

1 Introduction

1.1 Background

Content

Replication lies at the heart of the scientific method and makes it possible to build upon previously demonstrated and confirmed scientific findings. Many studies, however, have proved not to be reproducible. If research is not reproducible then this is often attributed to chance, or unintended errors, but p-hacking, publication bias and especially selective reporting will undoubtedly play a major role in this as well.¹

By encouraging the realisation of replication research, NWO wants to make a contribution to increasing the transparency of research and the quality and completeness of the reporting of results. With this, NWO is joining initiatives such as the Reproducibility Project in psychology, and journals such as The Journal of Finance that has launched a section for publishing replications.² NWO hopes that by encouraging replication research it can contribute to making replication research more commonplace and to improving insights into the reproducibility of research.

This programme is open to the submission of proposals for the replication of research within the disciplines of NWO Social Sciences and ZonMw. The programme may be modified in later rounds based on the results from earlier rounds.

There are three types of replication research:

1. Reproduction: replication with existing data - repeated analysis of the datasets from the original study.
2. Replication with new data: new data collection with the same research protocol as the original study.
3. Replication with the same research question: new data collection with a different design from the original study in which the research question remains unchanged compared to the original research.

In this pilot programme, only research that falls under the first two categories will be financed.

1.2 Available budget

For this funding round M€ 1 is available.³ A maximum of €75,000 can be requested for a Type 1 project and a maximum of €150,000 for a Type 2 study.

¹ Reproducibility is not the only factor that can influence the quality, societal impact, integrity and efficiency of research. In this context we refer you to the programme Fostering Responsible Research Practices <http://www.zonmw.nl/nl/programmas/programma-detail/bevorderen-van-verantwoorde-onderzoekspraktijken/algemeen/> (only in Dutch)

² <http://dx.doi.org/10.1126/science.aac4716>

<http://www.afajof.org/SpringboardWebApp/userfiles/afa/file/Submissions/Replications%20and%20Corrigenda.pdf>

³ NWO has made M€ 3 available for the programme, for a period of three years. The funding for next calls will be decided on the basis of the experiences of the first call.

1.3 Validity of the call for proposals

This call for proposals is valid until the closing date **January 12, 2017**.

2 Aim

With this pilot programme NWO wants to encourage researchers to carry out replication research. NWO also wants to gain experience that can lead to insights into an effective way of including replication research in research programmes and to obtain insight into and a reflection on the requirements that NWO sets for research in terms of methodology and transparency.

3 Guidelines for applicants

3.1 Who can apply

Researchers from the following knowledge institutions can submit proposals:

- Dutch universities;
- NWO and KNAW institutes;
- University Medical Centres;
- the Netherlands Cancer Institute (NKI);
- the Netherlands institute for health services research (NIVEL)
- the Trimbos Institute (Netherlands institute for Mental Health and Addictions)
- the National Institute for Public Health and the Environment (RIVM)
- the Max Planck Institute for Psycholinguistics in Nijmegen;
- researchers from the DUBBLE Beamline at the ESRF in Grenoble;
- NCB Naturalis;
- the Advanced Research Centre for NanoLithography (ARCNL).

Expertise required and composition of the project group

Applicants are researchers who hold a PhD and are employed at one of the aforementioned institutions for the duration of the proposed project. They clearly possess the methodological competencies needed to carry out/supervise such a study. Applicants should also have demonstrable expertise in the research area of the study to be replicated. If the research will be carried out by several researchers then it must be clear from the composition of the project group that it contains the relevant expertise required. Besides research expertise there is a strong emphasis on methodological and statistical expertise.

There may be no history of collaboration with the original researchers (such as a supervisor-PhD student relationship, co-authorship, or another form of collaborative relationship). On the other hand there may also be no history of conflict. Applicants should provide convincing evidence that there is no prejudice or conflict of interest with respect to the original researchers. Further details about the types of conflict of interest can be found in Section 2.2 of the [NWO Code of Conduct on Conflicts of Interest](#) and section 3.4 of this call for proposals.

