

Matthew J. Madison

University of Georgia
College of Education
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Education

<i>Degree</i>	<i>Program</i>	<i>Institution</i>	<i>Year</i>
Ph.D.	Quantitative Methodology	University of Georgia	2016
M.S.	Statistics	University of Georgia	2014
M.A.	Mathematics	Central Michigan University	2011
B.S.	Mathematics	University of South Carolina	2009

Academic Positions

University of Georgia 2020 – Present
College of Education
Department of Educational Psychology
Assistant Professor, Quantitative Methodology

Clemson University 2018 – 2020
College of Education
Department of Education and Human Development
Assistant Professor, Learning Sciences

University of California – Los Angeles 2016 – 2018
Graduate School of Education and Information Studies
Social Research Methodology Division
Assistant Professor, Advanced Quantitative Methods

Research Interests

Psychometrics; diagnostic classification models; longitudinal measurement models

Publications

*Indicates collaboration with a graduate student.

Madison, M. J. (2019). Reliably assessing growth with longitudinal diagnostic classification models. *Educational Measurement: Issues and Practice*, 38(2), 68-78.

Madison, M. J., & Bradshaw, L. (2018). Assessing growth in a diagnostic classification model framework. *Psychometrika*, 83(4), 963-990.

Madison, M. J., & Bradshaw, L. (2018). Evaluating intervention effects in a diagnostic classification model framework. *Journal of Educational Measurement*, 55(1), 32-51.

Bradshaw, L., & **Madison, M. J.** (2016). Invariance properties for general diagnostic classification models. *International Journal of Testing*, 16(2), 99-118.

Madison, M. J., & Bradshaw, L. (2015). The effects of Q-matrix design on classification accuracy in the LCDM. *Educational and Psychological Measurement*, 75(3), 491-511.

Piatek-Jimenez, K., **Madison, M. J.**, & Przybyla-Kuchek, J. (2014). Equity in mathematics textbooks: A new look at an old issue. *Journal of Women and Minorities in Science and Engineering*, 20(1), 55-74.

Piatek-Jimenez, K., & **Madison, M. J.** (2012). Equity in mathematics textbooks: A report on progress. *Proceedings of the 34th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Kalamazoo, MI: Western Michigan University.

Manuscripts Under Review

*Indicates collaboration with a graduate student.

Jurich, D., & **Madison, M. J.** Item influence indices for diagnostic classification models. Manuscript under review.

Current Grant Support

Co-Principal Investigator: *Native STEM Portraits: A Longitudinal, Mixed-Methods Study of the Intersectional Experiences of Native Learners and Professionals in STEM* (2020 – 2025). National Science Foundation ~ \$1,545,963.

Principal Investigator: *A Family of Diagnostic Models for Evaluating Learning Progressions* (2019 – 2022). National Science Foundation ~ \$229,430.

Advisory Board: *Next Generation STEM Teachers for Urban Schools: Recruiting, Preparing, and Mentoring Undergraduates for Innovative STEM Teaching* (2018 – 2023). National Science Foundation ~ \$949,721.

Grant Proposals Under Review

Principal Investigator: *Generalized, Multilevel, and Longitudinal Psychometric Models for Evaluating Educational Interventions* (2021 – 2024). Institute of Educational Sciences ~ \$887,024.

Co-Principal Investigator: *CT-STEM Pop-Ups4All: An RPP for Agile Learning* (2020 – 2023). National Science Foundation ~ \$948,551.

Previously Funded Grants

Principal Investigator: *Assessing Nested Effects in a Diagnostic Classification Model Framework* (2017 – 2018). UCLA Faculty Research Grant ~ \$6,305.

Unfunded Grant Proposals

Principal Investigator: *Generalized, Multilevel, and Longitudinal Psychometric Models for Evaluating Educational Interventions* (2020 – 2023). Institute of Educational Sciences ~ \$854,997.

Senior Personnel: *Personalized, Impactful Professional Development: Uniting Machine Learning and Teacher Developmental Needs* (2019 – 2020). National Science Foundation ~ \$99,889. PI: Jeff Marshall.

