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Decision "Major revision required" on paper AOS2501-026

Hans-Georg Müller via AOS EJMS <ejms-aos-noreply@vtex.lt> Fri, Mar 14, 2025 at 9:52 PM
Reply-To: Hans-Georg Müller <hgmueller@ucdavis.edu>
To: Peng Ding <pengdingpku@berkeley.edu>

Dear Peng,

Thank you for submitting your paper "Berry-Esseen bounds for design-based causal inference with possibly diverging treatment levels and varying group sizes" for possible publication in the Annals of Statistics.
It has now been reviewed and it has been determined that a major revision is required before the paper can be possibly accepted for publication. At the current stage there is no promise regarding the final decision for publication.

My comments are the following:

In accordance with comments from the AE and the two referees I classify the paper as requires major revision. The revision will need to carefully take into account all comments. I agree with a referee that the simulation should be more comprehensive and specifically involve more sample sizes, from small to medium to large. Additional simulation results should be reported in the Supplement
to keep the length of the main paper at the current level. All supplementary material needs to be referred to in the main paper.

A fuller report on the paper is available from the EJMS website

http://www.e-publications.org/ims/submission/index/login

To submit your revision, please log in to EJMS and submit it as a revised file to your original submission. Please also include as a separate supplemental file a detailed description of how you addressed the points raised by the reviewers. Furthermore, your revised paper should follow the page limits as mentioned in the comments when using the standard Annals of Statistics style files. If you need more space, additional material should be included as a supplement that will be posted in the archive of the AOS upon acceptance, see http://www.imstat.org/journals-and-publications/annals-of-statistics/annals-of-statistics-supplement-instructions/

Please note that if a revision is not submitted within 9 months of the decision date, the paper will be automatically withdrawn from the system, unless an extension is requested and approved by the editor. A revision submitted after that time will be treated as a new submission.

Thank you for considering the Annals of Statistics as a venue for your work.

Best wishes
Hans

Submission URL: https://www.e-publications.org/ims/submission/AOS/

Title:
Berry-Esseen bounds for design-based causal inference with possibly diverging treatment levels and varying group sizes

Authors:
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Abstract:
Neyman (1923/1990) introduced the randomization model, which con- tains the notation of potential outcomes to define causal effects and a frame- work for large-sample inference based on the design of the experiment. How- ever, the existing theory for this framework is far from complete especially when the number of treatment levels diverges and the treatment group sizes vary. We provide a unified discussion of statistical inference under the ran- domization model with general treatment group sizes. We formulate the es- timator in terms of a linear permutational statistic and use results based on Stein's method to derive various Berry–Esseen bounds on the linear and quadratic functions of the estimator. These new Berry–Esseen bounds serve as basis for design-based causal inference with possibly diverging treatment levels and a diverging number of causal parameters of interest. We also fill an important gap by proposing novel variance estimators for experiments with possibly many treatment levels without replications. Equipped with the newly developed results, design-based causal inference in general settings becomes more convenient with stronger theoretical guarantees.