Where the design of the research deviates from or has been modified with respect to the original research, the applicant should state why these changes are necessary and why this is not a Type 3 replication study.

3.2 What can be applied for

For this pilot programme, funding can be requested for the replication of so-called cornerstone research: research that has had substantial consequences with respect to theory or policy and for which it is therefore important to assess whether the results on which these consequences are based are reproducible. In their proposal the applicants must argue why the original research that they want to replicate can be regarded as cornerstone research and why it is important to replicate this.

It should be noted that if the research has previously been replicated or if it is being replicated at the moment the proposal is submitted then the applicants will have to provide convincing arguments as to why an additional replication study is worthwhile.

Cornerstone research concerns one or more of the following types of research:

- studies that are frequently cited with far-reaching consequences for subsequent research. This can also include studies with theoretical and/or practical implications for which an intensive post-publication debate has arisen in the form of letters to the editor, on websites (for example <https://pubpeer.com/>) or in blogs (for example <http://retractionwatch.com>).<https://pubpeer.com/http://retractionwatch.com/>
- research that plays a major role in policy formation, or studies on the basis of which important policy decisions have been taken: for example studies that have implications for the organisation and/or funding of healthcare or that play a crucial role or are expected to play a crucial role in a clinical guideline, with implications for the prevention of health problems.
- research that is part of the educational canon: research that is often cited in textbooks for students.
- research that has received a lot of media attention and therefore has a considerable impact on the public debate.
- studies with far-reaching consequences for legislation.

Explanatory note for proposals for ZonMw research

Examples of applications that can be submitted are proposals to replicate preclinical experimental animal research, stem cell and cell culture research, research aimed at models and human research aimed at prevention, diagnostics, therapy and prognosis. The replication of clinical trials falls outside of the scope of the pilot programme. Reproduction, reanalysing data from clinical trials, does however fall within the scope of the programme. See for ZonMw discipline codes the attachment to www.nwo.nl/replicationstudies.

Explanatory note for proposals for Social Sciences research:

Researchers can apply for funding for the replication of research that falls within the behavioural and social sciences, as included in the NWO discipline codes. Funding can be requested for the replication of experimental studies and for the reanalysis of survey data. Examples of research in the social and behavioural sciences that can be replicated in this programme are research that forms the basis for the development of teaching methods or research that forms the basis for interventions. See for social sciences discipline codes the attachment to www.nwo.nl/replicationstudies.

Type of replication, budget and-co-funding

As stated in Section 1.1 different types of replication studies can be distinguished. The most appropriate form for replicating the original study (Type 1 or Type 2) is described and substantiated by the applicants.

A maximum of €75,000 can be requested for a Type 1 project and a maximum of €150,000 for a Type 2 study. This amount can be freely allocated across personnel and material costs. The maximum duration of the research is two years. All costs for which funding is requested must be justified in the proposal. The reasonableness of the budget requested (value for money) is a heavily weighted assessment criterion and will be considered by the Executive Board when setting the amount awarded.

Within the category Type 1 research the preference is, where possible, for several replications to be carried out within a single project.

Co-funding is permitted as long as this remains limited to co-funding from the university/UMC, the Royal Netherlands Academy for Arts and Sciences (KNAW), NWO institutes, Netherlands Institute of Mental Health and Addiction (Trimbos Institute), Netherlands institute for health services research (NIVEL), National Institute for Public Health and the Environment (RIVM) and the health funds (Dutch Cancer Society, Dutch Heart Foundation, Asthma Fund, etc.). It is of paramount

importance that the research is carried out independently; interests must also be clearly stated in the Conflict of Interests section in the application. Co-funding is not a requirement and gives no advantage during the assessment.

Role of the original researchers and information about the original research

The replication research must be carried out independently from the original researchers. It is however important that the relevant information, if possible, is requested from the original researchers and that they are informed about the intention to replicate the research.

