

Jiahao Zhu

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Summary

Research Master's student specialising in computational cognitive modelling, risky decision-making, and decision-making dynamics. Expert in hierarchical Bayesian statistics, state-space modelling, and experiment design and engineering. My primary research interest lies in elucidating how decision-makers adapt to stochastic environments through continuous interaction. Committed to a robust scientific cycle: deriving statistical regularities from data-driven analysis, constructing formal theories to generate falsifiable predictions via simulation, and iteratively refining mechanistic explanations through targeted experimentation.

Education

Radboud University

M.Sc. in Behavioural Science (Research Master)

Nijmegen, Netherlands
Sept 2024 – present

- **GPA:** 9.1/10 (Summa Cum Laude candidate)
- **Thesis:** Dynamic Modelling of Latent Risk-Taking using Particle Filters
- **Focus:** Computational Cognitive Modelling, Risky Decision-Making, Dynamic System
- **Key Coursework:** Behavioural Decision Making, Programming Skills (Python), Advanced Statistics in R, Mixed-Effects Models, Structural Equation Modelling, Complexity Methods

Sun Yat-sen University

M.Sc. in Management Science and Engineering (Research Master)

Guangzhou, China
Sept 2022 – Mar 2024

- **GPA:** 3.8/4.0 (Top 5%), National Scholarship (Top 1%, 2023)
- **Focus:** Affective Decision-Making, Network Analysis, Natural Language Processing

Sun Yat-sen University

B.A. in Business Administration

Guangzhou, China
Sept 2018 – June 2022

- **GPA:** 3.9/4.0 (Top 5%), Outstanding Undergraduate Scholarship (2019-2022)
- **Thesis:** Emotional Expression and Market Performance: A Network Perspective (Outstanding Thesis)

Selected Research Experience

Graduate Researcher (Master's Thesis)

Supervised by Dr. Bernd Figner and Dr. Zhang Chen

Radboud University
Sept 2025 – present

Project: Dynamic Modelling of Latent Risk-Taking using Particle Filters

- Challenged the prevailing psychometric assumption of risk-taking as a static trait. Proposed a dynamic framework where risk-taking is conceptualised as a non-stationary latent state that evolves through tasks.
- Investigated the convergence gap between behavioural and self-reported measures using the Basel-Berlin Risk Study dataset ($N=1,507$). Implemented incremental Hierarchical Bayesian estimation (Cumulative Prospect Theory) to test the hypothesis that convergent validity follows an inverted-U relationship with data accumulation, providing empirical evidence to optimise risk elicitation protocols
- Developed a computational pipeline using Auxiliary Particle Filters to recover individual trial-by-trial trajectories of latent risk sensitivity while simultaneously estimating fixed parameters. This approach resolved the issue of averaging out meaningful cognitive fluctuations inherent in static model fits.
- Applied Generalised Additive Mixed Models to the estimated trajectories to statistically test the existence of dynamics, distinguishing non-stationary changes in risk-taking from random measurement noise.

Research Project Co-Lead

Supervised by Prof. Mike Rinck and Konrad Schweizer

Radboud University
Nov 2024 – June 2025

Project: Investigating Automatic and Motivational Avoidance in Academic Worry

- Investigated the cognitive mechanisms underlying academic anxiety, specifically testing the hypothesis that trait worry elicits automatic approach-avoidance biases in motor control systems.
- Engineered a continuous joystick-based Approach-Avoidance Task in PsychoPy with millisecond precision. Implemented a real-time visual feedback loop (dynamic zooming) that operationalises avoidance as a continuous motion trajectory, capturing subtle motor biases beyond simple binary choices.
- Conducted a simulation-based power analysis in R to determine the sample size for the repeated-measures design with interaction effects, ensuring the study was sufficiently powered to detect subtle cognitive biases.
- Applied Generalised Linear Mixed Models to analyse over 3,000 behavioural data points. Modelled reaction times and key-press counts using Poisson distributions to strictly handle the right-skewed properties of the data, providing reliable estimates of experimental effects.

Research Project Lead

Supervised by Prof. Zengxiang Chen

Sun Yat-sen University

Sept 2022 – May 2024

Project: Unveiling the Effect of Emotional Co-Expressions: A Network Perspective

- Applied Natural Language Processing to extract sentiment features from a massive corpus of crowdfunding project descriptions (Indiegogo & Kickstarter; 53,000+ texts, >10 million words) in Python, transforming unstructured naturalistic text into structured variables for quantitative analysis.
- Constructed a novel Emotional Co-expression Network framework to quantify the structural properties of emotional information. Transformed textual sentiment into quantifiable network topology metrics (e.g., density, clustering coefficients) to capture the complexity of emotion expression.
- Using econometric models (Stata), identified a robust inverted-U relationship between information density and funding outcomes, highlighting the trade-off between information richness and cognitive overload.
- As a master's student, selected to present this work at two Doctoral Consortia (Annual Conference of JMS China & CMAU Annual Conference, 2022).

Research Assistant

Worked with Dr. Chenming Peng and Prof. Zengxiang Chen

University of International

Business and Economics

Jan 2023 – Jan 2024

Project: The Effect of Brand Warmth and Competence: A Meta-Analysis

- Using PRISMA guidelines to execute a massive-scale systematic review on social perception dimensions (Stereotype Content Model). Screened over 17,000+ articles and coded 1,201 effect sizes from 587 eligible studies, constructing one of the most comprehensive datasets in the field to date.
- Conducted meta-analysis in R, employing random-effects modelling to estimate global effect sizes and mixed-effects meta-regression to investigate key moderators.

Technical Skills

Computational Modelling & Statistics: Hierarchical Bayesian Modelling (Stan), State-Space Modelling (Sequential Monte Carlo), Mixed-Effects Models, Causal Inference, Structural Equation Models, Network Analysis

Programming & Data Science: R (Advanced), Python (NumPy, Pandas), NLP, Machine Learning, Git

Experimental Engineering: PsychoPy, Adaptive Experiment, Joystick-based Input

Language: English (IELTS 7.5, C1 equivalent), Mandarin (Native)

Academic Activities

Selected Participant (Complexity Interactive Workshop)

Santa Fe Institute

Santa Fe, USA (online)

Oct 2023

- Engaged in advanced lectures on complexity science (e.g., collective intelligence, belief dynamics). During Hackthon, co-developed an Agent-Based Model simulating the formation of group identity.

Teaching Assistant (Econometrics, Consumer Behaviour)

Sun Yat-sen University

Guangzhou, China

Sept 2020 – June 2022

- Facilitated laboratory sessions on statistical programming (Stata/R) and quantitative methods.