

ROBERTO A. ABREU-MENDOZA

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EMPLOYMENT

Postdoctoral Fellow, Department of Psychological and Brain Sciences
Indiana University, Bloomington, Bloomington, IN
Principal Investigator: Elizabeth Gunderson

August 2023-Present

EDUCATION

PhD in Psychology

August 2018 to June 2023

MA in Psychology

Rutgers University – Newark, Newark, NJ

Advisor: Miriam Rosenberg-Lee

MSc in Behavioral Science – Neuroscience Concentration

January 2015 to June 2017

Universidad de Guadalajara, México

Advisor: Esmeralda Matute

Bachelor's in Psychology

2012

Universidad de Guadalajara, México

AWARDS & SHORT-TERM FELLOWSHIPS

2022 – International Mind, Brain, and Education/ National Science Foundation Travel Award, Montreal, Canada

2022 – Jay Rosenblatt Scholarly Publication Award for Outstanding Paper, Department of Psychology, Rutgers University-Newark, USA

2021 – RUBIC PILOT Grant, Rutgers University-Newark, USA

2017 – Mechanisms of Learning Forum, Emory University & UNAM, Queretaro, Mexico

2015 – 5th Latin American School for Education, Cognitive and Neural Sciences, James McDonnell Foundation, San Pedro de Atacama, Chile

2011 – PRO SNI II Scholarship, Universidad de Guadalajara, Mexico

2010 – Mexican Academy of Science Scholarship, Mexico

PUBLICATIONS

21. Schiller, L., **Abreu-Mendoza, R.A.**, Fitzsimmons, C.J., Thompson, C.A., & Rosenberg-Lee, M. (*in press*). Lack of integrated number sense among college students: evidence from rational number cross-notation comparison. *Journal of Experimental Psychology: Human Perception and Performance*
20. Schiller, L., **Abreu-Mendoza, R.A.**, Fitzsimmons, C.J., Thompson, C.A., & Rosenberg-Lee, M. (2024) Children's estimates of equivalent rational number magnitudes are not equal: evidence from whole numbers, percentages, decimals, and fractions. *Journal of Experimental Child Psychology*
19. Schiller, L., **Abreu-Mendoza, R.A.**, Siegler, R., Rosenberg-Lee, M. & Thompson, C.A. (2024). Building integrated number sense in adults and children: comparing fraction-only training to cross-notation number line training. *Journal of Experimental Child Psychology*. <https://doi.org/10.1016/j.jecp.2024.106017>
18. Chamorro, Y., Mendizábal-Ruiz, A. P., **Abreu-Mendoza, R.A.**, Morales, J.A., Ramírez-Dueñas, M., & Matute, E. (2024). Preliminary evidence for a positive relation between the COMT rs4680 Met/Met genotype and Math

Achievement. *Developmental Neuropsychology*. <https://doi.org/10.1080/87565641.2024.2326879>.
<https://doi.org/10.1080/87565641.2024.2326879>.

