

The Department of Educational Psychology's Research Methods, Measurement, & Evaluation (RMME) program and the Department of Statistics at the University of Connecticut present:

Approximate Balancing Weights for Clustered Observational Study Designs

Dr. Luke Keele, University of Pennsylvania

Friday, 4/29/2022, 3pm

<https://uconn-cmr.webex.com/uconn-cmr/j.php?MTID=m35b82d4dc6d3e77536aa48390a02485b>

In a clustered observational study, a treatment is assigned to groups and all units within the group are exposed to the treatment. Clustered observational studies are common in education where treatments are given to all students within some schools but withheld from all students in other schools. Clustered observational studies require specialized methods to adjust for observed confounders. Extant work has developed specialized matching methods that take key elements of clustered treatment assignment into account. Here, we develop a new method for statistical adjustment in clustered observational studies using approximate balancing weights. An approach based on approximate balancing weights improves on extant matching methods in several ways. First, our methods highlight the possible need to account for differential selection into clusters. Second, we can automatically balance interactions between unit level and cluster level covariates. Third, we can also balance high moments on key cluster level covariates. We also outline an overlap weights approach for cases where common support across treated and control clusters is poor. We introduce an augmented estimator that accounts for outcome information. We show that our approach has dual representation as an inverse propensity score weighting estimator based on a hierarchical propensity score model. We apply this algorithm to assess a school-based intervention through which students in treated schools were exposed to a new reading program during summer school. Overall, we find that balancing weights tend to produce superior balance relative to extant matching methods. Moreover, an approximate balancing weight approach tends to require less input from the user to achieve high levels of balance.



Dr. Luke Keele (Ph.D., University of North Carolina, Chapel Hill, 2003) is currently an Associate Professor at the University of Pennsylvania with joint appointments in Surgery and Biostatistics. Professor Keele specializes in research on applied statistics with a focus on causal inference, design-based methods, matching, natural experiments, and instrumental variables. He also conducts research on topics in educational program evaluation, election administration, and health services research. He has published articles in the *Journal of the American Statistical Association*, *Annals of Applied Statistics*, *Journal of the Royal Statistical Society, Series A*, *The American Statistician*, *American Political Science Review*, *Political Analysis*, and *Psychological Methods*.

ONLINE INTERDISCIPLINARY SEMINARS ON STATISTICAL METHODOLOGY FOR SOCIAL

AND BEHAVIORAL RESEARCH: Support for this seminar comes from Department of Educational Psychology's Research Methods, Measurement, & Evaluation (RMME) program and the Department of Statistics at the University of Connecticut (UConn), the Statistical and Applied Mathematical Sciences Institute (SAMSI), and the New England Statistical Society (NESS). This seminar aims to promote connection between the statistics and social/behavioral science communities and encourage interdisciplinary research across faculty and students.

For announcements and WebEx live streaming links, please contact Tracy Burke (tracy.burke@uconn.edu). For questions related to the seminars, please feel free to contact the session organizers, Prof. Xiaojing Wang (xiaojing.wang@uconn.edu) and/or Prof. Betsy McCoach (betsy.mccoach@uconn.edu). For information about previous and upcoming speakers, please visit <https://stat.uconn.edu/online-seminars/> or <https://rmme.education.uconn.edu/>.

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