

Ai Ye

235 E. Cameron Avenue, Campus Box 3270, Chapel Hill, NC, 27599 | 302-561-0048 | awella@live.unc.edu

EDUCATION

- 2016-** **Ph.D. student | Graduate School of Psychology and Neuroscience | UNC at Chapel Hill**
- **Specification:** *Quantitative Psychology*
 - Advisor: *Dr. Kenneth A. Bollen*
 - Intended date of graduation: May 2021
 - Core coursework: *Structural Equation Modeling, Item Response Theory, Multilevel Modeling, Latent Curve Modeling, Regression with Categorical Dependent Variables, Evaluation Theory, Rasch Model and Differential Item Functioning, Experimental Design*
- 2017-** **M.S. student | School of Statistics and Operational Research | UNC at Chapel Hill**
- **Specification:** *Statistics*
 - Advisor: *Dr. Yun Li*
 - Intended date of graduation: May 2020
 - Core coursework: *Probability and Statistical Theory (I, II), Measure and Integration, Large Sample Theory, Time Series, Generalized Linear Models, Multivariate Data Analysis, precision Medicine, Biostatistics Theory, Statistical Genetics*
- 2013** **M.A. | Graduate School of Education | University of California, Los Angeles**
- **Specification:** *Social Research Methodology*
 - Advisor: *Dr. Li Cai*
 - Core coursework: *Hierarchical Linear Models, Generalizability Theory, Mix Methods Research; Causal Inference, Qualitative Methods, Research Design & Statistics (II, III), Quantitative Methods (R Toolkit); Matrix Algebra & Optimization*
- 2012** **B.S. | Engineer | Wuhan University, Hubei, China**
- **Major:** *Geodesy and Geomatics*
 - Core coursework: *C, C++, C#, Object-Oriented Programming, Linear Algebra D, Advanced Mathematics (Calculus I, II), Probability and Statistics (I, II), Digital Image Processing, Geographic Information System (GIS), Geographic Positioning System (GPS), Remote Sensing*

PUBLICATION

Ye, A. & Gates, K. M. (under review). On the Interpretation of Directed and Undirected Contemporaneous Relations in Dynamic Psychometric Networks.

Ye, A., Gates, K. M., Henry, T. R., & Luo, L. (2020, April 10). Path and Directionality Discovery in Individual Dynamic Models: A Regularized Unified Structural Equation Modeling Approach for Hybrid Vector Autoregression. <https://doi.org/10.31219/osf.io/uh8ft>

Henry, T. R. & **Ye, A.** (in prep). The Effects of Omitted Variables and Measurement Error on Network Psychometric Models.

Rajan, V., **Ye, A.**, Resnick, I., Carrique, J., & Jordan, N.C. (*Manuscript under invited revision*). Developmental Trajectory of Fraction Magnitude Understanding in Young Children.

McCormick, E. M., Gates, K. M., & **Ye, A.** (in prep). multiREG: Directed Connectivity Search Using Regularized Regression.

Ye, A., Resnick, I., Hansen, N., Rodrigues, J., Rinne, L., & Jordan, N.C. (2016). Developmental Pathways to Fractions Learning: Investigating the Mediation Effects of Numerical Abilities on the Associations between Domain General Competencies and Fraction Knowledge. *Journal of Experimental Child Psychology*, 152, 242-263. doi: 10/1016/j.jecp.2016.08.001

Rinne, L., **Ye, A.**, & Jordan, N.C. (2017). Development of Fraction Comparison Strategies: A Latent Transition Analysis. *Developmental Psychology*, 53(4), 713-730. doi: 10.1037/dev0000275

Rinne, L., **Ye, A.**, & Jordan, N.C. (2019). Co-Development of Reading Fluency and Arithmetic Fluency in Young Children: An Autoregressive Latent Trajectory Analysis. *Journal of Educational Psychology*

Chen, Z., Solberg, V. S., & **Ye, A.** (2018). Chinese Youth Career Adaptability: Contextual Influences and Pathways to Positive Youth Development. *Youth & Society*. doi: 10.1177/0044118X18784058

