

ObsSensitivity: An R package for power analysis for sensitivity analyses of Observational Studies

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Researchers in the social sciences have been encouraged to use randomised controlled experiments (see, for example, Mosteller and Boruch(2002)). This has been aided by the development of easily used software such as that of Spybook et. al. (2009) which allows researchers to design both person randomised and cluster randomised trials. Despite this, observational studies are still often used. The design of observational studies is just as important as in randomised controlled experiments and “a well designed observational study resembles, as closely as possible, a simple randomized experiment . . . [except that in an observational study] . . . randomization is not used to assign treatments”. (Rosenbaum, 2010, p.4). Many observational studies now use propensity scores to make the treatment and control groups comparable.

Although propensity scores remove the effect of measured covariates, they do not remove bias due to unmeasured variables. An essential aspect of the analysis and reporting of an observational study is to carry out a sensitivity analysis which determines the magnitude of the bias that would be needed to alter the conclusions of the study. The bias is measured in terms of a parameter Γ (Gamma): the odds of receiving the treatment rather than the control given the observed covariates. A value of $\Gamma = 1$ indicates that there is no bias due to unmeasured covariates while a value of $\Gamma = 2$ indicates that an unobserved covariate has the effect of making one of two apparently equal subjects twice as likely to be in the treatment group than the control group.

This talk summarises an R package, **ObsSensitivity**, that assists researchers to determine the appropriate sample size for an observational study. The software tool is provided in R/Excel using the R Commander interface to R, giving the advantages of R but with a convenient and easily learnt environment. Demonstration of the use of the software with examples of actual observational studies will be given.

Mosteller, F. and Boruch, R., (Eds.), (2002). *Evidence Matters: Randomized Trials in Education Research*, Brookings Institution Press: Washington, DC.

Rosenbaum, P.R (2010). *Design of Observational Studies* Springer: New York.

Spybook, J., Raudenbush, S.W., Congdon, R., and Martínez, A. (2009). Optimal Design for Longitudinal and Multilevel Research: Documentation of the “Optimal Design” Software.

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