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Topic:

Visual Short-Term Memory Binding Performance in Physiological Aging and Pathological Aging

Abstract:

Our world has entered an aged society including Taiwan. The burden of caring the aged and age-related diseases has become a major public health issue. The medical society and scientists together have put immense efforts to investigate therapeutic methods and interventions to prevent or to halt the progression of Alzheimer's disease. However, the results are limited and almost 99% of therapeutic clinical trials report failure.

Cognitive decline is attributed to the natural course of physiological aging. Prior studies demonstrate a performance deficit across varied cognitive tasks and the relevance of brain wave biomarkers amongst the physiologically aged population. Essential to our routine life is a cognitive construct, the Visual Short Term Memory (VSTM) which the Alzheimer's patients show deficit of. However, studies that reports cognitive tasks or brainwave signatures to demarcate physiological and pathological aging are limited.

In an effort to elucidate the demarcation between physiological and pathological aging, we utilize a modified version of the Binding task (Parra et al., 2010) in our current study to assess the cognitive performance of individuals from healthy young, healthy old and old-diseased demographics.

The preliminary results from our study indicate a cognitive decline amongst the healthy individuals with increase in their age. Whereas, when the older healthy participants

were compared across their age-matched MCI and AD patients, the AD patients performed significantly poorer relative to the older healthy adults.

田昕平

Title: Imagery and Execution of Force Control Are Better Matched under the Feedback of Where than What

### Abstract

Motor imagery (MI) refers to the mentally representing a movement without overt execution. It is widely used in athletic training, rehabilitation, and brain computer interface. A dominant theoretical view of MI, functional equivalence, assumes that MI and the actual motor execution (ME) are identical in their neural representations and the functional principles. However, previous studies examining the equivalence between MI and ME have reported inconsistent findings. The present study aims to compare MI and ME in a force control task that requires minimal movements of one's body parts, which greatly reduces the complexity of control during performance. Participants were instructed to modulate the amount of force which their index finger applied on a force plate for various cycles or merely imagine the process. Impacts of visual feedback in the format of applied were contrasted. The results are generally consistent with the view of functional "what" (non-spatial) and "where" (spatial) that reflect the amount of force equivalence between MI and ME, but the timing of MI as a function of cycles performed tends to match that of ME less well when "what" information served as the visual feedback than "where". We suspect that "where" information is more closely integrated with force control than "what" information. Future studies should examine whether force control without visual feedback is also tightly linked to spatial representation, and further explore the functional equivalence

between MI and ME under more varieties of circumstances.

郭銘柔

Title: Does episodic simulation help prospective memory?

*Abstract*

This study aims to investigate whether episodic simulation could improve event-based prospective memory, under the control of the level of processing. To answer this question, we first replicated the behavioral experiment from a previous study that compared prospective memory performance from episodic simulation condition and phonics-related condition. A group of Chinese speakers was recruited and the experiment was comprised of two conditions, episodic simulation condition and tone generation condition. Each condition contained the encoding phase and prospective memory test phase. According to the results of a 3-way ANOVA, prospective memory performance would be marginally significantly better if the participants encoded the prospective memory cues in episodic simulation condition. Therefore, we successfully replicated the result of the previous study. However, to control the influences from the level of processing, an additional condition that has equal level of processing with episodic simulation is needed. If episodic simulation condition is still better, then the attribution from episodic simulation to prospective memory could be further supported. This issue will be included in further studies.

*Keywords:* event-based prospective memory, episodic simulation, level of processing