John Vito Binzak

Curriculum Vitae

University of Wisconsin–Madison
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EDUCATION

PhD **University of Wisconsin–Madison**
Educational Psychology (August 2020)
Minor Focus: Curriculum & Instruction in Digital Media
Dissertation: From brains to games and back again: Accessing the magnitude of fractions and ratios across contexts.
Committee: Edward Hubbard (chair/advisor), Percival Matthews, Shawn Green, Mitch Nathan, & Martha Alabali

MS **University of Wisconsin-Madison**
Educational Psychology, 2016
Advisor: Edward Hubbard

MEd **Harvard University, Graduate School of Education**
Mind, Brain, and Education, 2012
Advisor: David Rose

BS **University of Wisconsin–Madison**
Majors: Psychology & Biology with Neurobiology certificate
Transferred from the U of St. Thomas in St. Paul, MN after freshman year.

FELLOWSHIPS, AWARDS & RECOGNITIONS

2018 Mind, Brain, & Education Exceptional Trainee Award ($285)

2018 UW-Madison Graduate School, Student Research Travel Grant ($1200)

2017-2018 NSF LUCID Fellowship ($68,000 + tuition / 2 years)

2012 NEA (National Education Association) Foundation's Challenge to Innovate (C2i) Gaming Award for Conceptual design of *Friends of a Feather*, video game. ($1000)

2009 UW-Madison Dept. of Communication Arts Spring 2009 Showcase featured short film documentary, *Dr. Evermore and His Sculpture Park*

2007 U. of St. Thomas Leading E.D.G.E Award for excellence in Biology

PEER REVIEWED PUBLICATIONS

In Prep **Binzak, J.V.**, Matthews, P.G., & Hubbard, E.M. (in prep). *On common ground: Evidence for an association between fractions and the ratios they represent.* Cognitive Sciences.

2020 **Binzak, J.V.** & Hubbard, E.M. (2020). *No calculation necessary: Accessing magnitude through decimals and fractions.* Cognition.

Kalra, P., **Binzak, J.V.**, Matthews, P. G. & Hubbard, E. M. (2020). *Symbolic Fractions Invoke an Analog Magnitude Representation in School-age Children*. Journal of Experimental Child Psychology

2019 Demir-Lira, Ö.E., Suárez-Pellicioni, M., **Binzak, J.V.**, & Booth, J.R. (2019) *Attitudes Towards Math is Differentially Related to the Neural Basis of Multiplication Depending on Math Skill*. Learning Disability Quarterly.

CONFERENCE PROCEEDINGS

2016 Anderson, C.G., **Binzak, J.V.**, Dalsen, J., Saucerman, J., Jordan-Douglass, A., Kumar, V., Turker, A., Berland, M., Squire, K., & Steinkuehler C. (2016, June). Situating deep multimodal data on game-based STEM learning. Looi, C.K., Polman, J.L., Cress, U., and Reimann, P. (Eds.). T*ransforming Learning, Empowering Learners: The International Conference of the Learning Sciences (ICLS) 2016, (pp. 974-977), Volume 2.* Singapore: International Society of the Learning Sciences.

2015 **Binzak, J.V.**, Beall, M., Anderson, C.G., Azari, D., Wielgus, L., Dalsen, J., Squire, K., & Steinkuehler, C. (2015, July) *Designing Tenacity*. In A. Ochsner, J. Dietmeier, C. Williams, & C. Steinkuehler (Eds.), Proceedings of the 11th Annual Games+Learning+Society Conference. Pittsburgh PA: ETC Press.

CONFERENCE PRESENTATIONS

2020 Binzak, J.V., Matthews, P.G. & Hubbard, E.M. (2020, September) Neural representations of symbolic and nonsymbolic fractions in adolescents. In Y. Park (Chair), *Neural Development of Symbolic Math Knowledge from Childhood to Young Adulthood*. Symposium conducted virtually in the Mathematical Cognition and Learning Society Meeting, Dublin, Ireland.

2019 **Binzak, J.V.,** Toomarian, E.Y., Matthews, P.G., Hubbard, E.M. (2019, September). *From the Lab to the iPad: Understanding Fractions in assessment-based and game-based contexts.* Talk presented at the Learning Sciences Graduate Student Conference, Evanston, IL.

