Journal & Proceedings of the Royal Society of New South Wales, vol. 154, part 2, 2021, p. 256. ISSN 0035-9173/21/020256-01

Thesis abstract

Modelling cognitive performance in schizophrenia and across tasks

Laura Wall

Abstract of a thesis for a Doctorate of Philosophy (Psychology — Science) submitted to the University of Newcastle, Australia

This thesis comprises two distinct sections with different background, aims and implications, but which share the same methodology — analysis of three cognitive tasks with the Linear Ballistic Accumulator (LBA) model.

In the first section, I investigate the across task consistency of LBA parameter estimates to address an untested assumption that the estimates capture general, underlying cognitive processes, which are more than just task specific. I find that there is indeed consistency in the estimates across three similar but distinct tasks and therefore proceed to develop a novel approach which incorporates this shared information, providing more efficient and precise estimation. I fit the LBA to two tasks simultaneously by including a covariance matrix for two tasks into the hierarchical Bayesian estimation procedure. Despite the additional constraint this matrix imposes, the combined model adequately estimates both the individual and group parameters, as well as the estimates of across task covariance.

In the second half, I then use this new "combined modelling" approach to investigate cognitive deficits in schizophrenia and find that across the tasks there are some consistent differences between people with and without schizophrenia, such as poorer sensitivity, and some that are task and context specific, such as adjustments of caution.

Across both fields of cognitive modelling and cognition in schizophrenia, this new method of combined modelling of multiple tasks is a valuable addition as it allows more precise measurement with fewer data points.

Dr Laura Wall
School of Psychology
University of Newcastle
Callaghan NSW 2308
Australia

E-mail: laura.wall@newcastle.edu.au