Dear Editors,

We are hereby submitting the manuscript “…”.

Large birth-cohort studies with voluntary participation play an important role in research on the aetiology of mental health and other diseases. Highly cited articles showing typically non-significant differences between study and population estimates for selected exposure outcome-associations are frequently interpreted as indicating the absence of selection bias in exposure-outcome estimates obtained from large birth cohort more generally. In contrast, the structural approach to selection bias highlights the need to examine selection bias for each exposure-outcome estimation.

This article proposes to explicitly base examinations of selection bias on the structural approach of selection bias by (1) using directed acyclic graphs (DAG) to evaluate if selection bias is likely and (2) compare inverse probability of participation weighted and un-weighted association-estimates to estimate the size of selection bias.

The key innovations in our article are (a) to use the rapidly growing body of results on genetic correlations of different traits to evaluate the presence of common unobserved causes that is central to the emergence of selection bias, (b) to obtain estimates of bias and its highest density intervals by jointly estimating weighted and un-weighted association estimates in a Bayesian framework, and (c) to show how a simple decision tree can be used to identify potential for selection bias without formulating a complete DAG.

We illustrate this approach by examining selection bias for associations between exposures and ADHD in the Norwegian Mother and Child Cohort Study. Our results indicate the presence of selection bias for most examined associations. More generally, genetic correlations between education--a key indicator of study participation--and mental health suggest that selection bias should be a concern for studies investigating mental health with non-representative samples.

The manuscript concludes by discussing selection bias and its relationship to representativeness, and by emphasizing, that selection bias is not a property of entire studies, but rather a property of exposure-outcome associations.