Lijin Zhang

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Psychometrics, Quantitative Psychology, Bayesian Analysis

EDUCATION

Stanford University
- Ph.D. Candidate in Developmental and Psychological Science — 2022 - present
- Ph.D. Scholar in Data Science — 2024 - present
- M.S. in Statistics — 2022 - 2025

Sun Yat-sen University
- M.S. in Psychology — 2019 - 2022
- B.S. in Psychology — 2015 - 2019

AWARDS, HONORS, & FELLOWSHIPS

Vector Travel Award, International Meeting of Psychometric Society — 2025
Travel Grant, National Council on Measurement in Education — 2025
Data Science Fellowship (∼$100,000, 15 recipients across the campus), Stanford University — 2024 - 2026
Collaborative Learning Fund Award, Stanford Graduate School of Education — 2024 - 2025
Travel Fellowship, Stanford Graduate School of Education — 2023 - 2024
EDGE Fellowship ($12,800), Stanford University — 2022 - 2027
Outstanding Graduates, Sun Yat-sen University — 2022
National Scholarship, Minister of Education of China — 2020
Outstanding Paper Award, Chinese Psychological Society — 2019
Outstanding Undergraduate Thesis, Sun Yat-sen University — 2019
Outstanding Presenter, Undergraduate Psychology Forum at Peking University — 2018
First Prize Scholarship of Outstanding Students, Sun Yat-sen University — 2017 - 2021

PUBLICATIONS

Highlights: 8 first-authored journal articles, including research papers in *Psychological Methods*, *Multivariate Behavioral Research*, *Structural Equation Modeling*, *Behavior Research Methods*, and *R Journal*.

Journal Articles († indicates alphabetical order or reverse, * indicates correspondent author, IF represents the Impact Factor for the publication year or the year before.)

1. **Zhang, L.**, Ulitzsch, E., & Domingue, B.W. (accepted). Bayesian Factor Mixture Modeling with Response Time for Detecting Careless Respondents. *Behavior Research Methods.* [IF: 7.2; Q1]
2. Shen, H., Stafford, C., Meijsen, J., **Zhang, L.**, Reiter, J., Lawn, R.B., Smith, A.K., Vermuri, M., & Duncan, L.E. (accepted). Associations between testosterone and future PTSD symptoms among middle age and older UK residents. *Translational Psychiatry*. [IF: 5.8; Q1]
3. Domingue, B.W., Kanopka, K.†, Ulitzsch, E.†, & **Zhang, L.**† (2025). Implied probabilities of polytomous response functions for model-based prediction and comparison. *Behaviormetrika*. Advance Online Publication. [doi] [IF: 1.6; Q2]
4. **Zhang, L.**, Qu, W., & Zhang, Z. (2025). Bayesian Growth Curve Modeling with Measurement Error in Time. *Multivariate Behavioral Research.* Advance Online Publication. [doi] [IF: 5.3; Q1]

