Curriculum Vitae
David William Braithwaite

Florida State University
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Education and Employment

2018–present 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 2022). *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.**, & Siegler, R. S. (in press). A Unified Model of Arithmetic With Whole Numbers, Fractions, and Decimals. *Psychological Review*.

2. Alvarez-Vargas, D.[(d)], **Braithwaite, D. W.**, Lortie-Forgues, H., Moore, M.[(p)], Castro, M.[(d)], Wan, S.[(p)], Martin, E., & Bailey, D. (in press). Hedges, mottes, and baileys: Causally ambiguous statistical language can increase perceived study quality and policy relevance. *PLOS ONE*.

3. Liu, Q.[(d)], & **Braithwaite, D. W.** (2023). Affordances of fractions and decimals for arithmetic. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. doi:10.1037/xlm0001161

4. **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

5. **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

6. **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

7. **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

8. 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

9. **Braithwaite, D. W.**, & Siegler, R. S. (2021). Putting fractions together. *Journal of Educational Psychology*, *113*(3), 556-571. doi:10.1037/edu0000477

10. 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

11. 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

12. **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

13. **Braithwaite, D. W.**, Tian, J., & Siegler, R. S. (2018). Do children understand fraction addition? *Developmental Science*, *21*(4), e12601. doi:10.1111/desc.12601

14. **Braithwaite, D. W.**, & Siegler, R. S. (2018). Developmental changes in the whole number bias. *Developmental Science*, *21*(2), e12541. doi:10.1111/desc.12541

15. **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

16. **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

17. 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

18. **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

19. **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

20. **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

21. **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., Hölscher, 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

Braithwaite, D. W., & Rafferty, A. N. (2023, April). *Predicting Parameters of Strategy Choice in Fraction Arithmetic*. Presentation at Biennial Meeting, Society for Research in Child Development, Salt Lake City, Utah.

Braithwaite, D. W., Sprague, L.[(d)], & Siegler, R. S. (2022). *A unified model of arithmetic*. Presentation at the meeting of Cognitive Development Society, Madison, WI.

Braithwaite, D. W. (2022). *Relations between geometric proof and probabilistic reasoning*. Presentation at the meeting of Mathematical Cognition and Learning Society, Antwerp, Belgium.

Braithwaite, D. W., McMullen, J., & Hurst, M. A. (2021, April). *Cross-notation knowledge of rational numbers*. Presentation at Biennial Meeting, Society for Research in Child Development.

Braithwaite, D. W., & Siegler, R. S. (2021, April). *Towards a unified theory of rational number arithmetic*. Poster presentation at Biennial Meeting, Society for Research in Child Development.

Braithwaite, D. W., McMullen, J., & Hurst, M. A. (2021, March). *Cross-notation knowledge of rational numbers*. Presentation at Annual Conference, Mathematical Cognition and Learning Society.

Braithwaite, D. W. (2020, July). *Spontaneous and prompted uses of conceptual knowledge in rational arithmetic*. Presentation at Annual Conference, Mathematical Cognition and Learning Society.

Braithwaite, D. W., & Siegler, R. S. (2019, October). *A Conceptual Framework for Understanding Fractions and Fraction Addition*. Poster presentation at Biennial Meeting, Cognitive Development Society, Louisville, KY.

Braithwaite, D. W., Leib, E. R.[(d)], McMullen, J.[(p)], & Siegler, R. S. (2019, October). *Individual Differences in Fraction Arithmetic Learning*. Poster presentation at Biennial Meeting, Cognitive Development Society, Louisville, KY.

Braithwaite, D. W., & Leib, E. R.[(d)] (2019, June). *Modeling Individual Differences in Fraction Arithmetic*. Presentation at Annual Meeting, Mathematical Cognition and Learning Society, Ottawa, CA.

Braithwaite, D. W., & Siegler, R. S. (2019, June). *Whole Number Bias Impedes Understanding of Fraction Equivalence*. Presentation at Annual Meeting, Mathematical Cognition and Learning Society, Ottawa, CA.

Leib, E. R.[(d)], **Braithwaite, D. W.**, Siegler, R. S., & McMullen, J.[(p)] (2019, April). *Performance Profiles in Fraction Arithmetic*. Poster presentation at Biennial Meeting, Society for Research in Child Development, Baltimore, MD.

Braithwaite, D. W., Leib, E. R., McMullen, J., & Siegler, R. S. (2018, November). *Individual Differences in Fraction Arithmetic Learning*. Poster presentation at 59th Annual Meeting, Psychonomics Society, New Orleans, LA.

