

<https://www.nwo.nl/en/calls/open-science-fund-2023-package-23-1>

How to fill out this Open Science Fund (OSF) 2023 application form? Please read this information before starting.

IMPORTANT

Applications will be assessed by other applicants to the Open Science Fund 2023 call. This Call for proposals is open to researchers from all disciplines. Therefore, your proposal should be readable and understandable for colleagues outside your own area of expertise. Please bear this broad audience in mind when writing the proposal.

Each section contains further clarification and notes on how to fill the different parts. Please read the information and guidelines in the Call for Proposals when completing this form.

Please adhere to the following rules when filling out this application form:

- **The form must be completed in English** (apart from the Dutch public summary);
- Use the Calibri font at font size 9.5 and do not change the margins (2.5 cm, all directions), line spacing (setting 1,15) or character spacing;
- When writing your proposal, please be specific and provide only information that applies to the proposal and its objectives;
- You may use subheadings and hyperlinks;
- All literature references should be added to section 7;
- Please remove all explanatory text in blue and italics before converting the application to PDF and submitting it;
- Please do not password protect the PDF file as this will hinder the processing of your application;
- NWO signed the San Francisco Declaration on Research Assessment (DORA) in April 2019. DORA aims to call a halt to the irresponsible use of bibliometric indicators in assessing research and researchers (for more information, see <https://sfдора.org/>). NWO implements its principles in all instruments, including the Open Science Fund 2023. This means that the following guidelines for the use of quality indicators apply:
 - All types of quality indicators may be stated, including citations and downloads, as long as they only related to a single output item. Indicators that do not satisfy this guideline are not allowed. This means that you are **not allowed** to mention H-indexes, impact factors, or any type of metric that refers to journal, publisher or platform reputation (e.g. terms such as ‘top journal’) are not allowed either; the scientific content of a paper is much more important than the publication metrics or the identity of the journal in which it was published.

Submission

Please submit the proposal in pdf format and the budget form in excel format (and if applicable a declaration from the employer in pdf format) to NWO via the online application system ISAAC, which can be accessed via the NWO website. The proposal must be submitted from the account of the applicant. If the proposal is not correctly and timely submitted, it will not be considered for funding.

For any technical questions regarding submission, please contact the ISAAC helpdesk (isaac.helpdesk@nwo.nl or +31 (0)70 34 40 600)

The first package of the OSF call 2023 is open for submissions until 9 May 2023, 14:00:00 hours CEST.

Section 1a – Details of the applicant

Name	<i>Dr. Flavio Azevedo</i>
Affiliation – institution	<i>University of Groningen</i>
Affiliation – department	<i>Social Psychology</i>
Position	<i>Assistant Professor</i>
End date of contract	<i>31-12-2023</i>
E-mail address	<i>flavio.azevedo@rug.nl</i>
ORCID ID	<i>https://orcid.org/0000-0001-9000-8513</i>

Section 1b – Details of the team member(s)

Name team member 1	<i>Dr. Helena Hartmann</i>
Affiliation	<i>University Hospital Essen</i>
E-mail address	<i>helena.hartmann@uk-essen.de</i>
ORCID ID	<i>https://orcid.org/0000-0002-1331-6683</i>

Name team member 2	<i>Dr. Lukas Wallrich</i>
Affiliation	<i>Birkbeck, University of London</i>
E-mail address	<i>l.wallrich@bbk.ac.uk</i>
ORCID ID	<i>https://orcid.org/0000-0003-2121-5177</i>

Name team member 3	<i>Dr. Leticia Micheli</i>
Affiliation	<i>Leiden University</i>
E-mail address	<i>l.rettore.micheli@fsw.leidenuniv.nl</i>
ORCID ID	<i>https://orcid.org/0000-0003-0066-8222</i>

Name team member 4	<i>Dr. Sam Parsons</i>
Affiliation	<i>Donders Institute for Brain, Cognition and Behaviour, Radboudumc</i>
E-mail address	<i>sam.parsons@radboudumc.nl</i>
ORCID ID	<i>https://orcid.org/0000-0002-7048-4093</i>

