Qihao He

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EDUCATION

Peking University

B.S. in Psychology, School of Psychological and Cognitive Sciences (SPCS) **Sep. 2022 – Present**

- **Average Score:** 90.4/100 | **GPA:** 3.79/4.00 | **Rank:** 1/43
- **Core Courses:** Cognitive Psychology (92), Experimental Psychology (92), Physiological Psychology (94), Physiology (91), Developmental Psychology (97), Fundamentals and Frontiers of Systems Neuroscience (94)

LL.B. in Sociology, Department of Sociology (Double Major) **Sep. 2024 – Present**

RESEARCH EXPERIENCE

Dynamic Reconstruction of Perceptual Emotion Templates in Social Anxiety

Independent Researcher **May 2024 – Present**

Supervisor: *Dr. Yujia Peng, Peking University | Supported by 2024 President's Research Fund, Peking University*

- Investigated how individuals with high and low social anxiety (SA) perceive dynamic positive and negative facial expressions. Adopted a data-driven approach to create dynamic facial stimuli by parametrically manipulating Action Units (AUs) based on the Facial Action Coding System (FACS) and the Generative Model of 3D Faces (GMF).
- Designed and programmed the task; collected behavioral data from 70 participants (35 per group).
- Applied generalized linear mixed models (GLMM) and Bayesian hierarchical modeling to examine how AU amplitude and peak latency predicted emotion judgments and interacted with group status. Employed hierarchical drift diffusion model (HDDM) to estimate latent cognitive parameters to reveal group differences in perceptual sensitivity and decision bias. Reconstructed group-specific perceptual templates for positive and negative emotions using reverse correlation techniques.
- Found that high-SA individuals exhibited greater sensitivity to facial expressions with smaller AU amplitudes and later peaks, especially for AUs with greater contribution to emotion classification.

Global-Local Reference Frame Shift: The Influence of Street Layout on Heading in Spatial Navigation

Independent Researcher **Nov. 2024 – Present**

Supervisor: *Dr. Sheng Li, Peking University | Supported by 2025 Beijing Natural Science Foundation*

- Examined how individuals utilize multi-level spatial cues to construct and shift between global-local reference frames during spatial navigation in naturalistic environments. Employed the Judgment of Relative Direction (JRD) paradigm using panoramic street scenes and virtual environments.
- Designed two behavioral experiments using panoramas with regular (N = 36) and irregular (N = 24) street layouts. Implemented computer vision models (e.g., GIST, subband entropy, edge density) to examine how low-level visual features and spatial layout predict heading accuracy and reference frame use.
- Developed a virtual city environment in Unity to examine heading across hierarchical spatial levels. Collected behavioral data (N = 24) to prepare for an fMRI study. Planned to integrate computer vision models with Representational Similarity Analysis (RSA) and Multivoxel Pattern Analysis (MVPA) to examine how scene-selective regions (PPA, OPA, RSC) represent layout, heading, and reference frame shifts.
- Found that regular local street layouts facilitated the adoption of local reference frames, while irregular layouts and inter-regional orientation promoted global frame reliance. Results suggest RSC may play a central role in mediating reference frame conversion across spatial hierarchies.

Training Metacognitive Calibration with Optimal Confidence Feedback

Independent Researcher **Mar. 2025 – Sep. 2025**

Supervisor: *Dr. Dobrobir Rahnev, Georgia Institute of Technology*

- Explored whether trial-level optimal confidence feedback improves confidence calibration in perceptual

decision-making more effectively than traditional correct/incorrect feedback.

- Implemented Monte Carlo simulations within a visual discrimination task to combine task difficulty with estimated participant noise and deliver real-time trial-wise optimal confidence feedback. Programmed and conducted the experiment online.
- Applied Signal Detection Theory (SDT) and HDDM to compare pre- vs. post-training changes in perceptual sensitivity (d'), decision criterion (c), and metacognitive sensitivity (meta-d'), assessing the efficacy of different feedback mechanisms for enhancing metacognitive calibration.

Human–Machine Comparison in Face Identity Processing

Summer Research Intern **May 2025 – Present**

Supervisor: *Dr. Zili Liu, University of California, Los Angeles (UCLA)*

- Investigated differences between human observers and deep convolutional neural networks (DCNNs) in face identity processing across tasks involving twin identification and age-related face memory. Applied psychometric modeling (Area Under the ROC Curve, AUC) and human-AI comparison.
- Twin Identification: Analyzed behavioral data (N = 225) on human identification of same person, twins and unrelated individuals under varying levels of adversarial distortion (Fawkes). Tuned deep learning models (e.g., DeepFace) for comparison.
- Age-related Face Memory: Programmed and deployed an online recognition task using MORPH Database faces across different ages. Collected behavioral data (N = 152) under identity- vs. image-based memory conditions. Found that participants automatically encoded identity even when instructed to focus on low-level features.

TEACHING EXPERIENCE

Cognitive Psychology

Teaching Assistant | ***Instructor:*** *Prof. Sheng Li, Peking University* **Sep. 2025 – Present**

- Organized student literature presentation sessions on perception, attention, memory, conceptual processing, language, decision making and reasoning.
- Graded quizzes, midterm and final examinations.

SOCIAL WORKS & VOLUNTEERING

- *Committee Member* | Liaison Department, Student Union of SPCS Sep. 2022 – Jun. 2023
- *Committee Member* | Arts & Sports Department, Student Union of SPCS Sep. 2022 – Jun. 2023
- *Admissions Volunteer* | Beijing Admissions Team, Peking University Dec. 2022 – Jul. 2023
- *Student Volunteer* | Teaching and Outreach Program at Deyang No. 5 High School, SPCS Jul. 2023 – Jun. 2023
- *Student Volunteer* | "Leading New Swallows" Social Practice Program, Peking University Dec. 2024 – Mar. 2025

HONORS & AWARDS

- Xiaomi First-Class Scholarship (Top 2%), *Peking University* Sep. 2025
- Leo Koguan Scholarship (Top 2%), *Peking University* Dec. 2024
- First-Class Academic Scholarship, *Peking University* Oct. 2025
- First-Class Academic Scholarship, *Peking University* Sep. 2024
- Award for Merit Student (Top 5%), *Peking University* Sep. 2025
- Award for Merit Student (Top 5%), *Peking University* Dec. 2024
- Award for Community or Public Service, *Peking University* Dec. 2023

PROFESSIONAL SKILLS

Coding

- MATLAB, R, Python, JavaScript, HTML, CSS, C#, Stata

Research Method

- **Behavioral:** Experimental design and implementation (Psychtoolbox, jsPsych, Unity); psychophysics; reverse correlation method
- **Computational:** Statistical Modeling (ANOVA, mixed-effects, mediation, moderation, factor analysis); Cognitive Modeling (signal detection theory, drift diffusion model, Bayesian inference); Machine Learning & Computer Vision (deep convolutional neural networks, e.g., DeepFace, ArcFace; feature-based encoding, e.g., GIST, subband entropy; classification and prediction)
- **Neuroimaging:** fMRI (SPM; SVM, MVPA, RSA); EEG (time-window analysis, cluster-based permutation)

English Proficiency

- TOEFL iBT 106