

Ruyi Liu

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PERSONAL STATEMENT

MA student in the Institute of Brain and Psychological Sciences of Sichuan Normal University in China, with 2.5 years of experience in visual working memory (VWM) research and two published English papers, trained with EEG data collection & analysis lessons and visual attention-working memory symposiums, participating in projects on the retro-cue benefit (RCB) effect/memorability/emotion effect in visual working memory field which brings me capability of behavioral/EEG experiment program coding, data collection, and data analysis.

EDUCATION

MA in Psychology 2021.9 — 2024.7

Sichuan Normal University (SCNU)

Dissertation title: “Negative emotional state impairs individuals' ability to filter out distractors from VWM: An ERP study”. In this study, we induced participants' neutral (as baseline) or negative emotional state before filtering VWM tasks and recorded the EEG data during tasks. The contralateral delay activity (CDA) was analyzed to directly observe the amount of representations held in VWM. Results showed that the CDA amplitude was higher in the distractor condition with two targets and two distractors in the memory array than in the low-load condition with two targets when participants were induced into a negative emotion states, but this difference disappeared when they were in a neutral emotional state. These results indicate that the negative emotional state impairs distractor filtering process in VWM.

GPA: 3.5/4

BA in Law, *International relations* 2015.9 — 2019.7

Peking University (PKU)

GPA: 3.54/4

RESEARCH EXPERIENCE

Research Assistant of Ye's Lab, SCNU 2022.09 — present

- Focus on visual working memory and its interaction with attention or emotion.
- Act as main member of four projects (details shown in following parts).
- Assist in an ERP study on memorability. Responsible for program coding in E-prime, data collection (60+), EEG data analysis via Matlab, visualization via OriginLab, and Method writing.
- Assist in a behavioral study on familiarity. Responsible for data collection (50+), analysis via JASP, and visualization.

- Have extensive experience in manuscript writing and revising according reviewers' suggestion. Finish four manuscripts (three published and one in press) and prepare for another.

Main Member of Double Feature-based RCB Project

2022.03 — present

- Manipulate the amount of retro-cues (0 - 2) and the task difficulty to examine the existence of double RCB for features in VWM. Results support for the existence of double feature-based RCB, and furthermore, the VWM improvement of refocused attention shows no difference from that of focused attention for features.
- Assist in experiment design and data collection (40+). Responsible for data analysis, visualization, conceptualization, original draft writing, review and editing. Organize the accomplishment of Introduction & Discussion parts of manuscripts with two collaborators.
- Attend Working Memory Symposium 2023 (online) to present a talk on this research.

Main Member of Negative Emotional State Effect on Filtering Project

2022.04 — 2023.12

- Manipulate participants' emotional state and the memory condition (2 targets vs. 2 targets and 2 distractors vs. 4 targets) with recording of EEG data to examine the influence of negative emotional state on filtering in VWM. CDA (an ERP component) results indicate that the negative emotional state impairs filtering in VWM.
- Responsible for formal data analysis, visualization, conceptualization, original draft writing, supplementary writing and revising, review and editing.
- Publish a paper in *Cognitive, Affective, and Behavioral Neuroscience* (in press) as the second author.

Main Member of Requirement of Sustained Attention in Feature-based RCB Project

2022.12 — 2023.04

- Manipulate the appearance of interruption after retro-cues, the cue-to-interruption stimulus onset asynchrony, and the type of interruption (masks, a secondary task) to examine the requirement of sustained attention on target feature in the feature-based RCB. Results indicate that sustained attention is necessary to effectively prioritize representations of a feature (dimension) in VWM.
- Assist in experiment design and data collection (20+). Responsible for formal data analysis, model fitting of data via Matlab, visualization, conceptualization, original draft writing, supplementary writing and revising, review and editing.
- Publish a paper in *Journal of Vision* (2023.05) as the co-first author.

Main Member of Integration Phase of Real-world Object Project

2021.11 — 2022.08

- Manipulate the spatial regularity and the presentation condition (sequential vs. simultaneous) to examine whether VWM integrates real-world objects with spatial regularities in the maintenance phase. Results indicate that real-world objects in VWM are grouped according spatial regularities in the encoding phase rather than in the maintenance phase.
- Assist in experiment design, experiment coding and data collection (20+). Responsible for formal data analysis, visualization, conceptualization, original draft writing and revising, supplementary writing and revising, review and editing.
- Publish a paper in *Journal of Vision* (2022.09) as the co-first author. Attend Visual Science Society 2022 (online) to present a talk on this research.