17. Rosenberg-Lee, M., Varma, S., Cole, M., & **Abreu-Mendoza, R.A.** (2023). Competing number codes in decimal comparison: whole and rational distance both impact performance. *Cognition*, 105608, <https://doi.org/10.1016/j.cognition.2023.105608>
16. **Abreu-Mendoza, R.A.**, Powell, A.B., Renninger, K.A., Rivera, L. M., Vulic, J., Weimar, S., & Rosenberg-Lee, M. (2023). Middle-Schoolers' Misconceptions in Discretized Nonsymbolic Proportional Reasoning Better Explain Fraction Biases than their Continuous Reasoning: Evidence from Correlation and Cluster Analyses. *Cognitive Psychology*, 143, 101575. <https://doi.org/10.1016/j.cogpsych.2023.101575>
15. Schiller, L., **Abreu-Mendoza, R.A.**, Rosenberg-Lee, M. (2023). Adults underestimate decimals and priming induces further magnitude-based underestimation. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. <https://doi.org/10.31234/osf.io/dhz9p>
14. Angulo-Chavira, A.*, **Abreu-Mendoza, R.A.***, Flores-Coronado, M., Vargas-García, E., & Arias-Trejo, N. (2022). Perceptual dissimilarity, cognitive, and linguistic skills predict novel word retention, but not extension skills in Down syndrome. *Cognitive Development*, 62, 101166. <https://doi.org/10.1016/j.cogdev.2022.101166>
13. Friend, M., Lopez, O., DeAnda, S., **Abreu-Mendoza, R.A.**, & Arias-Trejo, N. (2022). Maternal Education Revisited: Vocabulary Growth in English and Spanish before 30 Months of Age. *Infant Behavior and Development*, 6,101685. <https://doi.org/10.1016/j.infbeh.2021.101685>
12. **Abreu-Mendoza, R. A.**, Pincus, M., Chamorro, Y., Jolles, D., Matute, E., Rosenberg-Lee, M. (2022). Parietal and hippocampal hyper-connectivity is associated with low math achievement in adolescence – A preliminary study. *Developmental Science*, 25(3), e13187. <https://doi.org/10.1111/desc.13187>
11. Coulanges, L., **Abreu-Mendoza, R.A.**, Varma, S., Uncapher, M., Gazzaley, A., Anguera, J., and Rosenberg-Lee, M. (2021) Linking inhibitory control to math achievement via counterintuitive decimal comparison. *Cognition*, 214, 104767. <https://doi.org/10.1016/j.cognition.2021.104767>
10. **Abreu-Mendoza, R.A.**, Coulanges, L., Ali, K., Powell, A. B., & Rosenberg-Lee, M. (2021). From non-symbolic to symbolic proportions and back: a Cuisenaire rod proportional reasoning intervention enhances continuous proportional reasoning skills. *Front. Psychol.* 12:633077. <https://doi.org/10.3389/fpsyg.2021.633077>
9. **Abreu-Mendoza, R.A.**, Coulanges, L., Ali, K., Powell, A. B., & Rosenberg-Lee, M. (2020). Children's Discrete Proportional Reasoning Is Related to Inhibitory Control and Enhanced by Priming Continuous Representations. *Journal of Experimental Child Psychology*, 199. <https://doi.org/10.1016/j.jecp.2020.104931>
8. **Abreu-Mendoza, R.A.**, Jasso, T., Soto-Alba, E.E. & Arias-Trejo, N. (2020). Receptive Number Morphosyntax in Children with Down Syndrome. *Language and Cognition*. 12(4), 679-704. <https://doi.org/10.1017/langcog.2020.18>
7. **Abreu-Mendoza, R.A.**, Chamorro, Y. & Matute, E. (2019). Psychometric Properties of the WRAT Math Computation Subtest in Mexican Adolescents. *Journal of Psychoeducational Assessment*, 37(8), 957-972. <https://doi.org/10.1177/0734282918809793>
6. **Abreu-Mendoza, R.A.**, Chamorro, Y., García-Barrera, M. & Matute, E. (2018). The Contribution of Executive Functions to Mathematical Learning Disabilities and Mathematical Talent During Adolescence. *PLoS One*. <https://doi.org/10.1371/journal.pone.0209267>
5. Beltrán-Navarro, B., **Abreu-Mendoza, R.A.**, Matute, E., & Rosselli, M. (2018). The development of early numerical abilities of Spanish-speaking Mexican preschoolers: a new assessment tool. *Applied Neuropsychology: Child*, 7(2), 117-128. <https://doi.org/10.1080/21622965.2016.1266940>
4. **Abreu-Mendoza, R.A.** & Arias-Trejo, N. (2017). Counting Abilities in Down Syndrome: The Role of the One-to-One Correspondence Principle and Receptive Vocabulary. *Neuropsychology*, 31(7), 750-758. <https://doi.org/10.1037/neu0000377>

3. **Abreu-Mendoza, R.A.** & Arias-Trejo, N. (2015). Numerical and Area Comparison Abilities in Down Syndrome. *Research in Developmental Disabilities*, 41-42, 58-65. <https://doi.org/10.1016/j.ridd.2015.05.008>
2. Arias-Trejo, N., **Abreu-Mendoza, R.A.** & Aguado-Servín, O. (2014). Spanish-speaking children's production of number morphology. *First Language*, 34 (4), 372-384. <https://doi.org/10.1177/0142723714544411>
1. **Abreu-Mendoza R.A.**, Soto-Alba E.E. & Arias-Trejo N. (2013). Area vs. Density: Influence of visual variables and cardinality knowledge in early number comparison. *Front. Psychol.* 4(805). <https://doi.org/10.3389/fpsyg.2013.00805>

INVITED SUBMISSIONS

3. Toledo, R. V. F., **Abreu-Mendoza, R.**, & Rosenberg-Lee, M. (2023). Brazilian math teacher's magnitude representation and strategy use in fraction comparison: A mixed methods study. *Caminhos da Educação Matemática em Revista*, 13(1), 93-116
2. **Abreu-Mendoza, R. A.**, & Rosenberg-Lee, M. (2023). Measuring fences and sharing pizzas: Current advances in nonsymbolic fraction interventions. *Caminhos da Educação Matemática em Revista*, 11(1), 25–47.
1. **Abreu-Mendoza, R.A.** (2020). Research on Numerical Cognition in Mexico. *Studies in Psychology*, 41(2), 245-270. <https://doi.org/10.1080/02109395.2020.1748999>

