

**Josh Medrano, Ph.D.**

Postdoctoral Scholar  
School of Education  
University of California, Berkeley

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**ACADEMIC APPOINTMENTS**

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- 2024- **Postdoctoral Scholar**, University of California, Berkeley  
Berkeley School of Education  
PI: Dr. Dana Miller-Cotto
- 2023-2024 **Postdoctoral Scholar**, Kent State University  
Department of Psychological Sciences  
PI: Dr. Dana Miller-Cotto

**EDUCATION**

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- 2019-2023 **Ph.D. in Human Development**, University of Maryland, College Park  
Advisor: Dr. Richard W. Prather  
Dissertation: *Integrating perceptual and cognitive processes in mental arithmetic*  
Committee: Drs. Donald J. Bolger, Doug Lombardi, Geetha Ramani, Tracy Riggins
- 2018-2019 **M.Ed. in Educational Psychology-Applied Developmental Science**,  
University of Virginia  
Advisor: Dr. Jamie Jirout
- 2013-2016 **B.A. in Psychology**, The Ohio State University

**RESEARCH INTERESTS**

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Cognitive development, mathematics learning and cognition, environmental and structural influences in child development

**HONORS & AWARDS**

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- 2024 NSF Modern Meta-Analysis Research Institute, Washington, DC
- 2023 Charles H. Flatter Fellowship (\$500)
- 2023 Ann Wylie/Lee Thornton Dissertation Fellowship Nomination
- 2022 The David and Winifred "Winkle" Fulk Fellowship Nomination
- 2022 Cognitive Developmental Society Diversity Travel Award (\$700)
- 2020 APA Conference Poster Selected for Presidential Poster Session
- 2019-2023 Department Travel Awards (4 years, \$2,300 total)
- 2019-2021 Dean's Fellowship, stipend and tuition
- 2017 AmeriCorps Education Award (\$3,011)
- 2014-2016 Dean's List

## GRANTS

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Role: Principal Investigator

2022 Support Program for Advancing Research and Collaboration (SPARC) Award  
[Funded, UMD] Amount: \$990  
Title: *Integrating perceptual and cognitive processes in mental arithmetic*

Role: Graduate Student Support

2021 Faculty-Student Research Award [Funded, UMD] Amount: \$10,000  
Title: *What role does arithmetic history play on adults' math skills?*

## PEER-REVIEWED PUBLICATIONS

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1. **Medrano, J.**, Mohan, S., & Lombardi, D. (in press). Cognitive flexibility moderates shifts in plausibility judgments of claims about climate change. *Discourse Processes*. <https://doi.org/10.1080/0163853X.2025.2499413>
2. Miller-Cotto, D. & **Medrano, J.** (in press). Does working memory moderate the effect of fading on math performance? *British Journal of Educational Psychology*. <https://doi.org/10.1111/bjep.12781>
3. **Medrano, J.** & Miller-Cotto, D. (2025). Understanding working memory as a facilitator of math problem solving: Offloading as a potential strategy. *British Journal of Educational Psychology*. <https://doi.org/10.1111/bjep.12767>
4. **Medrano, J.**, & Prather, R.W. (2023). Rethinking executive functions in mathematical cognition. *Journal of Cognition and Development*. <https://doi.org/10.1080/15248372.2023.2172414>
5. **Medrano, J.**, Crnosija, N., Prather, R. W., & Payne-Sturges, D. (2022). Bridging the environment and neurodevelopment for children's health: Associations between real-time air pollutant exposures and cognitive outcomes. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2022.933327>
6. Prather, R.W., Benitez, V.L., Kendall Brooks, L., Dancy, C.L., Dilworth-Bart, J., Dutra, N.B., Faison, M.O., Figueroa, M., Holden, L.T.R., Johnson, C., **Medrano, J.**, Miller-Cotto, D. Matthews, P.G., Manly, J.J., Thomas, A.K. (2022). What can cognitive science do for people? *Cognitive Science*. <https://doi.org/10.1111/cogs.13167>
7. **Medrano, J.\***, Jaffe, J.,\* Lombardi, D., Holzer, M.A., & Roemmele, C. (2020). Students' scientific evaluations of water resources. *Water*. <https://doi.org/10.3390/w12072048>

\*Co-first authors

Google Scholar: [scholar.google.com/citations?user=IrZrHOQAAAAJ&hl=en](https://scholar.google.com/citations?user=IrZrHOQAAAAJ&hl=en)  
(Citations: 72, h-index: 4; i10-index: 3)

## MANUSCRIPTS UNDER REVIEW

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8. **Medrano, J.** & Miller-Cotto, D. (under review). Examining subgroup differences in school readiness and math achievement in Asian American children through the opportunity-propensity model. Submitted to *Early Education and Development*.

