



**University
of Victoria**

Graduate Studies

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

of

MAXIMILIAN RABE

BSc (Universität Potsdam, 2016)

“Generalized Linear Mixed Modeling of Signal Detection Theory”

Department of Psychology

Friday, March 23, 2018

10:00 A.M.

Hickman Building

Room 120

Supervisory Committee:

Dr. D. Stephen Lindsay, Department of Psychology, University of Victoria (Co-Supervisor)

Dr. Michael Masson, Department of Psychology, University of Victoria (Co-Supervisor)

Dr. Adam Krawitz, Department of Psychology, UVic (Member)

External Examiner:

Dr. Farouk Nathoo, Department of Mathematics and Statistics, UVic

Chair of Oral Examination:

Dr. Daniela Constantinescu, Department of Mechanical Engineering, UVic

Abstract

Signal Detection Theory (SDT; Green & Swets, 1966) is a well-established technique to analyze accuracy data in a number of experimental paradigms in psychology, most notably memory and perception, by separating a response bias/criterion from the theoretically bias-free discriminability/sensitivity. As SDT has traditionally been applied, the researcher may be confronted with loss in statistical power and erroneous inferences. A generalized linear mixed-effects modeling (GLMM) approach is presented and advantages with regard to power and precision are demonstrated with an example analysis. Using this approach, a correlation of response bias and sensitivity was detected in the dataset, especially prevalent at the item level, though a correlation between these measures is usually not found to be reported in the memory literature. Directions for future extensions of the method as well as a brief discussion of the correlation between response bias and sensitivity are enclosed.