Che Cheng, Ph.D

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Education

2017 –2025	🔖 **Ph.D., Department of Psychology**, National Taiwan University. Specialization: Developmental Psychology & Quantitative Psychology Dissertation title: *Paradigmatic Decisions for Measuring Choices and Preferences: Likert Scales, Comparative Judgments, or Combined Models? Using Academic Attribution as an Example* Advisors: Keng-Ling Lay, Ph.D. & Yung-Fong Hsu, Ph.D.
2019 – 2020	🔖 **M.Sc., Institute of Applied Mathematical Sciences**, National Taiwan University. Specialization: Mathematical Statistics Thesis title: *Analysis of Growth Curves Based on the Semiparametric Latent Curve Model*. Advisor: Chin-Tsang Chiang, Ph.D.
2011 – 2017	🔖 **B.S., Department of Psychology**, National Taiwan University. Thesis title: *Do Chinese Really Prioritize Effort? Using Ordinal Paired Comparison to Investigate Self- and Other-Oriented Goal Priority.* 🔖 **B.S., Department of Mathematics**, National Taiwan University. 🔖 **Minor, Department of Philosophy**, National Taiwan University.

Publications

Journal Articles

1. Chen, Y.-K., Yang, T.-R., Chen, L.-T., Hsieh, C.-Y., **Cheng, C.,** Wu, P.-J., & Peng, C.-Y. J. (2025). Improving applications of a design-comparable effect size in single-case designs. *Behavior Research Methods*, *57*(10), Article 279. 🔗 https://doi.org/10.3758/s13428-025-02715-1

2. **Cheng, C.,** Yang, H.-H., & Hsu, Y.-F. (2025a). Identifiability of polychoric models with latent elliptical distributions. *Psychometrika*, *90*(2), 757–778. 🔗 https://doi.org/10.1017/psy.2024.25 **Award: Professor Chao-ming Cheng Memorial Scholarship**.

3. Chen, L.-T., Chen, Y.-K., Yang, T.-R., Chiang, Y.-S., Hsieh, C.-Y., **Cheng, C.,** Ding, Q.-W., Wu, P.-J., & Peng, C.-Y. J. (2024). Examining the normality assumption of a design-comparable effect size in single-case designs. *Behavior Research Methods*, *56*(1), 379–405. 🔗 https://doi.org/10.3758/s13428-022-02035-8

4. **Cheng**[*]**, C.,** Huang[*], Y.-J., & Hsu, Y.-F. (2022). Incorporating response confidence into adaptive methods for threshold estimation. *Chinese Journal of Psychology*, *64*(2), 217–232. 🔗 https://doi.org/10.6129/cjp.202206_64(2).0005
   [*] These authors contributed equally to the work.

5. Lay, K.-L., Lin, K.-C., Wu, S.-C., Tsai, Y.-M., Chang, T.-T., Huang, S.-Y., & **Cheng, C.** (2022). Chinese mothers' belief systems about learning and shared-reading behaviors: The pragmatic view of effort vs. the incremental view of intelligence. *Chinese Journal of Psychology*, *64*(3), 311–340. 🔗 https://doi.org/10.6129/cjp.202209_64(3).0003

6. **Cheng, C.,** Lay, K.-L., Hsu, Y.-F., & Tsai, Y.-M. (2021). Can likert scales predict choices? Testing the congruence between using likert scale and comparative judgment on measuring attribution. *Methods in Psychology*, *5*, Article 100081. 🔗 https://doi.org/10.1016/j.metip.2021.100081

7. Chen, L.-T., Ding, Q.-W., Hsieh, C.-Y., Chen, Y.-K., Chiang, Y.-S., Huang, S.-C., Yang, T.-R., **Cheng**, **C.**, Liou, P.-Y., & Peng, C.-Y. J. (2020). Effect size reporting practices in Taiwanese psychology and education journals: Review and beyond. *Chinese Journal of Psychology*, *62*(4), 553–592. 🔗 https://doi.org/10.6129/cjp.202012_62(4).0006

Conference Presentations

1. **Cheng**, **C.** (2025a). *Identifiability of ordinal SEM and item factor analysis* [Invited talk]. The 13th Conference of the IASC-ARS, Ho Chi Minh City, Vietnam. 🔗 https://viasm.edu.vn/en/hdkh/iasc-ars-2025 Session: Recent advances in latent variable models.

