

Reproducibility and Replicability

Reproducibility and replicability are essential for scientific credibility. Therefore, it's crucial to establish a common definition and clear typology. Such an effort ensures accurate comparisons and appropriate methodologies. It also fosters better coordination and clarity among researchers. By adopting a common language, we can enhance the foundation of scientific integrity and knowledge.*

What is...

...Reproducibility?

Reproducibility means obtaining the same results as a prior study using the same data, analysis code, and methods, ensuring results are consistent and verifiable.

...Robustness?

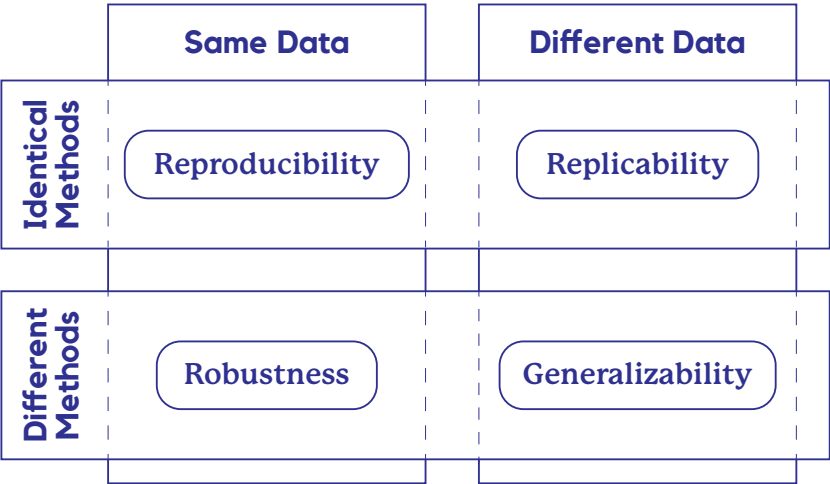
Robustness refers to whether study results remain consistent when different methods or assumptions are applied to the same data, confirming the reliability of findings.

...Replicability?

Replicability means obtaining consistent results when repeating a study with new data using the same methods, confirming the findings' reliability across datasets.


...Generalizability?

Generalizability is the ability to apply study findings to different populations, settings, or methods beyond the original context, enhancing the broader applicability of research.



Credits: Based on Schloss (2018) and Holzmeister (2024)


Applications of the Reproducibility & Replicability Typology in the Literature



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Typology of Reproducibility and Replicability Studies

Computational Reproducibility




Verifying whether the data and code from a published paper can produce the same results as reported by the original authors.

Recreate Reproducibility




The process of attempting to reanalyze the results of an original study as closely as possible without access to the analysis code and/or the exact data used in the original study.

Conceptual Replicability




Testing whether the results of an original study can be repeated on new data using alternative research designs or analysis methods to test the same hypothesis.

Robustness Reproducibility



Testing whether the results of an original study remain consistent when different analytical methods or specifications are applied to the same data.

Direct Replicability



Testing whether the results of an original study can be repeated on new data using the same research design and analysis methods.

* Credits: Adapted from Dreber and Johannesson (2024)