Ruizhe Liu

Pronounced as: /rā-ʒə/ /lju/

Stanford Cognitive & Systems Neuroscience Laboratory
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EDUCATION

08/2014 – 04/2020	Doctoral student, Department of Psychology, University of Pittsburgh, Pittsburgh, PA, U.S. Advisor: Dr. Melissa Libertus Dissertation: *The neural basis of symbolic numbers: multi-constituent neural networks and the connectivity*. Committee: Dr. Melissa Libertus, Dr. Marc Coutanche, Dr. Julie Fiez, Dr. Jessica Cantlon
09/2009 – 06/2012	M.S. in Psychology. School of Psychology, Beijing Normal University (BNU), Beijing, China
09/2005 – 06/2009	B.S. in Psychology. Department of Psychology, East China Normal University (ECNU), Shanghai, China

EMPLOYMENT

05/2020 – present	Postdoctoral Researcher, Stanford Cognitive & System Neuroscience Laboratory, Stanford University, Palo Alto, CA, U.S. Supervisor: Dr. Vinod Menon
08/2012-07/2014	Research Associate, Department of Psychology, Carnegie Mellon University, Pittsburgh, PA, U.S. Advisor: Dr. Robert. Siegler

AWARDS AND HONORS

2019	Travel award to The Sackler Colloquium "The brain produces mind by modeling" at Irvine, California ($1000)
2019	**Learning Research and Development Center Internal Award Program [PIs: Melissa Libertus, Avniel Ghuman]: *Using human intracranial recordings to examine the spatiotemporal dynamics of symbolic and non-symbolic number processing* ($37,953). In collaboration with Brett Bankson**
2018	Travel award to the International Joint Workshop between the University of Bologna and the University of Pittsburgh (€1000)
2016	Multimodal Neuroimaging Training Program (MNTP) Summer Workshop Training Fellowship ($2500)
2016	Travel award at the 2016 Math Cognition Conference ($500)
2009-2012	Graduate student scholarship, BNU
2009	Outstanding graduate of ECNU

PUBLICATIONS

Peer-reviewed

Ren, X., **Liu, R.,** Coutanche, M. N., Fiez, J. A., & Libertus, M. E. (2022). Numerical estrangement and integration between symbolic and non-symbolic numerical information: Task-dependence and its link to math abilities in adults. *Cognition*, *224*, 105067.

Liu, R., Fiez, J., Schunn, C., & Libertus, M. (2018). The integration between non-symbolic and symbolic numbers: Evidence from an EEG study. *Brain and Behavior, 8(4)*, e00938.

Möhring, W., **Liu, R.,** & Libertus, M. (2017). Infants' speed discrimination: Effects of different ratios and spatial orientations. *Infancy*, *22*(6), 762-777.

Libertus, M., Braham, E., **Liu, R.** (2016). Infants discriminate number: Evidence against the prerequisite of visual object individuation and the primacy of continuous magnitude. [Commentary on: Leibovich, Katzin, Harel & Henik. "From 'sense of number' to 'sense of magnitude' – The role of continuous magnitudes in numerical cognition".] *Behavioral and Brain Sciences*.

Liu, R., Zhou, R., & Oehl, M. (2013). Driving angry behavior of drivers in Mainland China and Germany. *Chinese Journal of Ergonomics, 19,* 10 -15.

Manuscript in preparation

Mistry, P., Strock, A., **Liu, R.,** Young, G., Menon, V (*under review*). Learning-induced reorganization of number neurons and emergence of novel numerical magnitude representations in a biologically-inspired neural network. Nature Communication.

Liu, R., Chang, H., Zhang, Y., El-Said, D., Menon, V. (*submitted*). Decoding of numbers and letters is context-specific and distributed across neural systems. Journal of Neuroscience.

Liu, R. & Libertus, M. (*invited revision*). Frontal and posterior brain region activation in symbolic and non-symbolic number comparisons in children: a multivariate classification approach. Journal of Numerical Cognition.

Liu, R., Tremel, J., Fiez, J., Durisko, C., Schunn, C., Coutanche, M, & Libertus, M. (*under review*). The integration of symbolic and non-symbolic number representations in the human brain. *Frontiers in Human Neuroscience*.

Liu. R. & Libertus, M. *Numerosity discrimination and its neural basis: a multivariate perceptual decision making view*.

Book Chapters

Liu, R., Braham,E. J., & Libertus, K. (2018). Visual spatial skills. In E. Braaten (Ed.), *The SAGE Encyclopedia of Intellectual and Developmental Disorders.* Thousand Oaks, CA: SAGE Publication.

