Last Updated: March 2024

Nicholas A. Vest

University of Wisconsin-Madison
1202 W. Johnson St.
Madison, WI 53703 USA
+1 317 385 6788 [m]
navest@wisc.edu

Education

2019– Ph.D. in Psychology (Developmental)
Department of Psychology, University of Wisconsin-Madison

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 and numerical cognition with a focus on how children develop an understanding of integers (i.e., zero, positives, and negatives).

Experience

2022– *Graduate Teaching Assistant*
Design and Analysis of Psychological Experiments II, University of Wisconsin-Madison
Design and Analysis of Psychological Experiments I, University of Wisconsin-Madison
Basic Statistics for Psychology, University of Wisconsin-Madison
Introduction to Psychology, University of Wisconsin-Madison
Cognitive Development, University of Wisconsin-Madison

- Manage and develop learning objectives for undergraduate students
- Plan and present lectures on a wide range of topics to a diverse audience with varying degrees of familiarity with subject materials
- Instruct and guide students in analyzing and synthesizing evidence to form original interpretive arguments
- Evaluate and provide critical feedback on assignments and exams

2019–2022 *Graduate Research Assistant*
Cognitive Development and Communication Lab, University of Wisconsin-Madison

Project: Fostering Conceptual Understanding and Skill with an Intelligent Tutoring System for Equation Solving
PIs: Martha Alibali, Ph.D. & Vincent Aleven, Ph.D.

- Collaborated with an interdisciplinary group of researchers (psychologists and computer scientists) to investigate how to improve middle-school students' understanding of algebra
- Designed Intelligent Tutoring Systems that use artificial intelligence to provide students individualized feedback during problem solving
- Analyzed data using educational data mining techniques
- Prepared and published research manuscripts addressing a novel research question under a tight deadline
- Effectively communicated complex ideas to diverse audiences including non-native English speakers

2017–2019 *Research Coordinator*
Learning, Education, and Development Lab, Indiana University
PI: Emily Fyfe, Ph.D.

- Coordinated multiple projects related to cognitive development with a focus on mathematics knowledge and problem solving
- Collected data with children ages 4-11
- Analyzed data using inferential statistics
- Prepared and published research manuscripts while balancing multiple priorities
- Mentored undergraduate research assistants

Awards

2024 Psychology Department Award for Outstanding Teaching, University of Wisconsin-Madison

2022–2024 Hertz Travel Award, University of Wisconsin-Madison [$2,500]

2019–2022 Menzies and Royalty Research Award, University of Wisconsin-Madison [$1,500]

2019 Mamie and Kenneth Clark Award, University of Wisconsin-Madison [$2,500]

Journal Publications

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. (under review) Research on mathematical cognition, learning, & instruction: A birds'-eye view

Vest, N.A. & Alibali, M.W. (under review). Is zero more than nothing? Relations between concepts of zero and integer understanding.

Borriello, G., Grenell, A., **Vest, N.A.**, Moore, K., & Fyfe, E. R. (2022). 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., 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.

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

2022– *Graduate Student Volunteer*, Antiracism 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]; SPSS [intermediate]; Python [novice]