Principal Investigator: CAREER: *Multilevel Diagnostic Classification Models for Evaluating Intervention Effects* (2019 – 2024). National Science Foundation ~ \$559,363.

Co-Principal Investigator: *Know Your Nearest Neighbors* (2018 – 2023). National Science Foundation: Discovery Research PreK – 12 ~ \$2,999,569. PI: David Weintrop.

Co-Principal Investigator: *Talent for Teaching* (2018 – 2023). National Science Foundation: Robert Noyce Scholarship Program ~ \$1,447,285. PI: Christopher Anderson.

Co-Principal Investigator: *Principles of Data Science (PODS)* (2017 – 2020). National Science Foundation: STEM + Computing ~ \$2,500,000. PI: Rob Gould.

Principal Investigator: *Diagnosing Teachers' Statistical Preparation* (2017 – 2018). UCLA Transdisciplinary Seed Grant ~ \$32,337.

Honors and Awards

Paul L. Beasley TRiO Trailblazer McNair Alumni Award University of South Carolina TRIO Programs	2019
Outstanding Dissertation Award American Educational Research Association Cognition and Assessment Special Interest Group	2019
Owen W. Scott Award for Academic Merit and Professional Promise University of Georgia Department of Educational Psychology	2015
UGA Amazing Student University of Georgia College of Education	2014

- 2nd Place: Quantitative Division Poster 2013
Group-mean centering in hierarchical linear models: A weighting approach. Poster presented at the 2013 College of Education Graduate Student Research Conference in Athens, GA.
- Outstanding Tutor Honorable Mention 2012
 Central Michigan University
 Department of Mathematics
- Outstanding Teaching Assistant 2011
 Central Michigan University
 Department of Mathematics
- Emerging Scholar Award 2008
 University of South Carolina
 Ronald E. McNair Scholars Program

Research Presentations

*Indicates collaboration with a graduate student.

2020

Madison, M. J. (2020, April). *A longitudinal and hierarchical diagnostic classification model for evaluating learning progressions.* Paper to be presented at the annual meeting of the National Council on Measurement in Education in San Francisco, CA. Cancelled due to COVID-19 pandemic.

Fager, M., & **Madison, M. J.**, (2020, April). *Weighing parsimony and flexibility in diagnostic classification model selection.* Paper to be presented at the annual meeting of the National Council on Measurement in Education in San Francisco, CA. Cancelled due to COVID-19 pandemic.

2019

Madison, M. J., Fager, M. (2019, October). *Revisiting diagnostic classification model invariance properties.* Paper presented at the annual meeting of the Northeastern Educational Research Association in Trumbull, CT.

Madison, M. J. (2019, April). *Effects of Item Parameter Drift on Longitudinal Diagnostic Classification Models.* Paper presented at the annual meeting of the National Council on Measurement in Education in Toronto, Ontario, CA.

*Kim, J., **Madison, M. J.**, Chung, S., & Bradshaw, L. (2019, April). *Approaches to estimating longitudinal diagnostic classification models.* Paper presented at the annual meeting of the National Council on Measurement in Education in Toronto, Ontario, CA.

*Soo, Y. S., **Madison, M. J.** (2019, April). *Effects of Local Dependence on Longitudinal Diagnostic Classification Models*. Paper presented at the annual meeting of the National Council on Measurement in Education in Toronto, Ontario, CA.

2018

Madison, M. J., & Bao, Y. (2018, July). *A longitudinal and polytomous diagnostic classification model*. Paper presented at the International Meeting of the Psychometric Society in New York, NY.

*Keenan, E. G., **Madison, M. J.**, Wood, J. J., & Lerner, M. D. (2018, May). *Psychometric analysis of the autism spectrum quotient using diagnostic classification modeling*. Poster presented at the Annual Meeting of the International Society for Autism Research, Rotterdam, Netherlands.

Madison, M. J. (2018, April). *Item influence measures for diagnostic classification models*. Paper presented at the annual meeting of the National Council on Measurement in Education in New York, NY.

