**Xiao Liu**

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**EDUCATION**

**Ph.D. in Quantitative Psychology** Expected May 2022

University of Notre Dame Notre Dame, IN

Advisor: Dr. Lijuan (Peggy) Wang

**M.S. in Applied and Computational Mathematics and Statistics** May 2020

University of Notre Dame Notre Dame, IN

Advisor: Dr. Fang Liu

**B.S. in Statistics** June 2017

Renmin University of China Beijing, China

**RESEARCH INTERESTS**

* Mediation analysis
* Longitudinal data analysis
* Causal inference and propensity score methods
* Study design (e.g., sample size planning)
* Bayesian statistics

**TEACHING INTERESTS**

**Undergraduate Courses**

Introduction to Statistics, Advanced Statistics, Introduction to Testing and Measurement, Introduction to Multivariate Analysis

**Graduate Courses**

Statistical Inference, Applied Linear Models, Generalized Linear Models, Experimental Design and ANOVA, Bayesian Statistics, Longitudinal Data Analysis, Multilevel Modeling, Structural Equation Modeling, Mediation Analysis, Causal Inference, Data Visualization with R, Computational Methods such as Bootstrap and Monte Carlo Simulation

**PUBLICATIONS**

**Liu, X.**, Wang, L., & Zhang, Z. (accepted). Bayesian hypothesis testing of mediation: Methods and the impact of prior odds specifications. *Behavior Research Methods.*

**Liu, X.**, Valentino, K., & Wang, L. (2022). The impact of omitting confounders in latent growth curve mediation models: analytical examination and tools for sensitivity analysis. (abstract), *Multivariate Behavioral Research*. 57(1), 153-154,<https://doi.org/10.1080/00273171.2021.2011701>

Li, Y., Liu, F., & **Liu, X.** (accepted). Adaptive noisy data augmentation for regularized construction of undirected graphical models. *The 8th IEEE International Conference on Data Science and Advanced Analytics.* (20% to 30% acceptance rate)

**Liu, X.**, & Wang, L. (2021). The impact of measurement error and omitting confounders on statistical inference of mediation effects and tools for sensitivity analysis. *Psychological Methods,* 26(3), 327-342. [doi: 10.1037/met0000345](https://doi.org/10.1037/met0000345).

**Liu, X.**, & Wang, L. (2020). The combined effects of omitting confounders and measurement error on statistical inference of mediation and a new tool for sensitivity analysis (abstract), *Multivariate Behavioral Research*, 55(1), 137-138. [doi: 10.1080/00273171.2019.1694478](https://doi.org/10.1080/00273171.2019.1694478).

**Liu, X.**, & Wang, L. (2019). Latent growth curve models with VAR residuals for longitudinal mediation analysis. In Z. Zhang, K. Yuan, Y. Wen, & J. Tang (Ed.), *Proceedings of the 2019 Meeting of International Society for Data Science and Analytics* (pp. 9-22). Granger, IN: ISDSA Press.

**Liu, X.**, & Wang, L. (2019). Sample size planning for detecting mediation effects: a power

analysis procedure considering uncertainty in effect size estimates. *Multivariate Behavioral Research*, 54(6), 822-839. [doi: 10.1080/00273171.2019.1593814](https://www.tandfonline.com/doi/pdf/10.1080/00273171.2019.1593814).

Wang, L., Yang, M., & **Liu, X.** (2019). The impact of over-simplifying the between-subject covariance structure on inferences of fixed effects in modeling nested data. *Structural Equation Modeling: A Multidisciplinary Journal*, 26(1), 1-11. [doi: 10.1080/10705511.2018.1489725](https://www.tandfonline.com/doi/pdf/10.1080/10705511.2018.1489725).

**MANUSCRIPTS UNDER REVIEW & IN PREPARATION**

**Liu, X.**, Wang, L, Liu, F., Miller-Graff, L., & Howell, K. H. (revise and resubmit). Causal inference for treatment effect in partially nested design.

**Liu, X.**, Valentino, K., & Wang, L. (manuscript in preparation). The impact of omitting confounders in latent growth curve mediation models: analytical examination and tools for sensitivity analysis.

Wang, L., **Liu, X.,** & Yang, M. (manuscript drafted). Methods for modeling intraindividual variability indicators as a predictor with longitudinal data.

**Liu, X.** & Wang, L. (in preparation). Intraindividual variability modeling with incomplete data: A comparison of multiple imputation, FIML, and Bayesian approaches.

**Liu, X.**, Wang, L., & Zhang, Z. (in preparation). Sequential design and hypothesis testing for mediation studies via Bayes factors.