Hansen, N., Rinne, L., Jordan, N.C., **Ye, A.**, Resnick, I., & Rodrigues, J. (2017). Investigating the Bidirectional Relationship between Fraction Magnitude Understanding and Mathematics Learning: An Autoregressive Cross-lagged Analysis. *Learning and Individual Differences* 60:18. doi: 10.1016/j.lindif.2017.10.005

Karpyn, A., Marks, S., Fillon, N., **Ye, A.**, May, H., Allen, M., & Gardner, M. (2017). Tasteful Animal Characters Paired with Produce Result in Increased Selection Among Children. *Health Education and Behavior*, 44(4), 581-589. doi: 10.1177/1090198116679359

INVITED TALKS AND CONFERENCE PRESENTATIONS

(Manuscript available upon request)

Ye, A., Gates, K. M., & Henry, T. R. (2020, April). Discover Contemporaneous Connections in Dynamic Network: Regularized Unified SEM as A Hybrid Vector Autoregressive Model. *Paper to be presented at the 2020 American Education Research Association Annual Meeting (Division D: Measurement and Research Methodology/Section 2: Quantitative Methods and Statistical Theory), San Francisco, CA.*

Ye, A. (2020, July). A Comparison of Three Psychometric Approaches for Intensive Longitudinal Data. *Paper to be presented at the 2020 International Meeting of the Psychometric Society (IMPS), College Park, MD.*

- Ye, A.** (2020, June). Path and Directionality Discovery in Individual Dynamic Models: A Regularized Unified Structural Equation Modeling Approach for Hybrid Vector Autoregression. *Invited paper presentation as part of the Symposium "Evaluation of Current and Novel Methods for Characterizing Path Directionality in Person-Specific Structural Vector Autoregressive Models" organized by Alexander Weigard at the 2020 Modern Modeling Method Conference, UCONN, Storrs, CT.*
- Ye, A., & Bollen, K. A.** (2019, July). Can We Distinguish Between Different Longitudinal Models for Estimating Nonlinear Trajectories? *Paper presented at the 2019 International Meeting of the Psychometric Society (IMPS), Santiago, Chile.*
- Ye, A.** (2018, August). Applications of Time Series Models in Psychological Studies. *Poster Presentation at the 2018 Intern EXPO, SAS Institute, Cary (HQ), NC.*
- Ye, A., & Harring J.** (2017, July). The Bias-corrected ML-based Three-step Method of Covariate Inclusion in Latent Transition Analysis. *Paper presented at the 2017 International Meeting of the Psychometric Society (IMPS), Zürich, Switzerland.*
- Ye, A., & Harring J.** (2017, May). The Bias-corrected Three-step Method of Covariate Inclusion in Latent Transition Analysis. *Paper presented at the 2017 Modern Modeling Method Conference, UCONN, Storrs, CT.*
- Ye, A., Cutler, L. E., Gilden, C., Xie, Y. M., Yun, J. Y., & Gaviria-Loaiza, J.** (2017, April). Investigating the Bidirectional Relationship between Home Environment and Student Achievement: A Cross-lagged Longitudinal Analysis. *Poster presentation at the 2017 American Education Research Association Annual Meeting (Division J), San Antonio, Texas.*
- Ye, A., Harring J., & Rinne, L.** (2017, April). The Three-step Maximum-likelihood Bias-correction Methods of Covariate Inclusion in Latent Transition Analysis. *Roundtable presentation at the 2017 American Education Research Association Annual Meeting (Division C), San Antonio, Texas.*
- Ye, A., Hansen, N., Resnick, I., Carrique, J., & Jordan, N. C.** (2016, August). Developmental Pathways to Fractions Learning. *Poster presented at American Psychology Association 2016 Annual Convention, Denver, CO.*
- Ye, A., Xie, Y., & May, H.** (2016, August). The Role of Psycho-Social Variables in Understanding Academic Performance and Retention of First-Generation College Students. *Individual Poster presented at American Psychology Association 2016 Annual Convention, Denver, CO.*
- Ye, A., & Rinne, L.** (2016, July). Estimating Covariance in Longitudinal Mixture Modeling using a Three-Step Approach. *Poster presented at the 2016 International Meeting of the Psychometric Society (IMPS), Asheville, NC.*
- Ye, A., Rajan, V., & Jordan, N.C.** (2016, April). Latent Growth Trajectory of the Linearity in Fraction Number Line Estimation. *Research Report presented at 2016 American Education Research Association Annual Meeting (Division C), Washington, D.C.*
- Ye, A., & Farley-Ripple, E. N.** (2016, April). Combating the "Sophomore Slump": Investigating the Contributions of On-campus Living. *Research Report presented at American Education Research Association Annual Meeting (Division J), Washington, D.C.*
- Ye, A., Hansen, N., Resnick, I., Carrique, J., & Jordan, N. C.** (2016, March). Mediation Effects of Latent Numerical Abilities on the Associations between Domain General Competencies and Fraction Knowledge. *Poster presented at Society for Research on Educational Effectiveness Semiannual Meeting (Content Area "Research Methods"), Washington, D.C.*