2. **Cheng**, **C.**, Lay, K.-L., Yang, H.-H., & Hsu, Y.-F. (2025). *A methodology for addressing the biases resulted in ipsative placement of Q-sort items* [Poster presentation]. SRCD 2025 Biennial Meeting, Minneapolis, Minnesota, USA. 🔗 https://www.srcd.org/event/srcd-2025-biennial-meeting/

3. **Cheng**, **C.**, Yang, H.-H., & Hsu, Y.-F. (2025b). *The universal Cramér-Rao lower bound: A genuine efficiency criterion for both biased and unbiased estimators* [Oral presentation]. The 64th Annual Convention of the Taiwanese Psychology Association, Tainan, Taiwan.

4. **Cheng**, **C.**, Yang, H.-H., & Hsu, Y.-F. (2025c). *When the test information curve misleads: Exact bias, se, and rmse curves in item response theory* [Oral presentation]. The 53rd Annual Meeting of the Behaviormetric Society, Kanagawa, Japan. 🔗 https://conference.wdc-jp.com/bms/2025/index.html/

5. **Cheng**, **C.**, Yang, H.-H., Hsu, Y.-F., & Lay, K.-L. (2025). *Paradigmatic decisions for measuring choices and preferences: Likert scales, comparative judgments, or combined models? Using academic attribution as an example* [Poster presentation]. The 89th Annual Convention of the Japanese Psychological Association, Sendai, Japan. 🔗 https://pub.confit.atlas.jp/ja/event/jpa2025/

6. **Cheng**, **C.**, & Hsu, Y.-F. (2024). *Integrating power analysis and accuracy in parameter estimation: A unified approach to sample size planning in quantitative research* [Poster presentation]. The 52nd Annual Meeting of the Behaviormetric Society, Osaka, Japan. 🔗 https://conference.wdc-jp.com/bms/2024/index.html/

7. **Cheng**, **C.**, Yang, H.-H., & Hsu, Y.-F. (2024a). *On the existence and uniqueness of polychoric correlations* [Poster presentation]. The 88th Annual Convention of the Japanese Psychological Association, Kumamoto, Japan. 🔗 https://pub.confit.atlas.jp/ja/event/jpa2024/

8. **Cheng**, **C.**, Yang, H.-H., & Hsu, Y.-F. (2024b). *On the existence, uniqueness, and finiteness of MLE of the ability in IRT* [Poster presentation]. International Meeting of the Psychometric Society 2024, Prague, Czech Republic. 🔗 https://www.psychometricsociety.org/annual-meeting/

9. **Cheng**, **C.**, Yang, H.-H., Hsu, Y.-F., & Lay, K.-L. (2024). *Two are better than one: Incorporating Likert scale and comparative judgment data in joint thurstonian models* [Oral presentation]. 2024 Taiwanese Psychology Association Convention, Taipei, Taiwan. 🔗 https://www.tpa-tw.org/2024main/

10. **Cheng**, **C.**, Yang, H.-H., Lay, K.-L., & Hsu, Y.-F. (2024). *Predetermined R-squared: An index of later development determined by the past* [Poster presentation]. 27th Biennial Meeting of the International Society for the Study of Behavioural Development, Lisbon, Portugal. 🔗 https://2024biennial.issbd.org/

11. **Cheng**, **C.**, Yang, H.-H., & Hsu, Y.-F. (2023). *Identifiability of polychoric models with latent elliptical distributions* [Oral presentation]. International Meeting of the Psychometric Society 2023, College Park, Maryland, United States. 🔗 https://www.psychometricsociety.org/annual-meeting/