Zhou, R., **Liu, R.,** & Yuan, L. (2011). Advances in Psychology. Beijing, China: Beijing Normal University Publication Group.

Translation works

Liu, X. & **Liu, R.** (2013). *That's Disgusting! Unraveling the mysteries of repulsion*. Beijing, China: China Light Industry Press. ISBN: 9787501989867. (Original work published in 2013)

Liu, R. (2009) Chapter 9, Chapter 16 and Chapter 20. In Geng, W. (Ed). *Bad Therapy: Master Therapists Share Their Worst Failures.* Shanghai, China: East China Normal University Publication Group. (Original work published in 2002).

Liu, R., & Zhou, R. (2010). Depression's evolutionary roots. *Scientific American (Chinese Version), 5,* 54-58.

CONFERENCE PRESENTATIONS

Liu. R., Koch, G., Coutanche, M., Fiez, J., & Libertus, M. (2019). *Different codes of symbolic numbers in the human brain.* Annual Meeting of The Mathematical Cognition and Learning Society, Ottawa, Canada.

Liu, R., Braham, E, Libertus, M. (2018). *Symbolic and non-symbolic number comparison in children: an EEG study.* Annual Meeting of the International Mind, Brain, and Education Society, Los Angeles, CA, U.S.

Liu, R., Braham, E, Libertus, M. (2017). *Symbolic number comparison in 5- to 9-year-old children: Age-related changes in event-related potentials and their relation to formal math abilities.* Nano-symposium at the Annual Meeting of the Society of Neuroscience: Neuroscience 2017, Washington, DC, U.S.

Liu, R., Liu, A., Schunn, C., Fiez, J., Libertus, M. (2016). *The integration between non-symbolic and symbolic numbers and its relation to math ability.* Annual Meeting of the International Mind, Brain, and Education Society, Toronto, Canada.

Liu, R., Liu, A., Schunn, C., Fiez, J., Libertus, M. (2016). *Automatic integration between non-symbolic and symbolic numbers in adults.* The Math Cognition Conference, Fort Worth, Texas, U.S.

Liu, R., Liu, A., Schunn, C., Fiez, J., Libertus, M. (2016). *Spontaneous integration between the representation of non-symbolic and symbolic.* Cognitive Neuroscience Society, New York, U.S.

Liu, R., Möhring, W., & Libertus, M. (2015). *The ratio and orientation effect in infants' and adults' speed discrimination.* Ninth Biennial Meeting of the Cognitive Development Society, Columbus, Ohio, U.S.

Liu, R. (2011). *Driving angry behavior of drivers in Mainland China and Germany.* The 13th National Academic Congress of Psychology, Shanghai, China.

Liu, R. (2009). *A comparative study on Chinese applicants' impression management in the interviews of Chinese and American Enterprises.* The 2nd Forum of Social science, Shanghai, China.

TEACHING

University of Pittsburgh

Spring 2020	Instructor, Cognitive Psychology Laboratory (PSY 0423, undergraduate level)
Spring 2017	Instructor, Cognitive Psychology Laboratory (PSY 0423, undergraduate level)
Fall 2016	Teaching assistant, Cognitive Psychology (PSY 0422, undergraduate level)

Beijing Normal University

2011	Teaching assistant, Experimental Psychology (undergraduate course)
Fall 2011	Teaching assistant, Evidence Based Psychotherapy (graduate course)
Fall 2010	Teaching assistant, Advances in Psychology (graduate course)

MENTORING

University of Pittsburgh

09/2014 – 04/2020	Honors Thesis advisor (Joy Cui, Melanie Matyi, Sierra Struble, Ashley Whited, and Onnaleah Trentini, Dept. of Neuroscience)
	Undergraduate research mentor (Dept. of Psycholgy: Trevor Zwaan; Dept. of Neuroscience: Onnaleah Trentini, Joy Cui, Sarah Lazzaro, Gabby Simon, Ashley Whited, Lydia Grubic, and Rebecca Laher; College of Business Administration: Kian Tabatabai)

Professional Service

Ad hoc Manuscript Reviewer

Brain Structure and Function
Neuropsychologia
Developmental Cognitive Neuroscience
Cognitive Science
Cognitive Processing

PROFESSIONAL SKILLS

Programming and data analysis

Python, R, BASH, Matlab, Pytorch

EEG, ERP, and ECoG data analysis

EEGLab, ERPLab, MNE, FieldTrip

fMRI data analysis

SPM, FSL, AFNI, NIPY

MRI and MRS data acquisition

GE MR 750 system