Ye, A., (2015, October). Will Students Stay On-campus? Predicting Student's Intention to Return to Campus Using a SEM Model. *Paper presented at the 2015 Annual Meeting of the Pennsylvania Educational Research American Association, Philadelphia, PA.*

Henry, T. R. & **Ye, A.** (2019, July). The Impact of Endogeneity on Network Psychometric Models. *Paper presenting at the 2019 International Meeting of the Psychometric Society (IMPS), Santiago, Chile.*

Carrique, J., Hansen, N., Resnick, I., Dyson, N.I., **Ye, A.**, & Jordan, N.C. (2016, April). A Practical and Powerful Screener of Middle School Mathematics Difficulties. *Research Report presented at National Council of Teachers of Mathematics Research Conference, San Francisco, CA.*

Rinne, L., **Ye, A.**, Carrique, J., Resnick, I., & Jordan, N.C. (2016, May). The Development of Fraction Comparison Ability: A Latent Transition Analysis of the Change in Strategy Selection over Time. *Poster presented at Math Cognition and Learning Conference by National Institute of Child Health and Human Development. Fort Worth, Texas.*

MAJOR RESEARCH INTERESTS

- Develop and evaluate advanced quantitative research methods in social science, with a concentration on the statistical computing and programming for the estimation of structural equation models (SEM) or latent variable models (LVM), and their longitudinal extensions (e.g., Panel models, hidden Markov models, Time Series models)
- Adopt machine learning methods to improve model selection and estimation in tradition SEMs, applying the regularized SEM approach to neuroscience research involving intensive longitudinal data or time series data such as functional magnetic resonance imaging (fMRI) or daily diary
- Extension and Generalization of a longitudinal panel model with latent variables called Autoregressive Latent Trajectory (ALT; first proposed by Dr. Bollen and Dr. Curran), with a special interest in modeling and comparing nonlinear patterns and autoregressive processes
- Development of statistical methods with application to the genetic dissection of complex diseases and traits
- Applications of advanced modeling within a broad realm of substantive contexts including psychological, behavioral, or educational and social, as well as clinical and health sectors

