

## Nicholas A. Vest

University of Wisconsin-Madison  
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## Education

- 2021–      Ph.D. in Psychology (Developmental)  
Department of Psychology, University of Wisconsin-Madison  
Committee: *Martha Alibali, Mitchell Nathan, Percival Matthews, & Stephen Ferrigno*
- 2019–2021    M.S. in Psychology (Developmental)  
Department of Psychology, University of Wisconsin-Madison
- 2012–2016    B.S. in Psychology, with Honors  
Certificate in Neuroscience  
Department of Psychological and Brain Sciences, Indiana University

## Research Interests

I investigate mathematical cognition, focusing on how children and adults mentally represent, manipulate, and understand integers, and how these processes depend on context.

## Research Experience

- 2019–      *Graduate Research Assistant*  
Department of Psychology, University of Wisconsin-Madison  
**Cognitive Development and Communication Lab**  
Projects: Fostering Conceptual Understanding and Skill with an Intelligent Tutoring System for Equation Solving, Helping Children Develop a Patterning Lens, Leveraging Simple Card Games to Promote Children's Learning about Biological Reasoning  
PI: Martha Alibali, Ph.D.
- 2017–2019    *Project Manager*  
Department of Psychological and Brain Sciences, Indiana University  
**Learning, Education, and Development Lab**  
PI: Emily Fyfe, Ph.D.

## Teaching Experience

- 2024      *Instructor of Record*  
Department of Psychology, University of Wisconsin-Madison  
**Numerical Cognition** (PSYCH 601)  
Effectiveness Rating: 4.9/5  
Inclusive Climate Rating: 5/5
- 2022–2024    *Graduate Teaching Assistant*  
Department of Psychology, University of Wisconsin-Madison  
**Design and Analysis of Psychological Experiments II** (PSYCH 710)  
**Design and Analysis of Psychological Experiments I** (PSYCH 610)  
**Basic Statistics for Psychology** (PSYCH 210)  
**Introduction to Psychology** (PSYCH 202)  
**Cognitive Development** (PSYCH 502)

## **Awards**

- 2025      Travel Award, Society for Research in Child Development [\$300]  
2024      Serendipity Award, University of Wisconsin-Madison [\$7,500]  
2024      Psychology Department Award for Outstanding Teaching, University of Wisconsin-Madison [\$500]  
2023      Student Research Grant Competition: Conference Presentation Award, University of Wisconsin-Madison [\$600]  
2022–2025    Hertz Travel Award, University of Wisconsin-Madison [\$3,500]  
2021      Simon Initiative's LearnLab Scholarship, Carnegie Mellon University [\$500]  
2019–2025    Menzies and Royalty Research Award, University of Wisconsin-Madison [\$3,000]  
2019      Mamie and Kenneth Clark Award, University of Wisconsin-Madison [\$2,500]

## **Journal Publications**

*\* Denotes mentored undergraduate*

**Vest, N. A.**, & Sidney, P. G., Alibali, M. W. (in prep). Extending and compressing the mental number line: How fractions and negative numbers challenge numerical representations.

**Vest, N. A.**, & Alibali, M. W. (in prep). The mental representation of negative integer magnitude.

Fyfe, E. R., Grenell, A., & **Vest, N. A.** (under review). The negative effects of self-focused feedback on mathematics problem solving.

**Vest, N. A.**, Anthony, L. E., Callery, K.\*, Shack, A. P.\*, Becerra-Lopez, C.\*, & Alibali, M. W. (in press). Does focusing on the unit of change help children learn growing pattern skills? *Journal of Cognition and Development*.

Alibali, M. W., Matthews, P. G., Rodrigues, J., Meng, R., **Vest, N. A.**, Jay, V., Menendez, D., Murray, J., Donovan, A. M., Anthony, L. E., & McNeil, N. M. (2024). Research on mathematical cognition, learning, & instruction: A bird's-eye view. *Journal of Experimental Child Psychology*.

