

Chang-Mao Chao

Assistant Professor

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Department of Psychology

National Chung Cheng University

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EMPLOYMENT, TRAINING, & EDUCATION

Aug 2024 – present. Assistant Professor, National Chung Cheng University, Psychology Department

Aug 2023 – June 2024. Post-Doctoral Research Fellow, University of California Riverside, Psychology Department. Advisor: Dr. Ilana Bennett

Oct 2020 – Jul 2023. Post-Doctoral Research Fellow, University of Notre Dame, Psychology Department. Advisor: Dr. Nathan Rose

Sept 2015 – Mar 2020. PhD Student, Psychology, Durham University Psychology department, Advisor: Dr. David Sanderson, Dr. Anthony McGregor, Dr. Amanda Ellison

Feb 2014 – Feb 2015. Research Assistant, Institute of Cognitive Neuroscience, National Central University, Taiwan. Advisor: Dr. Chi-Hung Juan

Jan 2013 – Jan 2014. Staff sergeant / Squad Leader, Armored cavalry Battalion (military service in Taiwan)

Sept 2010 – Jun 2012. MA, Neuroscience, National Yang-Ming University, Taiwan
Advisor: Dr. Chou Po Hung

Sept 2007 – Jun 2010. Research Assistant, Institute of Cognitive Neuroscience, National Central University, Taiwan. Advisor: Dr. Chi-Hung Juan

Sept 2006 – Jun 2010. BA, Biology, Biology Department, National Central University, Taiwan

RESEARCH INTERESTS

- Cognitive psychology / neuroscience of attention, memory, learning & aging
- Associative memory, working memory, episodic memory, eye movement

RESEARCH TECHNIQUES

- Transcranial magnetic stimulation (TMS), Transcranial direct-current stimulation (TDCS), Eye-tracking, Functional Magnetic resonance imaging (fMRI), fMRI combined with eye tracker, Monkey surgery techniques, Multi-electrode arrays recording. Electroencephalogram (EEG), MRI-Guided TMS with simultaneous EEG, ERP, Online data collection (Python to Java Scripts)
- Matlab, Python, MNE, PsychoPy, R, E-Prime, SPSS

PUBLICATIONS

1. **CM Chao**, C Xu, J.D. Koen, N.S. Rose. Neural and Behavioral Differences in Working Memory Updating Between Younger and Older Adults: An EEG Decoding Study (2024, in preparation)
2. C Xu, **CM Chao**, J.D. Koen, N.S. Rose. Neural Correlates of Cognitive Decline: Linking EEG Patterns in Working Memory Updating Tasks to Alzheimer's Disease Biomarkers (2024, in preparation)
3. **CM Chao**, A. Sun, J. Langley, A.R. Seitz, X. Hu, I.J. Bennett. Estimating a Neurometric Function of Perceptual Discrimination Using Multivariate Pattern Analysis (2024, in preparation)
4. **CM Chao***, C Xu*, N.S. Rose. A Dual Mechanisms of Control Account of Age Differences in Working Memory (2024, accepted, Psychology and Aging, see the pre-registration <https://osf.io/snfzb/>)
5. **CM Chao***, C Xu*, N.S. Rose. Are latent working memory items retrieved from long-term memory? (2023, accepted, QJEP, see the pre-registration <https://osf.io/z9cgq/>)
6. Rose, N. S., & **Chao, CM.** (2022). Hippocampal involvement in working memory following refreshing. *Cognitive Neuroscience*, 13(3-4), 215-217.
7. **CM Chao**, D.J. Sanderson, A. McGregor. Uncertainty and Predictiveness Modulate Attention in Human Predictive Learning (2021). *Journal of Experimental Psychology: General*.

8. P. Tseng, HY. Chiau, CL. Liu, TY Hsu, CF Chang, **CM Chao**, WK. Liang, CH. Juan* (2012). Neural Mechanisms of Implicit Visual Probability Learning. *Chinese Journal of Psychology*, 54(1), 115-131.
9. **Chao CM**, Tseng, P., Hsu, TY, Su JH, Tzeng, OJL., Hung, DL., Muggleton NG, Juan, CH. Juan* (2011). Predictability of saccadic behaviors is modified by transcranial magnetic stimulation over human posterior parietal cortex. *Human Brain Mapping*,32(11),61-72

FUNDS & AWARDS

1. Government Scholarship to Study Abroad (GSSA) from Taiwan (2017/6/1 – 2019/5/31, ~\$ 44000)
2. National Science Council (NSC97 - 2815 - C - 008 - 046 - H) (2010 – 2011, ~\$ 4000)
Project: Exploring the functional roles of human frontal eye fields and temporoparietal junction in visual selection and saccadic behaviours.
3. National Science Council (NSC98 - 2815 - C - 008 - 035 - H) (2009 – 2010, ~\$ 4000)
Project: Using a novel behavioral paradigm and a stochastic model to investigate the saccadic latencies in pro-saccade and anti-saccade.