*Cho, A. C. B., Wood, J., & **Madison, M. J.** (2018, January). *Personality matters: A latent profile analysis of personality subgroups in children with autism spectrum disorder*. Poster presented at the Annual Conference for the University of California Center for Research on Special Education, Disabilities, and Developmental Risk in Davis, CA.

2017

Madison, M. J., (2017, October). *A diagnostic approach to reliably assessing growth*. Paper presented at the annual meeting of the Northeastern Education Research Association in Trumbull, CT.

*Cruz, E., & **Madison, M. J.** (2017, October). *Diagnosing teachers' statistical preparation: A Pilot Study*. Paper presented at the Annual Meeting of the Society for Advancement of Chicanos/Hispanics and Native Americans in Science in Salt Lake City, UT.

Madison, M. J., & Bradshaw, L. (2017, April). *Evaluating intervention effects in a diagnostic classification model framework*. Paper presented at the annual meeting of the National Council on Measurement in Education in San Antonio, TX.

2016

*Grantham, T., **Madison, M. J.**, Collins, K., & Luckey, J. (2016, November). *Single-subject acceleration for gifted Black males using the Math Hall and Ball afterschool program*. Paper presented at the annual meeting of the National Association for Gifted Children in Orlando, FL.

Madison, M. J., & Bradshaw, L. (2016, October). *Evaluating innovative instruction using a longitudinal diagnostic classification model*. Paper presented at the annual meeting of the Northeastern Education Research Association in Trumbull, CT.

Madison, M. J., & Bradshaw, L. (2016, July). *Assessing growth in a general diagnostic classification model*. Paper presented at the International Meeting of the Psychometric Society in Asheville, NC.

Xiong, X., **Madison, M. J., & Mattar, J.** (2016, April). *Speededness for task based simulations items in a multi-stage licensure examination*. Paper presented at the annual meeting of the National Council on Measurement in Education in Washington, D.C.

Madison, M. J., & Bradshaw, L. (2016, April). *Assessing growth in a diagnostic classification model framework*. Poster presented at the 2016 College of Education Graduate Student and Faculty Research Conference in Athens, GA.

2015

Madison, M. J., & Bradshaw, L. (2015, October). *Invariance properties for general diagnostic classification models*. Paper presented at the annual meeting of the Northeastern Education Research Association in Trumbull, CT.

Madison, M. J., & Bradshaw, L. (2015, April). *Using Q^* Power to refine diagnostic assessment designs*. Paper presented at the annual meeting of the American Educational Research Association in Chicago, IL.

Madison, M. J. & Bradshaw, L. (2015, February). *Developing Diagnostic Formative Assessments in Graduate Statistics Courses*. Poster presented at the 2015 College of Education Graduate Student and Faculty Research Conference in Athens, GA.

2014

Madison, M. J. & Bradshaw, L. (2014, April). *The effects of Q -matrix design on classification accuracy in the LCDM*. Poster presented at the 2014 College of Education Graduate Student and Faculty Research Conference in Athens, GA.

Madison, M. J., Bradshaw, L., & Hollingsworth, B. (2014, April). *The role of Q -matrix design in diagnostic assessment*. Paper presented at the annual meeting of the National Council on Measurement in Education in Philadelphia, PA.

2013

Madison, M. J. & Bradshaw, L. (2013, October). *The effects of Q -matrix design on classification accuracy in the LCDM*. Paper presented at the annual meeting of the Northeastern Education Research Association in Rocky Hill, CT.

Madison, M. J., & Templin, J. (2013, April). *Group-mean centering in hierarchical linear models: A weighting approach*. Poster presented at the 2013 College of Education Graduate Student Research Conference in Athens, GA. Awarded 2nd place research prize.

2012

Bradshaw, L., Brown, C., Cohen, A., **Madison, M. J.**, & Templin, J. (2012, December). *Evaluating the statistical properties of epistemic network analysis*. Poster presented at the 4th annual Discovery Research K-12 Meeting in Madison, WI.

