ON SELECTIVE ESTIMATION IN NEUROIMAGING

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Selective estimation is the problem of estimation of a subset of population parameters selected using the same data ultimately used for estimation.
It is also known under many names such as "Double Dipping", "Circular Inference", and "Non-Independent analysis".

The problem is common in Neuroimaging as estimation is typically performed in locations selected due to their promising (data driven) characteristics.
The problem has recently gained much attention in a series of high-profile publications discussing its manifestations and remedies.

Considering the problem of estimating the magnitude of the correlation between a behavioral loss aversion index and aneural aversion index in a subset of selected locations, we construct several selective confidence intervals which control the proportion of non-covering intervals for selected parameters-- the False Coverage Rate (FCR).

Using simulations, we demonstrate that statistical qualities of the intervals are indeed guaranteed in neuroimaging problems, although not covered by existing analytic proofs.

We discover that given the sample size and selection type employed, selection bias in our setup is considerable.

We compare the selective intervals approach to a data-splitting approach.
While a data-splitting approach is the current consensus recommendation, we conclude it is dominated both in spatial stability and in the length of intervals, by our selective intervals.