Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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MSc (University of Victoria, 2014)
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“Exploring the Heart and Mind of Anxiety:
A Multi-Modal Approach to Examining the Neurovisceral
Integration Model in Clinically Anxious Adults”

Department of Psychology

Tuesday, July 10, 2018
8:30 A.M.
Clearihue Building
Room B007

Supervisory Committee:
Dr. Colette Smart, Department of Psychology, University of Victoria (Supervisor)
Dr. Mauricio Garcia-Barrera, Department of Psychology, UVic (Member)
Dr. John Allen, Department of Psychology, University of Arizona (Outside Member)

External Examiner:
Dr. Bruce Friedman, Department of Psychology, Virginia Polytechnic Institute and State University

Chair of Oral Examination:
Dr. Ziba Vaghri, School of Public Health and Social Policy, UVic

Dr. Stephen Evans, Acting Dean, Faculty of Graduate Studies
Abstract

Objective: The purpose of this dissertation was to reproduce Thayer and Lane’s (2000) neurovisceral model by examining both tonic and phasic heart rate variability (HRV) and emotion regulation (ER), and explore the effects of brief evidence-based intervention techniques in a sample of adults with clinically elevated levels of anxiety. Methods: This was a comprehensive multi-methodological study of 34 adults (ages 19 to 63 years) with clinically elevated levels of anxiety. Study 1 examined subjective and physiological effects of implementing ER strategies in response to a well-validated emotion elicitation paradigm consisting of viewing emotion-eliciting aversive images and sentences. Study 2 employed a within-subject RCT design and compared the impact of cognitive restructuring (CR), a top-down ER technique, with open monitoring mindfulness (OM), a bottom-up ER technique. Effects of intervention on self-regulation were assessed at a physiological (i.e. HRV), behavioral (i.e. ER and executive function (EF) computerized task) and subjective (i.e. self-report questionnaires) level. Results: Study 1 revealed that tonic HRV significantly predicted perceived ER success for both top-down and bottom-up generated emotions, whereas phasic HRV only predicted perceived ER success under conditions of bottom-up emotion generation. Variability emerged in our findings depending on the unique ER strategy used. Study 2 indicated a significant time by intervention effect on phasic HRV on the ER task, where HRV decreased with CR and increased with OM. There was a main effect of age independent of intervention on the EF task, such that increased age was related to increased phasic reactivity. On the ER task, CR led to greater perceived success in cognitive reappraisal. On the EF task, CR became faster, whereas OM became slower but more accurate. Significant intervention effects were also found on self-reported anxiety and aspects of mindfulness, with greatest reductions in anxiety found in OM compared to CR. Conclusions: In keeping with the neurovisceral integration model, HRV was reduced in individuals’ with clinically elevated levels of anxiety. Moreover, our findings illustrate that the method of emotion generation and regulation matters and has a significant impact on the degree to which persons with clinical levels of anxiety are able to successfully self-regulate. Finally, our results demonstrate the utility of multi-modal assessment of cognitive and emotional dysregulation in anxiety disorders, as well as the different pathways through which different interventions can impact HRV and ameliorate symptoms of anxiety.