

Matthew J. Madison

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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

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

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

Research Interests

Psychometrics; diagnostic classification models; item response models for longitudinal designs; K-16 formative assessment; STEM education assessment

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.

Madison, M. J., & Fager, M. Revisiting diagnostic classification model invariance properties. Manuscript under review.

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

Current Grant Support

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

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

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

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

Research Presentations

*Indicates collaboration with a graduate student.

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 Presentations/Workshops

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, UGA 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). *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: 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 2017, 2018
University of California – Los Angeles

Instructor: EDUC 230A – Introduction to Research Design and Statistics 2016, 2017
University of California – Los Angeles

Teaching Assistant: ERSH 8310 – Applied Analysis of Variance in Education 2013 – 2015
University of Georgia

Undergraduate Courses

Instructor: MTH 217 – Business Calculus 2012
Central Michigan University

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 Chair

In Progress

Karen Franklin, Learning Sciences, Clemson University

Pre-/Postdoctoral Research Fellow Supervisor

In Progress

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

Peer Reviewer for Journals

Applied Psychological Measurement

Behaviormetrika

Cognition and Instruction

Educational Measurement: Issues and Practice

Educational and Psychological Measurement

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

Academic Technology Council Clemson University	2019 – Present
Brenda Loyd Outstanding Dissertation Award Committee National Council on Measurement in Education	2019 – Present
Merit Review Committee Clemson College of Education Department of Education and Human Development	2019
Quantitative Methodologist Professor Search Committee Clemson College of Education Department of Education and Human Development	2018
Program Chair American Educational Research Association Special Interest Group 167: Cognition and Assessment	2018 – 2019
Outstanding Dissertation Committee American Educational Research Association, Division D	2018 – Present
Membership Chair Northeastern Educational Research Association	2017 – 2018
Core Faculty Member UCLA Department of Education Educational Leadership Program	2017 – 2018
Academic Personnel Committee UCLA Department of Education	2017 – 2018
Faculty Search Committee UCLA Department of Psychology	2017 – 2018
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 American Institute of Certified Public Accountants	Summer 2015
Graduate Assistant <i>Georgia Center for Assessment</i>	2014 – 2015

Graduate Research Assistant

2012 – 2014

AutoMentor: Virtual Mentoring and Assessment in Computer Games for STEM Learning.

National Science Foundation: Division of Research on Learning.

Software Skills

Fortran, MATLAB, 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