

# Bonan Zhao

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## Academic Appointments

- 2025-*now*    **Lecturer in Computational Cognitive Science**  
(Equiv. US Assistant Professor)  
School of Informatics, University of Edinburgh
- 2023-2024    **Postdoctoral Research Associate**  
Department of Computer Science, Princeton University

## Education

- 2019-2023    **PhD Psychology**, University of Edinburgh, Edinburgh, Scotland
- 2015-2017    **MSc Logic**, University of Amsterdam, Amsterdam, The Netherlands
- 2011-2015    **BA Philosophy**, Tsinghua University, Beijing, China

## Industrial Experience

- 2017-2019    **Data Scientist**, Screen 6 (acquired by Samba TV), Amsterdam, The Netherlands

## Awards

- 2024    Travel Award, The 4<sup>th</sup> International Joint Conference on Learning & Reasoning  
£2,000 for attending the conference
- 2022    Chinese Students Award, Great Britain–China Educational Trust  
£3,000 for PhD write-up period
- 2022    Good Research Practice Awards (Open Research Award), Edinburgh Research Office
- 2020-2022    Research Support Grants, Department of Psychology, University of Edinburgh  
Total £2,125 applied and approved for running online experiments
- 2019-2022    Postgraduate Research Award, College of Arts, Humanities & Social Science, University of Edinburgh  
£14,533 annual stipend & tuition fees at overseas rate for three years
- 2016    Springer Best Paper Award, European Summer School in Logic, Language and Information
- 2015-2017    Amsterdam Excellence Scholarship, University of Amsterdam  
€12,000 annual stipend & tuition fees at overseas rate for two years
- 2014    Dean's Award, School of Humanities, Tsinghua University  
Top 2 students in the school, GPA & service

## Publications

Asterisk \* marks equal contribution. Underlined are student (mentee) authors.

PREPRINT

- Preprint*    Huang, H., **Zhao, B.**, Griffiths, T. G., Vélez, N. Teaching and learning generalizable abstractions. <https://osf.io/preprints/psyarxiv/zxwrv>

## PEER-REVIEWED JOURNAL ARTICLES

- 2024 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2024). A model of conceptual bootstrapping in human cognition. *Nature Human Behaviour* 8 (1), 125-136.
- 2023 Bramley, N. R., **Zhao, B.**, Quillien, T., Lucas, C. G. (2023). Local search and the evolution of world models. *Topics in Cognitive Science*, 1-32.
- 2022 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2022). How do people generalize causal relations over objects? A non-parametric Bayesian account. *Computational Brain & Behavior*, 5(1), 22-44.
- 2018 Capraro, V., Sippel, J., **Zhao, B.**, Hornischer, L., Savary, M., Terzopoulou, Z., Faucher, P., Griffioen, S. F. (2018). People making deontological judgments in the Trapdoor dilemma are perceived to be more prosocial in economic games than they actually are. *PLoS One*, 13(10), e0205066.

## PEER-REVIEWED CONFERENCE PROCEEDINGS &amp; WORKSHOPS

- 2024 **Zhao, B.**, Vélez, N., Griffiths, T. G. (2024). Higher uncertainty leads to less exploration in a combinatorial discovery game. In *NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty*.
- 2024 Byers, J. B., **Zhao, B.**, Niv, Y. (2024). Modeling goal selection with program synthesis. In *Intrinsically-Motivated and Open-Ended Learning Workshop @NeurIPS2024*.
- 2024 Zhang, E., **Zhao, B.** (2024). The Art of Knowing When to Stop: Analysis of Optimal Stopping in People and Machines. In *The 4th Workshop on Mathematical Reasoning and AI, NeurIPS*.
- 2024 **Zhao, B.**, Vélez, N., Griffiths, T. G. (2024). A rational model of innovation by recombination. In *Proceedings of the 46<sup>th</sup> Annual Meeting of the Cognitive Science Society*.
- 2024 Sucholutsky, I., **Zhao, B.**, Griffiths, T. G. (2024). Using compositionality to learn many categories from few examples. In *Proceedings of the 46<sup>th</sup> Annual Meeting of the Cognitive Science Society*.
- 2024 Fascendini, B., **Zhao, B.**, Vélez, N. (2024). Are toddlers intrinsically motivated to explore their own competence? In *Proceedings of the 46<sup>th</sup> Annual Meeting of the Cognitive Science Society*.
- 2023 Gong, T., **Zhao, B.**, McIntosh, R. D., Lucas, C. G. (2023). A rational model of spatial neglect. In *Proceedings of the 45<sup>th</sup> Annual Meeting of the Cognitive Science Society*.
- 2023 Gong, T., **Zhao, B.**, McIntosh, R. D., Lucas, C. G. (2023). Understanding spatial neglect: A Bayesian perspective. In *Proceedings of the Computational Cognitive Neuroscience Society Meeting*.
- 2023 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2023). Bootstrapping compositional generalization with cache-and-reuse. (2023). In *Proceedings of the Computational Cognitive Neuroscience Society Meeting*.
- 2022 **Zhao, B.**, Bramley, N. R., Lucas, C. (2022). Powering up causal generalization: A model of human conceptual bootstrapping with adaptor grammars. In *Proceedings of the 44<sup>th</sup> Annual Meeting of the Cognitive Science Society*.
- 2022 Xia, Z\*., **Zhao, B.\***, Quillien, T., Lucas, C. (2022). Dissecting causal asymmetries in inductive generalization. In *Proceedings of the 44<sup>th</sup> Annual Meeting of the Cognitive Science Society*.
- 2022 Marchant, N., **Zhao, B.**, Bramley, N. R., Morales, D., Chaigneau, S. E. (2022). Categorizing perceived causal events. In *Proceedings of the Annual Meeting of the 44<sup>th</sup> Cognitive Science Society*.
- 2021 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2021). Building object-based causal programs for human-like generalization. In *Causal Inference & Machine Learning Workshop, NeurIPS*.
- 2021 Valentin, S., **Zhao, B.**, Jiang, C., Bramley, N. R., Lucas, C. (2021). Symbolic and sub-symbolic systems in people and machines. In *Proceedings of the 43<sup>rd</sup> Annual Meeting of the Cognitive Science Society*.
- 2020 **Zhao, B.**, Bramley, N. (2020). Order Effects in One-shot Causal Generalization. In *Proceedings*

