

# Matthew J. Madison

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## Education

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<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

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University of California – Los Angeles  
Graduate School of Education and Information Studies  
Social Research Methodology Division

June 2016 – Present

*Assistant Professor, Advanced Quantitative Methods*

## Research Interests

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Psychometrics; diagnostic classification models; item response models; latent class models; longitudinal psychometric models for analyzing intervention effects; K-16 formative assessment; mathematics and statistics education

## Publications

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\*Indicates collaboration with a graduate student.

**Madison, M. J.**, & Bradshaw, L. (accepted). Assessing growth in a diagnostic classification model framework. *Psychometrika*.

**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.

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### **Manuscripts Under Review**

\*Indicates collaboration with a graduate student.

**Madison, M. J.** (2017). Revisiting diagnostic classification model reliability. Manuscript under review.

**Madison, M. J.** (2017). Reliably assessing growth with longitudinal diagnostic classification models. Manuscript under review.

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### **Current Grant Support**

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

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### **Grant Proposals Under Review**

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

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### **Unfunded Grant Proposals**

**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.

## Research Presentations

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\*Indicates collaboration with a graduate student.

### 2018

**Madison, M. J.**, & Bao, Y. (2018, July). *A longitudinal and polytomous diagnostic classification model*. Paper to be 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 to be 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 to be 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 2<sup>nd</sup> 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 4<sup>th</sup> 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**

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- 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**

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**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**

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

### **Teaching Experience**

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#### **Graduate Courses**

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
GRE Mathematics Preparatory Instructor Central Michigan University Ronald E. McNair Scholars	2011 – 2012
Instructor: MTH 105 – Intermediate Algebra Central Michigan University	2009 – 2011
Instructor: MTH 055 – Beginning Algebra Central Michigan University	2010
Supplemental Instruction Leader: MTH 141 – Calculus I University of South Carolina	2006 – 2009

## **Professional Development Training Sessions/Workshops**

Bradshaw, L., & **Madison, M. J.** (April, 2018). *Diagnostic Classification Models Part I: Fundamentals*. Half-day training session to be 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 to be 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**

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### **Ph.D. Dissertation Co-Chair**

*In Progress*

Eric Setoguchi, Social Research Methodology, UCLA

### **Ph.D. Dissertation Committee Member**

*In Progress*

Anne Blackstock-Bernstein, Human Development and Psychology, UCLA

### **Second Year Project Committee Member**

*In Progress*

An Cho, Human Development and Psychology, UCLA

## **Honors and Awards**

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Outstanding Dissertation Award Nominee American Educational Research Association, Division D	2018
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 <sup>nd</sup> 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

## **Service Activities/Leadership Positions**

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Outstanding Dissertation Committee American Educational Research Association, Division D	2018 – Present
Membership Chair Northeastern Educational Research Association	2017 – Present
Core Faculty Member UCLA Department of Education Educational Leadership Program	2017 – Present
Academic Personnel Committee UCLA Department of Education	2017 – Present
Faculty Search Committee UCLA Department of Psychology	2017 – 2018
California State University Sally Casanova Pre-Doctoral Scholars Program Undergraduate Research Faculty Mentor	2017



CSU/UC Mathematics Diagnostic Testing Project Working Group Member	2017 – Present
Membership Committee Northeastern Educational Research Association	2016 – 2017
Los Angeles School Improvement Network Faculty Research Advisor	2016 – Present
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>	2013 – 2014
<i>Program Representative: Quantitative Methodology</i>	2012 – 2013

### **Other Professional Activities**

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<b>Graduate Assistant</b> <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: Cognition in Special Education, Measurement Goal 5.	2015 – 2016
<b>Psychometric Intern</b> American Institute of Certified Public Accountants	Summer 2015

**Graduate Assistant** 2014 – 2015  
*Georgia Center for Assessment*

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

### **Software Skills**

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

### **Professional Affiliations**

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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