Mathematica®
Progress Together

No Randomized Trial? No Problem!

We all want to use the best evidence and methods to prove our solutions make an impact, but using randomized controlled trials, the gold-standard in research, is often infeasible or impractical. Quasi-experimental approaches, like propensity score methods, reduce the biases associated with observational studies, making it possible to estimate accurate causal effects without randomization. Mathematica's methods experts have mastered a range of propensity score techniques and developed new ones to meet clients' needs.

Reliable, rigorous, real-world solutions for complex problems. We've helped our clients:

Evaluate major healthcare initiatives

Problem: Thousands of primary care practices volunteered to participate in an initiative to improve clinical practice. The initiative's sponsors wanted to know whether the approach succeeded in improving quality of care for the patients treated at participating practices, both overall and for specific subgroups of practices such as rural practices or specialty care practices.

Solution: Our experts used propensity score matching to construct a well-matched comparison group, enhancing the robustness and rigor of the study. The resulting comparison group was well-matched overall and in highly specific subsets of practices, which made it possible for researchers to study variation in the program's impact across different types of practices.

Boost power by reducing variability in matching weights

Problem: A new propensity score weighting method produces extremely well-matched samples, but it does so by assigning some comparison group observations extreme weights. Large variation in the matching weights increases the standard errors of the impact estimates, making it harder to determine whether the intervention being studied is effective.

Solution: Mathematica's methods experts extended the propensity score weighting method to give users more control over the trade-off between balance – the similarity of the treatment and comparison groups – and power – the variability in the matching weights. In the study, this method provided important power gains without sacrificing the quality of the comparison group.

Streamline matching under rolling enrollment

Problem: When selecting a comparison group for an observational study, researchers need to ensure that selected non-participants look like the participants did before enrolling in the intervention being studied. For interventions with rolling enrollment, like students or Medicaid beneficiaries, this process is more complicated because there is no objective way to define "before enrolling" for non-participants. Rather than arbitrarily selecting a single pre-enrollment period for each non-participant, the best practice is to allow for several options. But the methods that account for these additional options are cumbersome and time-consuming.

Solution: Mathematica statisticians, with outside collaborators, developed a streamlined approach that selects the best possible comparison group, allowing for several different pre-enrollment periods for each non-participant, in a single step. This approach produces a very high-quality comparison group with much less effort than the current standard approach.

Let's Progress Together. Contact Sheng Wang at Swang@mathematica-mpr.com.