

Haoyang Lu

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Research interest

I am interested in computational psychiatry in general. My research involves using the methods of computational cognitive sciences to understand the cognitive mechanisms underlying the core symptoms of mental disorders. In my PhD thesis, I applied these methods to investigate the (non-)instrumental information sampling in both autistic children and neurotypical individuals. Currently, I am studying the cognitive processes involved in the formation and updating of superstitious beliefs, such as illusory control.

Employment

School of Psychological and Cognitive Sciences, Peking University

Postdoctoral Research Fellow

2022 – Present

Advisor: Hang Zhang

Education

Peking University

Beijing, China

PhD in Integrated Life Sciences (Psychology)

2016 – 2022

Sun Yat-Sen University

Guangzhou, China

BSc in Psychology

2012 – 2016

Thesis

Title: *Inference and Decision-making in People with Autism Spectrum Disorder or Broader Autism Phenotype*

Advisors: Li Yi, Hang Zhang

Introduction: The core features of autism spectrum disorders (ASD) are believed to be pertinent to how individuals interact with and sample the world. Therefore, it is crucial to understand the outcome of atypical active inference in ASD. In this interdisciplinary project, I worked with two advisors, one specializing in child psychopathology (Prof. Li Yi) and the other in computational cognitive science (Prof. Hang Zhang). We conducted a series of studies on information sampling in both autistic children and adults with a broader autism phenotype. Through the clinical experience with autistic children and the use of Bayesian linear mixed models and hierarchical Bayesian modeling, we gained a deeper understanding of the behavioral, attentional, and cognitive processes that differ between autistic individuals and neurotypical people in both instrumental and non-instrumental information sampling.

Publications

Peer-reviewed journal articles.....

10. Wei, N., **Lu, H.**, Wang, Q., Song, C., Yi, L. (2023). Vigilance or avoidance: How do autistic traits and social anxiety modulate attention to the eyes? *Frontiers in Neuroscience*, 16, 1081769.
9. Hu, Y., Xiong, Q., Wang, Q., Song, C., Wang, D., **Lu, H.**, Shi, W., Han, Y., Liu, J., Li, X., & others. (2022). Early development of social attention in toddlers at high familial risk for autism spectrum disorder. *Infant Behavior and Development*, 66, 101662.
8. Wang, Q., **Lu, H.**, Feng, S., Song, C., Hu, Y., & Yi, L. (2021). Investigating intra-individual variability of face scanning in autistic children. *Autism: The International Journal of Research and Practice*, 13623613211064372.

7. Feng, S., **Lu, H.**, Wang, Q., Li, T., Fang, J., Chen, L., & Yi, L. (2021). Face-viewing patterns predict audiovisual speech integration in autistic children. *Autism Research*.
6. Feng, S., **Lu, H.**, Fang, J., Li, X., Yi, L., & Chen, L. (2021). Audiovisual speech perception and its relation with temporal processing in children with and without autism. *Reading and Writing*, 1–22.
5. **Lu, H.**, Yi, L., & Zhang, H. (2019). Autistic traits influence the strategic diversity of information sampling: Insights from two-stage decision models. *PLoS Computational Biology*, 15(12), e1006964.
4. **Lu, H.**, Li, P., Fang, J., & Yi, L. (2019). The perceived social context modulates rule learning in autism. *Journal of Autism and Developmental Disorders*, 49(11), 4698–4706.
3. Zhang, Y., Song, W., Tan, Z., Zhu, H., Wang, Y., Lam, C. M., Weng, Y., Hoi, S. P., **Lu, H.**, Chan, B. S. M., & others. (2019). Could social robots facilitate children with autism spectrum disorders in learning distrust and deception? *Computers in Human Behavior*, 98, 140–149.
2. Li, T., Hu, Y., Song, C., **Lu, H.**, & Yi, L. (2018). The measurements and mechanisms of restricted and repetitive behaviors in autism spectrum disorders. *Chinese Science Bulletin*, 63(15), 1438–1451.
1. Yang, Y., Tian, Y., Fang, J., **Lu, H.**, Wei, K., & Yi, L. (2017). Trust and deception in children with autism spectrum disorders: A social learning perspective. *Journal of Autism and Developmental Disorders*, 47(3), 615–625.

Conference abstracts

6. **Lu, H.**, Teng, T., & Zhang, H. (2023). The formation of superstitions in an uncontrollable environment. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 45. Retrieved from <https://escholarship.org/uc/item/5fx4t61x>
5. **Lu, H.**, Yi, L., & Zhang, H. (2022). Adults with more autistic traits are more willing to pay for “useless” information. *INSAR 2022 Annual Meeting*.
4. **Lu, H.**, Yi, L., & Zhang, H. (2020). Inefficient information sampling under explicit costs in children with ASD. *INSAR 2020 Virtual Meeting*.
3. Song, C., Wang, Q., Xu, J., **Lu, H.**, Qin, S., & Yi, L. (2020). Baseline arousal modulates face scanning in autism spectrum disorder. *INSAR 2020 Virtual Meeting*.
2. **Lu, H.**, Zhang, H., Yi, L. (2018). Adults with high autistic traits are reluctant to trade accuracy for monetary reward: a probabilistic reasoning experiment. *INSAR 2018 Annual Meeting*.
1. **Lu, H.**, Li, P., Yi, L. (2017) Impaired Rule Learning in Social Context of Children with Autism

Teaching

R for Eye-tracking data analysis

Workshop lecturer

Design and deliver a 2-day workshop for learning to use R for data analysis, particularly eye-tracking data.

Effective writing and communication in science

Teaching assistant

Design, tutorial delivery, and marking. Also deliver 1 2 hr lecture on how to do scientific data visualization.

Introduction to Cognitive Modeling

Guest lecturer

Delivery a one-hour tutorial on Reproducibility and Literate Programming in R

Child psychopathology

Teaching assistant

Marking and organizing group projects.

Topics in Autism Research

Teaching assistant

Design, marking, and organizing class discussion.

Chongqing, Nanjing, Shanghai, Beijing

2018 – 2023

Peking University

2021, 2022, 2023

Peking University

2020

Peking University

2018

Peking University

2017

Professional membership and service

Membership: Society for Research in Child Development; International Society for Autism Research; Cognitive Science Society; Society for Neuroeconomics

Reviewing: Journal of Autism and Developmental Disorders; eLife; OpenMind

Professional skills and languages

Research: Eye-tracking	<i>Expert</i>
fNIRS, fMRI, EEG	<i>Beginner</i>
Statistics: Bayesian statistics, Generalized linear mixed model, Generalized additive model	<i>Expert</i>
Survival analysis, Structural equation models, Machine learning methods	<i>Proficient</i>
Programming: R, MATLAB, Psychtoolbox	<i>Expert</i>
Stan, SPSS, PsychoPy/PsychoJs, Git	<i>Proficient</i>
Python, JAGS, Mplus, E-Prime, Visual Basic, C++, LaTeX	<i>Intermediate</i>
Languages: English	<i>Advanced</i>
Chinese	<i>Native</i>