In their application, applicants are requested to explain whether the original researchers have been informed and/or approached about the proposal and to state whether, and if so which, agreements have been made with the original researchers about access to the necessary information about the original research, the role of the original researchers (in an advisory capacity concerning the proposed replication for instance), and how the results of the research will be published and communicated. From this description it must be clear that the original researchers have no active researcher's role in the replication study.

Applicants must request the relevant data from the original study as comprehensively as possible: research protocol, logbook data collection, datasets, amendments, data analysis etc. In the application they must demonstrate that they have access/will obtain access to the data (Type 1) or the research protocol (Type 2). In some cases a research protocol will not be available. If this is lacking the applicants are requested to argue in the application how they will resolve this and in so doing to demonstrate the feasibility of their proposal.

Applicants are also requested to justify the choice of the sample they will take and to demonstrate that the sample size is large enough for the proposed research. Determining the required sample size can be justified in a number of ways.⁴ Because reported effect sizes in the literature are often overestimations as a result of publication bias,⁵ it is necessary to consider the required sample size well, and, if necessary, to determine this with the aid of a statistician.

If a proposal is awarded funding but the availability of the required data although likely has not been confirmed then the funding will be disbursed on the condition that these data are obtained. The project can only start once these data are clearly in the possession of the researchers.

⁴ Maxwell, S. E., Kelley, K., & Rausch, J. R. (2008). Sample Size Planning for Statistical Power and Accuracy in Parameter Estimation. *Annual Review of Psychology*, 59(1), 537–563.

<http://doi.org/10.1146/annurev.psych.59.103006.093735>

⁵ Open Science Collaboration, 2015: Estimating the reproducibility of psychological science. *Science* Vol 349, Issue 6251 28 August 2015. <http://science.sciencemag.org/content/349/6251/aac4716>

Button, Ioannidis, et al (2013): Power failure: why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience* 14, 365-376 (May 2013)

<http://www.nature.com/nrn/journal/v14/n5/full/nrn3475.html>

3.3 When can applications be submitted

The deadline for the submission of proposals is **January 12, 2017**, 14:00 hours CE(S)T.

When you submit your application to ISAAC you will also need to enter additional details online. You should therefore start submitting your application at least one day before the deadline of this call for proposals. Applications submitted after the deadline will not be taken into consideration.

3.4 Preparing an application

- Download the application form from the electronic application system ISAAC or from NWO's website (on the grant page for this programme).
- Complete the application form.
- Save the application form as a PDF file and upload it in ISAAC.

The application must be written in English and contain information about the following points:

1. Research proposal
 - Why can the research to be replicated be viewed as cornerstone research? Has the research had substantial consequences, from a theoretical or policy point of view, and why is it, terms of methodology or content, important to test whether the results on which these consequences are based are reproducible?
 - Motivation for choosing Type 1 or 2 – why is this the most suitable form?
 - The methodological approach for the research
 - is the replication/reproduction as precise as possible and if not, where does the replication study deviate from the original study and why?
 - arguments supporting the sample size. If an improvement of the sample size is proposed then the need for this should be justified
 - If the research has been replicated in the past or is currently being replicated then why is carrying out an additional replication worthwhile?
2. Original research
 - Arguments to demonstrate the independence with respect to the original researchers – conflict of interest
 - Have the original researchers been informed and have any agreements been made about the research?
 - Are the relevant data⁶ from the original research in the possession of the applicants and if that is not the case how do the applicants plan to deal with this?
3. Registration and dissemination
 - A plan for registering the research with a databank or repository
 - A data management plan that details the storage of measurement data and if data will not be stored in a public repository, then the reason for this choice must be given
 - A dissemination plan, with attention for the reporting guidelines, publications and other forms of knowledge utilisation used

⁶ Type 1: original dataset and analysis plan, Type 2: the complete original protocol.

4. Team

- Methodological competencies of the team
- Expertise in the area of the study to be replicated
- For each member of the team you can add a short CV as an attachment to illustrate the competencies and expertise stated above. For the CV please use the template provided with the application form.

