FOR2718: Modal and Amodal Cognition

Open Science Statement

(authored by task force on open-science: Kriti Bhatia, Dorina Kohler, HC Nürk, M Huff, VH Franz)

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Reproducibility is essential to maintain the integrity of research. To aid reproducibility and replicability, the following open science guidelines are recommended to all members of the DFG research group 'Modal and Amodal Cognition' (FOR2718).

While not all measures are applicable to all studies, with exceptions like clinical studies etc., different levels of "openness" are described:

- MANDATORY: Acknowledgement of funding sources. The DFG requires this to be mentioned in conference contributions, journal papers etc. in the following format
  - *English publications*: „Funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – 381713393 (Research Unit 2718: Modal and Amodal Cognition)"
  - *German publications*: „Gefördert durch die Deutsche Forschungsgemeinschaft (DFG) – 381713393 (Forschungsgruppe 2718: Modale and Amodale Kognition)"

  Note that all projects should use the same project number: 381713393 for acknowledgements, as mentioned in the DFG approval letters for the second round.

- The parts of this statement printed in red font are highly recommended to all members, since they are mentioned as measures for promoting open science in the FOR 2718 project proposal.

- BASIC: These are the minimum recommended guidelines for an average study conducted within the FOR2718.
  - Pre-registration
    - **..1.** https://aspredicted.org/
    - **..2.** https://osf.io/prereg/
  - Open-access pre-print
    - **..1.** https://arxiv.org/
    - **..2.** https://psyarxiv.com/
  - Open-access publication
  - Sample size determination: Power analysis, Stopping rule etc.
  - Contact Scientific Outreach group to post on Twitter about upcoming manuscripts/published papers

- ADVANCED: As more and more journals incentivize open practices, the following recommendations can be an added advantage. (Badges: https://doi.org/10.1371/journal.pbio.1002456)
  - Ethics approval
  - Open data and materials
  - Open analysis scripts and code

- SPECIAL CASES: Some journals offer specialized formats of articles like Registered Reports and Exploratory Reports for specific cases. Not all studies fit these formats.
  - Registered Reports: https://www.cos.io/initiatives/registered-reports?_ga=2.29146428.165026719.1633962004-422528577.1628496444
  - Exploratory Reports
    - **..1.** https://osf.io/mdz3g/wiki/home/
    - **..2.** https://doi.org/10.1016/j.cortex.2017.07.014

Notes and further information on the Open Science Guidelines

1. Basic

1.1. Pre-registration:

Pre-registration is based on trust and is non-binding. Typically, one can deviate from what is mentioned in the pre-registration if a justification is provided. Journals do not reject manuscripts that deviate from the pre-registration. Therefore, please refrain from the impulse to sugar-coat the details of your experiment. Read this blogpost for tips on how to properly pre-register a study: http://datacolada.org/64

1.2. Open-access pre-print:

- Most journals nowadays allow for publishing preprints on preprint servers. However, to be sure, please check the policy of your target journals, some journals may not allow open pre-prints to be published online (e.g., in case of obligatory double-blind reviews).
- In some cases, not publishing a pre-print is also a matter of strategy, when you don't want to give your competitors a heads-up on your soon-to-be-published paper before it is published. This should be evaluated on a case-to-case basis with the supervisor/PI.
- In general, we recommend (keeping the above-mentioned points in mind) publishing an almost final draft of the paper on a pre-print server especially if the journal is not open-access. Ideally this would correspond to the final, accepted version of the manuscript (before formatting by the journal; most journals allow this!) and it would also be nice if you updated an already existing pre-print to match this almost final version. All this ensures that your scientific work is available in some form outside of paywalls and increases your chances of being cited!

1.3. Open-access publication:

- There are several ways to make your published article publicly and freely available. First, you can publish your work in open

access journals (gold open access). Second, even if you publish in subscription-based journals (e.g., APA or Psychonomic Journals), you can publish a preprint of your work on preprint servers (green open access). The green open access option (also known as self-archiving) refers to the secondary publication of your published article on institutional or disciplinary repositories, sometimes also on the author's website. The third way is hybrid open access. In this case, you can pay a fee to make your article open access even if it is published in a subscription-based journal. Public funding by the university library is only available for gold open access, not for the hybrid open access option. The field is highly dynamic as several national initiatives (e.g., DEAL) negotiate with the publishers to advance open access. It's always a good idea to contact the university library and ask for assistance, ideally before acceptance or before any payments are made.