5. Gilbert, J.B., **Zhang, L.**, Ulitzsch, E., Domingue, B.W. (2025). Polytomous Explanatory Item Response Models for Item Discrimination: Assessing Negative-Framing Effects in Social-Emotional Learning Surveys. *Behavior Research Methods.* Advance Online Publication. [doi] [IF: 7.2; Q1]
6. Chen, Q., Su, K., Feng, Y., **Zhang, L.**, Ding, R., & Pan, J. (2024). A Tutorial on Bayesian Structural Equation Modeling: Principles and Applications. *International Journal of Psychology, 59*(6), 1326-1346. [doi] [IF: 3.3; Q1]
7. **Zhang, L.**, & Liang, X. (2024). Bayesian Regularization in Multiple-Indicators Multiple-Causes Models. *Psychological Methods, 29*(4), 679–703. [doi] [IF: 11.5; Q1]
8. Wang, E., Kennedy, K.M., **Zhang, L.**, Zuniga-Hernandez, M., Titzler, J., Li, B. S-K., Arshad, F., Khoury, M., & Caruso, T.J. (2024). A Technology Acceptance Model to Predict Anesthesiologists' Clinical Adoption of Virtual Reality. *Journal of Clinical Anesthesia, 98*, 111595. [doi] [IF: 5.0; Q1]
9. Wang, E., Qian, D., **Zhang, L.**, Li, B. S-K, Ko, B., Khoury, M., Renavikar, M., Ganesan, A., & Caruso, T.J. (2024). Acceptance of Virtual Reality in Trainees Using a Technology Acceptance Model. *JMIR Medical Education, 10*, e60767. [doi] [IF: 3.2; Q1]
10. He, E., Arshad, F., Li, B.S., Brinda, R., Ganesan, A., **Zhang, L.**, Fehr, S., Renavikar, M., Rodriguez, S.T., Wang, E., Rosales, O., & Caruso, T.J. (2024). Awe Inducing Elements in Virtual Reality Applications: A Prospective Study of Hospitalized Children and Caregivers. *Games for Health Journal*. Advance Online Publication. [doi] [IF: 2.2; Q1]
11. Ahmed, I., Bertling, M., **Zhang, L.**, Ho, A., Loyalka, P., Xue, H., Rozelle, S., & Domingue, B.W. (2024). Heterogeneity of item-treatment interactions masks complexity and generalizability in randomized controlled trials. *Journal of Research on Educational Effectiveness*. Advance Online Publication. [doi] [IF: 2.4; Q2]
12. **Zhang, L.**, Li, X., & Zhang, Z. (2023). Variety and Mainstays of the R Developer Community. *R Journal, 15*(3), 5-25. [doi] [IF: 5.2; Q1]
13. Gu, X., Zhu, X., **Zhang, L.**, & Pan, J.* (2023). Testing Informative Hypotheses in Factor Analysis Models using Bayes Factors. *Psychological Methods*. Advance Online Publication. [doi] [IF: 11.5; Q1]
14. Wang, E. Y., Kennedy, K. M., **Zhang, L.**, Qian, D., Forbes, T., Zuniga-Hernandez, M., Li, B. S-K., Domingue, B.W., & Caruso, T.J. (2023). Predicting pediatric healthcare provider use of virtual reality using a technology acceptance model. *JAMIA Open, 6*(3), ooad076. [doi] [IF: 2.5; Q2]
15. Zheng, S., **Zhang, L.**, Jiang, Z., & Pan, J. (2023). The Influence of Using Inaccurate Priors on Bayesian Multilevel Estimation. *Structural Equation Modeling, 30* (3), 429-448. [doi] [IF: 6.0; Q1]
16. Wei, X.†, Huang, J.†, **Zhang, L.**, Pan, D., & Pan, J. (2022). Evaluation and Comparison among SEM, ESEM and BSEM in Estimating Structural Models with Potentially Unknown Cross-loadings. *Structural Equation Modeling, 29* (3), 327-338. [doi] [IF: 6.0; Q1]
17. **Zhang, L.**, Pan, J., & Ip, E.H. (2021). Criteria for Parameter Identification in Bayesian Lasso Methods for Covariance Analysis: Comparing Rules for Thresholding, *p*-value, and Credible Interval. *Structural Equation Modeling, 28* (6), 941-950. [doi] [IF: 6.181; Q1]
18. Zeng, G., **Zhang, L.**, Fung, S., Li, J., Liu, Y-M., Xiong, K-Z., Jiang, Z-Q., Zhu, F-F., Chen, Z-T., Luo, S-D., Yu, P., & Huang, Q. (2021). Problematic Internet Usage and Self-Esteem in Chinese Undergraduate Students: The Mediation Effects of Individual Affect and Relationship Satisfaction. *International Journal of Environmental Research and Public Health, 18* (13), 6949. [doi] [IF: 4.6; Q1]
19. Chen, J.*, Guo, Z., **Zhang, L.**, & Pan, J.* (2021). A Partially Confirmatory Approach to Scale Develop-

ment with the Bayesian Lasso. *Psychological Methods, 26* (2), 210-235. [doi] [IF: 10.9; Q1]

