The University of Hong Kong
Department of Psychology

Departmental Seminar

Effects of Cognitive Training on Enhancing Verbal and Visual-Spatial Working Memory in Older Adults at Risk of Cognitive Decline: an Interim Analysis

Date: October 16, 2014 (Thursday)

Time: 3:30 p.m. – 4:30 p.m.

Venue: Room 813, 8/F, The Jockey Club Tower, Centennial Campus, HKU

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Aging populations are rapidly expanding and have become a pressing issue around the world. Declines in cognitive function accompanied by aging have exerted a heavy socioeconomic burden on the health care system. Therefore, it is imperative to identify cost-effective strategies that can potentially slow down the rate of age-related cognitive decline, especially in the cognitive domains that are found to be most vulnerable to aging. Increasing research has evidenced that our brain retains a capacity to change in response to experience until late adulthood, suggesting that cognitive training can possibly ameliorate the age-associated cognitive decline. Even though substantial empirical evidence has documented the beneficial role of cognitive training in alleviating the cognitive decline in older adults, it remains uncertain whether older adults who experience greater than normal rate of cognitive decline can also benefit from the cognitive training to a similar extent. To bridge this research gap, we conducted a randomized controlled trial of cognitive training in Chinese older adults (n = 136) at risk of cognitive decline (Study One). We adopted the computerized cognitive training

program grounded in the sensory deprivation model, and modified its content by taking out culturally sensitive materials to accommodate the needs of the local geriatric population. Eligible participants were randomly assigned to either the Cognitive Training (CT) or the Active Control (AC) groups and attended a total of 39 sessions (one hour/day; three days/week) over thirteen weeks of training. Our interim results revealed two significant interaction effects on verbal and visual-spatial working memory, indicating that older adults at risk of cognitive decline can also take advantage of cognitive training. Specifically, participants in the CT demonstrated significant improvements in their verbal and visual-spatial working memory following the training. Based on the findings acquired from Study One, we conducted further regression analyses to explore whether the training-associated changes in verbal and visual-spatial working memory could be better explained by the sensory deprivation model or the processing speed model (Study Two). Whereas the sensory deprivation model postulates that degraded sensory inputs lead to cognitive deterioration, the processing speed model proposes that cognitive processing speed is at the root of the higher-order cognitive operations. Inconsistent with our hypothesis, our preliminary results showed that changes in cognitive processing speed significantly predicted changes in visual-spatial working memory only in the CT but not in the AC group, indicating that the relationship between cognitive processing speed and visual-spatial working memory was training-specific. Interestingly, changes in cognitive processing speed did not significantly predict changes in verbal working memory in either CT or AC groups, suggesting that cognitive processing speed might exercise differential effects on different modalities of cognitive function. To conclude, the findings in our studies seem to suggest that training-associated changes in visual-spatial working memory cannot be solely accounted for by the sensory deprivation model, even though it is the theoretical basis of our cognitive training. Instead, they provide an insight that cognitive processing speed perhaps is a potential candidate for cognitive training in the geriatric population.