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Nicholas A. Vest, Ph.D.

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EDUCATION

2021–2025 **Ph.D. in Psychology (Developmental)**
Department of Psychology, University of Wisconsin-Madison
Committee: Martha W. Alibali, Mitchell J. Nathan, Percival G. 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

2025– **Postdoctoral Fellow**
School of Teaching and Learning, University of Florida
PIs: Avery H. Closser, Ph.D. & Anthony F. Botelho, Ph.D.
Analyze longitudinal engagement data from large-scale professional development platforms using AI-driven techniques and causal inference methods to identify educator participation profiles, link engagement to student outcomes, and collaborate with an interdisciplinary team to improve PD design and teacher engagement.

2019–2025 **Graduate Research Assistant**
Department of Psychology, University of Wisconsin-Madison
Cognitive Development and Communication Lab
PI: Martha W. Alibali, Ph.D.
Conducted dissertation and collaborative research on children's mathematical cognition, including projects on negative integers, zero,

algebra, and patterning. Designed and implemented behavioral studies and instructional interventions, applied advanced statistical methods, produced peer-reviewed publications, and mentored undergraduate researchers.

2017–2019 **Project Manager**
Department of Psychological and Brain Sciences, Indiana University
Learning, Education, and Development Lab
PI: Emily Fyfe, Ph.D.
Managed large-scale studies on children's early mathematics learning with a focus on patterning. Supervised research assistants, coordinated data collection, oversaw budget management, and contributed to publications on instructional strategies to support children's math development.

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]

GRANTS

2024 **NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship (F32)**
Cognitive and Neural Foundations of Early Numeracy
Sponsors: Elizabeth M. Brannon, Ph.D. & Michael L. Platt, Ph.D., University of Pennsylvania
Not funded

JOURNAL PUBLICATIONS

** Denotes mentored undergraduate*

Vest, N. A., & Marupudi, V. (in prep). Adults' dynamic representations of negative integers.

Vest, N. A., & Alibali, M. W. (in prep). The mental representation of negative integer magnitude over development and across contexts.

Closser, A. H., Westerberg, L., Geer, E. A., **Vest, N. A.**, Duncan, R., Schmitt, S. A., & Purpura, D. J. (under review). How do spatial skills take shape? Examining preschoolers' performance on 2D and 3D assembly tasks.

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. (2025). 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., & 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., Aleven, 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	Developmental Psychology Proseminar, University of Florida
2025	Mathematical Cognition in Context, The Mathematical Cognition and Learning Society
2025	Developmental Psychology 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 Psychology Proseminar, University of Wisconsin-Madison
2023	Cognitive Origins Lab, University of Wisconsin-Madison

WORKSHOPS

2025	Preparing Future Faculty, Office of Postdoctoral Affairs, University of Florida
2022	NUMBERs, From Cognition to Instruction: A Bird's-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 **Research Chair**, The Mathematical Cognition and Learning Society

2022– **Graduate Student Volunteer**, Anti-racism Learning and Action in Neuroscience, University of Wisconsin-Madison
2022– **Graduate Student Representative**, Colloquium Committee University of Wisconsin-Madison
2020–2022 **Graduate Student Representative**, 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]