20. **Zhang, L.**, Pan, J., Dubé, L., & Ip, E.H. (2021). blcfa: An R Package for Bayesian Model Modification in Confirmatory Factor Analysis. *Structural Equation Modeling, 28* (4), 649-658. [doi] [IF: 6.181; Q1]
21. Zheng, S., **Zhang, L.**, Qiao, X., & Pan, J.* (2021). Intensive Longitudinal Data Analysis: Models and Application. *Advances in Psychological Science*, *29* (11), 1948-1969. [doi] [IF: 1.62]
22. Zhang, X., **Zhang, L.**, Ding, Y., Qu, Z.* (2021). Behavioral Oscillations in Attention. *Advances in Psychological Science*, *29* (3): 461-471. [doi] [IF: 1.62]
23. **Zhang, L.**, Wei, X., Lu, J., & Pan, J.* (2020). Lasso Regression: From Explanation to Prediction. *Advances in Psychological Science*, *28* (10), 1777-1788. [doi] [IF: 1.62]
24. Feng, Q.†, Song, Q.†, **Zhang, L.**†, Zheng, S., & Pan, J.* (2020). Integration of Moderation and Mediation in a Latent Variable Framework: A Comparison of Estimation Approaches for the Second-stage Moderated Mediation Model. *Frontiers in Psychology, 11*, 2167. [doi] [IF: 2.4; Q2]
25. Liu, S., Huang, Z., **Zhang, L.**, Pan, J., Lei, Q., Meng, Y., & Li, Z.* (2020). Plasma Neurofilament Light Chain may be a Biomarker for the Inverse Association between Cancers and Neurodegenerative Diseases. *Frontiers in Aging Neuroscience, 12* (10), 1-8. [doi] [IF: 5.8; Q2]
26. **Zhang, L.**, Lu, J., Wei, X., & Pan, J.* (2019). Bayesian Structural Equation Modeling and Its Current Research. *Advances in Psychological Science*, *27* (11), 1812-1825. [doi] [IF: 1.62]

Manuscripts

27. **Zhang, L.**, Domingue, B.W., Vogelsmeier, L.V.D.E., & Ulitzsch, E. (R&R). A Beta Mixture Model for Careless Respondent Detection in Visual Analogue Scale Data. [preprint]
28. **Zhang, L.**, Rahal, C., Kanopka, K., Ulitzsch, E., Zhang, Z., & Domingue, B.W. (under revision). Evaluating Model Predictive Performance in Confirmatory Factor Analysis with Binary Outcomes Using the InterModel Vigorish. [preprint]
29. **Zhang, L.**, Liu, Y., Molenaar, D., Gilbert, J.B., Kanopka, K., & Domingue, B.W. (under review). Realistic Simulation of Item Difficulties. [preprint]
30. **Zhang, L.**, Liang, X., & Pan, J. (manuscript drafted). Comparison Between Bayesian and Frequentist Regularization in Factor Analysis.
31. Domingue, B.W., Braginsky, M., Caffrey-Maffei, L., Gilbert, J.B., Kanopka, K., Kapoor, R., Lee, H., Liu, Y., Nadela, S., Pan, G., **Zhang, L.**, Zhang, S., & Frank, M. (R&R). An introduction to the Item Response Warehouse (IRW): A resource for enhancing data usage in psychometrics. [preprint]
32. Wang, E., Castro, S., **Zhang, L.**, ..., & Caruso, T. J. (R&R). Augmented Reality Medical Simulation: A Multi-Site Study of Factors that Influence Acceptance.
33. Wang, S., Deng, Y., **Zhang, L.**, Zheng, S., & Pan, J. (under review). Regularized Structural Equation Modeling: A Balance between Exploratory and Confirmatory Analysis.
34. Pan, J., **Zhang, L.**, & Ip, E.H. (manuscript drafted). Bayesian Covariance Adaptive Lasso Factor Analysis Models with Ordinal Data.
35. Cao, C., Liang, X., **Zhang, L.**, & Lu, M. (manuscript drafted). The Performance of Bayesian Fit Measures in Approximate Measurement Invariance Testing in Cross-Cultural Research.