9. **Medrano, J.**, Devlin, B., Shingledecker, M., Thompson, C.A., & Miller-Cotto, D., (under review). Individual differences in fraction understanding and relations to EF and spatial/relational reasoning. Submitted to *Journal of Experimental Child Psychology* [Pre-registration: <https://osf.io/98gzv>].
10. Miller-Cotto, D., Borriello, G.A., **Medrano, J.**, & Zaborowski, S. (under review). When training is inconclusive: Making a case for supporting instead of training executive functions. Submitted to *Educational Psychologist*.
11. Miller-Cotto, D., Chan, J.Y.-C., & **Medrano, J.** (under review). Identifying challenging topics in mathematics: An analysis of student performance across domains. [Pre-registration: <https://osf.io/xfvjp>]. Submitted to *Journal of Experimental Education*.

#### MANUSCRIPTS UNDER REVISION

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12. **Medrano, J.** & Prather, R.W. (revising for resubmission). Interactions between perceptual cues and working memory during mental arithmetic: A dual-task experiment.
13. **Medrano, J.** & Prather, R.W. (revising for resubmission). Associations between inhibitory control and arithmetic: A cross-sectional study.

#### MANUSCRIPTS IN PREPARATION

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14. **Medrano, J.**, Borriello, G.A., & Miller-Cotto, D. (in prep). A meta-analysis of the correlations between executive functions and spatial skills.
15. Miller-Cotto, D., **Medrano, J.**, Thompson, C.A., Devlin, B., & Shingledecker, M. (in prep). Testing theories of working memory with whole number bias: A developmental analysis.
16. Robertson, J.R., **Medrano, J.**, & Lombardi, D. (in prep). Shifts in scientific stance: Changing judgments about the plausibility of competing explanations.
17. Miller-Cotto, D., Ribner, A.D., & **Medrano, J.** (in prep). The role of assessor racial identity on Black children's executive function task performance: An initial examination.

#### CONFERENCE PRESENTATIONS

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##### Chaired Symposia

1. **Medrano, J.** (Chair). *Asian American child and youth development: Contexts, processes, and outcomes* [Symposium]. The 2025 Biennial Meeting of the Society for Research in Child Development, Minneapolis, MN.
2. **Medrano, J.** (Chair). *The role of perception in arithmetic cognition* [Symposium]. The Sixth Mathematical Cognition and Learning Society Conference, Loughborough, UK.

##### Oral Presentations

1. **Medrano, J.** & Miller-Cotto, D. (2025, June). Examining subgroup differences in school readiness and math achievement in Asian American children through the opportunity-propensity model [Lightning Talk]. The 2025 Mathematical Cognition and Learning Society Conference, Hong Kong S.A.R., China.
2. Miller-Cotto, D. & **Medrano, J.** (2025, June). How does working memory “work” in math problem solving?: An aptitude by treatment interaction investigation. In

- Dumontheil, I. (Chair) *Neuroimaging and behavioural studies of the role of executive functions in mathematical skills over the course of development* [Symposium]. The 2025 Mathematical Cognition and Learning Society Conference, Hong Kong S.A.R., China.
3. **Medrano, J.** (2025, May). Examining predictors of school readiness in Asian American kindergartners through the ECLS-K:2011 dataset. In Medrano, J. (Chair) *Asian American child and youth development: Contexts, processes, and outcomes* [Symposium]. The 2025 Biennial Meeting of the Society for Research in Child Development, Minneapolis, MN.
  4. **Medrano, J.** & Miller-Cotto, D. (2025, March). The Asian American Child: Insights on school readiness from the ECLS-K:2011 cohort. Berkeley School of Education (BSE) Research Day.
  5. **Medrano, J.**, Miller-Cotto, D., Thompson, C.A., Devlin, B., & Shingledecker, M. (2024, June). Individual differences in third and sixth graders' fraction understanding and relations to EF and spatial skills. In Ernst, J. (Chair) *Exploring the relations between executive function and mathematics skills* [Symposium]. The Seventh Mathematical Cognition and Learning Society Conference, Washington, DC.
  6. **Medrano, J.** & Prather, R.W. (2023, June). Why does inhibitory control only sometimes associate with math? Insights from a review of executive function development research. In Hochman, S. (Chair). *Numerical Cognition Meets Executive Functions Symposium* [Symposium]. University of Surrey, Guildford, UK.
  7. **Medrano, J.** & Prather, R.W. (2023, June). Integrating perceptual and cognitive processes in mental arithmetic. In Medrano, J. (Chair). *The role of perception in arithmetic cognition* [Symposium]. 2023 Mathematical Cognition and Learning Society Conference, Loughborough, UK.
  8. **Medrano, J.\***, Crnosija, N.\*, Prather, R.W., & Payne-Sturges, D., (2022). Bridging the environment and neurodevelopment for children's health study: An overview. GradTerp Exchange, College Park, MD.
  9. Prather, R.W., & Payne-Sturges, D., **Medrano, J.**, Kendall Brooks, L., Johnson, C., & Crnosija, N. (2022, March). An asset-based quantitative framework to characterize cognitive development of African-American children. In Rittle-Johnson, B. (Chair). Barriers and supports for cognitive development and academic outcomes among marginalized youth. Bi-ennial Cognitive Development Society Conference 2022, Madison, WI.
  10. **Medrano, J.** & Prather, R.W. (2021, March). Examining how numerical and non-numerical inhibitory control contribute to arithmetic skills: A path analytical approach. 2021 Mathematical Cognition and Learning Society Conference [virtual].
  11. Chen, R.\*, Diallo, M.\*, Hancock, M.\*, Lampe, L.\*, **Medrano, J.\***, Salt, J.\*, & Wright, J.\* (2019). Motivation analysis of a multiage classroom: Exploring Agnor-Hurt Elementary. The Virginia Chapter of Association for Learning Environments Annual Conference, Williamsburg, VA.

