

# Lijin Zhang

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Psychometrics, Bayesian Analysis, Structural Equation Models

## EDUCATION

### Stanford University

- Ph.D. student in Development and Psychological Science 2022 - present  
(Advisors: Prof. Ben Domingue & Prof. Jason Yeatman)

### Sun Yat-sen University

- M.S. in Psychology 2019 - 2022
- B.S. in Psychology 2015 - 2019

## RESEARCH EXPERIENCES

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

*Starting Date*

### Domingue Lab, Stanford University

09/2022

- Advisor: Prof. Ben Domingue
- Research Topics: Model Selection [20], Item Response Theory [17,19]

### Lab for Big Data Methodology, University of Notre Dame

06/2021

- Advisor: Prof. Zhiyong Johnny Zhang
- Research Topics: Text Mining & Network Analysis [2], Longitudinal Analysis [18]

### Liang Lab, University of Arkansas

07/2020

- Advisor: Prof. Xinya Liang
- Research Topics: Bayesian Regularization, Structural Equation Modeling [3,21]

### Psychological Statistics and Modeling Lab, Sun Yat-sen University

09/2017

- Advisor: Prof. Junhao Pan
- Research Topics: Bayesian Lasso Confirmatory Factor Analysis [7,8,10,22,21]  
Mediation and Moderation Analysis [13], Longitudinal Analysis [11]

## PUBLICATIONS

Journal Articles (+ indicates co-first authors, \* indicates correspondent author)

1. Gu, X., Zhu, X., **Zhang, L.**, & Pan, J.\* (conditionally accepted). Testing Informative Hypotheses in Factor Analysis Models using Bayes Factors. *Psychological Methods*.
2. **Zhang, L.**, Li, X., & Zhang, Z. (accepted). Variety and Mainstays of the R Developer Community. *R Journal*.
3. **Zhang, L.**, & Liang, X.\* (2023). Bayesian Regularization in Multiple-Indicators Multiple-Causes Models. *Psychological Methods*. Advance Online Publication. [doi]
4. 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. *Journal of the American Medical Informatics Association Open*, 6(3), ooad076. [doi]
5. 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]

6. Wei, X.<sup>+</sup>, Huang, J.<sup>+</sup>, **Zhang, L.**, Pan, D.\*<sup>+</sup>, & 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]
7. **Zhang, L.**, Pan, J.\*<sup>+</sup>, & 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]
8. **Zhang, L.**, Pan, J.\*<sup>+</sup>, 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]
9. Zeng, G., **Zhang, L.**, Fung, S.\*<sup>+</sup>, 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]
10. Chen, J.\*<sup>+</sup>, Guo, Z., **Zhang, L.**, & Pan, J.\* (2021). A Partially Confirmatory Approach to Scale Development with the Bayesian Lasso. *Psychological Methods*, 26 (2), 210-235. [doi]
11. 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]
12. Zhang, X., **Zhang, L.**, Ding, Y., Qu, Z.\* (2021). Behavioral Oscillations in Attention. *Advances in Psychological Science*, 29 (3): 461-471. [doi]
13. Feng, Q.<sup>+</sup>, Song, Q.<sup>+</sup>, **Zhang, L.**<sup>+</sup>, 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]
14. 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]
15. **Zhang, L.**, Wei, X., Lu, J., & Pan, J.\* (2020). Lasso Regression: From Explanation to Prediction. *Advances in Psychological Science*, 28 (10), 1777-1788. [doi]
16. **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]

## Manuscripts Drafted

17. Ahmed, I., Bertling, M., **Zhang, L.**, Ho, A., Loyalka, P., Xue, H., Rozelle, S., & Domingue, B.W. (R&R). Heterogeneity of item-treatment interactions masks complexity and generalizability in randomized controlled trials. [preprint]
18. **Zhang, L.**, Qu, W., & Zhang, Z. (submitted). Bayesian Growth Curve Modeling with Measurement Error in Time.
19. Domingue, B.W., Kanopka, K., Ulitzsch, E., & **Zhang, L.** (manuscript drafted). Implied probabilities of polytomous response functions for model-based prediction and comparison. [preprint]
20. **Zhang, L.**, Kanopka, K., Rahal, C., Ulitzsch, E., Zhang, Z., & Domingue, B.W. (manuscript drafted). The InterModel Vigorish for Model Comparison in Confirmatory Factor Analysis with Binary Outcomes. [preprint]
21. **Zhang, L.**, Liang, X., & Pan, J. (manuscript drafted). Comparison Between Bayesian and Frequentist Regularization in Factor Analysis.