Braithwaite, D. W., & Siegler, R. S. (2018, January). *Improving Children's Understanding of Fraction Arithmetic*. Poster presentation at 2017-2018 Principal Investigators Meeting, IES NCER/NCSER, Arlington, VA.

Braithwaite, D. W., Zhou, X., & Siegler, R. S. (2017). *Associative Knowledge in Rational Arithmetic*. Poster presentation at Tenth Biennial Meeting, Cognitive Development Society, Portland, OR.

Braithwaite, D. W., & Siegler, R. S. (2017). *Improving Children's Understanding of Fraction Arithmetic*. Poster presentation at Tenth Biennial Meeting, Cognitive Development Society, Portland, OR.

Braithwaite, D. W., & Siegler, R. S. (2016). *A Cognitive Model of Fraction Arithmetic*. Poster presentation at 38th Annual Conference, Cognitive Science Society, Philadelphia, PA.

Braithwaite, D. W., Tian, J., & Siegler, R. S. (2016). *Conceptual Understanding of Fraction Arithmetic*. Poster presentation at 57th Annual Meeting, Psychonomics Society, Boston, MA.

Braithwaite, D. W., & Siegler, R. S. (2015). *A Cognitive Model of Fraction Arithmetic*. Poster presentation at 2015 Principal Investigators Meeting, IES NCER/NCSER, Washington, D.C.

Carvalho, P. F., **Braithwaite, D. W.**, & Goldstone, R. L. (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.

Braithwaite, D. W., & Siegler, R. S. (2015). *Whole Number Bias Impedes Understanding of Fraction Equivalence*. Poster presentation at 56th Annual Meeting, Psychonomics Society, Chicago, IL.

Braithwaite, D. W., & Siegler, R. S. (2015). *Whole Number Bias Impedes Understanding of Fraction Equivalence*. Poster presentation at Ninth Biennial Meeting, Cognitive Development Society, Columbus, OH.

Braithwaite, D. W., & Goldstone, R. L. (2014). *Interactions of Variation and Prior Knowledge in Abstract Concept Learning*. Poster presentation at Annual Conference, American Educational Research Association, Philadelphia, PA.

Braithwaite, D. W., & Goldstone, R. L. (2013). *Effects of Superficial Variation and Prior Knowledge on Learning Abstract Concepts*. Poster presentation at the meeting of Psychonomics Society Meeting, Toronto, Canada.

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.

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

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

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

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

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.

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 is 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

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).

Service

The Profession

Editorial Board Membership(s)

Journal of Experimental Psychology: Learning, Memory, and Cognition (2021).

Guest Reviewer for Refereed Journals

AERA Open (2021).

Applied Cognitive Psychology (2016–17).

Canadian Journal of Science, Mathematics, and Technology Education (2021).

Child Development (2017–19).

Cognition (2020–21).

Cognitive Development (2020–21).

Cognitive Psychology (2017).

Cognitive Research: Principles and Implications (2016).

Cognitive Science (2016–20).

Developmental Psychology (2015–16, 2018–19, 2022).

Developmental Science (2016).

Educational Studies in Mathematics (2020, 2022).

Frontiers in Psychology (2016).

Journal of Applied Research in Memory and Cognition (2013).

Journal of Cognition and Development (2017, 2020–21).

Journal of Artificial Societies and Social Simulation (2014).

Journal of Educational Psychology (2017–2020, 2022).

Journal of Experimental Child Psychology (2019–2022).

Journal of Experimental Psychology: Applied (2022).

Journal of Experimental Psychology: General (2019–2020).

Journal of Experimental Psychology: Learning, Memory, and Cognition (2014, 2018–19, 2021-2022).

Journal of the Royal Society (2016).

Journal of Numerical Cognition (2019–2020, 2022).

Learning and Individual Differences (2017–2020, 2022).

Learning and Instruction (2019–21).

Mathematical Thinking and Learning (2018–2022).

Memory and Cognition (2017–19).

Monograph Matters (2019).

PLOS One (2015–16, 2021-2022).

Quarterly Journal of Experimental Psychology (2021).

Scientific Studies of Reading (2021-2022).

Thinking and Reasoning (2017).

Reviewer or Panelist for Grant Applications

National Science Foundation (2019–2021).

National Science Foundation (2019).

National Science Foundation (2017).

Service to Professional Associations

Ad-hoc Conference Reviewer, Mathematical Cognition and Learning Society (2021).

Ad-hoc Conference Reviewer, Cognitive Science Society (2016–2018).

Ad-hoc Conference Reviewer, Society for Research in Child Development (2017).

The Community

Organizer and Activity Leader, Math Night at the Library, Leon County Public Library (2022–present).

(d) Doctoral student contributor.
(p) Post Doc contributor.