CARDIAC AUTONOMIC REGULATION AND COGNITIVE CONTROL IN OLDER AND YOUNGER ADULTS
Lesley J. Capuana, Jane Dywan, Raechelle M. Gibson, Sidney J. Segalowitz
Department of Psychology, Brock University, St. Catharines, Ontario, Canada

BACKGROUND

- Respiratory sinus arrhythmia (RSA) is an index of cardiac autonomic control and should be advantageous for cognitive control performance.
- Older adults demonstrate declines in both cognitive and cardiac autonomic control, but little is known about the link between them.
- Data has shown that RSA does not relate to cognitive control for all tasks
- We proposed that relations between RSA and cognitive control would be more evident when the task depended on the more metabolically-costly proactive rather than reactive cognitive control strategies.

PRESENT STUDY

We recorded pre-task RSA in older and younger adults and examined its relationship with accuracy on a Stroop paradigm that involved responding to lures designed to elicit either a "proactive" or "reactive" response strategy.

METHODS

Participants
- 23 younger adults (18 women, M = 20.0 years)
- 22 older adults (17 women, M = 68.0 years)

Procedure
- Participants completed the 3 Stroop tasks (Basic, Memory, Super Memory)
- Each version was completed twice
  - Standard Phase
  - Incentive Phase
    - Received 30 points for correct responses
    - Lost 120 points for errors and lost points for responding too slowly
    - Points converted to money ($5 - $15) on completion of task

Main Findings

- Lures that could benefit from the use of a proactive strategy (i.e., memory & super memory contingency lures) elicited faster and more accurate responses than those more dependent on a reactive strategy (i.e., incongruent lures).
- Higher levels of pre-task RSA were strongly and consistently associated with responses involving proactive control (i.e., memory & super memory contingency lures), especially for older adults.
- These findings support a model of neurovisceral integration that links cardiac autonomic control and cognitive performance.
- They also indicate that cardiac autonomic control is most relevant when performance relies on the use of proactive control, i.e., a cognitive control strategy that involves the sustained, active maintenance of goal representations over time and, as a result, represents a more resource-demanding and metabolically-costly operation.

CONCLUSIONS