

Curriculum Vitae

David William Braithwaite

Florida State University
1107 W. Call St.
Tallahassee, Florida 32306-4301

Phone: (850) 644-3409
Email: braithwaite@psy.fsu.edu
Website: psy.fsu.edu/~braithwaite

Education and Employment

- 2024–present Associate Professor, Psychology, Florida State University.
- 2018–2024 Assistant Professor, Psychology, Florida State University.
- 2014–2018 Postdoctoral Research Fellow, Department of Psychology, Carnegie Mellon University, Pittsburgh, PA.
- 2009–2014 Ph.D., Indiana University, Bloomington. Major: Psychology and Cognitive Science. Supervisor: Robert L. Goldstone. Outstanding Dissertation Award, Cognitive Science Program. Dissertation: *Grounding Mathematics Learning*.
- 2004–2009 Research Director and Deputy General Manager, Consumer Insight Research
- 1997–2004 Research Executive/Manager/Director, Consumer Behavior Research
- 1993–1997 B.A., The University of Chicago. Major: Mathematics. Phi Beta Kappa, Sigma Xi.
- 1993–1995 St. John's College, Annapolis, MD.

Funding

Braithwaite, D. W., & Siegler, R. S. (Sep 2019–Aug 2024). *Creating a Theory of Decimal Arithmetic Learning*. Funded by National Science Foundation. Total award \$550,000.

Braithwaite, D. W. (May 2019–Aug 2019). *Understanding Fraction Arithmetic with Virtual Manipulatives*. Funded by Florida State University. Total award \$20,000.

Publications

Refereed Journal Articles

1. **Braithwaite, D. W.** (in press). Domain Effects on Interpretations of General Conditionals: The Case of Mathematics. *Thinking & Reasoning*.
2. **Braithwaite, D. W.**, & Siegler, R. S. (2024). A Unified Model of Arithmetic With Whole Numbers, Fractions, and Decimals. *Psychological Review*, *131*(2), 431-455. doi:10.1037/rev0000440
3. **Braithwaite, D. W.**, & Hall, G. J. (2024). Explaining procedures and interleaving practice in fraction arithmetic. *Learning and Instruction*, *90*. doi:10.1016/j.learninstruct.2023.101854
4. Liu, Q.^(d), & **Braithwaite, D. W.** (2023). Affordances of fractions and decimals for arithmetic. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *49*(9), 1459-1470. doi:10.1037/xlm0001161
5. Alvarez-Vargas, D.^(d), **Braithwaite, D. W.**, Lortie-Forgues, H., Moore, M.^(p), Castro, M.^(d), Wan, S.^(p), Martin, E., & Bailey, D. (2023). Hedges, mottes, and baileys: Causally ambiguous statistical language can increase perceived study quality and policy relevance. *PLOS ONE*, *18*(10), e0286403. doi:doi.org/10.1371/journal.pone.0286403
6. **Braithwaite, D. W.**, McMullen, J., & Hurst, M. A. (2022). Cross-notation knowledge of fractions and decimals. *Journal of Experimental Child Psychology*, *213*, 105210. doi:10.1016/j.jecp.2021.105210
7. **Braithwaite, D. W.** (2022). Relations between geometric proof justification and probabilistic reasoning. *Learning and Individual Differences*, *98*, 102201. doi:10.1016/j.lindif.2022.102201
8. **Braithwaite, D. W.**, Sprague, L.^(d), & Siegler, R. S. (2022). Toward a unified theory of rational number arithmetic. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *48*(10), 1470-1483. doi:10.1037/xlm0001073
9. **Braithwaite, D. W.**, & Sprague, L.^(d) (2021). Conceptual knowledge, procedural knowledge, and metacognition in routine and nonroutine problem solving. *Cognitive Science*, *45*, e13048. doi:10.1111/cogs.13048
10. Tian, J.^(p), **Braithwaite, D. W.**, & Siegler, R. S. (2021). Distributions of textbook problems predict student Learning: Data from decimal arithmetic. *Journal of Educational Psychology*, *113*(3), 516-529. doi:10.1037/edu0000618