**Vest, N. A.**, & Alibali, M. W. (2024). Is zero more than nothing? Relations between concepts of zero and integer understanding. *Journal of Experimental Child Psychology*.

Borriello, G., Grenell, A., **Vest, N. A.**, Moore, K.\*, & Fyfe, E. R. (2023). Links between patterning and mathematics skills across childhood and adulthood. *Child Development*.

**Vest, N. A.**, Fagan, S. E., & Fyfe, E. R. (2022). The role of gesture and mimicry for children's pattern learning. *Cognitive Development*.

**Vest, N. A.**, Fyfe, E. R., Nathan, M. J., & Alibali, M. W. (2020). Learning from an avatar video instructor: The role of gesture mimicry. *Gesture*.

### Conference Proceedings

**Vest, N. A.**, Weaver, H. J., & Alibali, M. W. (2022, July). Zero in on this: Children are exposed to various concepts of zero prior to age six. *Proceedings of the Annual Conference of the Cognitive Science Society*. Toronto, Canada.

Nagashima, T., Ling, E., Zheng, B., Bartel, A. N., Silla, E. M., **Vest, N. A.**, Alibali, M. W., & Aleven, V. (2022, July). How does sustaining and interleaving visual scaffolding help learners? A classroom study with an Intelligent Tutoring System. *Proceedings of the Annual Conference of the Cognitive Science Society*. Toronto, Canada.

**Vest, N.A.**, Silla, E. M., Bartel, A. N., Nagashima, T., Aleven, V., & Alibali, M. W. (2022, July). Self-explanation of worked examples integrated in an Intelligent Tutoring System enhances problem solving and efficiency in algebra. *Proceedings of the Annual Conference of the Cognitive Science Society*. Toronto, Canada.

**Vest, N.A.**, & Alibali, M. W. (2021, July). The mental representation of integers: Further evidence for the negative number line as a reflection of the natural number line. *Proceedings of the Annual Conference of the Cognitive Science Society*. Vienna, Austria.

Nagashima, T., Bartel, A. N., Tseng, S., **Vest, N. A.**, Silla, E. M., Alibali, M. W., & Aleven, V. (2021, July). Scaffolded self-explanation with visual representations promotes efficient learning in early algebra. *Proceedings of the Annual Conference of the Cognitive Science Society*. Vienna, Austria.

- Bartel, A. N., Silla, E., **Vest, N. A.**, Nagashima, T., Aleven, V., & Alibali, M. W. (2021, July). Reasoning about tape diagrams: Insights from students and math teachers. *Proceedings of the International Conferences of the Learning Sciences*.
- Nagashima, T., Bartel, A. N., Tseng, S., **Vest, N. A.**, Silla, E. M., Alibali, M. W., & Aleven, V. (2021, July). Using anticipatory diagrammatic self-explanation to support learning and performance in early algebra. *Proceedings of the International Conferences of the Learning Sciences*.
- Nagashima, T., Bartel, A. N., Silla, E. M., **Vest, N. A.**, Alibali, M. W., & Aleven, V. (2020, June). Enhancing conceptual knowledge in early algebra through scaffolding diagrammatic self-explanation. In M. Gresalfi & I. S. Horn (Eds.), *Proceedings of the International Conference of the Learning Sciences* (pp. 35-43). Nashville, TN: International Society of the Learning Sciences.
- Nagashima, T., Yang, K., Bartel, A. N., Silla, E. M., **Vest, N. A.**, Alibali, M. W., & Aleven, V. (2020, June). Pedagogical Affordance Analysis: Leveraging teachers' pedagogical knowledge for eliciting pedagogical affordances and constraints of instructional tools. In M. Gresalfi & I. S. Horn (Eds.), *Proceedings of the International Conference of the Learning Sciences* (pp. 1561-1564). Nashville, TN: International Society of the Learning Sciences.