**Liu, X.** & Wang, L. (in preparation). Optimizing temporal design for increasing power of testing fixed effects in nonlinear latent growth curve analysis: A reliability-based approach.

Lam. J. C., Kim, D., **Liu, X.**, & Yoon, K. L. (manuscript in preparation). Recovery sleep preferentially benefits positive stimuli.

Chen, Y., Eberhard, K., & **Liu, X.** (in preparation). Perception of lexical stress by English monolinguals and Chinese-English bilinguals.

**PRESENTATIONS**

**Liu, X.**, Valentino, K., & Wang, L. (2021, October). *The impact of omitting confounders in latent growth curve mediation models: analytical examination and tools for sensitivity analysis.* Poster presented at the 2021 Annual Society of Multivariate Experimental Psychology Graduate Student Conference (Virtual).

**Liu, X.**, Wang, L., & Zhang, Z. (2021, July). *Bayesian hypothesis testing of mediation: Methods and the impact of prior odds specifications.* Talk presented at the 2021 International Meeting of the Psychometric Society (Virtual).

**Liu, X.**, Wang, L, Liu, F., Miller-Graff, L., & Howell, K. H. (2020, July). *Causal inference with partially nested designs: A propensity-score-based approach.* Talk presented at the 2020 International Meeting of the Psychometric Society (Virtual).

**Liu, X**, & Wang, L**.** (2019, October). *The combined effects of omitting confounders and measurement error on statistical inference of mediation and a new tool for sensitivity analysis.* Poster presented at the 2019 Annual Society of Multivariate Experimental Psychology Graduate Student Conference, Baltimore, Maryland.

**Liu, X.**, & Wang, L. (2019, July). *Latent growth curve models with VAR residuals for longitudinal mediation analysis.* Talk presented at the 2019 Meeting of The International Society for Data Science and Analytics, Nanjing, China.

**SOFTWARE DEVELOPMENT**

**Liu, X.**, Wang, L., & Zhang, Z. (2021). R shiny web application for Bayesian hypothesis testing of mediation effects. <https://xiaoliu.shinyapps.io/BayesianHypothesisTestingMediation/>

Wang, L., **Liu, X.,** & Yang, M. (2021). R package “IIVpredictor”: Modeling Within Individual Variability as Predictor. <https://cran.r-project.org/package=IIVpredictor>

**Liu, X.**, Wang, L & Liu, F.(2021). R package “IPWpn”: Inverse-propensity-weighting estimation for partially nested design.<https://cran.r-project.org/package=IPWpn>

**Liu, X.**, & Wang, L. (2020). R shiny web application for sensitivity analysis of statistical inference of mediation to measurement error and omitting confounders. <https://xiaoliu.shinyapps.io/MediationSensitivityAnalysis/>

**Liu, X.**, & Wang, L. (2019). R shiny web application for sample size planning for detecting mediation effects with accounting for uncertainty in effect size estimates. <https://xiaoliu.shinyapps.io/MediationPowerAnalysis/>

**TEACHIING EXPERIENCE**

**Teaching Assistant & Lab Instructor**, Longitudinal Data Analysis

Lecture instructor: Dr. Lijuan Wang Spring 2021

**Teaching Assistant & Lab Instructor**, Experimental Psy I: Statistics

Lecture instructor: Dr. Guangjian Zhang Spring 2019, Spring 2020

**STATISTICAL CONSULTING EXPERIENCE**

**Statistical Consultant**, Department of Psychology Fall 2020, Summer 2021-present

Provide services to faculty and graduate students regarding research and grant proposals; answer questions on experimental designs and data analysis.

**Research Assistant**, Center for Theology, Science, and Human Flourishing Summer 2018

Assisted with analysis of numerous datasets including exploratory and confirmatory factor analysis and structural equation modeling.

**AWARDS & FELLOWSHIPS**

Psychology Department's Excellence in Graduate Student Teaching Award 2021

*University of Notre Dame*

Competitive Society of Multivariate Experimental Psychology (SMEP) Travel Award 2019

*17th Annual SMEP Graduate Student Conference*

University Presidential Fellowship 2017-present

*University of Notre Dame*

China Petrol Scholarship 2016

*Renmin University of China*

Fei Hsiao-Tung Scholarship 2015

*Renmin University of China*

China National Scholarship 2014

*The State Council of the People’s Republic of China*

**SERVICE**

*Reviewer*:

Frontiers in Psychology 2021-present

Multivariate Behavioral Research 2020-present

Psychological Methods 2018-present

BMC Medical Research Methodology 2022-present

*Department:*

Faculty Meeting Representative for the Quant Area Fall 2021-present

**PROGRAMMING SKILLS**

R, M-Plus, SAS, SPSS Syntax, MATLAB