Josh Medrano, Ph.D.

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Updated June 1, 2025

ACADEMIC APPOINTMENTS

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

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

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

HONORS & AWARDS

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

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

1. **Medrano, J.** & Miller-Cotto, D. (accepted). Examining subgroup differences in school readiness and math achievement in Asian American children through the opportunity-propensity model. *Early Education and Development*.
2. **Medrano, J.**, Mohan, S., & Lombardi, D. (2025). Cognitive flexibility moderates shifts in plausibility judgments of claims about climate change. *Discourse Processes*. https://doi.org/10.1080/0163853X.2025.2499413
3. Miller-Cotto, D. & **Medrano, J.** (2025). Does working memory moderate the effect of fading on math performance? *British Journal of Educational Psychology.* https://doi.org/10.1111/bjep.12781
4. **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
5. **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
6. **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
7. 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
8. **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

MANUSCRIPTS UNDER REVIEW, IN REVISION, & IN PREPARATION

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. **Medrano, J.** & Prather, R.W. (in revision). Interactions between perceptual cues and working memory during mental arithmetic: A dual-task experiment. Submitted to *Journal of Applied Cognitive Psychology.*
11. **Medrano, J.** & Prather, R.W. (in revision). Associations between inhibitory control and arithmetic: A cross-sectional study. Submitted to *Journal of Intelligence.*
12. Robertson, J.R., **Medrano, J.,** & Lombardi, D. (under review). Shifts in scientific stance: Changing judgments about the plausibility of competing explanations. Submitted to *Learning and Instruction*.
13. 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*.
14. 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 Educational Psychology*.
15. **Medrano, J.,** Borriello, G.A., & Miller-Cotto, D. (in prep). A meta-analysis of the correlations between executive functions and spatial skills.
16. 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.
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.

*Co-first authors

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

CONFERENCE PRESENTATIONS

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. [U], Torres-Romero, K. [U], Moberly, E. [U], Paw, C., [U] **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. [U], Moberly, E. [U], Torres-Romero, K. [U], Lee, A. [U], **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.[U], **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.[U], **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]. 10th Curry Research Conference, Charlottesville, VA.

*Presenters contributed equally.

[U] Undergraduate Mentee

DEPARTMENTAL TALKS

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

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

Instructor of Record

University of Maryland, College Park
Course: Research Methods in Human Development (1 sections, 40 undergraduates)
Spring 2023

Guest Lecturer

University of California, Berkeley
Early Childhood: Cognitive Development
Course: Early Development and Education (1 section, 28 undergraduates)
Instructor: Dr. Dana Miller-Cotto
Spring 2025

Kent State University
Early Adolescence: Physical and Cognitive Development
Course: Child Psychology (1 section, 145 undergraduates)
Instructor: Dr. Dana Miller-Cotto
Spring 2024

Cognitive Development: Development of Academic Skills
Course: 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
Course: 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 undergraduates)
Instructor: Dr. Richard Prather
Fall 2022

SERVICE

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, University of Virginia, 2019
Administrative Assistant, T.C.P. World Academy, Cincinnati, OH, 2017-2018

PROFESSIONAL AFFILIATIONS

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

Mathematical Learning and Cognition Society

Patrick Ehrman, Graduate Student, Purdue University
Zory Zhang, Undergraduate Student, University of Illinois, Urbana-Champagne

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, Fakhrunessa 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