Lecture 13: Preparing journal artical with *papaja*

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Author Note: This is for demonstration only.

The authors made the following contributions. Hu Chuan-Peng: Conceptualization, Writing - Original Draft Preparation, Supervision; All Students: Writing - Original Draft Preparation, Writing - Review & Editing.

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Abstract

Psychological science has encountered a serious replication crisis.

To make self-correction of the field, researchers actively reform the current practices and increase the opennes, transparency, and reproducibility of studies in the field. Using R language for data analyses is recommended by many. With increasingly emphases on computational reproduciblity, *papaja* was developed to combine data analysis and manuscript preparation.

The current chapter aims to demonstrate how to use *papaja*.

We will introduce the package and key elements of the it.

After the lecture, we expected students able to create an example APA manuscript using open data or examplary data we had provided at the beginning of the class.

This demo and practice will further enhance the student's experience in computational reproducibility.

By spreading the ideas of reproducbility and teaching papaja, this class will increase the computational reprodcubility.

Keywords: Reproducibility, R, Teaching, Demonstration

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R language has been widely used in psychological science and social science in general. However, for most students with a background of psychology, learning R is not easy.

In the past decade, an increasingly number of psychological researchers had switched from SPSS to R. The most common suggestions from those who successfully adopted R is: learning by doing.

To fully integrate R in the life-cycle of psychological research, using R for preparing journal article is necessary.

Fortunately, we now have *papaja* (Aust & Barth, 2024), which enable us to prepare journal article that formatted as required by APA.

Below we will demonstrate how to use *papaja* to generate an APA formatted PDF. Note that we will use the data from perceptual matching task, which was from (Hu, Lan, Macrae, & Sui, 2020). The data analysis for this dataset has been showed in previous classes.

Here we will try to reproduce what has been reported in Hu et al. (2020). Thus, we adopted the code from: https://github.com/hcp4715/moralSelf_ddm.

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

The sample size of the study was determined in a dynamic way (Schoenbrodt, Wagenmakers, Zehetleitner, & Perugini, 2017). Specifically, we kept collecting data and analyzing the strength of evidence for the critical hypothesis, including the interaction

between Self-Relevance × Valence on RT data and two Bayes factor paired t-tests (good-self vs. bad-self, good-self vs. good-other). We stopped recruiting new participants when both paired t-tests reached $BF_{10} \leq 0.1$ or $BF_{10} \geq 10$. Participants who were already recruited at that moment continued to complete the experiment. See https://osf.io/w6hrj/ for the change of Bayes factor during the data collection. In total, 44 college students (25 females, age: 20.91 ± 2.58) were recruited. Two participants were excluded from data analysis because of procedural failures, leaving 42 participants (24 females, age: 20.71 ± 2.38).

Material and Procedure

The data was collected using the same settings as described in the pilot study, with several differences:

- In the shape-categorization task, the shapes were presented for 100 ms, instead of 200 ms in the pilot experiment, and feedback was Chinese character 'Correct' or 'Incorrect', instead of happy or sad symbolic faces.
- There were only two different types of blocks in the categorization task in the confirmatory study because the importance judgments resulted in unbalanced trials between participants.
- There were more trials per condition: 72 experimental trials for the matching task.
- The questionnaires were different from the pilot study.

Data analysis

We used R (Version 4.3.3; R Core Team, 2024) and the R-packages *afex* (Version 1.4.1; Singmann, Bolker, Westfall, Aust, & Ben-Shachar, 2024), *dplyr* (Version 1.1.4; Wickham, François, Henry, Müller, & Vaughan, 2023), *emmeans* (Version 1.11.1; Lenth, 2024), *ggplot2* (Version 3.5.2; Wickham, 2016), *patchwork* (Version 1.3.0; Pedersen, 2024)

and *tidyr* (Version 1.3.1; Wickham, Vaughan, & Girlich, 2024) for all our analyses. The results from Frequentist hypothesis testing (i.e., ANOVA and *t*-tests) will be reported below.

Results

Sensitivity (*d'*)

A two-way repeated-measure ANOVA revealed a significant interaction between Identity and Valence. $F(1, 41) = 12.06$, $p = 0.0012$. We conducted follow-up simple main effect analyses. When the shapes were self-referential, *d'* was significantly larger for moral condition (2.5 ± 0.11) than for immoral condition (1.99 ± 0.1), $t(41) = 4.29$, $p < 0.001$. However, this was no clear evidence that moral condition (2.11 ± 0.116) and immoral condition (2.27 ± 0.107) were not significantly different when the shapes are other-referential (see figure 1).

Reaction times

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Discussion

In this demonstration, we examplified how to use *papaja* to prepare an APA style manuscript. We highlighted the following details:

- Installation and start a manuscript from the template.
- YAML front
- Mathematical notations
- Citation
- Insert results from code block

- Plot

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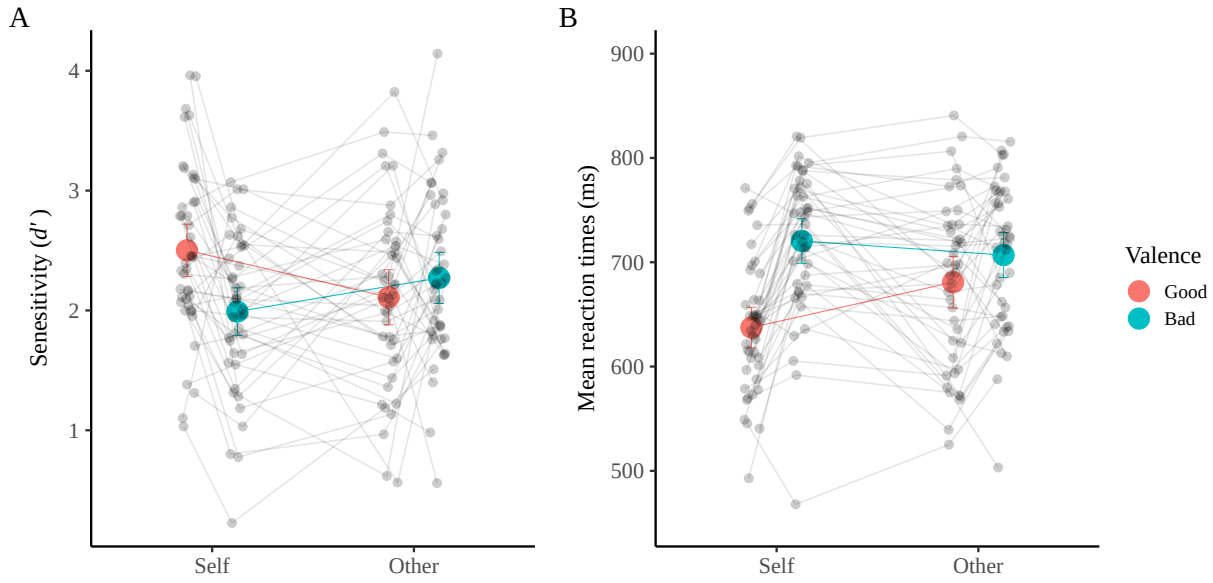

Figure 1. Interaction between identity and valence for (A) sensitivity and (B) reaction times.