You may want to use the services of DANS (www.dans.knaw.nl) when writing the application. DANS can advise about access to data via EASY, about access to data that is stored in repositories abroad, and provide help with the preparations for depositing data that emerges from the research (see also the section about data management under 3.5). For this you can contact Kees Waterman (kees.waterman@dans.knaw.nl).

3.5 Conditions on granting

NWO Regulation on Granting

The NWO Regulation on Granting applies to this programme. This regulation can be downloaded here: <http://www.nwo.nl/en/documents/nwo/legal/nwo-regulation-on-granting-2015>

Open Access

All scientific publications resulting from research that is funded by grants derived from this call for proposals are to be immediately (at the time of publication) and freely accessible worldwide (Open Access). There are several ways for researchers to publish Open Access. A detailed explanation regarding Open Access can be found at www.nwo.nl/openscience-en.

Data management

Responsible data management is part of good research. NWO wants research data that emerges from publicly funded research to become freely and sustainably available, as much as possible, for reuse by other researchers. Furthermore, NWO wants to increase the awareness among researchers about the importance of responsible data management. Proposals should therefore satisfy the data management protocol of NWO. This protocol consists of two steps:

1. Data management section

The data management section is part of the research proposal. Researchers should answer four questions about data management within their intended research project (see <http://www.nwo.nl/datamanagement> for further information). They will therefore be asked before the start of the research to think about how the data collected will be ordered and categorised such that it can be made freely available. This often means that measures will need to be taken when the data are produced and analysed to make its later storage and dissemination possible. Researchers are free to state which research data they consider relevant for storage and reuse.

2. Data management plan

After a proposal has been awarded funding, the researcher should elaborate the data management *section* into a data management *plan*. That plan must be submitted to NWO via ISAAC within four months of the proposal being awarded funding. NWO will approve the plan as quickly as possible. Approval of the data management plan by NWO is a condition for the grant being disbursed. The plan can be adjusted during the research.

Further information about the data management protocol of NWO and the form to be used can be found at:

<http://www.nwo.nl/datamanagement>.<http://www.nwo.nl/datamanagement>

Nagoya Protocol

The Nagoya Protocol became effective on 12 October 2014 and ensures an honest and reasonable distribution of benefits emerging from the use of genetic resources (Access and Benefit Sharing; ABS). Researchers who make use of genetic sources from the Netherlands or abroad for their research should familiarise themselves with the Nagoya Protocol (www.absfocalpoint.nl). NWO assumes that researchers will take all necessary actions with respect to the Nagoya Protocol.

Transparency: registration and publication

To increase transparency, the project should be registered with a databank or repository. During the registration prior to the start of the study the researchers will state what they will register and upload (research protocol, data management plan and data analysis plan) and they should substantiate this. After the completion of the study the logbook of the data collection (lab journal), the datasets, the data analysis (syntaxes and analysis files), and all outcomes will be uploaded. These data will be made accessible to other researchers and preferably be made publicly available. If there are reasons for not making the data publicly accessible then the applicants need to justify this choice in their proposal.

Researchers will explore the possibilities for registering the research protocol with journals and for publishing the research protocol, as well as the possibilities for publishing the research results and data from the research. Researchers should include a dissemination plan in their proposal in which they also describe how they will disseminate the results from the research within their own (sub)discipline(s). In this the researchers should also state which reporting guidelines they will follow. Where animal experiments form part of the proposed research then the [ARRIVE guidelines](#) must be adhered to.

How the registration takes place differs per field and discipline. Researchers are requested to act in accordance with the most recent and most progressive developments in the discipline concerned and to demonstrate this in their proposal.

At the end of the programme NWO will organise a scientific congress. Researchers will present their experiences, with a strong focus on the methodology and the practical aspects of replicating research.

3.6 Submitting an application

An application can only be submitted to NWO via the online application system ISAAC. Applications not submitted via ISAAC will not be taken into consideration.

A main applicant must submit her/his application via her/his own ISAAC account. If the main applicant does not have an ISAAC account yet, then this should be created at least one day before the application is submitted to ensure that any registration problems can be resolved on time. If the main applicant already has an NWO account, then she/he does not need to create a new account to submit an application.