11. **Braithwaite, D. W.**, & Siegler, R. S. (2021). Putting fractions together. *Journal of Educational Psychology*, *113*(3), 556-571. doi:10.1037/edu0000477
12. Tian, J.^(p), **Braithwaite, D. W.**, & Siegler, R. S. (2020). How do people choose among rational number notations? *Cognitive Psychology*, *123*, 101333. doi:10.1016/j.cogpsych.2020.101333
13. Siegler, R. S., Im, Soo-hyun, & **Braithwaite, D. W.** (2020). Understanding development requires assessing the environment in which learning occurs: Examples from mathematics learning. *New Directions for Child and Adolescent Development*, *173*, 83-100. doi:10.1002/cad.20372
14. **Braithwaite, D. W.**, Leib, E. R.^(d), Siegler, R. S., & McMullen, J.^(p) (2019). Individual differences in fraction arithmetic learning. *Cognitive Psychology*, *112*, 81-98. doi:10.1016/j.cogpsych.2019.04.002
15. **Braithwaite, D. W.**, Tian, J., & Siegler, R. S. (2018). Do children understand fraction addition? *Developmental Science*, *21*(4), e12601. doi:10.1111/desc.12601
16. **Braithwaite, D. W.**, & Siegler, R. S. (2018). Developmental changes in the whole number bias. *Developmental Science*, *21*(2), e12541. doi:10.1111/desc.12541
17. **Braithwaite, D. W.**, & Siegler, R. S. (2018). Children learn spurious associations in their math textbooks: Examples from fraction arithmetic. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *44*(11), 1765-1777. doi:10.1037/xlm0000546
18. **Braithwaite, D. W.**, Pyke, A. A., & Siegler, R. S. (2017). A computational model of fraction arithmetic. *Psychological Review*, *124*(5), 603-625. doi:10.1037/rev0000072
19. Carvalho, P. F., **Braithwaite, D. W.**, de Leeuw, J. R., Motz, B. A., & Goldstone, R. L. (2016). An in-vivo study of self-regulated study sequencing in introductory psychology courses. *PLoS ONE*, *11*(3), e0152115. doi:10.1371/journal.pone.0152115
20. **Braithwaite, D. W.**, Goldstone, R. L., van der Maas, H. L. J., & Landy, D. H. (2016). Non-formal mechanisms in mathematical cognitive development: The case of arithmetic. *Cognition*, *149*, 40-55. doi:10.1016/j.cognition.2016.01.004
21. **Braithwaite, D. W.**, & Goldstone, R. L. (2015). Effects of variation and prior knowledge on abstract concept learning. *Cognition and Instruction*, *33*(3), 226-256. doi:10.1080/07370008.2015.1067215
22. **Braithwaite, D. W.**, & Goldstone, R. L. (2013). Flexibility in data interpretation: Effects of representational format. *Frontiers in Psychology*, *4*(December), 1-16. doi:10.3389/fpsyg.2013.00980

23. **Braithwaite, D. W.**, & Goldstone, R. L. (2013). Integrating formal and grounded representations in combinatorics learning. *Journal of Educational Psychology*, *105*(2), 666-682. doi:10.1037/a0032095

Invited Journal Articles

1. Siegler, R. S., Im, Soo-hyun^(p), Schiller, L.^(d), Tian, J.^(p), & **Braithwaite, D. W.** (2020). The sleep of reason produces monsters: How and when biased input shapes mathematics learning. *Annual Review of Developmental Psychology*, *2*, 413-435. doi:10.1146/annurev-devpsych-041620-031544
2. **Braithwaite, D. W.** (2019). Challenges of modeling continuity and change in children's seriation and ordinal understanding. [Peer commentary on the article "The development of size sequencing skills: An empirical and computational analysis" by M. McGonigle-Chalmers and I. Kusel]. *Monograph Matters*. doi:doi.org/10.1111/mono.12411
3. Siegler, R. S., & **Braithwaite, D. W.** (2016). Numerical development. *Annual Review of Psychology*, *68*, 187-213. doi:10.1146/annurev-psych-010416-044101

Invited Book Chapters

1. Goldstone, R. L., **Braithwaite, D. W.**, & Byrge, L. A. (2012). Perceptual learning. In *Encyclopedia of the Sciences of Learning*. Heidelberg, Germany: Springer Verlag GmbH.