PUBLICATIONS

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1. **Liu, R.**, Guo, L., Cheng, Y., Li, Q., & Ye, C. (2022). The Representation Unit of Visual Working Memory. *Advances in Psychology*, 12(3), 868-875. <https://doi.org/10.12677/AP.2022.123103> (Chinese Journal)
 2. **Liu, R.(co-first author)**, Guo, L.(co-first author), Sun, H., Parviainen, T., Zhou, Z., Cheng, Y., Liu, Q., & Ye, C. (2023). Sustained attention required for effective dimension-based retro-cue benefit in visual working memory. *Journal of Vision*, 23(5), 13. <https://doi.org/10.1167/jov.23.5.13>
 3. Liu, X. (co-first author), **Liu, R. (co-first author)**, Guo, L., Astikainen, P., & Ye, C. (2022). Encoding specificity instead of online integration of real-world spatial regularities for objects in working memory. *Journal of Vision*, 22(9), 8. <https://doi.org/10.1167/jov.22.9.8>
 4. Cheng, Y., Guo, L., Zhou, Z., **Liu, R.**, Li, Q., & Ye, C. (2022). The Influencing Factors of Retro-Cue Effect in Visual Working Memory. *Advances in Psychology*, 12(04):1079-1087. <https://doi.org/10.12677/AP.2022.124128> (Chinese Journal)
 5. Li, Q., Guo, L., Zhou, Z., **Liu, R.**, Cheng, Y., & Ye, C. (2022). The Performance Difference of Visual Working Memory between Various Emotional Faces. *Advances in Psychology*, 12(05):1638-1646. <https://doi.org/10.12677/AP.2022.125196> (Chinese Journal)
 6. Ye, C., **Liu, R.**, Guo, L., Zhao, G., & Liu, Q. (2023) A negative emotional state impairs individuals' ability to filter out distractors from working memory: An ERP study. *Cognitive, Affective, and Behavioral Neuroscience*. (in press)
 7. **Liu, R.**, Guo, L., Lin, X., Astikainen, P., He, G., & Ye, C. (2022) A re-attended feature of visual information exists in working memory. (in preparing, preprint: <https://osf.io/dwep5>)

CONFERENCE & CAMP PRESENTATIONS

Visual Science Society 2022, online, April 2022.

- Present a talk claiming that real objects are grouped according spatial regularities in the encoding rather than maintenance phase of visual working memory.

Attention Bias Summer Camp, online, May-June 2023.

- Assist Prof. Hong-jin Sun (Associate Professor, Department of Psychology, Neuroscience & Behaviour, McMaster University) for this summer camp.
- Present three lectures on attention and its interaction with working memory, and organize the symposium among attendees, including undergraduate students in McMaster University and graduate students in several universities in China.

Working Memory Symposium 2023, online, June 2023.

- Present a talk claiming that the refocused feature is memorized not worse than the focused feature in visual working memory, and therefore probably without an attention shift cost, examined with a double retro-cue paradigm.
- Exchange ideas on possible explanations and potential revision of experiments with attendees.

Psychonomic Society's 64th Annual Meeting, California, USA, November 2023.

- Prepare posters and manuscripts for presentation of our experiments showing that the retro-cue benefit for features require sustained focused attention on target representations in visual working memory.

HONORS & AWARDS

- Third-class Academic Scholarship (for 20% graduate students), Sichuan Normal University, 2021
- President's List (for 20% graduate students), Sichuan Normal University, 2022
- Merit Student (for top 5% students), Sichuan Normal University, 2022
- President's List, Sichuan Normal University, 2023

LANGUAGE & SKILLS

- English: Fluent for academic use. IELTS: 7.5/9 (listening 8.5, reading 9.0, writing 6.0, speaking 6.0).
- Mandarin: Native.
- E-prime: Coding two behavioral experiments with recall tasks and one EEG experiment with a change detection task.
- PsychoPy: Coding one experiment with a coding task and a dot probe task.
- SPSS & JASP: Conducting ANOVA, classical or Bayesian *t*-test, correlation, and Logistic regression analysis.
- Matlab: Using eeglab to analyze EEG data.

REFERENCES

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