Section 2 - Public summary

English public summary

Replications of previous scientific work are essential to accumulate knowledge and accelerate scientific progress. Despite their relevance, replication studies are under-used and undercited, leading to a biased view of the literature. To facilitate the uptake of replication studies and their wider use in research, education, and policy, we propose to (1) develop and maintain a comprehensive database cataloguing replication efforts by crowdsourcing contributions; (2) develop two interactive online apps for finding, exploring and visualising replications allowing for field-specific metascientific analyses; (3) conduct outreach activities to teach how to best engage with our developed resources.

Word count (max 100): 94

Dutch public summary
<i>Description:</i>
Word count (max 100):

Section 3 – Project proposal

3.1 The details of proposal

Proposed project title and acronym	<i>Tracking and Mainstreaming Replications across the Social, Behavioral and Cognitive Sciences (TRACKREP)</i>
Project duration (in months)	<i>12 months</i>
The project will primarily address	<i>Open platforms or tools</i>
The project will secondarily address	<i>Culture change towards Open Science</i>
Relevance for a specific discipline	<p><i>All disciplines. Currently the project includes data relevant to, and contributions from, the following fields:</i></p> <ul style="list-style-type: none"> ● <i>Educational sciences</i> ● <i>Gender studies</i> ● <i>Linguistics</i> ● <i>Pedagogics</i> ● <i>Philosophy</i> ● <i>Psychology</i> ● <i>Public administration and political science</i> ● <i>Sociology</i> <p><i>Our community also includes members from the following fields:</i></p> <ul style="list-style-type: none"> ● <i>Biology</i> ● <i>Cultural anthropology</i> ● <i>Life sciences</i> ● <i>Life sciences and medicine</i> ● <i>Medicine</i>

3.2 The vision for your project (Criterion: Alignment with the aim of the Call for proposals)

Replication studies—which test the same hypotheses using comparable methods and statistics—are essential to verify results, accumulate knowledge, and accelerate progress^{1,2}. Replication studies are receiving considerable attention, including large-scale multi-site studies in psychology², medicine^{3,4}, preclinical cancer biology^{5,6}, and economics⁷. Nevertheless, they are cited at a lower rate than original studies^{8,9}, producing a skewed view of the literature, posing challenges for researchers and educators who need to stay up-to-date with their field’s state-of-the-art.

To address this problem, in 2020, the ‘Framework for Open and Reproducible Research Teaching’ (FORRT) initiated a crowd-sourced collection of replication studies (forrt.org/reversals). Our vision is to create a culture in academia where replications are embedded and valued activities in both research and education. The NWO Open Science fund will help expand the reach and impact of the **FORRT Replication database** through **three** Work Packages (WPs; cf. Figure 1 for intended outputs):

WP1—Building and maintaining the FORRT Replication database

More than 100 scholars have already contributed over 440 replication studies spanning more than 20 disciplines across the social, cognitive, and behavioural sciences (cf. Figure 2). However, to maximise the database’s value and impact on the scientific community, it’s imperative to expand the number of studies and disciplines represented. WP1 will extend and enrich the existing database and integrate data from existing projects (“Replication Database ReD” and “Curate Science”) into a consolidated open platform.

WP2—Building accessible, interactive online apps



WP2 aims to create two online, interactive, and user-friendly apps using the Shiny package in the R infrastructure (Figure 3). The first app, **Replicability Annotator**, supports educators by allowing the uploading of reference lists and identifying replicated studies and their status. The second app, **Replication Explorer**, enables the exploration and visualisation of replication effects and allows meta-scientific questions to be investigated.

WP3—Dissemination: Teaching, community interaction, and feedback

In WP3, we will disseminate the **FORRT Replication database and apps** within and outside of the scientific community to promote wider recognition of replication studies and broader adoption of replications as a tool to evaluate scientific results critically. We will disseminate these through workshops, teaching, and community interactions, focusing on low-barrier educational events and attracting people who aren’t already engaged in Open Science.