\*Presenters contributed equally.

### **Paper Presentations**

12. **Medrano, J.** & Miller-Cotto, D. (2025, April). Testing the opportunity-propensity model of achievement in Asian-American subgroups. 2025 Annual Meeting of the American Educational Research Association, Denver, CO.
13. Chan, J. Y.-C., Miller-Cotto, D., & **Medrano, J. R.** (2025, April). Cracking the code: Identifying challenging math topics and knowledge types through students' problem-solving performance. 2025 Annual Meeting of the American Educational Research Association, Denver, CO.
14. Robertson, J.R., **Medrano, J.**, & Lombardi, D. (2025, April). Shifts in scientific stance: Changing judgments about the plausibility of competing explanations. 2025 Annual Meeting of the American Educational Research Association, Denver, CO.
15. **Medrano, J.**, Mohan, S., Jaffe, J.B., & Lombardi, D. (2021, August). Executive functions in plausibility judgments and scientific evaluations [Paper Presentation]. 31st Annual Meeting of the Society for Text and Discourse, Atlanta, GA.
16. Mohan, S., **Medrano, J.**, Lombardi, D., & Jaffe, J. (2021, August). Students' evaluations, plausibility perceptions, and knowledge shifts about climate change and water resources [Pre-recorded Poster Presentation]. 2021 Annual Meeting of the American Educational Research Association, San Diego, CA.

### **Poster Presentations**

17. Lee, A.<sup>U</sup>, Torres-Romero, K.<sup>U</sup>, Moberly, E.<sup>U</sup>, Paw, C.,<sup>U</sup> **Medrano, J.**, & Miller-Cotto, D. (2025). Understanding working memory as a facilitator of math learning: Offloading as a potential strategy. [Poster Presentation]. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 47.
18. Paw, C.<sup>U</sup>, Moberly, E.<sup>U</sup>, Torres-Romero, K.<sup>U</sup>, Lee, A.<sup>U</sup>, **Medrano, J.**, & Miller-Cotto, D. (2025). Testing the role of working memory and domain-general skills in fraction comparisons. [Poster Presentation]. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 47.
19. Parrish, L.<sup>U</sup>, **Medrano, J.**, & Miller-Cotto, D. (2024, April). Whole number knowledge correlates with working memory and fraction understanding. [Poster Presentation]. 2024 Undergraduate Symposium for Research, Scholarship and Creative Endeavors, Kent State University, Kent, OH.

**\*\*\* Poster Judged First Place Among Psychological Sciences Posters**

20. Ernst, L.<sup>U</sup>, **Medrano, J.**, & Miller-Cotto, D. (2024, April). Understanding the underlying cognitive mechanisms of whole number bias in third graders. [Poster Presentation]. 2024 Undergraduate Symposium for Research, Scholarship and Creative Endeavors, Kent State University, Kent, OH.
21. **Medrano, J.**, Miller-Cotto, D., Thompson, C.A., Devlin, B., & Shingledecker, M. (2024, March). Individual differences in third and sixth graders' fraction understanding and relations to EF and spatial skills. [Poster Presentation]. 2024 Bi-ennial Cognitive Development Society Conference, Pasadena, CA.
22. Crnosija, N., **Medrano, J.**, Prather, R.W., & Payne-Sturges, D. (2022, September). The effect of COVID-19 lockdown/post-lockdown and season on children's exposure to PM2.5 and time expenditure by environment type [Poster Presentation]. 34th Annual

Conference of the International Society for Environmental Epidemiology, Athens, Greece. <https://doi.org/10.1289/isee.2022.P-0519>.

