

HE REN

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EDUCATION

Beijing Normal University (BNU), Collaborative Innovation Center of Assessment for Basic Education Quality

Beijing, China

M.Ed. in Psychology

Sep 2019 – Jun 2022 (expected)

- GPA: **3.9/4**; Ranking: **1/28**
- Core Courses: *Advanced Item Response Theory, Research Methods in Psychology: Design and Technology, Multivariate Statistics, Big Data Machine Learning, and Adaptive Testing and Diagnostic Adaptive Assessment.*

Beijing Normal University (BNU), School of Statistics

Beijing, China

B.S. in Statistics

Sep 2015 – Jun 2019

- GPA: 3.6/4
- Core Courses: *Advanced Algebra, Mathematical Analysis, Probability Theory, Mathematical Statistics, Linear Model, Applied Multivariate Statistical Analysis, Experimental Design, and Statistical Computation.*

PUBLICATIONS AND WORK IN PROGRESS

Ren, H., Huang, Y., & Chen, P. (2022). Types, characteristics, and application of termination rules in computerized classification testing (in Chinese). *Advances in Psychological Science*, 30(5), 1168-1182.

<https://doi.org/10.3724/SP.J.1042.2022.01168>

- Reviewed the core ideas of the likelihood ratio (LR), Bayesian decision theory, and ability confidence intervals (ACI) rules: constructing hypothesis tests, designing loss functions, and comparing the position of the cut point relative to the confidence interval, respectively.
- Illustrated the pros and cons of different rules: (1) The LR has good theoretical properties but is more difficult to extend to complex test situations; (2) The loss function in Bayesian decision theory rules has a very flexible and changeable form, making the method easily applicable to different test situations, and simultaneously, it inevitably brings a choice problem to the users; (3) The ACI is the most straightforward rule among the three methods, but it has poor robustness and relatively low efficiency.

Ren, H., Xu, N., Lin, Y., Zhang, S., & Yang, T. (2021). Remedial teaching and learning from a cognitive diagnostic model perspective: Taking the data distribution characteristics as an example. *Frontiers in Psychology*, 12, Article 628607. <http://doi.org/10.3389/fpsyg.2021.628607>

- Determined the hierarchical structure of related attributes and developed test instruments.
- Chose the proper cognitive diagnosis model to learn about the poorly mastered attributes.
- Verified the effect of targeted intervention based on the cognitive diagnosis of improving students' abilities by pre-and post-test.

Ren, H., & Chen, P. (2021). Two new termination rules for multidimensional computerized classification testing (in Chinese). *Acta Psychologica Sinica*, 53(9), 1044–1058. <https://doi.org/10.3724/SP.J.1041.2021.01044>

- Proposed a Mahalanobis-distance based sequential probability ratio test (Mahalanobis-SPRT) to overcome the instability of classification decisions caused by the existing Projected SPRT rule in the early stage of the test.
- Extend the stochastically curtailed generalized likelihood ratio to multidimensional situations.
- Used Monte Carlo simulation to compare the existing rules with the two new rules. The new rules led to a shorter test length without sacrificing too much accuracy.

Chen, P., Li, X., **Ren, H.**, & Xin, T. (accepted). Research on the influence factors of equating linkage based on improved single group design (in Chinese). *Journal of Psychological Science*.

- Proposed the improved single group design to decrease item exposure in non-equivalent groups with anchor test.
- Conducted simulation to fully compare four equating methods under the new design.

Huang, Y., **Ren, H.**, & Chen, P. (under review). New item selection designs for computerized classification testing with item exposure and test-taking time control.

- Proposed the stage adaptive item selection design (SAI) that makes the current need for decision-making compatible with the percentile rank of item information.
- Optimized the "maximizing Fisher information per time unit" method and put forward the timed-SAI method.
- The results of the Monte Carlo simulation revealed that an item usage balanced and short test could be achieved.

