Hybrid_Power

Overview and Directions for Running the Shiny R Dashboard Program

January 2026

Peter Z. Schochet (pzschochet@gmail.com)

Under a "hybrid" multisite impact evaluation design, randomized controlled trials (RCTs) are conducted in some study sites (where feasible) and quasi-experimental designs (QEDs) are conducted in more sites, including the RCT sites. This design can increase precision and generalizability and can be used to test and adjust for hidden bias in the QED-only sites. ***Hybrid_Power*** is a Shiny R dashboard that performs power calculations for such hybrid designs using the methods discussed in Schochet (*Journal of Policy Analysis and Management*, 2026). The methods allow for potential hidden biases in the QED impacts after incorporating inverse probability weighting, which can be measured in the RCT-QED sites conditional on covariates and then transported to the QED-only sites. The approach fuses causal inference and machine learning estimation methods, with multiple applications of the classification and regression trees (CART) algorithm. The power calculations are conducted for commonly used designs—including nonclustered and clustered designs—and allow for model covariates to improve precision. The inputs for the power analysis can be entered flexibly into the dashboard.

Hybrid_Power.R can be run in R using standard methods for running R programs (R Version 4.5.2 run using R Studio 2026.01.0+392 was used for testing). Before using the dashboard, you will need to download the following six commonly used R packages from the official R repository (CRAN): shiny, shinydashboard, ggplot2, kableExtra, ggtext, and scales. These packages can be installed, for example, using the install.packages("ggplot2") command, and similarly for the other five packages. If not installed, you may be asked if you want them installed the first time you run the program.

When the ***Hybrid_Power.R*** program is run, the ***Hybrid_Power*** dashboard will open and you can then enter inputs for your design in the sidebar panel. The dashboard displays default inputs that you should tailor to your design. After pressing the **Submit** button at the bottom of the sidebar, the program will then produce a table and graph showing the power analysis results (see the output example on the following page). The graph can then be saved to a .pdf or .png file. The program will check for errors and describe them. You can produce new results in the same session by updating your inputs.

A few notes on the program:

1. The program calculates the **minimum detectable impact in effect size (standard deviation) units (MDEs)** that can be achieved for a given sample size of RCT-QED and QED-only sites and individuals.

2. MDEs are calculated for two causal estimands: (i) the complier average causal effect (CACE) estimand, where the QED sample includes compliers (program participants) and the RCT sample includes eligible applicants (identified prior to program participation); and (ii) the intention-to-treat (ITT) estimand, where both the QED and RCT samples contain eligible applicants.

3. Users have three options for the variances underlying the MDEs: (i) all sites are included and the QED variances adjust for the bias corrections, (ii) all sites are included and the QED variances do not adjust for the bias corrections, and (iii) only the RCT impacts are included (so that users can assess precision gains from including the QED impacts).

Output example from ***Hybrid_Power***