Assessing the effect of exercise on dual-task cognitive impairment in patients with Parkinson's disease
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Introduction

- Parkinson’s disease (PD): progressive neurodegenerative disease
  - Causes death of dopamine neurotransmitters in the brain
  - Leads to loss of ability to perform motor and non-motor functions

- Difficulty performing secondary motor or cognitive task (Bond and Morris, 2000)
- Forced exercise (Ridgel et al., 2009) show improvements in motor symptoms
- Exercise helps with cognitive performance in Parkinson’s animal models (Cho et al., 2013; Goes et al., 2014)

Objectives

- Further investigate methods to combat non-motor symptoms of PD.
- Focus specifically on the memory component of the cognitive impairment.
- Assess the effects of riding an exercise bike on memory impairment.
- Explore which part of the memory is impacted, semantic memory, episodic memory, or both?

Participants

- PD patients and baseline population

Materials

- Exercise bike

Methods

Research participants will ride an exercise bike and paddle at their preferred speed while being shown images of different context scenes

- Partial-context scene (Hemmer et al., 2014)

An image of partial-context, semantically organized, scene used to test the influence of semantic memory

- Random context scene (Hemmer et al., 2014)

An image of random context, little association between objects, is used to estimate episodic memory

Procedure

- Pretest: 5 images shown; 2 partial-context scene and 3 random context scene (Vice versa)
- Instructed to encode information for 5 seconds.
- Distractor cognitive task given for 5 seconds (count backward from # 30).
- Participants asked to recall via microphone
  - Voice recording are diagnostic of motor impairments (Tsanas et al., 2010)
- Test: Same experiment as pretest; participants are riding the bike.
  - Changes:
    - 5 different images used
    - Different distractor cognitive task given (start the alphabet from the letter given)

Anticipated Results/Future Directions

- High recall for partial-context scene, due to the influence of semantic memory, than random context scene
- PD patients show greater memory impairment than the baseline population
- Riding exercise bike helps dual-cognitive impairment in PD patients
- Examine how the influence of resistance, minimal to maximal, on exercise bike effects memory impairment using same tasks
- To understand the role of speech impairment while performing a dual-cognitive task

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References