

Studentized Sensitivity Analysis in Paired Observational Studies

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A fundamental limitation of causal inference in observational studies is that perceived evidence for an effect might instead be explained by factors not accounted for in the primary analysis. Methods for assessing the sensitivity of a study's conclusions to unmeasured confounding have been established under the assumption that the treatment effect is constant across all individuals. In the potential presence of unmeasured confounding, it has been argued that certain patterns of effect heterogeneity may conspire with unobserved covariates to render the performed sensitivity analysis inadequate. We present a new method for conducting a sensitivity analysis for the sample average treatment effect in the presence of effect heterogeneity in paired observational studies. Our recommended procedure, called the studentized sensitivity analysis, represents an extension of recent work on studentized permutation tests to the case of observational studies, where randomizations are no longer drawn uniformly. The method naturally extends conventional tests for the sample average treatment effect in paired experiments to the case of unknown, but bounded, probabilities of assignment to treatment. In so doing, we illustrate that concerns about certain sensitivity analyses operating under the presumption of constant effects are largely unwarranted.