



Reproducible research bindings

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Reproducible research requires achieving the same results by using the same source code, dataset, and configuration. This form of publishing scientific papers has several benefits such as an increased transparency and credibility, which is particularly important in times of the reproducibility crisis (Baker, 2016). However, being able to validate findings by rerunning the reported analysis is not the only advantage. Reviewers can follow the computations which produced the statistics and figures and are thus better able to assess the validity of the findings. In addition, readers can reuse existing data and software resulting in citations for the original author and less work for the reader. Assessing the validity of scientific findings and reusing research materials both require a detailed understanding of how the results were achieved. This is a challenging task even if all materials are attached and executable. For example, Readers still have to search for the source code snippet and data columns which produced a certain figure in the paper. Such tasks can be facilitated with the help of reproducible research bindings. These bindings are links which connect source code, data, and paper components such as figures. Readers can thus examine only those code and data subsets which produced a certain statistical result, table, or figure. Moreover, these bindings can become more fine-grained and describe a specific variable in the source code which is used, for example, as a threshold in the figure. The linkage to a specific variable allows inspecting essential details of a figure. In addition, we are able to attach user interface (UI) widgets to the variable, for example, a slider which allows readers to change the threshold to see how these changes affect the results. Furthermore, these bindings can be used to attach UI widgets which manipulate the dataset or replace it with another, compatible one. Readers and reviewers are thus better able to follow the computations in detail. The resulting understanding might also help readers to assess if they can reuse the source code and the data.

Baker, M. (2016). Is there a reproducibility crisis? A Nature survey lifts the lid on how researchers view the crisis rocking science and what they think will help. *Nature*, 533(7604), 452-455.