When you submit your application to ISAAC you will also need to enter additional details online. You should therefore start submitting your application at least one day before the deadline of this call for proposals. Applications submitted after the deadline will not be taken into consideration.

For technical questions please contact the ISAAC helpdesk, see Section 5.2.1.

4 Assessment procedure

4.1 Procedure

The first step in the assessment procedure is to determine the admissibility of the application. This is done using the conditions stated in Chapter 3 of this call for proposals.

The NWO Code of Conduct on Conflicts of Interest applies to all persons and NWO staff involved in the assessment and/or decision-making process.

Once the admissibility has been checked by ZonMw and NWO Social Sciences, the proposals will be submitted to two external experts for review: one expert in the subject of the proposal and one methodological expert. The research expert will be asked to respond to the assessment questions about the cornerstone quality of the research to be replicated and the assessment questions that are concerned with the research aspects of the proposal (is it a proposal that will yield a worthwhile replication, quality of the applicants, et cetera). The methodological expert will be asked to consider the methodological aspects of the proposal. Both reports will be submitted for a rebuttal to the main applicant. The selection committee will consist of methodological and statistical experts from the two fields, and will prioritise the proposals based on the proposal, the referees' reports and the rebuttal. The assessment committee will formulate the funding recommendation to the accredited board within NWO, who then takes the decision.⁷

Option for preselection:

Preselection will only take place if more than sixty proposals are received (in principle four times as many proposals as the expected number of proposals to be awarded funding). If this criterion is not satisfied then all proposals will be sent to the referees without preselection. If a preselection is carried out then the composition of the selection committee for this will be expanded: in addition to a core committee of methodological/statistical experts the committee will be enlarged to include ad hoc members who will assess the cornerstone value of the proposals.

The assessment in the preselection will be based on some of the assessment criteria – see below. Those criteria are: Criterion 1: justification cornerstone and relevance of the application, and Criterion 3: availability of data needed. During the preselection the committee will assess all proposals on a comparative basis and will prioritise these according to their chances of funding without making use of external referees. The candidates with the least chance will be informed that the committee does not intend to select their proposals for further consideration. If candidates have a valid reason to challenge the assessment of the committee then they can send a motivated response to the office. Following the response the committee can eventually still decide to select a proposal. If the proposal is not selected then the candidate will receive a formal rejection decision concerning the proposal.

⁷ In 2017, NWO will have a new governance structure with a central Executive Board and four domain boards (<http://www.nwo.nl/en/news-and-events/news/2015/contours-new-nwo-announced.html>). More details as to what the “accredited board” for this funding instrument is will be published in due course on the NWO Funding page for this call.

If the interest for the programme during the first round proves to be particularly large then a preproposal procedure for later rounds will be considered.

Qualifications

NWO gives all full proposals a qualification. The applicant is informed of this qualification when the decision about whether or not to award funding is announced.

Only proposals that receive at least the qualification excellent/very good/good will be eligible for funding.

For further information about the qualifications see www.nwo.nl/qualifications.

The allocation of funding between ZonMw and NWO Social Sciences will take place according to the ratio of proposals from both divisions that are identified as fundable so that the proposals awarded funding are a reflection of the proposals of good quality submitted.

Programme committee

The research-specific guidance of this pilot programme largely rests with subject experts in the area of replication research. To this end, NWO has appointed a programme committee that contains experts from the field of replication research. The programme committee will meet about twice per year to discuss the programming, the progress, the latest developments, bottlenecks and any interim adjustments needed for the pilot programme. The programme committee has no role in the assessment of the proposals. The programme committee will advise the boards of ZonMw and NWO Social Sciences/the ZonMw and NWO Social Sciences and Humanities domains and the Governing Board / Executive Board of NWO.⁸

Indicative timeline

The indicative timeline is as follows:

12 January 2017	Deadline submission proposals
January - April 2017	Consultation referees
May 2017	Obtaining rebuttal from applicants. Researchers will be given a week to give a response
June 2017	First meeting selection committee
July 2017	Decision Executive Board NWO
July 2017	NWO informs applicants about the decision

4.2 Criteria

1. Justification cornerstone and relevance of replication
 - Does the research that will be replicated form a cornerstone in the sense that important policy decisions have been or will be taken or because the research has or will have major theoretical consequences? Do the applicants provide convincing arguments about why this research in particular should be repeated?