12. Yang, H.-H., **Cheng**, **C.**, & Hsu, Y.-F. (2023). *Estimates of standard errors and confidence intervals for the ability parameter in the 2PL model with fast and exact parametric bootstrap* [Poster presentation]. International Meeting of the Psychometric Society 2023, College Park, Maryland, United States. 🔗 https://www.psychometricsociety.org/annual-meeting/

13 **Cheng**, C., Huang, Y.-J., & Hsu, Y.-F. (2021). 閾值估計探究：引入反應信心量尺於適測方法 [Incorporating response confidence into adaptive methods for threshold estimation] [Oral presentation]. 2021 Taiwanese Psychology Association Convention, Virtual.
🔗 https://www.tpa-tw.org/

14 Lay, K.-L., **Cheng**, **C.**, & Huang, S.-Y. (2021). Associations of parental mastery and performance goal orientations and preschoolers' mastery motivation. In W. Wang (Chair), *Understanding the origins, determinants, and consequences of children's mastery motivation: A developmental approach* [Symposium]. SRCD 2021 Biennial Meeting, Virtual.
🔗 https://www.srcd.org/event/srcd-2021-biennial-meeting

15 **Cheng**, **C.**, Lay, K.-L., & Hsu, Y.-F. (2020). *Can Likert scales predict choices? Explaining the incongruence between Likert-scale and comparative-judgment predictions based on a joint Thurstonian IRT model* [Poster presentation]. The 8th Annual Academic Conference on Psychology at NTU, Taipei, Taiwan.
Award: Second place outstanding poster award.

16 **Cheng**, **C.**, Lay, K.-L., Lin, C. Y., Li, Y. Y., Chang, T. C., Yang, L. J., Chen, H. T., & Wang, Y. J. (2019). *Differential SEL effect for children with diverse initial states: II. the communication-skill curriculum designed by Taiwan happiness village association* [Poster presentation]. 7th ENSEC Conference, Budapest, Hungary. 🔗 https://ensec2019.elte.hu/

17 **Cheng**, C., Lay, K.-L., & Hsu, Y.-F. (2018). 華人真的最希望自己是個努力的人嗎？以次序成對比較探討學生之「理想我」與「應該我」[Do chinese really prioritize effort? Using ordinal paired comparison to investigate students' ideal self and ought self] [Oral presentation]. 2018 Academic Conference of Psychology Departments from National Taiwan University, Peking University, and The Chinese University of Hong Kong, Hong Kong, China.

18 **Cheng**, C., & Lay, K.-L. (2016a). *Activation control moderates the relation between motivation and procrastination* [Oral presentation]. 2016 Academic Conference of Psychology Departments from National Taiwan University, Peking University, and The Chinese University of Hong Kong, Taipei, Taiwan.

19 **Cheng**, C., & Lay, K.-L. (2016b). 載舟還是覆舟？–失敗恐懼對大學生拖延閒混的預測力 [Carry or capsize? the predictive power of fear of failure on college students' procrastination] [Poster presentation]. 2016 Academic Conference of Psychology Departments from National Taiwan University, Peking University, and The Chinese University of Hong Kong, Taipei, Taiwan.

20 **Cheng**, **C.**, & Lay, K.-L. (2015a). 前段高中學生拖延閒混行為背後的「努力沒有用」信念 [Belief in "no contingency between effort and outcome" predicts procrastination behavior among gifted high school students.] [Oral presentation]. 2015 Taiwanese Psychology Association Convention, Taipei, Taiwan. 🔗 https://www.facebook.com/taiwanpsy/

Research Grants

1 **Cheng**, **C.** (2025b). *A methodology for addressing the biases resulted in ipsative placement of Q-sort items* (Research Grant) [Travel grant for attending international conferences]. National Science and Technology Council, Taiwan.

