THE UNIVERSITY OF CHICAGO | **DEPARTMENT OF STATISTICS**

Master's Thesis Presentation

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Abstract

Observational studies drawing causal conclusions can be vulnerable to unmeasured confounding. In such cases, researchers often perform a sensitivity analysis to estimate the minimum level of hidden bias, or the minimum strength of unmeasured confounding, required to discount the observed association between treatment and outcome. When the magnitude of this required bias is large, it suggests that the treatment is likely to have a significant effect. Rosenbaum's sensitivity analysis is a modern method designed for matched observational studies; it assesses the magnitude of the maximum hidden bias across all matched sets necessary to discount for the observed association. But, this approach can be overly conservative and pessimistic, especially if investigators suspect that some matched sets exhibit exceptionally high levels of hidden bias. In this thesis, we extend Rosenbaum's framework by performing sensitivity analysis on permutations of hidden biases across all matched sets, which is more robust than the maximum bias.