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LETTER TO THE EDITOR

Biometrical Journal

On the necessity and design of studies comparing statistical methods

In data analysis sciences in general and in biometrical research particularly, there are strong incentives for presenting work that entails new methods. Many journals require authors to propose new methods as a prerequisite for publication, as this is the most straightforward way to claim the necessary novelty. The development of new methods is also factually often a sine qua non condition to be recruited as a faculty member or to obtain personnel funding from a methods-oriented research agency, not least because it noticeably increases the chance to get published as outlined above. Thus, in statistical research and related methodology-oriented fields such as machine learning or bioinformatics, the well-known adage "publish or perish" could be translated into "propose new methods or perish."

Boulesteix, Binder, Abrahamowicz & Sauerbrei, Biometrical Journal 2018

Biometrical Journal special issue guest-edited by four STRATOS members including three SP members

Towards neutral comparison studies in methodological research

Guest editors: Anne-Laure Boulesteix (coordinator), Mark Baillie, Dominic Edelmann, Leonhard Held, Tim Morris, Willi Sauerbrei

Biomedical researchers are frequently faced with an array of methods they might potentially use for the analysis and/or design of studies. It can be difficult to understand the absolute and relative merits of candidate methods beyond one's own particular interests and expertise.
Choosing a method can be difficult even in simple settings but an increase in the volume of data collected, computational power and methods proposed in the literature makes the choice all the more difficult. In this context, it is crucial to provide researchers with evidence-supported guidance derived from appropriately designed studies comparing statistical methods in a neutral way, in particular through well-designed simulation studies.

While neutral comparison studies are an essential cornerstone towards the improvement of this situation, a number of challenges remain with regard to their methodology and acceptance. Numerous difficulties arise when designing, conducting and reporting neutral comparison studies. Practical experience is still scarce and literature on these issues almost inexistent. Furthermore, authors of neutral comparison studies are often faced with incomprehension from a large part of the scientific community which is more interested in the development of 'new' approaches and evaluates the importance of research primarily based on the novelty of the presented methods. Consequently, meaningful comparisons of competing approaches (especially reproducible studies including publicly available code and data) are rarely available and evidence-supported state of the art guidance is largely missing, often resulting in the use of suboptimal methods in practice.

In this context, this special issue intends to publish both:

- well-designed neutral comparison studies of methods (including but not limited to studies arising from community challenges), i.e. comparison studies fulfilling the two following criteria: (i) focused on the comparison of existing methods already described elsewhere rather than on a new prototype method being introduced; (ii) authored by a group of researchers who are (ideally) approximately equally familiar with all the compared methods;
- papers defining, developing, discussing or illustrating concepts related to practical issues and improvement of neutral comparison studies in the context of methodological biometrical research, including but not limited to the design, analysis and presentation of reliable simulation studies, study protocols, study registration and (structured) reporting, replication studies, uncertainty quantification and research synthesis. Papers of this type will provide a lens through which to critically reflect on neutral comparison studies in the future.

Papers addressing parts of one or both aspects are also welcome.

All codes and data should be made available following the reproducibility guidelines of the Biometrical Journal: https://onlinelibrary.wiley.com/doi/abs/10.1002/bimj.201500156

Submissions are welcome until **March 31st 2022**.

Simulation study estimands (Tim Morris)

- Methods in simulation studies can be tuned/optimised
- Should we implement methods at their best, or as would be implemented by a non-expert?
- To whom do we want the results to apply?
- This is a question of the **simulation study estimand.**
- Much argument about simulation results could be resolved by being clear and honest about the estimand