Together, these WPs will produce valuable research and pedagogical tools to advance Open Science practices for multiple target audiences and stakeholders. **Researchers** can find updated information on replication and generate new meta-analytic knowledge. **Educators** can incorporate replications into their teaching, encouraging in-class discussions regarding the robustness of published findings. **Supervisors** can direct students to existing replication studies before starting new projects. **Policy-makers, consumers of science, and the public** can interact with updated scientific output and learn about the most credible evidence for interventions and policy-making.

Word count (max 450): 450

3.3 Project plan (Criterion: Feasibility of the project plan)

The team has extensive experience in creating and maintaining resources in Open Science and hosting hackathons on these topics. We also leverage the FORRT community in this effort, which, since 2018, has demonstrated a strong track record of completing big-team science projects with high-impact publications and resource dissemination¹⁰⁻¹⁵. FORRT includes diverse international researchers and educators across all career stages with a wide array of expertise in Open Science. Figure 1 shows a detailed plan of our proposed WPs and deliverables.

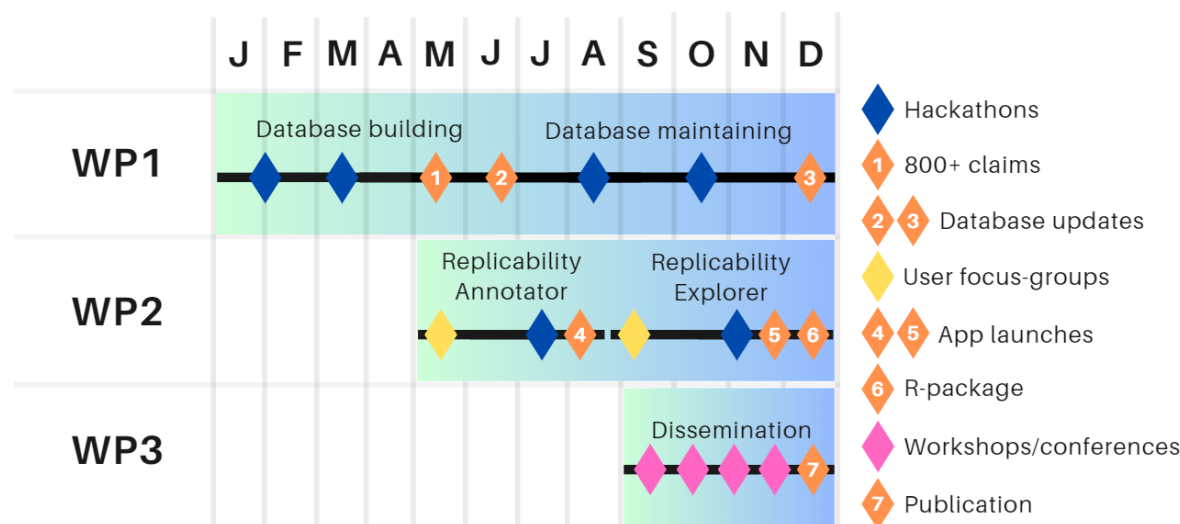


Figure 1. Project timeline.

WP1 - Building and maintaining the FORRT Replication database

The FORRT community has collectively reviewed and compiled over 440 documented replication results based on their status (replicated, not replicated, mixed, or reversed) including effect-sizes of both original and replicated studies (see Figure 2 for an example). WP1 aims to expand it to 800+ completed effects, allowing for field-specific metascientific analyses. We will conduct multiple hackathons over the year to crowdsource contributions from the community (improving existing entries and adding new ones). These events will be advertised across underrepresented fields aiming to increase interdisciplinarity and reach of the database. We plan two major updates over the year, which will be openly shared on [FORRT’s website](#).

Positive Psychology

- **Power pose.** Taking on a power pose lowers cortisol and risk tolerance, while it raises testosterone and feelings of power.

