From noise to insight: the functional role of BOLD signal variability and aperiodic neural activity in metacontrol

Zhang, C.

Curriculum Vitae

Chenyan Zhang was born on December 9, 1992, in Linzhou, Henan province, China. In 2011, she graduated from Linzhou No.2 High School with her high school diploma. Thereafter, she studied psychology at Henan University, obtaining her bachelor's degree in 2015. Chenyan then started her master's program at Southwest University, investigating the cognitive and neural mechanisms underlying delay-discounting and procrastination. She received her master's degree in 2018. In the same year, Chenyan started her Ph.D. at Leiden University under the supervision of Prof. Bernhard Hommel. Initially, her research focused on the effects of ego depletion on the dynamic of metacontrol. However, failures in replicating the ego-depletion effect prompted a shift in her research to explore the relationship between neural "noise" and metacontrol bias toward persistence or flexibility. This investigative path forms the core of her doctoral thesis, with the findings outlined therein.

List of Publications

Articles published:

Zhang, C., Stock, A.K., Mückschel, M., Hommel, B., & Beste, C. (2023). Aperiodic neural activity reflects metacontrol. *Cerebral Cortex*, 33, 7941–7951.

Zhang, C., Beste, C., Prochazkova, L., Wang, K., Speer, S.P.H., Smidts, A., Boksem, M.A.S., & Hommel, B. (2022), Resting-state BOLD signal variability is associated with individual differences in metacontrol, *Scientific Reports* 12: 18425.

Zhang, C., Ni, Y., & Feng, T. (2017). The effect of regulatory mode on procrastination: Bi-stable parahippocampus connectivity with dorsal anterior cingulate and anterior prefrontal cortex. *Behavioural Brain Research*, 329, 51-57.

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Zhang, S., Verguts, T., **Zhang, C.**, Feng, P., Chen, Q., & Feng, T. (2021). Outcome value and task aversiveness impact task procrastination through separate neural pathways. *Cerebral Cortex*.

Chen, Z., Liu, P., **Zhang, C.**, Yu, Z., & Feng, T. (2021). Neural markers of procrastination in white matter microstructures and networks. *Psychophysiology*.

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Chen, Z., Feng, P., Becker, B., Xu, T., Nassar, M. R., Sirois, F., Hommel, B., **Zhang, C.**, He, Q., Qiu, J., He, L., Lei, X., Chen, H., & Feng, T. (2021). Neural connectome prospectively encodes the risk of post-traumatic stress disorder (PTSD) symptom during the COVID-19 pandemic. *Neurobiology of Stress*, 15, 100378.

Chen, Z., Liu, P., **Zhang, C.**, & Feng, T. (2019). Brain Morphological Dynamics of Procrastination: The Crucial Role of the Self-Control, Emotional, and Episodic Prospection Network. *Cerebral Cortex*.

Articles submitted:

Zhang, C., Zhang, W., Beste, C., & Hommel, B. How to think out of the box: Aperiodic neural activity predicts divergent thinking.

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In the challenging third year of my Ph.D., as my initial project on ego depletion was on the brink of being deemed a failure, I experienced many sleepless nights filled with worry about the possibility of completing my degree. The question of whether, how, and when I could complete my Ph.D. recurred over and over again. During these moments of doubt and frustration, the encouragement and assurance from my supervisor, Bernhard – "we will find a solution" brought me hope and encouraged me to keep moving forward.

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