The Relationship between Neurocognitive Function, Physical Activity and the APOE Gene.

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Introduction

Aging is a natural process that involves a decline in both cognitive and motor skills. Physical activity, however, has been implicated in having positive effects on the natural decline in neurocognitive function due to aging. Impairment of cognitive processes includes a deterioration of executive functioning ability, which is also associated with dementia. Apolipoprotein E is a genetic precursor for dementia. This study will evaluate the impact of physical activity on executive function for individuals with a genetic risk for dementia.

Eriksen Flanker Paradigm

The flanker paradigm is one in which participants are required to inhibit or filter misleading information provided by incongruent flanking cues. Participants were presented with a series of five arrows (preceded by a fixation cue) and were asked to respond to the direction to which the middle arrow was facing. Successful performance of this task requires invocation of selective spatial attention and inhibition of peripheral flanking cues.

Discussion

Physical activity showed no significant relationship to RT between carriers or non-carriers of APOE ε4 gene. However, age and education played a significant role in moderating RT performance. Aging is a natural process that contributes to decreased executive function performance. Education contributes to individual cognitive reserve, which affects individual performance on cognitive tasks. Participants were part of a high functioning/highly educated cohort. As such, education may mask the positive benefits of reduced RT that previous research has indicated physical activity provides.

Expectations

Methods

Participants were middle aged (50-70) cognitively normal adults. Genotype was determined for each participant and DNA was extracted via restriction digest. Each participant was administered the Cambridge Cognitive examination to confirm cognitive status. Each participant was administered the Yale Physical Activity survey to determine their level of physical activity. Two versions of the Eriksen Flanker test (one taken under MEG observation) were administered to each participant to assess their level of executive function. A hierarchal regression was performed against age, level of education, genotype, and weekly caloric expenditure.

References

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