Details

- Status: not replicated
- Original paper: 'Power Posing : Brief Nonverbal Displays Affect Neuroendocrine Levels and Risk Tolerance', Carney et al. (2010), n=42 mixed sexes; 2010, [citations = citation = 1450 (GS, April, 2022)]
- Critiques: [Garrison et al. \(2016\)](#), [n=305, citations = 70 (GS, April 2022)]; [Metzler and Grezes \(2019\)](#), [n = 82 men, citations = 3 (GS, April 2022)] [Ranehill \(2015\)](#), [total n=200, citations = 291 (GS, April 2022)]; [Ronay 2017](#) [n=108, citations = 38 (GS, April 2022)];
- Original effect sizes: $\Phi = 0.30$ in risk-taking from Carney et al. (2010), Sources unknown: $d = -0.30$ for cortisol, $d=0.35$ for testosterone $d=0.79$ for feelings of power
- Replication effect size: Garrison et al. (2016): feeling of power: $n_p^2 = .016$; Metzler and Grezes (2019): cortisol: $n_p^2 = 0.02$, testosterone: $n_p^2 = 0.01$; Ranehill (2015): cortisol: $d = -0.157$, feelings of power: $d = 0.34$; risk taking: $d = -0.176$, testosterone: $d = -0.200$; Ronay (2017): cortisol: $d = 0.034$, feeling of power: $d = 0.226$, testosterone: $d = 0.121$.

Figure 2. A database entry.

WP2 - Building accessible, interactive online apps

Figure 3 shows a preliminary version of the two apps. We will hold two focus groups to discuss initial versions of the apps, and users' needs. Following a development stage, we will run two hackathons to stress-test the apps, identify bugs, collect community feedback, and prepare them for release (including the associated R package).

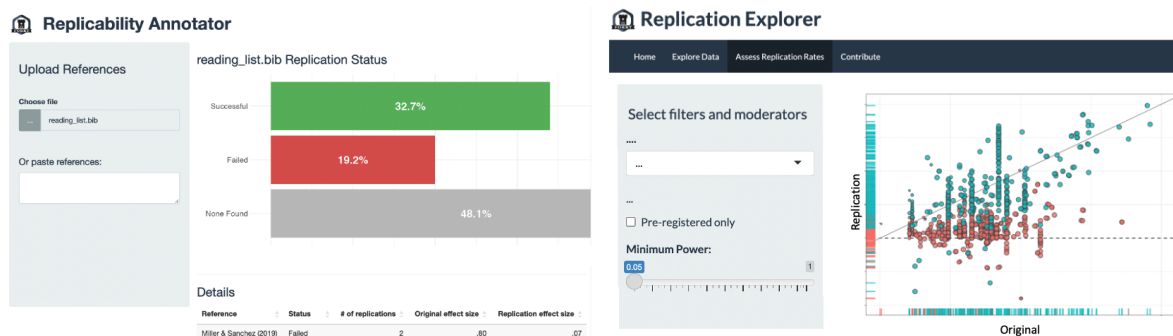


Figure 3. Preliminary App versions.

WP3 - Dissemination: Teaching, community interaction, feedback on improvement

To increase the reach of our initiatives, encourage the wider adoption of replications across different fields, and engage people not yet involved in Open Science, we plan four main activities: First, we will use FORRT's social media channels (i.e., Twitter, LinkedIn) to regularly publicise the products of WP1 and WP2. Second, we will host workshops (online and at our institutions) and record tutorials on Youtube to teach how to efficiently make use of the database and apps for research, education, and policy purposes. Third, we will present our project at conferences (e.g., [Society for the Improvement of Psychological Science](#); [APA Society for the Teaching of Psychology](#)), and develop lesson plans to support the integration of the resources into MSc and PhD training curricula. Finally, we will write a manuscript describing the database and apps, and conducting metascientific research using our data to demonstrate what our resources can achieve. We plan to publish in an open-access, peer-reviewed journal with a broad audience.

Word count (max 500): 431

3.4 Project roles and expertise (Criterion: Feasibility of the project plan)

Flavio Azevedo, the PI, will oversee the project, manage the team, and ensure that all deliverables are met. As the director of FORRT, he has extensive experience in project management and leading large teams.