ACADEMIC & INDUSTRY POSITIONS

- 2018 Aug-** **Genetic and Epidemiology Statistician**, *Genetics, School of Medicine; Epidemiology, Gillings School of Global Public Health; Carolina Population Center, UNC-CH*
- Method development for GWAS regulatory variants in terms of their targeted genes and potential DNA methylation involved causal mechanism
 - Sparse Canonical Correlation Analysis in multi-ethnic study of atherosclerosis multi-omics data, with application to hematological traits
 - Multiple Imputation, mediational analysis, and longitudinal modeling for Detroit Neighborhood Health Study, with the goal to 1) understand the role of early life determinants and that of social environmental exposures during sensitive periods of development on racial health disparities and 2) elucidate the biological processes and behavioral mechanisms through which social environmental exposures lead to health disparities across the life course
- 2016 Aug-** **Graduate Researcher**, *L. L. Thurstone Psychometric Lab, Department of Psychology and Neuroscience, UNC-CH*
- Involving in research regarding the Model-Implied Instrumental Variable, Two-Stage Least Square (MIIV-2SLS) estimator in SEM, proposed by Dr. Kenneth Bollen in 1996.
 - Conducting research to adopt machine learning methods to improve model selection and estimation in tradition SEMs, applying the regularized SEM approach to neuroscience research involving intensive longitudinal data or time series data such as functional magnetic resonance imaging (fMRI) or daily diary
- 2018** **Summer Fellow in Software Developer**, *Econometrics Technology, Advanced Analytics Div., R&D, SAS Institute, Cary (HQ), NC*
- *Project I*: Example illustration for PROC HMM: the study of Emotion Regulation by fitting facial electromyography (EMG) data using Regime-Switching Autoregressive models
 - *Project II*: Literature review of the development of Dynamic Factor Model (DFM) in the fields of econometrics and of psychometrics
 - *Project III*: Example illustration for PROC SSM: the investigation of dynamics individual personality using DFM specified as State-Space model
- 2017-2018** **Anesthesiology Researcher**, *Institute for Trauma Recovery, School of Medicine, UNC-CH*
- *Project I*: NIH-funded research aims to better understand the physical and mental processes mediating recovery after trauma, and to develop more effective interventions that promote rapid recovery and prevent chronic symptom development. My work was focused on longitudinal modeling for post-trauma recovery trajectory of targeted victims (e.g., motorcycle vehicle collision survivors, sexual assault survivors, and veterans), using clinical and psychological outcomes including chronic pain, PTSD, somatic symptoms, depression, etc.
 - *Project II*: Developing a clinically useful objective biomarker (e.g., microRNA from blood sample) of chronic pain and posttraumatic stress development. With high dimensional variable selection and support vector machines, I worked with biostatisticians to develop a predictive algorithm that defines individuals at high risk of developing adverse outcomes, using nonparametric statistical models and machine learning tools. The development of this algorithm uses both clinical data from our participants, along with genomic and transcriptomic data assessed in the early aftermath of trauma exposure

- 2016-2017** **Teaching Assistant (PSYC210 Intro to Statistics),** *School of Psychology, UNC-CH*
- Taught two recitation classes (24 students each class) for two sessions per week
 - Assisted the professor in constructing class material, and facilitated classroom teaching
 - Provided independent coaching and teaching by holding weekly office hour
- 2015-2016** **Research Methodologist,** *Center for Improving Learning of Fractions (CILF),*
Graduate School of Education, University of Delaware
- Longitudinal data analysis on a four-year longitudinal data including 2668 demographic, cognitive, and mathematics-related variables of 536 students from third to sixth grade
 - Co-authored multiple manuscripts that published on top-tier peer-reviewed journals
 - Disseminated findings through national and international conference presentations
 - Statistical consultant at the center on data management and statistical modeling
- 2014-2016** **Assessment Researcher,** *Office of Residence Life and Housing, University of Delaware*
- Led the design of various data collection instruments including survey (electronic survey platform such as CampusLabs®, Qualtrics, etc.), focus group, and interview
 - Reviewed literature and national reports on college student success, identified components pertinent to the department, designed corresponding questions in assessment instruments
 - Performed statistical analysis of assessment data, compared our findings with various institutional and national norm, wrote intensive reports on the combined findings
 - Generated departmental reports for university and national presentations
 - Provided Statistics Trainings to all staffs, training sessions recorded by UD Capture
 - Participated in department-wide staff recruitment and professional training activities
- 2015-2016** **Research Assistant & GIS Specialist,** *Center for Research in Education and Social Policy*
Graduate School of Education, University of Delaware
- Built up the monthly survey instrument in Qualtrics to initiate the evaluation of nutrition incentives for SNAP users
 - Drew ArcGIS maps to present the locations of SNAP-Education sites and SNAP partnership retailers (e.g. farmers' market, supermarkets, convenient stores, corner stores, etc.) on Census Bureau base maps and Census Tract data
 - Implemented need assessment on the SNAP retailers and SNAP-Education sites in the state of Delaware in collaboration with colleagues from Dept. of Agriculture at UD
 - Performed data analysis (log-linear modeling for contingency table) for some experiments using Randomized Control Trails (RCT) to study children's nutrition selection
- 2013** **Research Assistant,** *UCLA Survey Research Project,* Graduate School of Public Policy, UCLA
Location(s): Los Angeles Unified School District (LAUSD), CA
- Visited LAUSD schools, assisted in survey administration by checking with the school and facilitating survey procedure
 - Conducted classroom observation, collected and coded survey and observation data, and reported to the program coordinator