Piatek-Jimenez, K., & **Madison, M. J.** (2012, November). *Equity in mathematics textbooks: A report on progress*. Poster presented at the annual conference of the North American Chapter of the International Group for the Psychology of Mathematics Education in Kalamazoo, MI.

Marcinek, T., & **Madison, M. J.** (2012, July). *Learning to interpret the mathematical thinking of others in pre-service mathematics courses: potential and limitations*. Paper presented at the 12th International Congress on Mathematical Education in Seoul, Korea.

Hamed, D., & **Madison, M. J.** (2012, April). *Factors affecting student achievement in business calculus*. Poster presented at the annual Student Research and Creative Endeavors Exhibition in Mount Pleasant, MI.

Invited Panels/Presentations/Workshops

Madison, M. J. (2020, June). *Graduate training in educational measurement and psychometrics: A curricula review of graduate programs in the U.S.* Invited panelist at the annual meeting of the National Council on Measurement in Education in San Francisco, CA. Virtual format due to COVID-19 pandemic.

Madison, M. J. (2020, April). *Advice on transitioning from graduate training to the professional world (GSIC Featured Session)*. Invited panelist at the annual meeting of the National Council on Measurement in Education in San Francisco, CA. Cancelled due to COVID-19 pandemic.

Madison, M. J. (2019, December). *Some exciting applications of diagnostic classification models*. Invited presentation the University of Georgia Department of Educational Psychology.

Madison, M. J. (2019, December). *Longitudinal diagnostic classification models*. Guest lecture for ERSH 8140, University of Georgia Quantitative Methodology Program.

Madison, M. J. (2019, March). *Meaningful metrics in mathematics education research*. Invited presentation the UCLA Curtis Center Mathematics and Teaching Conference.

Madison, M. J. (2018, October). *Introduction to diagnostic measurement models*. Invited workshop to University of Massachusetts Amherst Research, Educational Measurement, and Psychometrics Program.

- Madison, M. J.** (2018, April). *A diagnostic classification analysis of an MDTP Test*. Invited presentation to the Working Group of the Mathematics Diagnostic Testing Project. Long Beach, CA.
- Madison, M. J.** (2018, March). *Meaningful metrics in educational research*. Invited presentation to the Quantitative Methodology Colloquium, University of Georgia Department of Educational Psychology.
- Madison, M. J.** (2018, February). *Getting more out of educational assessments*. Invited presentation to the Precision Institute at National University in San Diego, CA.
- Madison, M. J.** (2018, January). *Non-arbitrary metrics in educational research*. Invited presentation to the Teaching and Learning Lab (TALL), UCLA Department of Psychology.
- Madison, M. J.** (2017, October). *Getting ready to publish*. Invited panelist at the annual meeting of the Northeastern Educational Research Association in Trumbull, CT.
- Madison, M. J.** (2017, October). *Evaluating learning (and forgetting) over time via a diagnostic classification model*. Invited presentation to the Cognitive Psychology CogFog Meeting, UCLA Department of Psychology.
- Madison, M. J.** (2017, October). *Psychometric models for the reliable measurement of multiple latent traits*. Invited presentation to the UCLA Department of Statistics Research Seminar.
- Madison, M. J.** (2017, April). *Evaluating an instructional intervention with a longitudinal diagnostic model*. Invited presentation to the Human Development and Psychology Colloquium, UCLA Department of Education.
- Madison, M. J.** (2016, May). *Navigating the academic job market*. Invited presentation to Graduate Researchers in Educational Psychology at the University of Georgia.
- Madison, M. J.** (2016, January). *Getting more out of educational assessments*. Invited presentation at the 2016 University of Georgia College of Education Doctoral Recruitment Weekend in Athens, GA.

Technical Reports

- Madison, M. J.** (2018). *A Diagnostic Classification Analysis of an MDTP Test*. Technical Report. Mathematics Diagnostic Testing Project.
- Madison, M. J.** (2015). *Examining the Speediness of the Uniform CPA Examination*. Technical Report. American Institute of Certified Public Accountants.