Helena Hartmann, a community manager at FORRT, will lead WP1 by managing the development and extension of the database, while reviewing changes and comments from each contributor. Given her experience, she will be able to grow the community of contributors further. She will also contribute to WP3 due to her long-standing expertise in public outreach and science communication.

Lukas Wallrich, a FORRT member, will lead WP2, as he has previously worked on developing and maintaining apps, including those to [display meta-analyses](#) based on his [metaUI](#) R package and to assess sources of evidence ([CiteSource](#)). He will also support WP1 as he will be responsible for integrating our database with other existing datasets.

Leticia Micheli, a community manager at FORRT, will lead WP3 by organising and leading workshops. In that, she will leverage her extensive experience with teaching and conducting outreach activities at FORRT, where she is co-leading successful initiatives to [integrate Open Science practices](#) into teaching and mentoring and to lower barriers to the adoption of Open Science practices.

Sam Parsons, the co-founder of FORRT and [ReproducibiliTea Journal Clubs](#), will support WP2 and WP3 with his substantial expertise in data visualisation, teaching, and outreach. With his wide-ranging experience in Open Science-related projects and project management, he will provide valuable input to the project's success.

Word count (max 250): 248

3.5 Budget table

Please copy the information from the budget form into the table in this application form. The budget form automatically checks the right salary posts and automatically does all the additions. Table entries should not exceed one line each. The cost descriptions can be very brief, since the full budget justification is provided separately. The maximum budget you can apply for is € 50,000. You can add extra rows if needed to the table below. The category 'other' is not allowed: all costs must be specified. In case of personnel costs, please specify the type of position, the amount of FTE, and for how many months you are requesting funding. Salary costs for scientific staff must adhere to the UNL- or NFU-tariffs at the moment of submission of the application.

Type of costs	Short description	Costs in euros
Personnel	Other scientific personnel (Flavio Azevedo) (0.2 FTE, 12 months)	€ 16,752
Personnel	Non-scientific personnel (0.3 FTE, 12 months)	€ 18,716
Project-related goods/services	Shiny App hosting subscription costs (5 years)	€ 4,450
Project-related goods/services	Compensation for Participation (4 Hackathons x 30 people x 50€)	€ 6,000
Travel and accommodation costs	Conference Participation for one team member (2 conferences EU/US; travel costs; accommodation; meals; conference fee)	€ 4,000
Total request from NWO		€ 49,918

3.6 Budget justification (Criterion: Feasibility of the project plan)

Clarify your expenditures briefly (max 200 words).

Clarification:

We anticipate the timely execution of all WPs will require time of involved personnel, including 0.2 FTE of the main applicant's (Flavio Azevedo) time to coordinate this project during one year, and a 0.3 FTE project administrator to work closely with the team. They will both be tasked with: maintaining the database, facilitating communication between project partners, organising outreach activities, collecting evidence of the effectiveness of training,

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building community around Open Science adoption, and facilitating onboarding of new contributors.

We also budget project-related activities such as a 5-year subscription to shinyapps.io to ensure both apps are accessible and the project remains viable in the long term (see section 6.3 for details).

In line with FORRT's [commitment](#) to acknowledge all contributions and support Diversity, Equity, and Inclusivity of our work, we budget to offer compensation for the labour of participants who contribute with entries for the database or with input for the apps. We have planned four hackathons (WP1-2), each including approximately 30 people, with a compensation of 50€ for meaningful contributions.

To aid the dissemination (WP3), we budget the participation costs of one team member in two international conferences.

Word count (max 200): 193

Section 4 – Open Science track record of the applicant

Flavio Azevedo is a pioneer in developing tools and practices in Open Science and an advocate for a more diverse, equitable, and inclusive Open Science movement. He is a recognised international leader in Open Science and has received prestigious awards for Open Science, including the UKRN Dorothy Bishop Prize, Hidden-REF, and JISC. His work has been highlighted by NASA¹⁶ and UNESCO¹⁷.

