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The effects of acute resistance and aerobic exercise modes on cognitive performance in the elderly with mild cognitive impairment

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Background: Although a number of studies have demonstrated that aerobic exercise can effectively enhance cognitive performance in the elderly with mild cognitive impairment (MCI), thus far, no research has yet been conducted on the effects of resistance exercise on cognitive performance.

Purpose: The present study aims to investigate the effects of an acute exercise intervention with 2 different exercise modes (i.e., resistance and aerobic exercises) on cognitive performance when performing a task-switching paradigm.

Methods: Thirty-six elderly people with MCI were recruited and randomly assigned to a resistance exercise (RE) group (n=12), aerobic exercise (AE) group (n=12), and non-exercise-intervention (control) group (n=12). Cognitive performance was measured when individuals performed a task-switching paradigm at baseline and after either an acute bout of 30 minutes of moderate-intensity RE, AE, or a control period.

Results: Although neither acute exercise mode could enhance the accuracy rates in the homogeneous condition nor RE and nor AE groups showed significant improvements in the heterogeneous condition (RE: pre- vs. post-exercise=84.43±8.03% vs. 89.38±6.39%, p=0.003; AE: pre- vs. post-exercise=87.78±6.56% vs. 94.35±4.65%, p=0.001). Reaction times were significantly faster after compared to before acute exercise in both RE and AE groups in the homogeneous (RE: pre- vs. post-exercise=620.39±68.77 vs. 571.92±64.03 ms, p=0.001; AE: pre- vs. post-exercise=626.099±99.76 vs. 580.10±66.07 ms, p=0.018) and heterogeneous (RE: pre- vs. post-exercise=1294.13±395.84 vs. 1027.47±276.72 ms, p<0.001; AE: pre- vs. post-exercise=1606.41±608.70 vs. 1315.60±435.77 ms, p=0.001) conditions.

Conclusions: The findings suggest that not only acute RE but also AE exercise modes could benefit the executive functioning in the elderly with MCI. Practical Application: Some evidence shows that aerobic training can attenuate the cognitive degeneration in the elderly with MCI. However, the present study also demonstrated that resistance exercise seems to produce comparable benefits to those seen with aerobic exercise for the elderly with MCI, suggesting that such an exercise mode may also have non-pharmacological protective effects on the functional integrity of the MCI patients' brains and cognition.

Biography

Chia-Liang Tsai (Andy Tsai) is a distinguished professor of Institute of Physical Education, Health & Leisure Studies in the National Cheng Kung University for cognitive neurophysiology laboratory. Professor Tsai received his Ph.D. from the National Taiwan Sport University in 2005 with a research focus on exercise medicine and health promotion. He has published extensively in two areas of cognitive neuroscience across the life span: One with emphasis on children with motor difficulties, and a second focus on the effects of exercise intervention on neurocognitive and biochemical performances. Dr. Tsai holds vice-president status in the Taiwan Adapted Physical Activity Society and is a director in the Asian Society for Adapted Physical Education. Professor Tsai teaches and does research in the areas of exercise and neurocognitive performance, exercise and aging, exercise prescription, developmental disabilities, and the foundational aspects of the field of kinesiology.

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