Invited Talk

36. **Zhang, L.**, Ulitzsch, E., & Domingue, B.W. (2024). *Mixture Modeling for Identifying Careless Responding.* The Norwegian Psychometrics Gathering, 19-20 Sep, Stavanger, Norway. [slides]
37. **Zhang, L.**, Qu, W., & Zhang, Z. (2023). *Bayesian Growth Curve Modeling with Measurement Error in Time.* University of Notre Dame, 31 Aug, South Bend, USA. [slides]
38. **Zhang, L.**, & Pan, J.* (2022). *Latent Multiple Mediation Analysis with the Bayesian Lasso.* The 15th Chinese R Conference, 25 Nov, Virtual. [slides]
39. **Zhang, L.**, Pan, J., & Ip, E.H., (2022). *Bayesian Lasso Confirmatory Factor Analysis*. Utrecht University, 23 May, Virtual. [slides]
40. **Zhang, L.**, Lu, J., Wei, X., & Pan, J.* (2019). *Bayesian Structural Equation Modeling and Its Current Research.* The 12th Chinese R Conference, 24-26 May, Beijing. [slides]

Contributed Conference Presentations (underline: presenter)

41. **Zhang, L.**, Domingue, B.W., Vogelsmeier, L.V.D.E., & Ulitzsch, E. (2025). *A Beta Mixture Model for Careless Respondent Detection in Visual Analogue Scale Data.* International Meeting of Psychometric Society, 15-18 July, Minnesota, USA.
42. **Zhang, L.**, Liu, Y., & Domingue, B.W. (2025). *Realistic Simulation of Item Difficulties.* National Council on Measurement in Education Annual Meeting, 23-26 April, Denver, USA.
43. **Zhang, L.**, Ulitzsch, E., & Domingue, B.W. (2024). *Bayesian Factor Mixture Modeling with Response Time for Detecting Careless Respondents.* International Meeting of Psychometric Society, 16-19 July, Prague, Czech.
44. Domingue, B.W., Braginsky, M., Caffrey-Maffei, L., Gilbert, J.B., Kanopka, K., Kapoor, R., Liu, Y., Nadela, S., Pan, G., **Zhang, L.**, Zhang, S., & Frank, M. (2024). *The Item Response Warehouse.* International Meeting of Psychometric Society, 16-19 July, Prague, Czech.
45. Cao, C., Liang, X., **Zhang, L.,** & Lu, M. (2024). *The Performance of Bayesian Fit Measures in Approximate Measurement Invariance Testing in Cross-Cultural Research.* International Meeting of Psychometric Society, 16-19 July, Prague, Czech.
46. **Zhang, L.**, Qu, W., & Zhang, Z. (2024). *Bayesian Growth Curve Modeling with Measurement Error in Time.* Annual Meeting of the International Society for Data Science and Analytics, 21-24 July, Vienna, Austria.
47. **Zhang, L.**, Kanopka, K., Rahal, C., Ulitzsch, E., Zhang, Z., & Domingue, B.W. (2024). *The InterModel Vigorish for Model Comparison in Confirmatory Factor Analysis with Binary Outcomes.* Stanford Data Science Conference, 7 May, California, USA.
48. Domingue, B.W., Kanopka, K., Ulitzsch, E., & **Zhang, L.** (2024). *Implied Probabilities of Polytomous Response Functions for Model-Based Prediction and Comparison.* National Council on Measurement in Education Annual Meeting, 11-14 April, Philadelphia, USA.
49. **Zhang, L.**, & Domingue, B.W. (2023). *The InterModel Vigorish for Model Comparison in Confirmatory Factor Analysis with Binary Outcomes.* International Meeting of Psychometric Society, 25-28 July, Maryland, USA. [slides]
50. **Zhang, L.**, Liang, X., & Pan, J. (2023). *Comparison between Bayesian and Frequentist Regularization in Factor Analysis.* International Meeting of Psychometric Society, 25-28 July, Maryland, USA. [slides]
51. **Zhang, L.**, & Domingue, B.W. (2023). *The InterModel Vigorish for Model Comparison in Confirmatory Fac-*