In 2018, Flavio co-founded FORRT (forrt.org)—an interdisciplinary international community of 750+ scholars at all career stages. FORRT integrates Open Science principles into higher education to advance research transparency, reproducibility, rigour, and ethics through pedagogical reform¹⁰. Flavio has directed the FORRT community through the development of a range of pedagogical resources, including: ready-to-use Open Science lesson plans¹³, a consensus-based glossary of over 250 Open Scholarship terms¹², and a systematic review of the impact of Open Scholarship on students' outcomes¹⁴.

Flavio has co-led several Big Team Science projects on the psychology of COVID-19¹⁸⁻²¹ and joined other open replication efforts, including COS's SCORE²² and Multi100 projects, Crowdsourced Replication Initiative²³, and Psychological Science Accelerator²⁴.

Flavio has hosted over 50 workshops, including; methodology and statistics, programming, Open Science, and pedagogy.

In his own work, he shares data, analysis scripts, materials, and preprints²⁵⁻³⁵.

Word count (max 200): 200

Section 5 – Data management (Criterion: Feasibility of the project plan)

5.1 Will this project involve re-using existing research data?

Kies een item. **Yes: Are there any constraints on its re-use?**

If no, please briefly explain why; if yes, state any constraints on re-use of existing data if there are any.

In WP1 (building and maintaining the database) we will make use of existing databases of replication efforts (i.e., Curate Science, ReD, and any others that might be identified by our community members). There are no constraints on the re-use of these data (a) as they are based on summary statistics and paper-level meta-data so that no ethical limitations apply and (b) as the databases are released under Creative Commons or similar licences that are compatible with our licensing.

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5.2 Will data be collected or generated that are suitable for reuse?

Kies een item.

If no, please explain why the project will not result in reusable data or in data that cannot be stored or data that for other reasons are not relevant for reuse.

YES

5.3 After the project has been completed, how will the data be stored for the long-term and made available for the use by third parties? Are there possible restrictions to data sharing or embargo reasons? Please state these here.

Data collected in WP1 (building and maintaining the database) will be released on the Open Science Framework (osf.io) and Zenodo (zenodo.org), ensuring F.A.I.R. principles of Findability, Accessibility, Interoperability, and Reusability are adhered to. There will not be an embargo period. The OSF is committed to maintain storage for 50+ years and EU's Zenodo for at least 20 years. Data will also be stored in a GitHub repository alongside the source code for the apps, and released in an R package to CRAN. While the latter is primarily intended for use in teaching, it will also contribute to long-term accessibility.

5.4 Will any costs (financial and time) related to data management and sharing/preservation be incurred?

Kies een item.

No direct financial costs will be incurred relating to data management, preservation, and sharing. We have budgeted for 5 years hosting of the Shiny apps to ensure long term accessibility beyond the project duration. The time necessary to ensure data management, preservation, and sharing are accounted for within project lead (0.2 FTE) and project assistant (0.3 FTE).

Section 6 – Software sustainability (Criterion: Feasibility of the project plan)

NWO expects that any software developed as a result of this call will be made, as much as possible, openly and sustainably available for reuse. In this section, you are asked to think in advance how any developed software will be licensed and published so that it can be made openly available for reuse. After a proposal has been awarded, the main applicant should elaborate the software sustainability section into a software sustainability plan. The plan must be submitted to NWO via ISAAC within four months after the proposal has been awarded funding.

6.1 Will software be generated during the project?

Kies een item. YES

6.2 How will the software be licensed and be made available for re-use?

We will licence the apps and all underlying code under the [GPL-3](https://www.gnu.org/licenses/gpl-3.0.html), considered the gold standard for software that is freely available for reuse and adaptation. This will also allow us to build on existing code that is partly licenced under CC licences which are only compatible with GPL-3. The software will be made available for reuse through releases on GitHub and CRAN (the leading R package archive). In addition, the apps will be hosted on shinyapps.io so that they can also be used by novices, supported by tutorials and detailed documentation.