Developed Software

Madison, M. J., Bradshaw, L. (2015). Q*Power (1.0): A tool for prospective diagnostic assessment design. [Computer software]. Athens, GA.

Teaching Experience

Graduate Courses

Instructor: ERSH 8360 – Categorical Data Analysis in Education University of Georgia	2020
Instructor: EDF 9870 – Survey of Latent Variable Models Clemson University	2020
Instructor: EDF 9870 – Multivariate and Categorical Educational Research Clemson University	2019
Instructor: EDF 9770 – Multiple Regression / General Linear Models in Education Clemson University	2019
Instructor: EDF 9270 – Quantitative Research Design and Statistics in Education Clemson University	2018
Instructor: EDUC 255 – Diagnostic Classification Models University of California – Los Angeles	2017
Instructor: EDUC 231C – Categorical Data Analysis University of California – Los Angeles	2017
Co-instructor: EDUC 288 – Research Apprenticeship Course University of California – Los Angeles	2017
Instructor: EDUC 230B – Linear Models in Social Sciences: Multiple Regression University of California – Los Angeles	2017, 2018
Instructor: EDUC 230A – Introduction to Research Design and Statistics University of California – Los Angeles	2016, 2017
Teaching Assistant: ERSH 8310 – Applied Analysis of Variance in Education University of Georgia	2013 – 2015

Undergraduate Courses

Instructor: MTH 217 – Business Calculus Central Michigan University	2012
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GRE Mathematics Preparatory Instructor 2011 – 2012
Central Michigan University Ronald E. McNair Scholars

Instructor: MTH 105 – Intermediate Algebra 2009 – 2011
Central Michigan University

Instructor: MTH 055 – Beginning Algebra 2010
Central Michigan University

Supplemental Instruction Leader: MTH 141 – Calculus I 2006 – 2009
University of South Carolina

Professional Development Training Sessions/Workshops

Madison, M. J. (April, 2019). *Diagnostic Classification Models: Advanced Applications*. Half-day training session presented at the annual meeting of the National Council on Measurement in Education in Toronto, Ontario, CA.

Bradshaw, L., & **Madison, M. J.** (April, 2018). *Diagnostic Classification Models Part I: Fundamentals*. Half-day training session presented at the annual meeting of the National Council on Measurement in Education in New York, NY.

Madison, M. J., & Bradshaw, L. (April, 2018). *Diagnostic Classification Models Part II: Advanced Applications*. Half-day training session presented at the annual meeting of the National Council on Measurement in Education in New York, NY.

Bradshaw, L., & **Madison, M. J.** (April, 2017). *Diagnostic Measurement: Theory, Methods and Applications*. Full day training session presented at the annual meeting of the National Council on Measurement in Education in San Antonio, TX.

Mentorship

Ph.D. Dissertation Committee Member

In Progress

Meina Bian, Quantitative Methodology, University of Georgia

Postdoctoral Research Fellow Supervisor

In Progress

Eric Setoguchi, UCLA + National University Precision Institute

Ph.D. Dissertation Committee Member

In Progress

Jiajun Xu, Quantitative Methodology, University of Georgia

Ph.D. Dissertation Committee Member

In Progress

Zach Feldberg, Quantitative Methodology, University of Georgia

Ph.D. Dissertation Committee Member

In Progress

Robert O'Hara, Learning Sciences, Clemson University

Ph.D. Dissertation Committee Member

In Progress

Georgia McKown, Learning Sciences, Clemson University

Ph.D. Dissertation Chair

In Progress

Karen Franklin, Learning Sciences, Clemson University

Pre-/Postdoctoral Research Fellow Supervisor

Completed

Meghan Fager, UCLA + National University Precision Institute

Ph.D. Dissertation Co-Chair

Completed (2019)

Eric Setoguchi, Social Research Methodology, UCLA

Ph.D. Dissertation Committee Member

Completed (2019)