of the 42<sup>nd</sup> Annual Meeting of the Cognitive Science Society.

- 2018 **Zhao, B.\***, van de Pol, I.\*, Raijmakers, M. E., Szymanik, J. (2018). Predicting cognitive difficulty of the deductive mastermind game with dynamic epistemic logic models. In *Proceedings of the 40<sup>th</sup> Annual Meeting of the Cognitive Science Society*.

#### BOOK

- 2022 van Emde Boas, P., van Emde Boas, G., Xie, K., **Zhao, B.** (2022). *Analyzing the Logic of Sun Tzu in "The Art of War", Using Mind Maps*. Springer.

#### Conference and Workshop Presentations

- Dec 2024 Higher uncertainty leads to less exploration in a combinatorial discovery game  
*Poster at NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty*
- Jul 2024 A rational model of innovation by recombination  
*Talk at Annual Meeting of the Cognitive Science Society, Rotterdam, The Netherlands*
- Jul 2024 Are toddlers curious to learn about their own competence?  
*Poster at Annual Meeting of the Cognitive Science Society, Rotterdam, The Netherlands*
- Mar 2024 Constructing deep concepts through shallow search  
*Talk at AAI Spring Symposium on Human-Like Learning, Stanford University, CA, USA*
- Mar 2024 Comparing human behavior to an optimal policy for innovation  
*Poster at AAI Spring Symposium on Human-Like Learning, Stanford University, CA, USA*
- Aug 2023 Bootstrapping compositional generalization with cache-and-reuse  
*Poster at Computational Cognitive Neuroscience Society Meeting (CCN), Oxford, UK*
- Jul 2022 Bootstrap learning complex causal concepts with adaptor grammars  
*Talk at Edinburgh Computational CogSci Workshop, University of Edinburgh*
- Jun 2022 Bootstrap learning of complex causal concepts  
*Talk at Reasoning Workshop, Edinburgh Laboratory for Integrated Intelligence*
- Dec 2021 Building object-based causal programs for human-like generalization  
*Poster at Causal Inference & Machine Learning: Why now?, NeurIPS, remote*
- Jul 2021 Causal programs in generalizations  
*Talk at Symbolic and sub-symbolic systems in people and machines, CogSci, remote*
- Jun 2021 How do people generalize causal relations over objects? A Bayesian non-parametric account  
*Talk at International Conference of Thinking (ICT), remote*
- Aug 2020 Order effects in one-shot causal generalization  
*Poster at Annual Meeting of the Cognitive Science Society (CogSci), remote*
- Aug 2020 Predicting cognitive difficulty of the deductive mastermind game with dynamic epistemic logic models  
*Poster at Annual Meeting of the Cognitive Science Society (CogSci), Madison, WI, USA*
- Jul 2016 Revising social networks with stubborn agents  
*Talk at North American Summer School on Logic, Language, and Information (NASSLLI), Rutgers, NJ, USA*
- Jul 2016 Logic of closeness revision  
*Poster at Logic and the Foundations of Game and Decision Theory (LOFT), Maastricht, The Netherlands*
- Nov 2015 Why my sugar is your poison? Type-based rationality in backward induction  
*Talk at LABEX CIMI Pluridisciplinary Workshop on Game Theory, Toulouse, France*

