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

of

JAMIE KNIGHT

BA (University of Victoria, 2015)

“Olfactory Testing: A Preclinical Biomarker for Alzheimer’s Disease”

Department of Psychology

Thursday, June 1, 2017
1:00PM
Cornett Building
Room B316

Supervisory Committee:
Dr. Andrea Puccinin, Department of Psychology, University of Victoria (Supervisor)
Dr. Mauricio Garcia-Barrera, Department of Psychology, UVic (Member)

External Examiner:
Dr. Brian Christie, Division of Medical Sciences, UVic

Chair of Oral Examination:
Dr. Ray Siemens, Department of English, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

The earliest stage of Alzheimer’s disease (AD) pathology begins in one of the main components of the olfactory pathway, the entorhinal cortex, making deficits in smell a potential prospective biomarker for the early detection of AD. This study contributes to the field with a reproduction and extension of work by Wilson, Arnold, Schneider, Boyle, Buchman, and Bennett (2009). A sample of 1089 individuals (\(M=78.4\) years), more than double the data available in 2009, completed annual assessments of olfactory functioning, and cognitive functioning for up to 18 years with brain donation at death. Mixed effects models conditioned on demographics estimated between and within-person effects in olfactory functioning and episodic memory (EM). After successful reproduction of Wilson et al. (2009), addition of AD pathology (ADP) demonstrated that both ADP and olfaction were significantly related to EM at baseline. Higher ADP at autopsy was significantly related to faster declines in olfaction, as well as more rapid declines in EM. Higher olfactory scores were associated with higher EM scores and a model for EM with olfaction as time-varying covariate indicated that at a given occasion, individuals with higher olfactory scores also have higher EM scores.

These results align with the hypotheses that difficulty in identifying odors predicts development of cognitive impairment; increased levels of AD pathology are related to both decreased EM at baseline and faster declines, as well as faster rates of decline in olfaction; and olfaction and cognition are travelling together over time.

Keywords: dementia, neurodegenerative disease, olfaction, smell, cognitive decline, Alzheimer’s