Yichi Zhang

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Research summary

Aims—to pursue fair and accurate psychological measurement using statistical tools.
Methods—structural equation modeling, hierarchical linear models, Bayesian statistics, robust methods.
My research has focused on the practical implications of measurement issues in applied psychological research and robust statistical models.
I am a fast learner with strong desire to learn new areas in statistics and software; a dedicated team member with strong communication skills.

Education

2019 — present **PhD. Student, Quantitative Methods and Computational Psychology**, University of Southern California

2019 — 2021 **M.A., Quantitative Methods and Computational Psychology**, University of Southern California

2015 — 2019 **B.S., Mathematics, Psychology**, Dickinson College

Publications

Journal articles (fully reviewed, archival)

2021 Zhang, Y., Lai, M. H. C., & Palardy, G. J. (2022). A Bayesian Region of Measurement Equivalence (ROME) Approach for Establishing Measurement Invariance. Psychological Methods. https://doi.org/10.1037/met0000455

Lai, M. H. C., & Zhang, Y (2021). Classification accuracy of multidimensional tests: Quantifying the impact of noninvariance. Structural Equation Modeling: A Multidisciplinary Journal. Manuscript accepted for publication. https://doi.org/10.1080/10705511.2021.1977936

Lai, M. H. C., Zhang, Y., & Ji, F. (in revision). Adjusting for measurement error in cluster means in multilevel modeling: Two numerically stable alternatives to latent-mean centering.

Conference Presentations

2021 Zhang, Y. & Lai, M. H. C. (2021, August 12-14). Classification accuracy of multidimensional tests: Quantifying the impact of noninvariance (Poster Session). American Psychological Association Annual Convention (APA), online.

Zhang, R., Zhang, Y., & Lalonde, R. (2021, July 27-31). Examining multiculturalism-creativity link from the perspective of challenge and threat appraisals. International Association of Cross-Cultural Psychology (IACCP), online.

Zhang, Y. & Lai, M. H. C. (2021, July 20-23). Classification accuracy of multidimensional tests: Quantifying the impact of noninvariance (Oral Presentation). Annual Meeting of the Psychometric Society (IMPS), College Park, MD, United States.

2020

Zhang, Y. & Lai, M. H. C. (2020, July 14-17). A Bayesian framework for establishing measurement invariance for observed test scores (Poster Session). Annual Meeting of the Psychometric Society (IMPS), College Park, MD, United States.

Zhang, Y., & Lai, M. H. C. (2020, June). A Bayesian framework for establishing measurement invariance for observed test scores (Poster Session). Modern Modeling Methods Conference, Storrs, CT, United States.

Current Research Projects

present

Bayesian Region of Measurement Equivalence (ROME) Approach for Establishing Measurement Invariance
- Identify noninvariant items using Bayesian alignment and effect size indices - Establish measurement invariance using the Bayesian Region of Measurement Equivalance (ROME) approach

present

Developing a short form for Moral Foundation Questionnaire-2
- Develop a short form of Moral Foundation Questionnaire-2 using IRT-based method - Test measurement invariance across demographic groups and cultures

present

Improving Subnational Predictions with Social Media Data: Multilevel Regression and Poststratification
- Conducted Multilevel Regression and Poststratification with tweets related to COVID-19 to predict county-level covid cases and deaths

present

Evaluating Standard Error Estimators for Multilevel Models on Small Samples With Heteroscedasticity and Unbalanced Cluster Sizes
- Compared the standard error estimators in multilevel models for small samples with heteroscedasticity and unbalanced cluster sizes using Monte Carlo simulation
- Proposal accepted by the 2022 AERA Annual Meeting Division D Graduate Student In-Progress Research Gala

Research Experience

2020 — 2021

Research Assistant, University of Southern California
Developing a Multidimensional Psychometric Framework on the Impact of Item Bias on Classification (Department of Defense/Army Research; Supervisor: Lai, M. H. C.)
- Extended the selection accuracy framework to multidimensions
- Illustrated the framework using a real data example that investigates measurement invariance of personality scale across gender

2020 — 2021

Research Assistant, University of Southern California
Evaluation of "Identity-Based Motivation Journey to Academic Success" (Department of Education/i3; Supervisor: Lai, M. H. C.)
- Conducted attrition analysis and reliability analysis for large scale assessment data
- Made tables and prepared the report using R packages knitr, flextable, and modelsummary

2020 — 2021

Research Assistant, University of Southern California
Developing and Validating Early Assessments of College Readiness: Differential Effects for Underrepresented Groups, Optimal Timing of Assessments, and STEM-specific Indicators (National Science Foundation, Research on Learning in Formal and Informal Settings; Supervisor: Palardy, G. J.)
- Conducted Principle Component Analysis using data from Educational Longitudinal Study of 2002 (ELS: 2002) in R
- Tested Measurement invariance using auxiliary variables to account for missing data in Mplus

Teaching experience

2019 — 2020

Teaching assistant, University of Southern California
PSYC 274 Lg: Statistics and PSYC 100 Lg: Introduction to Psychology

2017 — 2018

The Quantitative Reasoning Center Tutor, Dickinson College
- Assisted students with questions about Math and Psychology

2021

Co-instructor of Workshop "Advancing Quantitative Science with Monte Carlo Simulation, Simulation Summer School, Psychology Postgraduate Affairs Group, the British Psychological Society
- Led one session on simulating data to demonstrate the Central Limit Theorem

Service

2020 — present

Ad Hoc Reviewer
Psychological Methods; Multivariate Behavioral Research; Asian American Journal of Psychology

Awards & honours

2020 — 2021

Dornsife PhD Academy Psychology Department Research Award, Dornsife College of Letters, Arts and Sciences, University of Southern California

2019 — 2020

First-Year Dornsife PhD Academy Psychology Department Research Award, Dornsife College of Letters, Arts and Sciences, University of Southern California

2020

Psychology Department Travel Grant Award, Dornsife College of Letters, Arts and Sciences, University of Southern California

Publicly available research code & data

2021

Data, materials, and analyses for manuscript "Evaluating Standard Error Estimators for Multilevel Models on Small Samples With Heteroscedasticity and Unbalanced Cluster Sizes" 1
https://osf.io/s7u2z/

Data, materials, and analysis for manuscript "A Bayesian Region of Measurement Equivalence (ROME) Approach for Establishing Measurement Invariance" 2
https://osf.io/e75wk/

Software & Skills

R (lavaan, blavaan, lme4, glmmTMB, brms, igraph, tm, ltm, mirt, TAM)
Mplus
Stata
Stan
fexMIRT
Markdown, Rsweave, Latex
Keras

Selected Coursework & Workshop

Measurement: Fundamental of Psychological Measurement

Statistics: Introduction to the Theory of Statistics, Classic and Modern Statistic Methods, Multilevel Modeling, Bayesian Data Analysis, Data Analysis for Categorical Variables

Machine Learning & NLP: Applied Machine Learning, Computational social sciences: Text as Data

Consulting: Statistical Problem Solving

Introduction to flexMIRT by Li Cai, Michael Edwards and Carrie R. Houts
Longitudinal Data Analysis Using SEM by Paul D. Allison
Introduction to Social Network Analysis by Tracy Sweet