PREPRINTS

2. Romero-Juárez, L.D.[†], Matute, E., Chamorro, Y., Schiller, L.K., Rosenberg-Lee, M., & **Abreu-Mendoza, R.A.** (2024) Distinct Fraction Comparison Strategies Relate to Rational Number Difficulties and Cognitive Outcomes Among High-School Students. <https://osf.io/preprints/psyarxiv/ngvuf>
1. **Abreu-Mendoza R. A.**, Members of the ManyNumbers Research Network, & Gunderson, E. (registered report Stage 1, 2nd revision). ManyNumbers 1: A multi-lab international study of preschool number knowledge. *Developmental Science*

IN PREPARATION

3. Fan, A.[†], **Abreu-Mendoza, R.A.**, van Hoof, J., van Dooren, W., Rosenberg-Lee, M. (in prep). College students' strategy choice in fraction comparison and its relations to math achievement and executive functions.
2. **Abreu-Mendoza R. A.**, Nkwo, C., Cole, M., Mill, R., Pincus, M., & Rosenberg-Lee, M. (in prep). Similarity of neural representations of nonsymbolic proportional reasoning and fraction knowledge.
1. Nkwo, C.[†], **Abreu-Mendoza, R. A.**, Rosenberg-Lee, M. (in prep). Differential relationship between math achievement and functional connectivity in young adults with autism.

*These authors contributed equally to this work

[†]Graduate student mentee

ORAL PRESENTATIONS AND INVITED TALKS

- Rosenberg-Lee, M., **Abreu-Mendoza, R. A.**, & Nkwo, C. (2024, June). Continuous or discretized? Examining the nonsymbolic underpinnings of fraction magnitude understanding. Talk presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.
- Libertus, M., **Abreu-Mendoza, R.A.**, Barner, D., Boni, I., Cheung, P., Cordes, C., Feigenson, L., Gunderson, E. A., Hyde, D., Izard, V. (2024, June). The ManyNumbers Project: Creating a global network of early numeracy labs. Talk presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.
- Schiller, L., **Abreu-Mendoza, R.A.**, Thompson, C.A., & Rosenberg-Lee, M. (2024, June). Children's estimates of equivalent rational number magnitudes are not equal: Evidence from fractions, decimals, percentages, and

whole numbers. Talk presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.

Abreu-Mendoza, R. A., & Rosenberg-Lee, M. (2023, July). Executive Function Contributions to Challenging Mathematical Concepts. Talk presented at the 2023 Association for Psychological Science Annual Convention, Washington D.C., USA.

Abreu-Mendoza, R. A., & Rosenberg-Lee, M. (2022, July). Fraction Knowledge and Its Relations to Nonsymbolic Proportional Reasoning and Executive Functions. Talk presented at Mathematical Thinkers Like Me Summer Work Group, Newark, NJ, USA.

Abreu-Mendoza, R. A. (March, 2022). Informando a la educación matemática desde las neurociencias de la educación: un estudio de caso sobre la instrucción de fracciones. Online talk presented at Proseminario del Instituto de Neurociencias, Universidad de Guadalajara.

Abreu-Mendoza, R. A., Pincus, M., Chamorro, Y., Jolles, D., Matute, E., Rosenberg-Lee, M. (2021, October). Parietal and hippocampal hyper-connectivity is associated with low math achievement in adolescence. Online talk presented at 2021 Mathematical Cognition and Learning Society Conference Lightning Talks.

Abreu-Mendoza, R. A., Soto-Alba, E. & Arias-Trejo, N. (2014, May). The relation between children's performance in a number comparison task and their cardinality knowledge: the usage of different visual controls. Oral paper presented at the 44th Annual Meeting of the Jean Piaget Society, San Francisco, USA

POSTER PRESENTATIONS

Abreu-Mendoza, R. A. & Gunderson, E.A. (2024, June). Nonsymbolic proportional estimation profiles are not associated with better magnitude understanding at the early stages of fraction instruction. Poster presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.

Rennerfeldt, P., Abreu-Mendoza, R.A., Rosenberg-Lee, M. (2024, June) Whole-number magnitudes interfere with decimal processing in children across strategies, and high performers additionally process rational magnitudes. Poster presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.

Nkwo, C., Abreu-Mendoza, R. A., McCabe, C., Graves, W., Rosenberg-Lee, M. (2024, June). Math achievement and functional connectivity differences in young adults with and without autism. Poster presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.