CONFERENCE PRESENTATIONS

Ren, H., & Chen, P. (2020, April). *Research on Termination Rules of Multidimensional Computerized Classification Testing*. Poster presented at the Annual Meeting of the National Council on Measurement in Education (NCME), San Francisco, CA (Online).

Huang, Y., **Ren, H.**, & Chen, P. (2022, April). *New Item Selection Designs for Computerized Classification Test*. Poster presented at the Annual Meeting of the National Council on Measurement in Education (NCME), San Diego, CA (Online).

FUNDED GRANTS

2020 National Natural Science Foundation of China (Grant No. 32071092).	Participant
<i>Online Calibration in Computerized Adaptive Testing: New Challenges and Solutions</i>	2021 – 2024
Funded by National Natural Science Foundation of China	~\$90,000
2019 Independent Project grant.	Principal Investigator
<i>Computerized Classification Test: Personalized Classification Test in the Era of Big Data</i>	2019 – 2020
Funded by Collaborative Innovation Center of Assessment for Basic Education Quality	~\$1,000
2018 Independent Project grant.	Participant
<i>From Paper-based to Computer-based: Development and Comparison of Measurement Techniques in Large-Scale Educational Assessment Programs</i>	2018 – 2019
Funded by Collaborative Innovation Center of Assessment for Basic Education Quality	\$1,000
2017 Beijing College Students' Innovation Training Program grant.	Principal Investigator
<i>Analysis and Intervention on the Mastery of Data Distribution Characteristics of Eighth-Graders based on Cognitive Diagnosis Model</i>	2017 – 2018
Funded by Beijing Municipal Education Commission	~\$1,500

RESEARCH AND TEACHING EXPERIENCE

National Assessment Center for Education Quality	Beijing, China
Research Assistant	06/2019 – 08/2019
<ul style="list-style-type: none"> Participated in the research on test equating design and methods. Helped with programming for Monte Carlo simulation programs to compare different equating methods. Assisted in creating research presentation posters and PowerPoint slides. 	
Beijing Normal University (BNU)	Beijing, China
Teaching Assistant (Awarded as Excellent T.A.)	
<i>Adaptive testing and diagnostic adaptive assessment</i> (Instructor: Prof. Ping Chen)	09/2020 – 01/2021
<ul style="list-style-type: none"> Undertook the task of introducing R language. Tutored 18 graduate students in remedial courses on the fundamentals of statistics. Corrected homework assignments weekly. 	

SELECTED AWARDS AND HONORS

China National Scholarship (The highest honor for graduate students)	2021
Liyun Outstanding Graduate Students	2021
The First Prize Scholarship of Beijing Normal University	2020
Meritorious Winner in the Interdisciplinary Contest in Modeling (ICM; As Student Advisor)	2020
Outstanding Graduate of Beijing (The highest honor for graduates set by the government of Beijing)	2019
Outstanding Graduate of Beijing Normal University	2019
Merit Student of Beijing (Top 1%)	2018
Honorable Mention in the Interdisciplinary Contest in Modeling (ICM; As Team Member)	2017

COMPUTER AND LANGUAGE SKILLS

Data Analysis: Proficient in R, SPSS; Capable of MATLAB, Python, *Mplus*, Stata, and Conquest.

Programming: Capable of C Language.

Language: Chinese (native), English (fluent).

CURRENT RESEARCH INTERESTS

Computerized Adaptive Testing
 Multidimensional Item Response Theory
 Cognitive Diagnosis Models
 The Application of Machine Learning Algorithms in Psychometrics

ADDITIONAL PROFESSIONAL AND EXTRACURRICULAR EXPERIENCES

Summer School

Global Leadership Program at the University of Pennsylvania	2017
Volunteer Experience	
Press-Tribune Assistant at Beijing 2022 Olympic Winter Games	2022
Voluntary support education in No. 2 Middle School of Fenggang (a remote county in southwest China)	2019
Extracurricular Activities	
Youth BNU Newspaper Office (Chief Editor)	2017 – 2018
The Eleventh Standing Committee of Capital Campus Press Union (Vice Chairman)	2018 – 2019