Refereed Proceedings

1. **Braithwaite, D. W.**, & Siegler, R. S. (2022). Testing a unified model of arithmetic. In *Proceedings of the Annual Meeting of the Cognitive Science Society*. Toronto, CA. Retrieved from <https://escholarship.org/uc/item/1zn3w132>
2. Carvalho, P. F., **Braithwaite, D. W.**, de Leeuw, J. R., Motz, B. A., & Goldstone, R. L. (2015). Effectiveness of Learner-Regulated Study Sequence: An in-vivo study in Introductory Psychology course. In Noelle, D. C., Dale, R., Warlaumont, A. S., Yoshimi, J., Matlock, T., Jennings, C. D., & Maglio, P. P. (Eds.), *37th Annual Conference of the Cognitive Science Society* (pp. 1189-1194). Austin, TX: Cognitive Science Society.
3. **Braithwaite, D. W.**, & Goldstone, R. L. (2014). Benefits of Variation Increase with Preparation. In Bello, P., Guarini, M., McShane, M., & Scassellati, B. (Eds.), *36th Annual Conference of the Cognitive Science Society* (pp. 230-235). Austin, TX: Cognitive Science Society.

4. **Braithwaite, D. W.**, & Goldstone, R. L. (2014). Spatial Organization and Presentation Mode in the Representation of Complex Data. In Bello, P., Guarini, M., McShane, M., & Scassellati, B. (Eds.), *36th Annual Conference of the Cognitive Science Society* (pp. 1940-1945). Austin, TX: Cognitive Science Society.
5. **Braithwaite, D. W.**, & Goldstone, R. L. (2013). Benefits of Graphical and Symbolic Representations for Learning and Transfer of Statistical Concepts. In Knauff, M., Pauen, M., Sebanz, N., & Wachsmuth, I. (Eds.), *35th Annual Conference of the Cognitive Science Society* (pp. 1928-1933). Austin, TX: Cognitive Science Society.
6. **Braithwaite, D. W.**, & Goldstone, R. L. (2012). Inducing Mathematical Concepts from Specific Examples: The Role of Schema-Level Variation. In Miyake, N., Peebles, D., & Cooper, R. P. (Eds.), *34th Annual Conference of the Cognitive Science Society* (pp. 138-143). Austin, TX: Cognitive Science Society.
7. **Braithwaite, D. W.**, & Goldstone, R. L. (2011). Effects of Grounded and Formal Representations on Combinatorics Learning. In Carlson, L., Höscher, C., & Shipley, T. (Eds.), *33rd Annual Conference of the Cognitive Science Society* (pp. 3431-3436). Austin, TX: Cognitive Science Society.

Presentations

Refereed Presentations at Conferences

- Liu, Q.^(d), & **Braithwaite, D. W.** (presented 2024, April). *Affordances of fractions and decimals for arithmetic*. Presentation at Annual Conference, American Educational Research Association, Philadelphia, PA. (National)
- Liu, Q.^(d), & **Braithwaite, D. W.** (presented 2024, March). *Children's notation preferences for fraction and decimal arithmetic*. Presentation at Biennial Conference, Cognitive Development Society, Pasadena, CA. (National)
- Braithwaite, D. W.**, & Rafferty, A. N. (presented 2023, November). *Predicting Parameters of Strategy Choice in Rational Number Arithmetic*. Presentation at 64th Annual Meeting, Psychonomic Society, San Francisco, CA. (International)
- Braithwaite, D. W.**, & Rafferty, A. N. (presented 2023, April). *Predicting Parameters of Strategy Choice in Fraction Arithmetic*. Presentation at Biennial Meeting, Society for Research in Child Development, Salt Lake City, Utah. (International)
- Braithwaite, D. W.**, Sprague, L.^(d), & Siegler, R. S. (presented 2022). *A unified model of arithmetic*. Presentation at Biennial Conference, Cognitive Development Society, Madison, WI. (National)