Fan, A., Abreu-Mendoza, R.A., Van Hoof, J., Van Dooren, W., Rosenberg-Lee, M. (2024, June), College students' strategy choice in fraction comparison and its relation to math achievement and executive functions. Poster presented at the 2024 Mathematical Cognition and Learning Society Conference. Washington D.C., USA.

Abreu-Mendoza, R. A. & Rosenberg-Lee, M. (2022, July), Contributions of Discrete and Continuous Nonsymbolic Proportional Reasoning to Symbolic Magnitude Fraction Comparison Skills. Poster presented at IMBES 2022, Montreal, Canada.

Abreu-Mendoza, R. A., Pincus, M., Chamorro, Y., Jolles, D., Matute, E., Rosenberg-Lee, M. (2019, October). Parietal Hyper-Connectivity is Associated with Low Math Performance During Adolescence. Poster presented at 2019 Annual Meeting of the Society for Neuroscience, Chicago, USA

Abreu-Mendoza, R. A., Coulanges, L., Ali, K., Powell, A. B., & Rosenberg-Lee, M. (2019, June). Effects of a non-symbolic fraction intervention on proportional reasoning. Poster presented at the 2nd Mathematical Cognition and Learning Society Conference, Ottawa, Canada

Toledo, R., dos Santos, C., Powell, A. B., Souza M., Abreu-Mendoza, R. A., & Rosenberg-Lee, M. (2019, June). Fraction Education Based on Cognitive Neuroscience Theory And 4a- Instructional Model Intermediated By A Lesson Study. Poster presented at the 2nd Mathematical Cognition and Learning Society Conference, Ottawa, Canada

Abreu-Mendoza, R. A., Coulanges, L., Ali, K., Powell, A. B., & Rosenberg-Lee, M. (2019, June) Enhancing Children's Proportional Reasoning Skills with a Non-Symbolic Intervention. Poster to be presented at Heterogeneous

Contributions to Numerical Cognition: Learning and Education In Mathematical Cognition workshop, Ghent, Belgium

- Abreu-Mendoza, R.A.**, Chamorro, Y., García-Barrera, M., & Matute, E. (2019, March). The Contribution of Executive Functions to Mathematical Learning Disabilities and Mathematical Talent During Adolescence. Poster presented at 2019 SRCD Biennial Meeting, Baltimore, Maryland, USA
- Jasso, T., **Abreu-Mendoza, R.A.**, Soto-Alba, E.E. & Arias-Trejo, N. (2019, March) Number Morphosyntax and Numerical Comparison Abilities in Children with Down Syndrome. Poster presented at 2019 SRCD Biennial Meeting, Baltimore, Maryland, USA
- Abreu-Mendoza, R.A.**, Chamorro, Y., Zarabozo-Hurtado, D. & Matute, E. (2018, April). Neural Underpinnings of Nonsymbolic Numerical Comparison in Adolescents with Different Math Performance. Poster presented at the 1st Mathematical Cognition and Learning Society Conference, Oxford, UK
- Abreu-Mendoza, R. A.**, Ramos-Sánchez, J. & Arias-Trejo, N. (2017, April). The comprehension of the one-to-one correspondence principle in Down syndrome: a looking time study. Poster presented at 2017 SRCD Biennial Meeting, Austin, Texas, USA
- Beltrán-Navarro, B., **Abreu-Mendoza, R. A.**, Esmeralda Matute, Rosselli M. (2017, April). The development of early numerical skills of Spanish-speaking preschoolers living in Mexico. Poster presented at 2017 SRCD Biennial Meeting, Austin, Texas, USA
- Gonzalez-Gomez, N., **Abreu-Mendoza, R. A.**, & Arias-Trejo (2016, May). Crosslinguistic Effects of Lexical Stress on Early Word Learning. Poster presented at XX Biennial International Conference on Infant Studies, New Orleans, USA
- Abreu-Mendoza, R. A.** & Arias-Trejo (2015, March). Numerical and area discrimination in Down syndrome. Poster presented at the biennial meeting of the Society for Research in Child Development, Philadelphia, Pennsylvania, USA
- Arias-Trejo, N., **Abreu-Mendoza, R.**, Barrón-Martínez, J. & Pérez-Peredo, L. (2015, March). Receptive vocabulary of children with Down syndrome: an eye-tracking task. Poster presented at the biennial meeting of the Society for Research in Child Development, Philadelphia, Pennsylvania, USA
- Santana, D., **Abreu-Mendoza, R. A.**, Arias-Trejo, N., & Haro, R. (2014, November). Electrophysiological investigation of number and area comparison abilities in children. Poster presented at 2014 Annual meeting of the Society for Neuroscience, Washington, USA
- Arias-Trejo, N., Cantrell, L., Smith, L., Alva Canto & **Abreu-Mendoza, R. A.** (2014, July). Infant Use Grammatical Number Cues to Infer Novel Referents. Poster presented at the XIX Biennial International Conference on Infant Studies, Berlin, Germany
- DeAnda, S., **Abreu-Mendoza, R. A.**, Friend, M. & Arias-Trejo, N. (2014, July). Vocabulary size and SES effects in Mexican Spanish infant learners. Poster presented at the XIX Biennial International Conference on Infant Studies, Berlin, Germany
- Abreu-Mendoza, R. A.**, Arias-Trejo, N. & Santana-Vargas, D. (2014, May). Children's Processing of Number and Area: Representing Number is No Longer Easier than Representing Area. Poster presented at the 44th Annual Meeting of the Jean Piaget Society, San Francisco, USA
- Arias-Trejo, N., **Abreu-Mendoza, R. A.**, Soto-Alba E., González-Gómez, N. (2013, September). How visual controls affect children's performance on non-symbolic numerical comparison tasks. Poster presented at the 2013 Annual Conference of the BPS Developmental and Cognitive Sections, Reading, Berkshire.
- Abreu-Mendoza, R. A.**, Plascencia-González, A., & Arias-Trejo, N. (2013, April). Early Singular-Plural and Plural-Singular Production of Familiar and Novel Words in Spanish. Poster presented at the biennial meeting of the Society for Research in Child Development, Seattle, Washington
- Abreu-Mendoza, R. A.**, Plascencia-González, A., & Arias-Trejo, N. (2013, April). Children's Learning and Generalization of the Numeral Three. Poster presented at the biennial meeting of the Society for Research in Child Development, Seattle, Washington.

