Finding therapy-response markers of lithium treatment of bipolar disease using causal interaction analysis

Carolina Fransson[*]

June 2015

Abstract

In this thesis, we aim to identify genetic markers associated with lithium treatment response of patients with bipolar disorder. Identifying such genetic markers is a step towards personalized genotype-based treatment of bipolar disorder. By using causal inference we estimate bounds on the causal interaction between lithium treatment and genetic markers on treatment response. In particular, we aim to identify genetic markers that might either block the effect of lithium treatment or be a prerequisite for treatment response. For this reason we also estimate bounds on the causal interaction under the assumption of monotonic effects of lithium treatment and genetic markers on treatment response. We use a weighed logistic regression model to estimate the bounds, with Inverse Probability of Treatment Weights to control for confounding. We find that, to some extent, the genetic markers interact with lithium treatment. A small number of genetic markers potentially affect lithium treatment in only one direction.

[*]Postal address: Mathematical Statistics, Stockholm University, SE-106 91, Sweden. E-mail: fransson.carolina@gmail.com. Supervisor: Tom Britton.