OTHER PROFESSIONAL EXPERIENCE

2013-2014 Grant & Evaluation Intern | Girls Incorporated of Alameda County | Oakland, CA

Key Responsibilities:

- Initiated the project “*State of the Alameda County Girl*” that aimed to examine effects and impact of elements at play for girls ages 5-18 in Alameda County, particularly their access to the enrollment and engagement in STEM major.
- Gathered statistics from multiple sources and accomplished a quantitative report on the demographics facts and STEM-related resources in Alameda County.
- Collected and analyzed large-scale data or reports from national sources (e.g. Census Tract data, USDA, Center for Disease Control, etc.) and developed comparison report.
- Program evaluation on Advocating Change Together (ACT) Program. Assisted in establishing logic models, survey data entry, coding, analysis, and report writing

2009 Summer Exchange Participant in Education | AIESEC Delhi IIT | New Delhi, India

Key Responsibilities:

- Taught English and cultural courses at multiple schools located at underserved areas
- Helped students in effective learning and developing an understanding of cultural diversity
- Evolved new methodologies for effective teaching for students with education disparity

2009-2012 On-Campus Sales Rep | Science and Education Daily Newspaper | Wuhan, China

Key Responsibilities:

- Recruited, organized and supervised an on-campus group of 150 sales team members and 50 delivery team members
- Created newspaper advertising campaigns and facilitated contact between the newspaper company and the sales team

TEACHING & MENTORING

Summer 2019 Teaching Assistant, Summer Course “*Machine Learning for the Analysis of Text as Data*”

ICPSR Summer Program in Quantitative Methods of Social Research, Inter-university Consortium for Political and Social Research at University of Michigan, Ann Arbor

Summer 2018 Teaching Assistant, Data Matters™ Short Course Series “*Advanced Statistical Computing in R*”, “*Network Analysis for Data Scientist*”, “*Data Mining and Machine Learning*”

National Consortium for Data Science, North Carolina State University, RENCI, the Odum Institute for Research in Social Science at UNC Chapel Hill

Summer 2017 Teaching Assistant, Course: PSYC210 Intro to Statistics, Instructor: Dr. Neil Mulligan

Spring 2017 Teaching Assistant, Course: PSYC210 Intro to Statistics, Instructor: Dr. Elizabeth Adams

Fall 2016 Teaching Assistant, Course: PSYC210 Intro to Statistics, Instructor: Dr. Viji Sathy

Fall 2015 Teaching Assistant, Course: EDUC873 Multilevel Models, Instructor: Dr. Henry May

Spring 2015 Assessment Statistics Staff Training, Office of Residence Life & Housing