6.3 What measures are needed to make the software appropriate for long-term (re-)use by third parties?

Four measures will ensure the availability and suitability of the software for long-term reuse:

1. We choose an **architecture** that is stable. R is a long-lived programming language with broad community support, and the Shiny app ecosystem (www.shinyapps.io) is supported both by Posit and a broad volunteer community. Therefore, the technical base should remain functioning long-term.
2. We will **store** the fully commented and documented code on both the OSF (with their 50+ year storage commitment) and on GitHub (where it is findable by a broad community).
3. We **enable continuous updates** of the underlying database where users can submit additions and corrections within the Shiny app. They will be automatically added into the dataset, and be displayed after a streamlined volunteer review process. In addition, we will disentangle the code from the data and

- clearly document the data format, so that the software can easily be used with other datasets.
4. We will **host** the Shiny apps on shinyapps.io under a 5-year plan. Note, however, that they can be run offline by any interested user, and deployed to any other cloud hosting platform so that this is not a critical dependency.
 5. We will **release** a stable version of the apps and dataset on **CRAN**, the central R package archive. This will facilitate its use particularly by less experienced users and in a classroom context. Additionally, hosting our apps and dataset on CRAN will provide an additional layer of storage, ensuring that they are always accessible and reducing the risk of data loss.

6.4 How large do you expect the community that will potentially use the software to be, and do you expect outside contributors to the software?

We expect the reception of the database and corresponding Shiny apps to be large and cross-disciplinary. We already have 750+ past and active contributors all over the world, and expect a benefit of our project both within and outside academia. Our resources can be used 1) by **researchers**, especially within the Open Science community, who are interested in informing themselves about or in changing the landscape of replication research to answer meta-analytic research questions, 2) by **educators** to assess the evidentiary status of their reading lists and to educate students about the importance of replications, 3) by **supervisors** who can transmit open science values such as replications to their employees and students, and 4) by **stakeholders, consumers of science, and the public** who are able to interact with updated scientific evidence.

Regarding external contributions, FORRT as an organisation already embraces an Open Scholarship perspective by inviting interested people to contribute with effects from their disciplines. We expect no other external contributions, but stay open to possible new avenues and collaborations, e.g. meta-scientific projects to extend the shiny apps.

6.5 What expertise do you expect to be needed to make the software appropriate for long-term re-use by third parties? Is this expertise available?

Creating and maintaining robust web applications to interact with a large database requires expertise in project management, supervision and community building, which are skills that our team members possess. We will also ensure that the project administrator will be recruited and trained with these skills in mind.

Enabling long-term reuse of software requires ability in defensive programming and testing, an understanding of the R ecosystem and of potential archiving and hosting platforms. As a project team with substantial experience in Open Science and Open Source practices, we have substantial expertise in these matters, and thus do not expect to need external expertise. For instance,

- Lukas Wallrich is the creator and maintainer of multiple R packages (*rsprite2* - <https://cran.r-project.org/web/packages/rsprite2>, *timesaveR* - <https://github.com/LukasWallrich/timesaveR> and *metaUI* - <https://github.com/LukasWallrich/metaUI>), and has contributed to a range of larger packages that have given him a better understanding of the R ecosystem (e.g. *modelsummary*, *broom* and *rcrossref*).
- Sam Parsons is the creator and maintainer of the *splithalf* (<https://cran.r-project.org/web/packages/splithalf>) and *ICED* packages (<https://cran.r-project.org/web/packages/ICED>), which equips him to further enhance the sustainability of WP2.
- Flavio Azevedo designed and implemented FORRT's large-scale website (<https://forrt.org>) openly on GitHub (<https://github.com/forrtproject/forrtproject.github.io>), containing several types of academic, research, and educational pages/initiatives as well as a focus on accessibility.
- Helena Hartmann is experienced in using RMarkdown and handling FORRT's website, in order to continuously update the project and output sub pages.

Section 7 – Literature references

Note: names of applicant team members are in **bold**

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11. Korbmacher, M., Azevedo, F. ... Hartmann, H. ... Micheli, L., & Evans, T. (in press). The replication crisis has led to positive structural, procedural, and community changes. *Communications Psychology*.
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