EFFICIENT SAMPLE SIZE FOR POWER AND DESIRED ACCURACY IN COHEN'S *D* ESTIMATION IN TWO-GROUP CLUSTER RANDOMIZED DESIGNS

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The aim of this thesis is to develop a new program for estimating sample sizes required for a specified power or accuracy in the Cohen's *d* estimation in two-group cluster randomized design.

APPROVED:

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Date W. Joel Schneider, Chair

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Date Matthew Hesson-McInnis

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Researchers need a simple and widely available method to estimate sample sizes required for a specified power or accuracy in the Cohen's *d* estimation in the two-group cluster randomized design (CRD). A new program that accomplishes these tasks is described. The estimation in CRD involves two kinds of sample sizes (i.e., number of clusters and cluster size) and different kinds of Cohen's *d*, for which the program uses individual-level Cohen's *d*. The program will help researchers to estimate a combination of sample sizes depending on whether the goal is to minimize cost given power (or width of confidence interval of Cohen's *d*) or to maximize power (minimize the width of confidence interval) given a fixed budget. The program can introduce a covariate in the sample size estimation. The program algorithm is based on finding starting values of

sample sizes by normal approximation and modifying the sample sizes by a priori Monte Carlo simulation using Mplus.

Keywords: sample size estimation, power, cluster randomized design, confidence interval of effect size

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