23. **Medrano, J.**, Crnosija, N., Prather, R.W., & Payne-Sturges, D. (2022, March). Bridging the environment and neurodevelopment for children's health study: An overview [Poster Presentation]. Bi-ennial Cognitive Development Society Conference 2022, Madison, WI.
24. Dobaria, A., Bailey, J. M., Mohan, S., Klavon, T. G., **Medrano, J. R.**, Jaffe, J. B., & Lombardi, D. (2021, August). Students' scientific evaluations of astronomy concepts [Poster Presentation]. EARLI 2021—the 19th Biennial EARLI Conference, Gothenburg, Sweden.
25. Crnosija, N.\*, **Medrano, J.\***, Prather, R.W., & Payne-Sturges, D., (2021, August). Bridging the environment and neurodevelopment for children's health study: An overview [Poster Presentation]. Eighth Annual Public Health Research, College Park, MD.
26. **Medrano, J.** & Prather, R. W. (2021, April). Consistency of individual differences across number line tasks [Poster Presentation]. Society for Research in Child Development 2021 Virtual Biennial Meeting.
27. Jaffe, J.\*, **Medrano, J.\*** & Lombardi, D. (2020, August). Promoting scientific plausibility and knowledge shifts through modeled evaluation activities [Poster Presentation]. American Psychological Association Convention 2020, Washington, D.C.

**\*\*\* Poster Selected for Presidential Poster Session**

28. **Medrano, J.** & Prather, R. W. (2020, June). Cognitive, behavioral, and affective influences of mathematical achievement [Conference Canceled]. 2020 Mathematical Cognition and Learning Society Conference, Dublin, Ireland.
29. **Medrano, J.\***, Jaffe, J.\*, & Lombardi, D. (2020, April). Does the evidence support the model? Examining the effectiveness of two instructional scaffolds in science classrooms [Conference Canceled]. 30th Annual Meeting of the Society for Text and Discourse, Atlanta, GA.
30. **Medrano, J.** & Jirout, J. (2019, October). The role of relative magnitude reasoning in space-math relations [Poster Presentation]. Bi-ennial Cognitive Development Society Conference 2019, Louisville, KY.
31. **Medrano, J.** & Jirout, J. (2019, March). Thinking relatively: The role of magnitude in mathematical and spatial thinking [Poster Presentation]. 10<sup>th</sup> Curry Research Conference, Charlottesville, VA.

\*Presenters contributed equally.

<sup>U</sup> Undergraduate Mentee

## DEPARTMENTAL TALKS

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**Medrano, J.** (2024, May). Inhibitory control and mathematical thinking and learning: What, when, and how. University of Pittsburgh, Kid's Thinking Lab.

**Medrano, J.** (2024, April). Examining specific cognitive processes during arithmetic: The roles of inhibitory control and working memory. University of Notre Dame, Cognition, Brain, and Behavior Group Brown Bag.

**Medrano, J.** (2023, October). Examining how numerical and non-numerical inhibitory control contribute to arithmetic skills: A path analytical approach. Kent State University Cognitive Brown Bag.

## **RESEARCH ASSISTANTSHIPS**

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**Graduate Research Assistant**, Cognition and Development Lab, 2019-2023

University of Maryland, College Park, PI: Dr. Richard W. Prather

Projects: Bridging the Environment and Neurodevelopment for Children's Health;  
Accurate, Precise, Equitable and Useful Models of the State of the Learner;  
Maryland Order of Operations (MOOS)

**Graduate Research Assistant**, Science Learning Research Group, 2019-2020

University of Maryland, College Park, PI: Dr. Doug Lombardi

Projects: Model-Evidence-Link (MEL) Project, IC+MET

**Graduate Research Assistant**, Research in Education and Learning Lab, 2018-2019

University of Virginia, PI: Dr. Jamie Jirout

Projects: Spatial learning as play, Role of magnitude in math and spatial thinking

**Research Assistant**, Cognitive Development Lab, 2014-2016

The Ohio State University, PI: Dr. Vladimir Sloutsky, Mentor: Tracey Miser

Project: Development of categorization during inductive learning

**Research Assistant Intern**, Berkeley Early Learning Lab, 2015

University of California, Berkeley, PI: Dr. Fei Xu, Mentor: Shaun O'Grady

Project: Development of nonsymbolic probability judgments

## **TEACHING EXPERIENCE**

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### **Instructor of Record**