tor Analysis with Binary Outcomes. Annual Meeting of the International Society for Data Science and Analytics, 4-6 July, Shanghai. [slides]

52. **Zhang, L.**, & Liang, X.* (2023). *Bayesian Regularization in Multiple Indicators Multiple Causes Models.* National Council on Measurement in Education Annual Meeting, 12-15 April, Chicago, USA.
53. Ip, E.H., Sandberg, J., **Zhang, L.**, & Pan, J. (2022). *Matched-pair Binary Item Response Analysis Using Bayesian Adaptive Lasso Factor Model.* International Meeting of Psychometric Society, 11-15 July, Bologna, Italy.
54. **Zhang, L.**, & Pan, J. (2021). *How to Select Prior Variance in Bayesian Approximate Measurement Invariance?* The 6th Eastern Chapter of International Society for Bayesian Analysis Conference, 17 November, Virtual.
55. **Zhang, L.**, & Liang, X. (2021). *Bayesian Regularization in Multiple Indicators Multiple Causes Models.* International Meeting of Psychometric Society, 19-23 July, Virtual. [slides]
56. **Zhang, L.**, Pan, J., & Ip, E.H. (2021). *Comparison between Different Parameter Identification Criteria using the Bayesian Lasso.* International Meeting of Psychometric Society, 19-23 July, Virtual. [slides]
57. Pan. J, **Zhang, L.**, & Ip, E.H.* (2021). *Bayesian Covariance Adaptive Lasso Factor Analysis Models with Ordinal Data.* International Meeting of Psychometric Society, 19-23 July, Virtual.
58. **Zhang, L.**, Pan, J., & Ip, E.H. (2020). *blcfa: An R package for Bayesian Model Modification in Confirmatory Factor Analysis.* International Meeting of Psychometric Society, 14-17 July, Virtual. [slides]
59. **Zhang, L.**, Lu, J., Zhang, Y., & Pan, J. (2019). *The Influence of Social Support on Career Decision-Making Difficulty: Bayesian Modeling Based on Longitudinal Data.* The 22nd National Academic Conference of Psychology, 18-20 Oct, Hangzhou. [poster]
60. Pan, J., **Zhang, L.**, & Ip, E.H. (2018). *Bayesian Lasso Factor Analysis Models with Ordered Categorical Data.* The 13th Cross-Straits Conference on Educational and Psychological Testing, 22-25 Oct, Taiwan.
61. Pan, J., **Zhang, L.**, Ip, E.H. (2017). *Bayesian Lasso Factor Analysis Models with Ordered Categorical Data.* The 20th Chinese Academic Conference of Psychology, 3-5 November, Chongqing.

Book Chapter

62. Pan, J., & **Zhang, L.** (2023). Bayesian Structural Equation Modeling. In *Handbook of Quantitative Methods in Psychological and Behavioral Research.* Wan Juan Methods Series. Beijing Normal University Press.

Software Development

63. **Zhang, L.** (2025). *imv4sem: InterModel Vigorish for Model Comparison in SEM.* Retrievable from https://github.com/zhanglj37/imv4sem.
64. **Zhang, L.**, Pan, J., & Ip, E.H. (2020). *blcfa: An R Package for Bayesian Model Modification in Confirmatory Factor Analysis.* Retrievable from https://github.com/zhanglj37/blcfa. [7 stars].

