



University
of Victoria

Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

AMANDA KELLY

BSc (University of Victoria, 2012)

**“On the intraindividual dynamics of blood pressure and cognitive functioning:
An examination of short-term coupling”**

Department of Psychology

Thursday August 13, 2015

1:00pm

Cornett Building

Room B316

Supervisory Committee:

Dr. Scott Hofer, Department of Psychology, University of Victoria (Supervisor)

Dr. Graciela Muniz Terrera, Department of Psychology, UVic (Member)

External Examiner:

Dr. Morgan Price, Division of Medical Sciences, UVic

Chair of Oral Examination:

Dr. Christo Papadopoulos, Department of Electrical and Computer Engineering, UVic

Abstract

While it is now understood that long-standing hypertension is predictive of later cognitive decline and risk for dementia, little research attention to date has focused on whether the short-term dynamics of blood pressure exert immediate influence on cognitive functioning. The present study contributes to this growing field with a conceptual replication and extension of work by Gamaldo, Weatherbee and Allaire (2008). A sample of 27 older adults ($M=70.2$ years) completed daily assessments of blood pressure, psychological stress and cognitive functioning for 14 consecutive days. Multilevel models conditional on demographic factors were applied to simultaneously estimate between- and within-person effects across three metrics of blood pressure (systolic, diastolic and pulse) and five measures of cognitive functioning. To follow a suggestion proposed by Gamaldo *et al.*, the model was extended to include main effect and blood pressure interaction terms for stress at both levels. In secondary analyses, within-person mediation models were applied to explore blood pressure as a mediator between stress and cognition. Results from the first model demonstrated a direct, positive association between occasion diastolic pressure and episodic memory. A cross-level interaction term revealed that processing speed was impaired on high-diastolic pressure days for those with high diastolic pressure on average. We found no evidence that occasion blood pressure mediated the association between stress and cognition. Overall, our results align with the hypothesis that age-related changes to vascular structures impair the carrying capacity of blood vessels and that occasions of increased blood pressure provide additional force to overcome these limitations, delivering larger quantities of blood and oxygen to cerebral tissue. We conclude that upward fluctuations in diastolic pressure may be cognitively beneficial for older adults; diastolic pressure is the most sensitive metric for detection of within-person associations with cognition; and episodic memory and processing speed exhibit sensitivity to occasion blood pressure levels.