- Braithwaite, D. W.** (presented 2022). *Relations between geometric proof and probabilistic reasoning*. Presentation at the meeting of Mathematical Cognition and Learning Society, Antwerp, Belgium. (International)
- Braithwaite, D. W.**, McMullen, J., & Hurst, M. A. (presented 2021, April). *Cross-notation knowledge of rational numbers*. Presentation at Biennial Meeting, Society for Research in Child Development. (International)
- Braithwaite, D. W.**, & Siegler, R. S. (presented 2021, April). *Towards a unified theory of rational number arithmetic*. Poster presentation at Biennial Meeting, Society for Research in Child Development. (International)
- Braithwaite, D. W.**, McMullen, J., & Hurst, M. A. (presented 2021, March). *Cross-notation knowledge of rational numbers*. Presentation at Annual Conference, Mathematical Cognition and Learning Society. (International)
- Braithwaite, D. W.** (presented 2020, July). *Spontaneous and prompted uses of conceptual knowledge in rational arithmetic*. Presentation at Annual Conference, Mathematical Cognition and Learning Society. (International)
- Braithwaite, D. W.**, & Siegler, R. S. (presented 2019, October). *A Conceptual Framework for Understanding Fractions and Fraction Addition*. Poster presentation at Biennial Meeting, Cognitive Development Society, Louisville, KY. (National)
- Braithwaite, D. W.**, Leib, E. R.^(d), McMullen, J.^(p), & Siegler, R. S. (presented 2019, October). *Individual Differences in Fraction Arithmetic Learning*. Poster presentation at Biennial Meeting, Cognitive Development Society, Louisville, KY. (National)
- Braithwaite, D. W.**, & Leib, E. R.^(d) (presented 2019, June). *Modeling Individual Differences in Fraction Arithmetic*. Presentation at Annual Meeting, Mathematical Cognition and Learning Society, Ottawa, CA. (International)
- Braithwaite, D. W.**, & Siegler, R. S. (presented 2019, June). *Whole Number Bias Impedes Understanding of Fraction Equivalence*. Presentation at Annual Meeting, Mathematical Cognition and Learning Society, Ottawa, CA. (International)
- Leib, E. R.^(d), **Braithwaite, D. W.**, Siegler, R. S., & McMullen, J.^(p) (presented 2019, April). *Performance Profiles in Fraction Arithmetic*. Poster presentation at Biennial Meeting, Society for Research in Child Development, Baltimore, MD. (National)
- Braithwaite, D. W.**, Leib, E. R., McMullen, J., & Siegler, R. S. (presented 2018, November). *Individual Differences in Fraction Arithmetic Learning*. Poster presentation at 59th Annual Meeting, Psychonomics Society, New Orleans, LA. (National)

- Braithwaite, D. W., & Siegler, R. S.** (presented 2018, January). *Improving Children's Understanding of Fraction Arithmetic*. Poster presentation at 2017-2018 Principal Investigators Meeting, IES NCER/NCSEER, Arlington, VA. (National)
- Braithwaite, D. W., Zhou, X., & Siegler, R. S.** (presented 2017). *Associative Knowledge in Rational Arithmetic*. Poster presentation at Tenth Biennial Meeting, Cognitive Development Society, Portland, OR. (National)
- Braithwaite, D. W., & Siegler, R. S.** (presented 2017). *Improving Children's Understanding of Fraction Arithmetic*. Poster presentation at Tenth Biennial Meeting, Cognitive Development Society, Portland, OR. (National)
- Braithwaite, D. W., & Siegler, R. S.** (presented 2016). *A Cognitive Model of Fraction Arithmetic*. Poster presentation at 38th Annual Conference, Cognitive Science Society, Philadelphia, PA. (International)
- Braithwaite, D. W., Tian, J., & Siegler, R. S.** (presented 2016). *Conceptual Understanding of Fraction Arithmetic*. Poster presentation at 57th Annual Meeting, Psychonomics Society, Boston, MA. (National)
- Braithwaite, D. W., & Siegler, R. S.** (presented 2015). *A Cognitive Model of Fraction Arithmetic*. Poster presentation at 2015 Principal Investigators Meeting, IES NCER/NCSEER, Washington, D.C. (National)
- Carvalho, P. F., **Braithwaite, D. W., & Goldstone, R. L.** (presented 2015). *The Right Sequence for the Right Learning: Blocked and Interleaved Study Differences in the Study of Mathematical Concepts*. Poster presentation at 56th Annual Meeting, Psychonomics Society, Chicago, IL. (National)
- Braithwaite, D. W., & Siegler, R. S.** (presented 2015). *Whole Number Bias Impedes Understanding of Fraction Equivalence*. Poster presentation at 56th Annual Meeting, Psychonomics Society, Chicago, IL. (National)
- Braithwaite, D. W., & Siegler, R. S.** (presented 2015). *Whole Number Bias Impedes Understanding of Fraction Equivalence*. Poster presentation at Ninth Biennial Meeting, Cognitive Development Society, Columbus, OH. (National)
- Braithwaite, D. W., & Goldstone, R. L.** (presented 2014). *Interactions of Variation and Prior Knowledge in Abstract Concept Learning*. Poster presentation at Annual Conference, American Educational Research Association, Philadelphia, PA. (National)
- Braithwaite, D. W., & Goldstone, R. L.** (presented 2013). *Effects of Superficial Variation and Prior Knowledge on Learning Abstract Concepts*. Poster presentation at the meeting of Psychonomics Society Meeting, Toronto, Canada. (International)

