

**Brown Bag Lunchtime Seminar**  
**(Theme: Cognition and Neuroscience)**

**Perceptual Learning and Plasticity in the Aging Binocular Visual System**

12:30 p.m. – 1:30 p.m. | November 10, 2023 (Friday)  
Rm 813, 8/F, The Jockey Club Tower | Centennial Campus | The University of Hong Kong



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**Abstract**

Visual ability declines with age. Much of this decline is due to changes in the central nervous system (CNS) rather than in the sensory organs. Depth perception is one capacity that has been documented to decline with age. Perceptual learning has been found to be effective in improving visual function in younger and older observers. The present study aims to explore the effectiveness of perceptual learning in improving depth sensitivity of older observers, thereby potentially mitigating age-related decline.

In Experiment 1, we tested older (aged 60-80) and younger (aged 18-38) participants with normal visual and cognitive abilities on two depth task variants (a signal-in-noise, SNR task, and a fine disparity discrimination, fine task) before and after training on either one or none of the tasks. Both tasks required observers to judge whether a central target was in front (near) or behind (far) of the surround. Task difficulty was manipulated by adjusting the proportion of dots defining the central target versus a random disparity (SNR task), or the disparity difference between the center and surround (fine task). Results showed that while older observers had worse performance in comparison to the younger observers across all tasks, they exhibited a similar pattern of behavioural improvements as well as the transfer of learning, as for younger observers.

In Experiment 2, older and younger observers were tested on the SNR depth task along with a novel contrast discrimination task before and after training on either one of the tasks with stimuli presented in a 'fine' configuration. Neural responses were concurrently imaged using functional magnetic resonance imaging (fMRI). Results from the multi-voxel-pattern analysis revealed that neural response patterns to the two tasks changed in both older and younger observers, particularly in early visual areas v1, v2, and dorsal area of v3. These findings suggest that the aging brain retains a considerable degree of plasticity and can benefit from perceptual learning (at least in a stereoscopic context), as for younger brains.

**About the speaker**

Ng Chung Hei is a final-year MPhil candidate under the supervision of Dr. Dorita Chang.

**Zoom (For participants who couldn't attend the Seminar in person)**

<https://hku.zoom.us/j/3951550048?pwd=SncvL3RYakEycUtpL29vdDJEdlEwdz09>

Meeting ID: 395 155 0048 | Password: psyc



**~All are Welcome~**

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