



**University
of Victoria**

Graduate Studies

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

of

Taryn Berman

BSc (University of Victoria, 2017)

**“Exploring Personality: The Impact of Impulsivity on Decision Making
and Reward Processing”**

Interdisciplinary Studies

April 23, 2019

10:00am

McKinnon Building

Room 155

Supervisory Committee:

Dr. Olav Krigolson, Department of Exercise Science, Physical and Health Education,
University of Victoria (Co-supervisor)

Dr. Clay Holroyd, Department of Psychology, UVic (Co-supervisor)

External Examiner:

Dr. Marla Mickleborough, Department of Psychology, University of Saskatchewan

Chair of Oral Examination:

Dr. Janelle Jenstad, Department of English, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Impulsivity is a common and multifaceted personality trait that is characterized by the presence of heightened reward sensitivity, novelty seeking, lack of premeditation, and behavioural and emotional inhibition deficits (Leshem, 2016a). These behaviours are often associated with substance abuse, gambling disorders, obesity, abnormal time perception, and other psychological and neurological conditions (Bari & Robbins, 2013; Berlin & Rolls, 2004). Reward processing deficits have also been well documented, with many researchers finding an association between impulsivity and the inclination towards smaller, immediate, rewards over larger, delayed rewards (Petry, 2001). Additionally, a larger reward positivity amplitude – an event-related potential component associated with rewards and expectancy – was found for the immediate rewards, relative to delayed rewards in high impulsivity individuals (Cherniawsky & Holroyd, 2013; Schmidt, Holroyd, Debener, & Hewig, 2017). The purpose of this thesis was to replicate and extend previous findings, by having participants complete two tasks: delayed gratification and time estimation. In the time estimation task, participants estimated the length of one second. The first task, a replication, assesses subject's preference for immediate rewards; moreover, the second task extended previous research and functioned as an additional way of assessing reward processing and examined participant's ability to estimate time. Abnormal time perception in impulsive individuals is thought to contribute to atypical delay gratification behaviour (Wittmann & Paulus, 2008). Electroencephalography (EEG) was recorded from participants during both tasks. Based on previous research on impulsivity (Cherniawsky & Holroyd, 2013; Coull, Cheng, & Meck, 2011; Holroyd & Krigolson, 2007; Schmidt et al., 2017), I predicted that impulsivity would affect performance on the time estimation task (which is novel in its use with impulsivity and EEG), and response times and reward positivity amplitudes on both tasks. Counter to our hypothesis, I found that response times and task performance were not affected by impulsivity levels. I also observed that the reward positivity was mediated by impulsivity in the delayed gratification task, but not in the time estimation tasks, suggesting that the tasks activate different neural pathways for reward processing. My results indicate that impulsivity can influence the amplitude of the reward positivity, but that different neural pathways are associated with distinct tasks. Further investigation into quantifiable measures of impulsivity and their effect on various reward processing tasks needs to be conducted.