Anne Blackstock-Bernstein, Human Development and Psychology, UCLA

Ed.D. Dissertation Committee Member

Completed (2019)

Christina E. Apostolakis, Educational Leadership, UCLA

Second Year Project Committee Member

Completed (2018)

An Cho, Human Development and Psychology, UCLA

Service Activities/Leadership Positions

Editorial Leadership and Service

Editorial Board Member

Journal of Educational Measurement

2019 – Present

Educational Assessment

2020 – Present

Peer Reviewer for Journals

Applied Psychological Measurement

Behaviormetrika

Cognition and Instruction

Educational and Psychological Measurement

Educational Measurement: Issues and Practice

Frontiers in Psychology

International Journal of Methods in Psychiatric Research
International Journal of Testing
Journal of Educational and Behavioral Statistics
Psychometrika

Peer Reviewer for Conferences and Organizations

American Educational Research Association
National Council on Measurement in Education
National Science Foundation
Northeastern Educational Research Association
Sage Publications

Organizational Leadership and Service

Chair, Diagnostic Assessment Special Interest Group 2020 – Present
National Council on Measurement in Education

Brenda Loyd Outstanding Dissertation Award Committee 2019 – Present
National Council on Measurement in Education

Merit Review Committee 2019
Clemson College of Education
Department of Education and Human Development

Quantitative Methodologist Professor Search Committee 2018
Clemson College of Education
Department of Education and Human Development

Program Chair 2018 – 2019
American Educational Research Association
Special Interest Group 167: Cognition and Assessment

Outstanding Dissertation Committee 2018 – Present
American Educational Research Association, Division D

Membership Chair 2017 – 2018
Northeastern Educational Research Association

Core Faculty Member 2017 – 2018
UCLA Department of Education
Educational Leadership Program

Academic Personnel Committee 2017 – 2018
UCLA Department of Education

Faculty Search Committee 2017 – 2018
UCLA Department of Psychology

California State University Sally Casanova Pre-Doctoral Scholars Program Undergraduate Research Faculty Mentor	2017
Membership Committee Northeastern Educational Research Association	2016 – 2017
DCMNET: Diagnostic Classification Model Network Listserv Owner and Operator	2016 – Present
Standards and Test Use Committee National Council for Measurement in Education	2015 – 2016
Project U-SPARC: Math Hall and Ball Co-director University of Georgia / Howard B. Stroud Elementary	2015
The 2014 Frasier Equity & Excellence STEM Conference Planning Committee University of Georgia, College of Education	2014 – 2015
Graduate Student Liaison American Educational Research Association Special Interest Group 167: Cognition and Assessment	2013 – 2016
Mathematics Curriculum Team University of Georgia	2013 – 2015
Training and Professional Development Committee National Council for Measurement in Education <i>Graduate Student Representative</i>	2013 – 2014
Graduate Researchers in Educational Psychology University of Georgia <i>Executive Committee: Treasurer</i> <i>Program Representative: Quantitative Methodology</i>	2013 – 2014 2012 – 2013

Other Professional Activities

Psychometric Collaborator Navy Education	2018 – Present
Graduate Research Assistant <i>Developing Enhanced Assessment Tools for Capturing Students' Procedural Skills and Conceptual Understandings in Mathematics.</i> United States Department of Education, Institute of Educational Sciences award number R324A150035.	2015 – 2016

Psychometric Intern Summer 2015
American Institute of Certified Public Accountants

Graduate Assistant 2014 – 2015
Georgia Center for Assessment

Graduate Research Assistant 2012 – 2014
AutoMentor: Virtual Mentoring and Assessment in Computer Games for STEM Learning.
National Science Foundation: Division of Research on Learning award number 0918409.

Software Skills

Fortran, Mplus, Python, R, SAS, SPSS, Visual Studio, Visual Basic, Linux

Professional Affiliations

American Statistical Association	2015 – Present
Psychometric Society	2015 – Present
Northeastern Educational Research Association	2013 – Present
American Educational Research Association	2012 – Present
National Council on Measurement in Education	2012 – Present