HONORS & AWARDS

- July 2019** **Graduate Student Workshop Grant**, *Society of Multivariate Experimental Psychology*
Support workshop at the 2019 International Meeting of the Psychometric Society
- July 2019** **Graduate Student Travel Award**, *The L. L. Thurstone Psychometric Lab, Department of Psychology and Neuroscience*
Support Paper presentation at the 2019 International Meeting of the Psychometric Society
- Aug 2018** **Summer Fellowship**, *Advanced Analytics Division, R&D, SAS Institute, Cary, NC (HQ)*
- Aug 2018** **Graduate Student Workshop Grant**, *Society of Multivariate Experimental Psychology*
Support workshop at the 2018 Joint Statistics Meeting by American Statistics Association
- Aug 2018** **Dashiell Student Travel Award**, *Department of Psychology and Neuroscience, UNC*
Support Paper presentation at the 2018 International Meeting of the Psychometric Society
- July 2017** **Graduate Student Travel Award**, *Society of Multivariate Experimental Psychology*
Support workshop at the 2017 International Meeting of the Psychometric Society
- July 2017** **Graduate Student Transportation Award**, *UNC Graduate Professional School*
Support Paper presentation at the 2017 International Meeting of the Psychometric Society
- May 2017** **Graduate Student Travel Award**, *Society of Multivariate Experimental Psychology*
Support Paper presentation at the 2017 Modern Modeling Method Conference
- April 2016** **1st Place, Graduate Paper Award**, *31st Marion H. Steele Research Symposium*
College of Education and Human Development, University of Delaware
Paper Title: Developmental Pathways to Fractions Learning: Investigating the Mediation Effects of Numerical Abilities on the Associations between Domain General Competencies and Fraction Knowledge
- April 2015** **1st Place, Graduate Paper Award**, *30th Marion H. Steele Research Symposium*
College of Education and Human Development, University of Delaware
Title: Combating the 'Sophomore Slump': Investigating the Contributions of On-campus Living
- 2014-2018** **Four-year Full Fellowship** from School of Education, University of Delaware
- 2014-2016** **Tuition Scholarship**, Office of Residence and Housing, University of Delaware
- 2012-2013** **Division-based Merit Fellowship** (\$9,000/year), UCLA
- 2009-2012** **Academic Merit-based University Scholarship**, Wuhan University
- 2010-2012** **Academic Merit-based National Fellowship**, Wuhan University
- 2008** **Champion, Campus Talent Show** (Oriental Dance/Calligraphy), Wuhan University

PROFESSIONAL TRAINING & CERTIFICATES

- Oct 2019** **Neural Networks and Deep Learning** | Instructor: Dr. Andrew Ng | Coursera
- Nov 2015** **Latent Class Analysis** | Instructor: Dr. Stephanie Lanza | Statistical Horizons
- May 2014** **Honor Code Certificate for CHEM181x: Food for Thought** | McGill University | edX

PROFESSIONAL SERVICES & OUTREACH

Professional Affiliations

- 2018- **Member**, American Statistics Association
2014- **Member**, American Education Research Association, (AERA; Div. D, Div. H)
2014- **Member**, National Council on Measurement in Education (NCME)
2015- **Member**, The Psychometric Society
2015- **Member**, American Psychological Association (APA; Div. 5)
2015- **Member**, Society of Research in Educational Effectiveness (SREE)
2013 **Student Advisory Board (SAB)**, InterActions, Graduate School of Education, UCLA

Reviewing Services

- Aug 2016 **Reviewer**, American Educational Research Association Annual Conference
Sept 2016 **Reviewer**, National Council on Measurement in Education Annual Meeting
Oct 2015 **Reviewer**, National Council on Measurement in Education Annual Meeting

PROFESSIONAL SKILLS

Programming Software: R Studio, Rmarkdown, SAS, C, C++, C#, MATLAB, Stata, SPSS; *Mplus*, Amos, HLM, IRTPRO, WINSTEPS, GENOVA, Nvivo; ArcGIS, Visual Studio, AutoCAD, SketchUp, Adobe Photoshop

Modeling Skills: (Data Manipulation and Analysis) Statistical Inference, Hypothesis Testing, Experiment Design, Casual inference, Propensity Score Matching, Sensitivity Analysis, Diagnostics, Principal Component and Factor Analysis, Mediation, Longitudinal Data Analysis, Microarray Data Analysis, Need Assessment, Geo-Spatial Analysis; **(Modeling Technique)** Generalized Linear Models (GLM), Structural Equation Models (SEM) or Latent Variable Models (LVM), Multilevel Modeling, Mixture Models (Latent Class and Transition Models, Hidden Markov Chain, Growth Mixture Models), Empirical Bayes Modeling, Time Series Models

Computational Skills: Markov Chain Monte Carlo Simulation, Visualization, Linear programming, Data Normalization, Dimension Reduction, Cross Validation, Classification and Clustering, Bootstrap and Resampling

LANGUAGE

Mandarin, English, French (speaking and listening comprehensions)