CONFERENCE POSTERS & TALKS

1. Neural and Behavioral Differences in Working Memory Updating Between Younger and Older Adults: An EEG Decoding Study. (2024) J Fragetta, C Xu, **CM Chao**, Z Xie, D Henrickson, N.S. Rose. Society For Neuroscience. (Poster)
2. Neural Correlates of Cognitive Decline: Linking EEG Patterns in Working Memory Updating Tasks to Alzheimer's Disease Biomarkers. (2024) C Xu, J Fragetta, **CM Chao**, Z Xie, D Henrickson, N.S. Rose. Society For Neuroscience. (Poster)
3. Brain and Behavioral Differences in Working Memory Updating Between Healthy Young and Old Adults. (2024) J Fragetta, M Benitez, **CM Chao**, Z Xie, C Xu, D Henrickson, N.S. Rose. Cognitive Neuroscience Society (Poster)

4. Do Indices of Working Memory Updating from Behavioral and Neural Data Differ between Healthy Older Adults with vs. without Biomarkers of Alzheimer's Disease? (2023) **CM Chao**, J.D. Koen J.D., Z Xie, C Xu, N.S. Rose. Dallas Aging and Cognition Conference (Poster)
5. Neural and Behavioral Measures of working memory updating in Healthy Older Adults with Alzheimer's Disease Biomarkers (2022). **CM Chao**, J.D. Koen J.D., Z Xie, C Xu, N.S. Rose. Psychonomic Society Conference (Poster)
6. A Dual Mechanism of Cognitive Control Account of Age Difference in Working Memory (2022). **CM Chao**, C Xu, N.S. Rose. Psychonomic Society Conference (Poster)
7. Working memory updating in Healthy Older Adults with Alzheimer's Disease Biomarkers: Neural and Behavioral Measures (2022). **CM Chao**, J.D. Koen J.D., Z Xie, C Xu, N.S. Rose. Visual Working Memory Symposium (Talk)
5. Effects of reactivating latent working memory on age differences in working memory and subsequent long-term memory (2021). **CM Chao**, N.S. Rose. Visual Working Memory Symposium (Talk)
6. The effects of learned predictiveness and uncertainty on attention depend on task difficulty (2018). **CM Chao**, D.J. Sanderson, A. McGregor. 30th Annual International Conference of The Spanish Society For Comparative Psychology (Talk)
7. Attentional Exploration and exploitation of predictive cues may depend on task difficulty (2018). **CM Chao**, D.J. Sanderson, A. McGregor. Associative Learning Symposium XXII (Talk)
8. Attentional Exploration and exploitation of predictive cues may depend on task difficulty (2017). **CM Chao**, D.J. Sanderson, A. McGregor. East, North, and East Midlands Associative learning group meeting (Talk)
9. Exploring the Role of Attention in Associative Learning (2017). **CM Chao**, D.J. Sanderson, A. McGregor. Postgraduate Conference Durham (Talk)
10. Lateral feature-level interactions in anterior visual cortex of monkeys and humans. (2014).

CP Hung, **CM Chao**, YC Hsu, LF Yeh, YP Chen, CP Lin. Computational and Systems Neuroscience 14 (poster)

11. Monkey neuronal assemblies predict (across objects) human fMRI and behavior. (2013)

CP Hung, **CM Chao**, LF Yeh, Y Chen, C Lin, Y Hsu, D Cui Vision Sciences Society 13 (9), 1004-1004ster)

12. Key object feature dimensions modulate texture filling-in. (2012). **CM Chao**, LF Yeh, CP Hung. Vision Sciences Society 12 (9), 1063-1063 (poster)

13. Predictability of saccadic behaviors is modified by transcranial magnetic stimulation over human posterior parietal cortex. (2010) **Chao CM**, Tseng, P., Hsu TY, Juan, CH* Asia-Pacific Conference on Vision 10 (poster)

REVIEWERSHIP

-Peer Reviewed Journal:

Journal of Cognition

PLoS One

Journal of Experimental Psychology: Learning, Memory, and Cognition

Memory & Cognition

Journal of Experimental Psychology: Animal Learning and Cognition

Quarterly Journal of Experimental Psychology

Psychology & Aging