RESEARCH EXPERIENCES IN PSYCHOMETRICS

Note. [x] refers to the papers in the publication list. Date

Domingue Lab, Stanford University *PhD Student*, 2022 - present

Advisor: Prof. Ben Domingue
Research Topics: Model Selection [28], Process Data Analysis [1]
Item Response Models [3,5,11,3,31,29,27]

Centre for Educational Measurement, University of Oslo *Visiting Student*, Summer, 2024
Advisor: Prof. Esther Ulitzsch
Research Topics: Mixture Modeling[1,27]

Lab for Big Data Methodology, University of Notre Dame *Visiting Student*, Summer, 2021 & 2023
Advisor: Prof. Zhiyong Johnny Zhang
Research Topics: Text Mining & Network Analysis [12], Longitudinal Data Analysis [4]

Liang Lab, University of Arkansas *Visiting Student (Remote)*, Summer, 2020
Advisor: Prof. Xinya Liang
Research Topics: Bayesian Regularization, Structural Equation Modeling [7,35]

Psychological Statistics and Modeling Lab, Sun Yat-sen University *Graduate Student*, 2019 - 2022
Advisor: Prof. Junhao Pan
Research Topics: Bayesian Lasso Confirmatory Factor Analysis [13,17,20,19,34]
Mediation and Moderation Analysis [24], Longitudinal Data Analysis [21]

RESEARCH COLLABORATION ON SUBSTANTIVE TOPICS

Data Analysis Collaborations with Research Labs in Psychology, Education, and Medicine — *Date*

- LEVANTE Project, Language & Cognition Lab, Stanford University — 2024 - present
- Chariot Program, Lucile Packard Children's Hospital, Stanford University [8,9,10,14,32] — 2022 - present
- ROAR Project, Brain Development & Education Lab, Stanford University — 2024
- PTSD Project, Department of Psychiatry and Behavioral Sciences, Stanford University [2] — 2024
- The Science of Well-being Research Institute, Guangdong, China [18] — 2021 - 2022
- Ni Lab, Center for Social Work and Mental Health Research, Tsinghua University — 2020
- Pang Lab, School of International Relations, Sun Yat-sen University — 2019 - 2020

TEACHING EXPERIENCES

- TA, EDUC 400A: Introduction to Statistical Methods in Education, Stanford University — 2024
- Instructor, Workshop on Bayesian Structural Equation Modeling — 2023 - 2025
- Instructor, Workshop on Structural Equation Modeling with Mplus — 2023 - 2025
- Instructor, Tutorial on PhD Application [github repo; ∼1,000 stars] — 2023
- TA, Workshop on Experience Sampling Method — 2022
- TA, Advanced Structural Equation Modeling, Sun Yat-sen University — 2021
- TA, Structural Equation Modeling, Sun Yat-sen University — 2020
- TA, Psychological Statistics, Sun Yat-sen University — 2020

MENTORSHIPS

- Sreejith Mohan, Shuman Wang; Graduate Student, Stanford University — 2024 - 2025
  GSE Mentorship Program
- Divya Vetticaden; Undergraduate, Stanford University — 2025
  Mentored on DS 120 project: Predictors of Academic Turnarounds in Early Childhood
- Shufang Zheng; Graduate Student, Sun Yat-sen University — 2022
  Mentored on Bayesian multilevel modeling project published in SEM Journal

AD HOC REVIEWER

- Structural Equation Modeling
- Journal of Behavioral Data Science
- Science Progress
- British Journal of Mathematical and Statistical Psychology
- BMC Medical Research Methodology
- BMC Psychology
- AERA Conference
- R Journal
- Frontiers in Psychology
- Scientific Reports
- Stanford Data Science Conference
- Multivariate Behavioral Research
- Behavior Research Methods
- Computer Applications in Engineering Education

MEMBERSHIPS

- National Council on Measurement in Education
- Graduate Student Committee, Psychometric Society