

Multiverse Analysis in R

Workshop at the University of Zurich

18. October 2023

Topic

Empirical results depend on the conceptual and analytical choices made by the researcher. For example, researchers need to decide how variables should be operationalized and estimated, which variables to control for, which observations to exclude, what to do with missing values, which functional form to assume, which subgroups to analyse, what model to choose and so on. When interpreting study outcomes, we seek genuine insights into the underlying relationships under scrutiny. Achieving this goal hinges on the premise that reported analyses accurately represent the pool of valid analyses that could have been conducted – a condition frequently unmet. One issue is that published results may hinge upon arbitrary decisions made by researchers. Another concern is the inclination of researchers to favor evidence that aligns with their assumptions rather than presenting contrary evidence.

Multiverse-style methods (also known as specification curve analysis or vibration of effects) have been proposed as a possible solution to this dilemma. The idea is to estimate an effect across the entire set of possible specifications to expose the impact of hidden degrees of freedom and/or obtain robust, less biased estimates of the effect of interest. However, this does not come with potential pitfalls: if the investigated specifications are not truly arbitrary, multiverse-style analyses can produce misleading results, potentially hiding meaningful effects within a mass of poorly justified alternatives.

The workshop aims to equip participants with the knowledge to meaningfully apply multiverse/specification curve analyses to their own research. The 1-day workshop covers (1) a theoretical introduction to the concept of researcher's degrees of freedom and the problem of undisclosed flexibility in data analyses, (2) an in-depth discussion of how multiverse approaches may help to establish better practices and more transparency in this regard, and (3) practical tutorial sessions illustrating how to use the package *specr* to conduct multiverse/specification curve analyses in R.

Teacher

The workshop will be held by [Dr. Philipp K. Masur](#) (Vrije Universiteit Amsterdam), who is the developer of the R package *specr*.

Preparation

For this 1-day workshop, I expect you...

- ...to have R and RStudio installed. If you haven't done so yet, have a look at this [getting started tutorial](#), which walks you through the installation and helps you get

some first hands-on experience using R. If possible, try to install the R package `specr`, which we will use to run multiverse analyses:

```
install.packages("specr")
```

- ...to have some basic knowledge of R and particularly data wrangling skills (at best, some knowledge about the tidyverse). If this is still new to you, we have several videos and tutorials on our [R course material GitHub page](#) that can help you getting started. I would suggest to check out the tutorials on transforming, summarizing, visualizing and reshaping data in the “data wrangling with the tidyverse” category.
- ...some basic knowledge of regression models (e.g., linear regression, multilevel linear regression).

Note: The workshop will not provide an introduction to R!

Questions

Please feel free to contact Philipp directly at p.k.masur@vu.nl.