## **Conference Presentations**

- Vest, N. A.**, & Alibali, M. W. (2025, June). Do representations of negative numbers in children and adults depend on context? In Y. Oscar (Chair), *Visual-spatial aspects of numerical cognition*. Symposium presented at the Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Vest, N. A.**, Park, S., & Hu, Y.\* (2025, June). *Slippery slopes: Examining college students' understanding of linear equations with negative slopes*. [Lightning talk] Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Vest, N. A.**, Briceno, A. R.\*, Berger, H. Z.\*, & Alibali, M. W. (2025, May) *Developing negative number magnitudes: Evidence from distance effects during symbolic magnitude comparison*. [Poster] Biennial Meeting of the Society for Research in Child Development.
- Vest, N. A.**, Anthony, L. E., Callery, K.\*, Shack, A. P.\*, Becerra, C.\*, Maheshwary, P.\*, & Alibali, M.W. (2024, June). Does focusing on the unit of change help children extend and abstract shape and number patterns? In N.A. Vest (Chair), *Pattern learning: Empirical research about interventions, parental beliefs, and links to mathematical competence in children*. Symposium presented at the Annual Meeting of the Mathematical and Cognition Learning Society Conference.

- Vest, N. A.,** Anthony, L. E., Becerra, C.\*, Maheshwary, P.\*, Callery, K.\*, Shack, A. P.\*, & Alibali, M. W. (2024, March). *Learning to extend shape and number patterns: Do lessons focused on the pattern unit help?* [Poster] Biennial Meeting of the Cognitive Development Society.
- Vest, N. A.,** & Alibali, M. W. (2023, June). Conceptions of zero and the semantic congruence effect: Evidence from children and adults. In N.A. Vest (Chair), *More than nothing? Empirical insights into children and adults' conceptions of "zero"*. Symposium presented at the Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Vest, N. A.,** Manhart, H. M.\*, Smith, L. R.\*, & Alibali, M. W. (2022, March). *Predictors of arithmetic fluency with integers.* [Poster] Biennial Meeting of the Cognitive Development Society.
- Silla, E. M., **Vest, N. A.,** Nagashima, T., Bartel, A. N., Anthony, L., Aleven, V., & Alibali, M. W. (2021, November). *Efficacy of tape diagrams: Evidence from an Intelligent Tutoring System.* [Lightning talk] Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Vest, N. A.,** & Alibali, M. W. (2021, November). *How do children's concepts of zero relate to their understanding of integers?* [Lightning talk] Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Borriello, G. A., **Vest, N. A.,** & Fyfe, E. R. (2021, April) *Associations between novel patterning assessments and mathematics knowledge across childhood.* [Poster] Biennial Meeting of the Society for Research in Child Development.
- Vest, N. A.,** Borriello, G. A., & Fyfe, E. R. (2021, April) *Mimicking speech and gesture during a lesson may not be beneficial for early learners.* [Poster] Biennial Meeting of the Society for Research in Child Development.
- Vest, N. A.,** Silla, E. M., Bartel, A. N., Nagashima, T., Aleven, V., & Alibali, M. W. (2021, April) *Learning from worked examples: Conceptually rich explanations predict conceptual gains.* [Poster] Biennial Meeting of the Society for Research in Child Development.
- Nagashima, T., Bartel, A. N., Silla, E. M., **Vest, N. A.,** Alibali, M. W., & Aleven, V. (2020, November). *Collaborative open educational practices: Sharing of evidence-based open educational resources to facilitate meaningful adaptation.* [Gallery showcase] Open Education Conference.
- Bartel, A. N., Silla, E. M., **Vest, N. A.,** Nagashima, T., Tang, Y.\*, Aleven, V., & Alibali, M. W. (2020, July). *Reasoning about equations with tape diagrams: Do differing visual features matter?* [Poster] Annual Meeting of the Cognitive Science Society.

