Tutorial: Hypotheses Evaluation Using the Bayes Factor

Go to the bottom of

<https://informative-hypotheses.sites.uu.nl/software/bain/>

to download the course materials (some of the materials are referenced below). You can prepare by executing the R tutorial R-hand-on-mini-course.pdf and reading BFTutorial.pdf. The workshop will flow along the following lines (addressing psychologists, that is, concepts, applications, hands-on and no formulas):

July 4, 2019, 9.30-17.00

1) In three steps, interactive with the audience, I will introduce the replication crisis, and discuss possible causes like: publication bias, questionable research practices, and hidden moderators. During the discussion the p-value and Type I and II errors will be re-introduced.

2) Introduction to classical and informative (a simple example is m1 > m2 > m3) hypotheses, and the Bayes factor as a tool to evaluate them (what is the Bayes factor, what are posterior model probabilities, what is Bayesian updating).

3) Lab meeting. Participants need to have R and RStudio installed on their laptop. Via RStudio (tab tools – install packages) the package bain can be installed. Participants can do the lab-meeting even if they have no knowledge of R. But, you can prepare for R with the R-hand-on-mini-course.pdf that is included with the course materials

 July 5, 9.30-17.00

1) Using figures (no formulae) it will be more thoroughly explained what the Bayes factor is.

 2) Two applications will be presented in which informative hypotheses and the Bayes factor are used: the evaluation of replication studies and the evaluation of the same set of hypotheses using multiple sources of data input (e.g., a multi-laboratory study in which not all the variables have the same operationalization).

3) Interactive with the audience. Discussion meeting. First in small groups the pro's and con's of null-hypotheses significance testing and the Bayesian approach will be discussed. Then three groups will be constructed (the classicists, the Bayesians and the referees), and a structured debate will follow.

4) Questions and answers, continuation of the lab-meeting.