2 **Cheng**, **C.** (2024). *Predetermined R-squared: An index of later development determined by the past* (Research Grant) [Travel grant for attending international conferences]. National Science and Technology Council, Taiwan.

3 **Cheng**, C., Lay, K.-L., & Hsu, Y.-F. (2024). 學業歸因種類與向度對於學習適應之預測力探討 (Research Grant No. 113-2424-H-002-002-DR) [The national science and technology council award for doctoral candidates in the humanities and social sciences for writing doctoral dissertations]. National Science and Technology Council, Taiwan.

4 **Cheng**, **C.** (2023). *Identifiability of polychoric models with latent elliptical distributions* (Research Grant) [Travel grant for attending international conferences]. National Science and Technology Council, Taiwan.

5 **Cheng, C.** (2019). *Differential SEL effect for children with diverse initial states: II. the communication-skill curriculum designed by Taiwan happiness village association* (Research Grant) [Travel grant for attending international conferences]. Ministry of Science and Technology, Taiwan.

6 **Cheng, C.,** & Lay, K.-L. (2015b). 大學生拖延閒混的兩種亞型–短視近利型及意志軟弱型拖延閒混 (Research Grant No. 104-2815-C-002-188-H) [College student research scholarship]. Ministry of Science and Technology, Taiwan.

7 **Cheng, C.,** & Lay, K.-L. (2014). 從絕望中看見希望–探討數理資優生習得性無助背後的學習動機與家庭因素 (Research Grant No. 103-2815-C-002-057-H) [College student research scholarship]. Ministry of Science and Technology, Taiwan.

Awards

2025 **NTU Graduate President's Award** (臺大研究生校長獎), National Taiwan University
The highest research honor for NTU graduate students, awarded for the dissertation "Paradigmatic decisions for measuring choices and preferences: Likert scales, comparative judgments, or combined models?"

Professor Chao-ming Cheng Memorial Scholarship (鄭昭明獎學金), Department of Psychology, National Taiwan University
The top prize of graduate psychology students for outstanding research at the academic year 2024-2025

Dean's Award, College of Science, National Taiwan University
The top class graduating for outstanding research achievement at the academic year 2024-2025

Professor Su Xiangyu Psychology Doctoral Dissertation Award (蘇薌雨教授心理學博士學位論文獎), Taiwanese Psychological Association
Awarded for the doctoral dissertation "Paradigmatic decisions for measuring choices and preferences: Likert scales, comparative judgments, or combined models?"

2024 **Professor Kuo-Shu Yang Memorial Scholarship** (楊國樞教授紀念獎學金)
Travel scholarship for attending the International Meeting of the Psychometric Society 2024

2023 **Best Paper Award**, Chinese Journal of Psychology
7th Annual Paper Award for "Chinese mothers' belief systems about learning and shared-reading behaviors: The pragmatic view of effort vs. the incremental view of intelligence" (Lay et al., 2022)

2022 **NTU Excellent Teaching Assistant**
Course: Psychology of Adolescence

2020 **Second Place Outstanding Poster Award** in the 8th Annual Academic Conference on Psychology at NTU
Title: *Can Likert Scales Predict Choices? Explaining the Incongruence between Likert-Scale and Comparative-Judgment Predictions based on a Joint Thurstonian IRT Model.*

2017 **Dean's Award**, College of Science, National Taiwan University
The top 10% of the class graduating for outstanding scholastic achievement at the academic year 2016-2017

Professor Fa-Yu Cheng Memorial Scholarship (鄭發育獎學金), Department of Psychology, National Taiwan University
The top prize of undergraduate psychology students for outstanding academic performance at the academic year 2016-2017

Teaching

Adjunct Instructor

Fall 2025	🔖 **Precalculus (基礎數學), Lunghwa University of Science and Technology**
Spring 2023	🔖 **Experimental Psychology II, Fu Jen Catholic University**

Teaching Practicum

Fall 2025	🔖 **Mathematics, Taipei First Girls' High School (北一女中)**
	Designed and delivered lessons on probability and statistics, with a teaching demonstration on hypothesis testing.