- Bartel, A. N., Silla, E. M., **Vest, N. A.**, Nagashima, T., Tang, Y., Alevan, V., & Alibali, M. W. (2020, June). Do tape diagrams promote a focus on conceptual principles? Evidence from equation solving with an Intelligent Tutoring System. In T. T. Wong (Chair), *Principle knowledge in mathematics: its development, cognitive predictors, and potential interventions*. Symposium presented at the Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Vest, N. A.**, & Fyfe, E. R. (2020, June). *Don't copy me! How mimicking gestures influence children's patterning performance*. [Poster] Annual Meeting of the Mathematical and Cognition Learning Society Conference.
- Vest, N. A.**, & Fyfe, E. R. (2020, April). *A novel patterning assessment and its associations with formal numeracy knowledge*. [Poster session canceled] Annual Meeting of the Midwestern Psychological Association, Chicago, IL.
- Vest, N. A.**, & Fyfe, E. R. (2020, March). The effects of feedback in an evaluative online learning context. In M. DeCaro (Chair), *The science of learning*. Symposium presented at the annual meeting of the Southern Society for Philosophy and Psychology.
- Vest, N. A.**, & Fyfe, E. R. (2019, May). *The effects of self-focused feedback on students' mathematics problem solving*. [Poster] Annual Convention of the Association for Psychological Science. Washington, D.C.
- Macchione, A. L.\*, **Vest, N. A.** & Fyfe, E. R. (2019, March) *Point to those! Grouping gestures predict children's early patterning skills*. [Poster] Biennial Meeting of the Society for Research in Child Development. Baltimore, MD.
- Vest, N. A.**, & Fyfe, E. R. (2018, November) *Feedback hinders performance on women's mathematics problem solving*. [Poster] Annual Convention of the Psychonomic Society. New Orleans, LA.
- Vest, N. A.**, & Fyfe, E. R. (2018, May). *Learning from an avatar video instructor: Gesture mimicry supports middle schoolers' algebra knowledge*. [Poster] Annual Convention of the Association for Psychological Science. San Francisco, CA.
- Vest, N. A.**, & Fyfe, E. R. (2018, May). *YOU are right! Feedback focused on the self enhances problem solving*. [Poster] Annual Conference of the Midwest Cognitive Science. Bloomington, IN.
- Vest, N. A.**, West, M. J., & Dohme, R. (2016, March). *Attentional differences and their contribution to autism*. [Poster] Indiana University's Department of Psychological and Brain Sciences Honors Banquet. Bloomington, IN.

## **Invited Talks**

2025	Mathematical Cognition in Context, The Mathematical Cognition and Learning Society
2025	Developmental Proseminar, University of Wisconsin-Madison
2025	The Computation and Language Lab, University of California-Berkeley
2024	Cognitive Origins Lab, University of Wisconsin-Madison
2024	Developmental Proseminar, University of Wisconsin-Madison
2023	Cognitive Origins Lab, University of Wisconsin-Madison

## **Workshops**

2022	NUMBERS, From Cognition to Instruction: A Birds'-Eye View of Math Cognition Interventions, Kent State University [Scholarship]
2022	From Images to Symbols: Drawing as a Window into the Mind, Annual Cognitive Science Conference, Toronto, Canada
2021	LearnLab, Educational Data Mining, Carnegie Mellon University [Scholarship]
2020	ICPSR Summer Program, Machine Learning: Applications and Opportunities in Social Science Research, University of Michigan [Scholarship]

## **Service**

2024–2026	<i>Research Chair</i> , The Mathematical Cognition and Learning Society
2022–	<i>Graduate Student Volunteer</i> , Anti-racism Learning and Action in Neuroscience, University of Wisconsin-Madison
2022–	<i>Graduate Student Representative</i> , Colloquium Committee University of Wisconsin-Madison
2020–2022	<i>Graduate Student Representative</i> , Climate and Diversity Committee University of Wisconsin-Madison

## **Ad Hoc Reviewer**

*Journal of Experimental Child Psychology*  
*Mathematical Thinking and Learning*

## **Technical Skills**

R [advanced]; Python [competent]; JavaScript [competent]

## **References**

Martha Alibali, Ph.D.  
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University of Wisconsin-Madison  
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Emily Fyfe, Ph.D.

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Percival Matthews, Ph.D.  
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