
on Mathematics Learning and Achievement.

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.

### **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

### **SPECIAL TRAINING**

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2018 **The Meta-Analysis Training Institute**, Institute for Education Sciences  
Instructors: Drs. Terri Pigott, Natasha Beretvas, Elizabeth Tipton, Josh Polanin, and  
Ryan Williams

- 2018 **Introduction to Systematic Review and Meta-Analysis**, Coursera  
Instructors: Drs. Tianjing Li and Kay Dickersin
- 2016 **Item Response Theory Modeling**, Statistical Horizons  
Instructor: Dr. Tenko Raykov
- 2016 **A Didactic Introduction to Latent Variable Modeling in R**, AERA  
Instructor: Dr. Holmes Finish
- 2014 **Hierarchical Linear Modeling**, The Carnegie Foundation  
Instructors: Drs. Stephen Raudenbush and Anthony Bryk
- 2014 **Structural Equation Modeling**, Department of Psychology, Temple University  
Instructor: Dr. Mark Schmitz
- 2012 **Multivariate Statistics**, Department of Psychological Studies in Education,  
Temple University  
Instructor: Dr. Joseph P. Ducette

**Statistical Software Knowledge:** Mplus (intermediate), SPSS (advanced), Stata (intermediate),  
R (intermediate)

### **PROFESSIONAL AFFILIATIONS**

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