Binzak, J.V., Toomarian, E.Y., Matthews, P.G., Hubbard, E.M. (2019, August). *Fractions War: An iOS Game to Measure and Train Magnitude Processing with Fractions.* Poster presented at the Make Play Learn Conference, Madison, WI.

Conference Presentations (continued)

2019 **Binzak, J.V.,** Matthews, P.G., Hubbard, E.M. (2019, June). *Confidence counts Relationships between math dispositions and fractions knowledge.* Poster presented at the 2nd Annual Meeting of the Mathematical Cognition and Learning Conference, Ottawa, Canada.

2018 **Binzak, J.V.** (2018, October). *Fractions War: An iOS Game to Measure and Train Magnitude Processing with Fractions.* Poster presented at the International Mind, Brain, and Education Society Conference, Los Angeles, CA.

Binzak, J.V. (2019, October). *From Brains to Games: Investigations of Symbolic and Nonsymbolic Ratio Processing with fMRI and Gameplay Data.* Talk presented at the International Mind, Brain, and Education Society Conference, Los Angeles, CA.

Binzak, J.V., Toomarian, E.Y., Matthews, P.G., & Hubbard, E.M. (2018, July). Fractions War: An iOS game to measure and train magnitude processing with fractions. Poster presented at the 40th Annual Meeting of the Cognitive Science Society, Madison, WI.

Hubbard, E.M., **Binzak, J.V.**, Park, Y., Kalra, P., & Toomarian, E.Y. (2018, April) The ratio processing system underpins symbolic fractions understandings: Developmental neuroimaging investigations. Talk presented at the 1st Mathematical Cognition and Learning Society Conference in Oxford, England.

Nathan, M. J., Walkington, C., Vinsonhaler, R., Michaelis, J., McGinty, J., **Binzak, J. V.**, & Kwon, O., H. (2018, April). Embodied account of geometry proof, insight, and intuition among novices, experts, and English language learners. Paper presentation to the 2018 Annual Meeting of the American Educational Research Association, New York, NY.

Binzak, J.V., Park, Y., Toomarian, E.Y., Kalra, P., Chuang, Y-S., Matthews, P.G., Hubbard, E.M. (2018, March). Are fractions percepts? Neurocognitive relationships between nonsymbolic and symbolic ratio processing in children and adults. Poster presented at 25th annual Meeting of the Cognitive Neuroscience Society, Boston MA.

2017 **Binzak, J.V.**, Toomarian, E.Y., & Hubbard, E.M. (2017, November). *The ratio processing system (RPS) as a foundation for symbolic fractions understanding.* Talk given at the Society for Neuroscience Annual Meeting, Washington, D.C.

Binzak, J.V., Murphy, A., & Hubbard, E.M., & Rogers, T.T. (2017, August). *Beyond magnitude study: psychological and neural representations of number properties.* Talk presented at the 2017 eLUCID8 Conference, Madison, WI.

Binzak, J.V., Murphy, A., & Hubbard, E.M., & Rogers, T.T. (2017, July). *Beyond magnitude study: psychological and neural representations of number properties.* Talk presented at the 39th Annual Meeting of the Cognitive Science Society, London, England.

Conference Presentations (continued)

2017 **Binzak, J.V.**, Toomarian, E.Y., & Hubbard, E.M. (2017, July). *Shared neural regions sensitive to magnitude support symbolic and nonsymbolic fractions understanding.* Talk presented at the 4th Annual Midwest Meeting of Mathematical Thinking, Madison, WI.

Toomarian, E.Y., **Binzak, J.V.**, & Hubbard, E.M. (2017, July). *The ratio processing system (RPS) as a foundation for symbolic fraction understanding.* Talk presented at UW-Madison Brain Food seminar series.

Binzak, J.V., Toomarian, E.Y., & Hubbard, E.M. (2017, March). *Overlapping Neural Representation of Magnitude Support Understanding Nonsymbolic and Symbolic Fractions*. Poster presented at the 24th Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA.

2016 **Binzak, J.V.** (2016, August). *Multiplier Maze: Grounding fractions knowledge in a puzzle game*. Showcase presented at the 12thAnnual Games + Learning + Society Conference, Madison, WI.