Tutor

Fall 2022 - Spring 2024	🔖 **Statistics Tutor of the Center for Teaching and Learning Development**

Teaching Assistant

Fall 2025	🔖 **Advanced Developmental Psychology**	
Spring 2024	🔖 **Psychological Statistics II**	
Fall 2023	🔖 **Psychology of Adolescence**	3.44/5
	🔖 **Psychological Statistics I**	4.34/5
Spring 2023	🔖 **Advanced Developmental Psychology**	
Fall 2022	🔖 **Psychology of Adolescence**	4.44/5
Spring 2022	🔖 **Childhood Psychopathology**	
	🔖 **Socioemotional Development**	
Fall 2021	🔖 **Psychology of Adolescence (NTU Excellent Teaching Assistant)**	4.62/5
	🔖 **Experimental Design**	
Spring 2021	🔖 **Advanced Developmental Psychology**	
Fall 2020	🔖 **Psychology of Adolescence**	4.44/5
	🔖 **Experimental Design**	
Spring 2020	🔖 **Statistics in Psychology and Education II**	
Fall 2019	🔖 **Statistics in Psychology and Education I**	
Spring 2019	🔖 **General Psychology**	
Fall 2018	🔖 **Psychology of Adolescence**	4.49/5
	🔖 **Experimental Design**	
Spring 2018	🔖 **Intermediate Statistics II**	
Fall 2017	🔖 **Psychology of Adolescence**	4.67/5
	🔖 **Intermediate Statistics I**	
Spring 2017	🔖 **Statistics in Psychology and Education II**	
Fall 2016	🔖 **Statistics in Psychology and Education I**	
Spring 2016	🔖 **Statistics in Psychology and Education II**	4.16/5
Fall 2015	🔖 **Statistics in Psychology and Education I**	4.36/5

Professional Service

Peer Review

2025	🔖 **BMC Medical Research Methodology** (Springer Nature)
	Reviewed 2 manuscripts

Skills

AI Tool Development

MCP Servers	Developed **18+ Model Context Protocol (MCP) servers** in Swift for research workflow automation, including bibliography validation (APA 7th), citation management, calendar integration, and database querying.
Citation Tools	Built tools for **cross-referencing AI-generated citations** against Zotero libraries and BibTeX databases to verify accuracy and prevent hallucinated references.
Open Source	Published MCP servers and Claude Code plugins on GitHub, contributing to the open-source AI tooling ecosystem.

Software Development

Data Science	**R / Shiny / Python**: Statistical computing, interactive dashboard development, data processing and automation.
App Dev	**Swift (iOS/macOS)**: Native Apple platform application and MCP server development.
Database	**DuckDB / PostgreSQL / Supabase**: Analytical databases, production databases, and backend-as-a-service.
Web Dev	**TypeScript / Next.js**: Frontend web applications with React-based UIs.

Statistical & Computational Skills

- Expert in using **R, SAS, Python, MPLUS, SPSS, JASP** in statistical analysis.
- Expert in **Structural Equation Modeling (SEM)** including Confirmatory Factor Analysis (CFA), Path Analysis (PA), mediation analysis and moderation analysis.
- Expert in **Hierarchical Linear Modeling (HLM)**, mixed effect models, and Generalized Linear Mixed effect Models (GLMM).
- Expert in **longitudinal data analysis** methods including latent growth curve models, latent profile models, latent mixture models, and Generalized Estimating Equations (GEE).
- Expert in **Item Response Theory (IRT)** including Rasch model, 2PL model, graded response model, and multidimensional IRT models.
- Expert in **paired-comparison data analysis** including Thurstonian models and its variants.

Languages

Languages	Strong reading, writing and speaking competencies for Mandarin Chinese.
	Strong reading, fluent writing, and intermediate speaking competencies for English.
	Strong reading competencies for Japanese.