Invited Lectures and Readings of Original Work

Braithwaite, D. W. (2018, June). *A Theory of Fraction Arithmetic Learning*. Delivered at Carnegie Learning, Inc, Pittsburgh, PA. (Local)

Braithwaite, D. W. (2017). *A Theory of Fraction Arithmetic Learning*. Delivered at Department of Psychology, University of Kentucky, Louisville, KY. (Local)

Braithwaite, D. W. (2017). *A Theory of Fraction Arithmetic Learning*. Delivered at Department of Psychology, Florida State University, Tallahassee, FL. (Local)

Braithwaite, D. W. (2017). *A Theory of Fraction Arithmetic Learning*. Delivered at School of Education, University of California, Irvine, Irvine, CA. (Local)

Braithwaite, D. W. (2017). *A Theory of Fraction Arithmetic Learning*. Delivered at Faculty of Education, University of Western Ontario, London, Ontario, CA. (Local)

Braithwaite, D. W. (2017). *Finding the Angel in the Marble: The Challenge of Learning Mathematics*. Delivered at Department of Psychology, University of East Anglia, Norwich, UK. (International)

Teaching

Courses Taught

Development of Math Thinking (PSY5916)
Learning Rational Numbers (PSY4910)
Preliminary Examination Preparation (PSY6656)
Research Topics (PSY4920)
Child Psychology (DEP3103)
Individual Research Study (PSY5900)
Directed Individual Study (PSY5908)
Experimental Methods in Psychology
Cognitive Psychology
Computer and Statistical Methods in Psychology

Doctoral Committee Chair

Sprague, L. N., doctoral student.
Liu, Q., doctoral student.

Doctoral Committee Member

Sorenson, P. A., graduate. (2022). *Investigating theory of the testing effect: Assessing the underlying assumptions and mechanisms of the episodic context theory and the dual memory model.*
Breedin, O., doctoral candidate.

Master's Committee Chair

Sprague, L. N., graduate. (2022). *Defining and measuring mathematical reasoning.*
Liu, Q., graduate. (2021). *Executive Function and Intermixing in Math: The differential impact of Inhibition and Shifting.*

Master's Committee Member

Breedin, O. W., graduate. (2022). *Sexual Afterglow: How Long Does it Last and Does it Vary across People?*
Sorenson, P. A., graduate. (2019). *To recognize or not to recognize: What is the effect on relearning?*

Honors, Awards, and Prizes

Provost's Faculty Travel Award, The Florida State University (2023). (\$1,000).
College of Arts and Sciences Dean's Faculty Travel Award, The Florida State University (2023). (\$1,500).
College of Arts and Sciences Dean's Faculty Travel Award, The Florida State University (2018). (\$1,500).
Young Scientist Travel Award, Indiana University (2016). (\$1,500).
Outstanding Dissertation Award, Cognitive Science Program, Indiana University (2015).
College of Arts and Sciences Travel Award, Indiana University (2013).
NSF Conference Grant for Annual Meeting of the Cognitive Science Society (2013).
NSF Conference Grant for Annual Meeting of the Cognitive Science Society (2012).
Phi Beta Kappa, University of Chicago (1997).
Sigma Xi, University of Chicago (1997).