Anderson, C.G., Berland, M., **Binzak, J.V.**, Dalsen, J., Jordan-Douglass, A., Kumar, V., Saucerman, J., Steinkuehler, C., & Turker, A. (2016, August). *Connecting Gameplay, Discourse, and Assessment in a Learning Game Camp*. Poster presented at the 12th Annual Games + Learning + Society Conference, Madison, WI.

Binzak, J.V., Anderson, C.G., J., Kumar, V., Jordan-Douglass, A., & Berland. (2016, August). *Comparing gameplay across formal and informal contexts.* Extended Abstract presented at the Digital Games Research Association and the Foundations of Digital Games Conferences, Dundee, Scotland.

Binzak, J.V. & Hubbard, E.M. (2016, June). *Symbolic encoding and magnitude processing during decimal & fraction comparisons*. Talk presented at the 4th Annual Midwest Meeting of Mathematical Thinking, Madison, WI.

Toomarian, E.Y., Lewis, M.R., **Binzak, J.V.**, & Hubbard, E.M. (2015, October) *Grounding symbolic fractions in the ratio processing system: a developmental fMRI-A Study.* Poster presented at the Society for Neuroscience Annual Meeting, Chicago, IL.

2015 **Binzak, J.V.** & Hubbard, E.M. (2015, August) *Accessing rational magnitudes through fraction notation.* Poster presented at the Midwest Meeting of Mathematical Thinking, Minneapolis, MN.

Binzak, J.V., Beall, M., Anderson, C.G., Azari, D., Wielgus, L., Dalsen, J., Squire, K., & Steinkuehler, C. (2015) *Designing Tenacity*. Talk presented at the Games + Learning + Society Conference, Madison, WI

VIDEO GAME DESIGN & DEVELOPMENT

2016 -*present* ***Fractions War****,* Co-Creator & Co-Executive Designer,
An adaptation of the classic card game for iOS, designed to play with traditional cards or decks containing only numerical symbols or suit-based quantities.

2015-2018 ***The Hidden Village****,* Content Developer,
Motion capture game designed to test embodied theories of geometry learning. Assisting the UW-Madison MAGIC lab with Dr. Mitch Nathan

2016 ***Multiplier Maze****,* Creator & Co-Developer
Educational puzzle-based video game to teach the multiplication of fractions

2012 ***Friends of a Feather****,* Creator
An educational video game to teach elementary animal, climate, & life sciences.

RESEARCH POSITIONS

2014 – *present* **Graduate Research Assistant,** Educational Neuroscience Lab
University of Wisconsin – Madison, PI: Edward M. Hubbard

2015 - 2018 **Graduate Research Assistant** MAGIC Lab
University of Wisconsin – Madison, PI: Mitchel J. Nathan

2014 – 2016 **Graduate Research Assistant** Games + Learning + Society
University of Wisconsin – Madison, PI: Constance Steinkuehler

2012 – 2014 **Project Coordinator**, Developmental Cognitive Neuroscience Lab
Northwestern University, PI: James R. Booth

2011 **Research Assistant**, Center for Child and Family Policy
Duke University, PI: Dr. Kenneth Dodge

2009 - 2010 **Research Assistant,** Neural Basis of Behavior Lab
University of Wisconsin-Madison, PI: Craig Berridge

2009 **Research Assistant**, PATHS Lab
University of Wisconsin-Madison, PI: Diane Gooding

EDUCATIONAL MEDIA POSITIONS

2012 **Multimedia Design Contract Worker**
Center for Applied Special Technology, Supervisor: Yvonne Domings

2011 **Design, Technology, and Multimedia Internship**
Center for Applied Special Technology, Supervisor: Tracey Hall

TEACHING & OUTREACH

2018 **Member Abstract Reviewer**, Cognitive Science Society Annual Meeting
UW-Madison

2014 - 2017 **Guest Lecturer**, Mind, Brain & Education, UW-Madison
Invited lecture, *Math anxiety: affective causes and effects on the brain and behavior*, presented to and undergraduate course

2014 **Teaching Assistant**, Mind, Brain & Education, UW-Madison
Instructor: Edward M. Hubbard

2013, 2014 **Brain Awareness Fair Volunteer**, Chicago, IL

2009 **Film mentor for an Autistic Child**, Madison, WI
Watching and discussing movies in order to practice social interaction.