## Invited Talks

- Oct 2024*    **Concepts and Cognition Lab**, Princeton University, USA
- Sep 2024*    **Tsing Ch'a Sessions**, Tsinghua University, Beijing, China
- Aug 2024*    **IMPression in ACTion Lab**, University of California, San Diego, remote
- Jul 2024*    **Computational Models of Structure-based Cognition Symposium**, The Fifth International Conference on Analogy, Amsterdam, The Netherlands
- Apr 2024*    **PDP Seminar Series**, Princeton University, USA
- Feb 2024*    **Cognitive Science Colloquium**, University of California, Irvine, USA
- Nov 2023*    **OpenTalks**, Chinese Open Science Network (COSN), remote
- Oct 2023*    **NYUConcats**, New York University, USA
- Oct 2022*    **Max Planck Institute for Biological Cybernetics**, Tübingen, Germany
- Oct 2022*    **Human Cognitive Neuroscience seminar**, University of Edinburgh, UK
- Sep 2022*    **Computational Cognitive Science Lab**, Princeton University, remote
- Sep 2022*    **Computation & Cognition Lab**, Stanford University, remote
- May 2022*    **Computational Cognitive Science Lab**, University of Melbourne, remote
- Mar 2022*    **Logic and Interactive Rationality**, University of Amsterdam, remote
- Mar 2022*    **London Judgment and Decision Making Seminar**, UCL, London, UK
- Feb 2022*    **Causality in Cognition Lab**, Stanford University, remote
- Jul 2021*    **Computational Principles of Intelligence Lab**, MPI Tübingen, remote
- Oct 2017*    **DTU Compute**, Technical University of Denmark, Copenhagen, Denmark
- May 2017*    **Donders Institute for Brain, Cognition and Behaviour**, Nijmegen, The Netherlands
- Apr 2016*    **Cool Logic**, Institute for Logic, Language and Computation, Amsterdam, The Netherlands

## Teaching

- 2022-2023*    **Centre for Data, Culture & Society**, University of Edinburgh, UK  
 Data Carpentry (instructor)  
 Introduction to Descriptive Statistics (instructor)  
 Version Control with git and GitHub (instructor + course design)  
 Data Visualization with R (co-instructor)  
 Open Research Practices (co-instructor)
- 2020-2023*    **School of Philosophy, Psychology and Language Sciences**, University of Edinburgh, UK  
 Causal Cognition (tutorial, TA)  
 Logic 1 (tutorial, TA)  
 Introduction to Cognitive Science (Python lab, TA)  
 Univariate Statistics and Methodology using R (R lab, TA)  
 Data Analysis for Psychology in R (R lab, TA)
- 2018-2019*    **HackYourFuture** (free coding school for refugees), Amsterdam, The Netherlands  
 Git and command line interface (lead lecturer)  
 SQL and Database (co-lead lecturer)  
 JavaScript (TA)

## Service

### AD-HOC REVIEWER

- Journals* Artificial Intelligence; Cognition (2); Journal of Cognition; Journal of Experimental Psychology: Applied; Journal of Experimental Psychology: Learning, Memory, and Cognition; Psychological Science; Open Mind (2); Scientific Reports
- Conferences* Annual Meeting of the Cognitive Science Society (CogSci) 2020–2024  
International Joint Conference on Learning & Reasoning (IJCLR) 2024  
Conference on Cognitive Computational Neuroscience (CCN) 2023

### ORGANIZING & OUTREACH

- 2024 Program Committee, International Joint Conference on Learning & Reasoning (IJCLR)
- 2023- Outreach volunteer, Chinese Open Science Network (COSN)
- 2021-2022 Open Research Facilitator, University of Edinburgh  
Organized 12 workshops and tutorials about open research practices  
Built and maintained school-wise open research information hub
- 2019-2022 EdinCoCoSci lab meetings, University of Edinburgh
- 2016-2017 Logic Tea seminar series, University of Amsterdam

## Mentoring

- 2024-2025 Zachary S. Siegel, BS Computer Science, Princeton University
- 2023-2024 Ham Huang, PhD Psychology, Princeton University
- 2024 Evelene Zhang, BS Cognitive Science, Carleton College
- 2023 Lucas Linzmeier, BS Computer Science, Princeton University
- 2021 Zeyu Xia, MSc Informatics, University of Edinburgh

## References

Thomas L. Griffiths [tomg@princeton.edu](mailto:tomg@princeton.edu)  
 Natalia Vélez [nvelez@princeton.edu](mailto:nvelez@princeton.edu)  
 Neil R. Bramley [neil.bramley@ed.ac.uk](mailto:neil.bramley@ed.ac.uk)  
 Christopher G. Lucas [c.lucas@ed.ac.uk](mailto:c.lucas@ed.ac.uk)

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