22. Pan, J., **Zhang, L.**, & Ip, E.H.\* (manuscript drafted). *Bayesian Covariance Adaptive Lasso Factor Analysis Models with Ordinal Data*.

### Invited Talk

23. **Zhang, L.**, & Pan, J.\* (2022). *Latent Multiple Mediation Analysis with the Bayesian Lasso*. The 15th Chinese R Conference, 25 Nov, Virtual. [[slides](#)]
24. **Zhang, L.**, Pan, J., & Ip, E.H., (2022). *Bayesian Lasso Confirmatory Factor Analysis*. Utrecht University, 23 May, Virtual. [[slides](#)]
25. **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)

26. **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](#)]
27. **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](#)]
28. **Zhang, L.**, & Domingue, B.W. (2023). *The InterModel Vigorish for Model Comparison in Confirmatory Factor Analysis with Binary Outcomes*. Annual Meeting of the International Society for Data Science and Analytics, 4-6 July, Shanghai. [[slides](#)]
29. **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.
30. 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.
31. **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.
32. **Zhang, L.**, & Liang, X.\* (2021). *Bayesian Regularization in Multiple Indicators Multiple Causes Models*. International Meeting of Psychometric Society, 19-23 July, Virtual. [[slides](#)]
33. **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](#)]
34. 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.
35. **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](#)]
36. **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](#)]
37. 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. [[slides](#)]

38. 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 Chapters**

39. **Computational Neuroscience and Cognitive Modelling - Chinese Version (Anderson, 2014)**  
Translated chapters 9-13 (Neural Networks).
40. **Handbook of Quantitative Methods in Psychological and Behavioral Research (in Chinese)**  
Wrote the Bayesian Structural Equation Modeling chapter with Prof. Junhao Pan.

## **Software Development**

41. **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>.
42. **Zhang, L.**, Sun, R., & Pan, J. (2020). *sampleMplus: An R Package for Sample Size Determination in Structural Equation Modeling*. Retrievable from <https://github.com/zhanglj37/sampleMplus>.

## **GRANTS**

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National Innovation Training Program for Undergraduates, China	2018
Climbing Plan for Undergraduate and Graduate Students, Guangdong Province	2018

## **HONORS & AWARDS**

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EDGE Fellowship, Stanford University	2022
Outstanding Graduates, Sun Yat-sen University	2022
First Prize Scholarship of Outstanding Students, Sun Yat-sen University	2017 - 2021
National Scholarship, Minister of Education of China	2020
Third Prize, Outstanding Thesis Award, Chinese Psychological Society	2019
Outstanding Undergraduate Thesis, Sun Yat-sen University	2019
Outstanding Presenter, Undergraduate Psychology Forum, Peking University	2018

## **PROFESSIONAL EXPERIENCES**

### **Instructor / Teaching Assistant**

· Instructor, Workshop on Bayesian Structural Equation Modeling	2023
· Instructor, Workshop on Structural Equation Modeling with Mplus	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

### **Data Analyst & Statistical Consultant**

· Data Analyst, <a href="#">Chariot Lab</a> , Lucile Packard Children's Hospital, Stanford University <sup>[4]</sup>	2022 - present
· Data Analyst, The Science of Well-being Research Institute, Guangdong, China <sup>[9]</sup>	2021 - 2022
· Statistical Consultant, Ni Lab, Tsinghua Shenzhen International Graduate School	2020
· Statistical Consultant, Pang Lab, School of International Relations, Sun Yat-sen University	2019 - 2020

### **Reviewer**

- Structural Equation Modeling
- Journal of Behavioral Data Science
- Science Progress

- British Journal of Mathematical and Statistical Psychology
- BMC Medical Research Methodology
- BMC Psychology
- American Educational Research Association Annual Meeting

### **Memberships**

- Psychometric Society
- Capital of Statistics, China
- National Council on Measurement in Education