TEACHING

Teaching Assistant, Rutgers University-Newark

302: Psychology Research Methods <i>one section taught weekly</i>	2022 Spring
302: Psychology Research Methods <i>one section taught weekly</i>	2021 Fall
302: Psychology Research Methods <i>one section taught weekly</i>	2021 Spring
301: Psychology Statistical Methods <i>one section taught weekly</i>	2020 Fall
301: Psychology Statistical Methods <i>one section taught weekly</i>	2020 Spring
302: Psychology Research Methods <i>one section taught weekly</i>	2019 Fall

MENTORSHIP

Chinedu Nkwo, 2022-2024, Rutgers University – Newark, Master of Arts Program in Psychology

Daniel Romero, 2019-2021, Universidad de Guadalajara, Master of Science Program in Behavioral Science – Neuroscience Concentration

Akua Asante, 2021-2022, GS-LSAMP

Ajala Trotman, 2021-2022, Rutgers University – Newark, Biology Major, Graduate School Newark Research Fellow

Samer Youssef, 2020-2022, Rutgers University – Newark, Biology Major

Manpreet Singh, 2021-2022, Rutgers University – Newark, Psychology Major

Shayaka Wilson, 2021-2022, Rutgers University – Newark, Biology Major

Falisha Verma, 2021, Rutgers University – Newark, Psychology Major

Joseph Owadee, 2021, Rutgers University – Newark, Computer Science Major, GS-LSAMP

Herve Borgella, 2020-2021, Rutgers University – Newark, Biology Major, GS-LSAMP

Portia Shaheed, 2019-2021, NJIT, Biology Major

Javan Wilson, 2019, Essex County Community College, Computer Science Major, GS-LSAMP

Sena Dzirasa, 2019, Essex County Community College, Mathematics Major, GS-LSAMP, now at Rutgers-NB

Blessing Eluwa, 2018-2019, Rutgers University – Newark, Biology Major, Honors Thesis

EDITORIAL DUTIES

Referee/Reviewer

Applied Neuropsychology: Child (Taylor & Francis)	Journal of Experimental Child Psychology (Elsevier)
Brain and Behavior (Wiley),	Journal of Mathematical Behavior (Elsevier)
Brain and Language (Elsevier)	Journal of Neuroimaging (Wiley)
Cognitive Development (Elsevier)	Journal Psychoeducational Assessment (Sage)
Cognition (Elsevier)	Mind, Brain, and Education (Wiley)
Current Opinion in Behavioral Sciences (Elsevier)	Neuroscience (Elsevier)

Developmental Psychology (APA)
Developmental Review (Elsevier)
Frontiers in Human Neuroscience (Frontiers)
Frontiers in Psychology (Frontiers)

PlosOne (Plos)
Suma Psicológica (Elsevier)