⁸ Dependent on the moment in the transition process of NWO and ZonMw.

- Does the replication have any methodological and/or subject-specific added value?
 - Has the research been replicated in the past? If so, is the argumentation of the researchers as to why additional replication is needed convincing?
2. Exactness and feasibility of the replication
 - Is the proposed research a replication that is as precise as possible? If not, then are the points where the replication research deviates from the original study convincingly justified? If the applicants propose a specific improvement of sample size, for example, then are the reasons for this and the realisation of this sufficiently supported?
 - Is a justification of the sample size included in the proposal? Is it clear from this that the sample size is large enough? Have the underlying assumptions been sufficiently supported?
 3. Availability necessary data
 - Is the required information available to carry out the application: for Type 1 research: is the dataset and the analysis plan available, and for Type 2 research: is the protocol available?
 - If applicable, do the researchers convincingly describe how they will deal with missing information?
 4. Methodology, registration, publication, knowledge utilisation
 - Does the action plan proposed enable the researchers to draw a clear conclusion about the reproducibility of the original research?
 - Is there a clear plan for the registration of the research, publication of the results and the registration of the data, data analysis, protocols and other relevant details about the research? Is the study in line with the most recent and most progressive developments in the discipline?
 - Is there a concrete plan for dissemination? Is this realistic?
 - Does the plan miss out opportunities?
 5. Quality of the applicants
 - Are the researchers capable of carrying out the proposed research?
 - Do the researchers possess the right subject-specific and methodological knowledge and experience required for the proposed research?
 6. Budget
 - Is the budget requested reasonable for the realisation of the proposed research (value for money)?
 - Has the budget been allocated across personnel and material costs in such a way that the research can be carried out properly?
 7. Relationship with the original researchers
 - Is the relationship with the original researchers clearly described?
 - Is there any form of involvement between the applicant and the original researchers?

In assessing the proposals, a 9 point scale will be used, on which 1 represents the highest/best score, and 9 the lowest/worst. All criteria will be scored (and in case of a preselection, a subset of the criteria).

On the basis of the scores and overall weighted average score will be calculated. This overall average score constitutes the final score. The final score will determine the position in the ranking. In calculating the final scores, the different weights allocated to the criteria will be taken into account. Criteria 1 to 3 contribute to the final score for 20% each, criteria 4 to 7 for 10% each.

5 Contact details and other information

5.1 Contact

5.1.1 Specific questions

For specific questions about Replication studies and this call for proposals please contact:

- Carlien Hillebrink, + [REDACTED], c.hillebrink@nwo.nl
<mailto:c.hillebrink@nwo.nl>
- Guillaume Macor, + [REDACTED], macor@zonmw.nl
<mailto:macor@zonmw.nl>

5.1.2 Technical questions about the electronic application system ISAAC

For technical questions about the use of ISAAC please contact the ISAAC helpdesk. Please read the manual first before consulting the helpdesk. The ISAAC helpdesk can be contacted from Monday to Friday between 10:00 and 17:00 hours CET on +31 (0)20 346 71 79. However, you can also submit your question by e-mail to isaac.helpdesk@nwo.nl. You will then receive an answer within two working days.

5.2 Other information

After the completion of the research projects, the programme committee will evaluate the outcomes of the pilot in order to formulate recommendations for NWO. This evaluation will concern the outcomes of the research funded, such as publications, preregistration, accessibility of data, and additional data about the research.

At the end of the programme a conference will take place to present the results of the programme. Researchers funded by the programme will present their experiences with carrying out their replication research and make a statement about the outcome of their replication research.

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