- It is optimal to have an open-access publication and the major drawback is the cost of publishing. There are solutions to this, as listed below.
- Our university library provides funding towards Open-access pre-print and publication. However, only until a certain limit of costs and only for gold open access, but not for green open access. See: https://uni-tuebingen.de/de/58988 and also https://uni-tuebingen.de/de/216529
- Here is a directory to search for Open-access journals in any field: https://www.doaj.org/
- Here are some (rough) examples for publication fees in open-access journals (… and one might wonder why some journals take the liberty of exceptionally high fees for tax-payer funded research...):
    - Journal of Cognition: 1150 EUR
    - PLoS One: 1749 USD (app. 1500 EUR)
    - Journal of Vision: 1850 USD (app. 1600 EUR)
    - Frontiers in Psychology: 2950 USD (app. 2500 EUR)
    - Nature Communications 4500 EUR

1.4. **Sample size:** Whether you go the Bayesian way, or do a power analysis (in the grant proposal, we promised to aim at a power of 0.8), or set a fixed number, keep in mind that there is currently no consensus on the best/correct answer. Some helpful references:

- Rouder, J. N. (2014). Optional stopping: No problem for Bayesians. Psychonomic bulletin & review, 21(2), 301-308. https://doi.org/10.3758/s13423-014-0595-4
- de Heide, R., & Grünwald, P. D. (2021). Why optional stopping can be a problem for Bayesians. Psychonomic Bulletin & Review, 28(3), 795-812. https://doi.org/10.3758/s13423-020-01803-x
- Schönbrodt, F. D., Wagenmakers, E. J., Zehetleitner, M., & Perugini, M. (2017). Sequential Hypothesis Testing with Bayes Factors: Efficiently Testing Mean Differences. Psychological Methods, 22, 322–339.
- Miller, J., & Ulrich, R. (2020). A simple, general, and efficient method for sequential hypothesis testing: The independent segments procedure. Psychological Methods. https://doi.org/10.1037/met0000350

2. Advanced

2.1. **Ethics approval**: An ethics approval is not required by law for most of our experiments (e.g., typical psychophysical studies), but most journals pose this requirement. It is also relevant for Open Science because of the guidelines for storing and anonymizing experimental data, with respect to the GDPR (EU General Data Protection Regulation). Properly anonymized data can then be published openly without legal problems.

2.2. **Open data and materials**: This is the most valuable and useful part of Open Science. Many journals already require authors to save and store their data for a certain number of (15-20) years after publication and sharing this data (on request) to other researchers who ask for it. Repositories for uploading data and materials: Zenodo, OSF, Potsdam Mind Research Repository (recommended – as mentioned in the grant proposal).

2.3. Open analysis scripts and code

- **General:** Keep the open analysis in mind while scripting to make it more readable/understandable for an outside user, e.g. adding useful comments while writing the code.
- **SPSS users:** Please use the paste-function to create a syntax-file (scripting language).

3. Special cases

3.1. **Registered reports:** Here are some examples of Registered Reports co-authored by members of the FOR2718.

- Kopiske, K. K., Bruno, N., Hesse, C., Schenk, T., & Franz, V. H. (2016). The functional subdivision of the visual brain: Is there a real illusion effect on action? A multi-lab replication study. Cortex, 79, 130-152. https://doi.org/10.1016/j.cortex.2016.03.020, http://www.ecogsci.cs.uni-tuebingen.de/pub/publications_abstracts.php#Kopiske_etal_CORTEX_16
- Colling, L. J., Szűcs, D., De Marco, D., Cipora, K., Ulrich, R., Nuerk, H.-C., Soltanlou, M., Bryce, D., Chen, S.-C., Schroeder, P. A., Henare, D. T., Chrystall, C. K., Corballis, P. M., Ansari, D., Goffin, C., Sokolowski, H. M., Hancock, P. J. B., Millen, A. E., Langton, S. R. H., … McShane, B. B. (2020). Registered Replication Report on Fischer, Castel, Dodd, and Pratt (2003). Advances in Methods and Practices in Psychological Science, 3(2), 143–162. https://doi.org/10.1177/2515245920903079