

The relationship between cardiorespiratory fitness and executive functions in older adults using different fitness assessment

Predovan D. ^{1,2}, Lussier M. ^{1,2}, Berryman, N. ^{1,3}, Brouillard, P. ^{1,4}, Vu T.M.T. ^{1,5}, Villalpando J.M. ¹, Bherer L. ^{1,6}

¹ Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal ² Université du Québec à Montréal ³ Bishop's University
⁴ Université de Montréal ⁵ Centre Hospitalier de l'Université de Montréal ⁶ Psychology Department and PERFORM Centre, Concordia University

1 Introduction

- Evidence suggests a link between cardiorespiratory fitness (VO₂ max) and cognition (i.e. executive function) in healthy older adults. As the gold standard to assess cardiorespiratory fitness (VO₂ max) is often difficult to implement, many studies rely instead on estimates. The present study examined whether the aforementioned relation hold true for three different estimation of VO₂ max, namely the Rockport One-Mile Fitness Walking Test, the VO₂ peak test and the Jurca's equation.

2 Method

- Inclusion criteria:** Aged 60 and older, sedentary, MMSE>24, absence of depression (GDS>11), no mobility limitations, no surgery in the past year. N=40 (7M)

Executive functions: **N-Back task** (updating of new information). **Stroop task** (inhibition (suppressing prepotent responses) and switching (from one mental set to another)). **Computerised dual-task paradigm** (Divided attention)

Estimation of VO₂ max: **VO₂ peak** : value *attained* during the test, not necessarily the highest value *attainable*.

Rockport One-Mile Fitness Walking Test : Based on time (s) and Equation. Example for women :

$54.899 - (0.0947 * 2.2046 * \text{Weight}) - (0.3709 * \text{Age}) - (3.9744 * \text{Walk time}) - (0.1847 * \text{Exercise heart rate})$

Jurca's equation : $\text{CRF} = \text{Gender} (2.77) - \text{Age} (0.10) - \text{BMI} (0.17) - \text{RHR} (0.03) + \text{SRPA} + 18.07$, where

RHR = Resting heart rate and SRPA = Self-reported physical activity.

3 Results : Pearson's correlation

	Updating 1-Back Accuracy	Updating 2-Back Accuracy	Stroop Reading RT	Stroop Counting RT	Stroop Inhibition RT	Stroop Switching RT	Simple-Pure RT	Simple-Mixed RT	Dual-Mixed RT	% Task-Set Cost	% Dual-task Cost
VO ₂ peak	-0.161	-.362*	-0.18	-0.179	-0.295	-.436**	-.324*	-0.143	-0.025	0.138	0.27
Rockport Estimation	-0.267	-.512**	-0.255	-0.274	-.331*	-.473**	-.407*	-0.21	-0.074	0.115	0.28
Rockport Time (s)	0.251	.433**	.413*	.443**	.454**	.570**	.551**	0.258	0.031	-0.214	-.457**
Jurca's Estimation	-0.011	-.348*	-0.027	-0.052	-0.175	-.354*	-0.069	0.12	0.142	0.229	0.114

4 Conclusion and discussion

- All estimates correlated with both the performance on the 2-Back task and on the switching condition of the Stroop task. Interestingly, a specific relationship was observed between the performance on the Rockport test and the performance on the divided attention task and the inhibition condition of the Stroop task. The present results suggest that the choice of cardiorespiratory fitness estimate can have an influence on the relationship observed between cardiorespiratory fitness and cognitive performance.

OUR LAB

LESCA
 LABORATOIRE D'ETUDE DE LA
 SANTE COGNITIVE DES AINES
 COGNITIVE HEALTH AND
 AGING RESEARCH LAB

www.lesca.ca

ACKNOWLEDGEMENT

CIHR IRSC
 Canadian Institutes of
 Health Research
 Instituts de recherche
 en santé du Canada

Canadian Institutes
 of Health Research

INSTITUTIONS

**UNIVERSITÉ
 Concordia
 UNIVERSITY**
 Centre PERFORM

LES
 GRANDS
 BALLETS

CENTRE NATIONAL DE
 DANSE-THERAPIE

iugm
 Institut universitaire
 de gériatrie de Montréal

UQÀM

CHUM
 Université de Montréal

CHUM