University of Maryland, College Park

Research Methods in Human Development (1 sections, 40 undergraduate students)  
Spring 2023

### **Guest Lecturer**

University of California, Berkeley

*Early Childhood: Cognitive Development*

Early Development and Education (1 section, 28 undergraduates)

Instructor: Dr. Dana Miller-Cotto

Spring 2025

Kent State University

*Early Adolescence: Physical and Cognitive Development*

Child Psychology (1 section, 145 undergraduates)

Instructor: Dr. Dana Miller-Cotto

Spring 2024

*Cognitive Development: Development of Academic Skills*

Children's Thinking (1 section, 40 undergraduates)

Instructor: Dr. Dana Miller-Cotto  
Fall 2023

University of Maryland, College Park

*Middle Childhood: Physical and Cognitive Development*

Human Development Throughout the Life Span (1 section, 40 undergraduates) Instructor:  
Rachel Ghosh  
Fall 2021

### **Teaching Assistant**

University of Maryland, College Park

Research Methods in Human Development (2 sections, 80 undergraduate students)

Instructor: Dr. Richard Prather  
Fall 2022

### **SERVICE**

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#### **Ad-Hoc Journal Reviewing**

*British Journal of Developmental  
Psychology*

*Child and Youth Care Forum*

*Cognitive Development*

*Contemporary Educational Psychology*

*Educational Psychology Review*

*Environmental Research*

*Infant Behavior and Development*

*Journal of Cognition & Development*

*Journal of Numerical Cognition*

*npj Science of Learning*

#### **Service to the Field**

Conference Reviewer, American Psychological Association Conference, Division 7, 2024

Conference Reviewer, Mathematical Cognition and Learning Society Conference, 2021-Present

Volunteer (Programme Design), Mathematical Cognition and Learning Society Conference,  
2024

Panelist, How to Find, Obtain, and Thrive in a Postdoctoral Position, Badar Kauffman  
Conference, Kent, OH, 2024

Feedback Reviewer, Application Statement Feedback Program, 2023 - Present

Editor, Application Statement Feedback Program, 2022 - Present

Symposium Moderator, Curry Research Conference, University of Virginia, 2019

Editor, Journal of Undergraduate Research at Ohio State (JUROS), 2015-2016

#### **Service to the Department and University**

Graduate School Field Committee for Developmental Science

Graduate Student Liaison, Executive Committee, 2021-2023

Human Development Graduate Student Organization

President, 2021-2022

Professional Development Committee Co-Chair, 2019-2021

Social Committee Co-Chair, 2019-2020

Graduate Student Government, University of Maryland

Department Student Representative/Assembly Member, 2020-2021



Graduate Research Appreciation Day Committee Member, 2020-2021

### **Outreach Experience**

Virginia Discovery Museum, Charlottesville, VA, 2018-2019.

Language Sciences Research Lab at Center for Science and Industry (COSI), Columbus, OH, 2014

- Provided student assistance for the demonstration "Trick Sentences."

<https://u.osu.edu/thebln/language-outreach/>.

### **Volunteering Experience**

Volunteer, 826 Valencia, 2024-present

Tutor/Corps Member, AmeriCorps/Ohio Math Corps, Cincinnati, OH, 2016-2017

### **Other Professional Experience**

Graduate Student Coordinator, Summer Undergraduate Research Program, <sup>[L]</sup><sub>[SEP]</sub>University of Virginia, 2019

Administrative Assistant, T.C.P. World Academy, Cincinnati, OH, 2017-2018

## **PROFESSIONAL AFFILIATIONS**

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American Psychological Association

Division 7 - Developmental Psychology

Division 15 - Educational Psychology

Cognitive Development Society

Math Learning and Cognition Society

Society for Research in Child Development

## **MENTORSHIP ACTIVITIES**

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### **Mathematical Learning and Cognition Society**

Patrick Ehrman, Graduate Student, Purdue University

Zory Zhang, Undergraduate Student, University of Illinois, Urbana-Champaign

### **University of California, Berkeley**

Ayanna Lee, Andie Liu, Emily Moberley, Cheyenne Paw, Dayton Phan, Ella Rho, Katie Torres-Romero, Kyla Burfoot, Kiara Eng, Helen Bui, Mira Patel, Fakhrulessa Samim, Aly Turfler, Ysabelle Valdez, Shiyu Hu

### **Kent State University**

Logan Ernst, Hannah Fender, Amelia King, Lauren Parrish

### **University of Maryland**

Linus Ghanadan, Jasmine Williams, Divija Kambala