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www.nagc.org

Registered Reports

Registered Reports are a form of empirical article in which the methods and proposed analyses are pre-registered and sent to reviewers for feedback *prior to* the research being conducted. This format is designed to minimize bias in science, while also allowing complete flexibility to conduct exploratory (unregistered) analyses and report serendipitous findings.

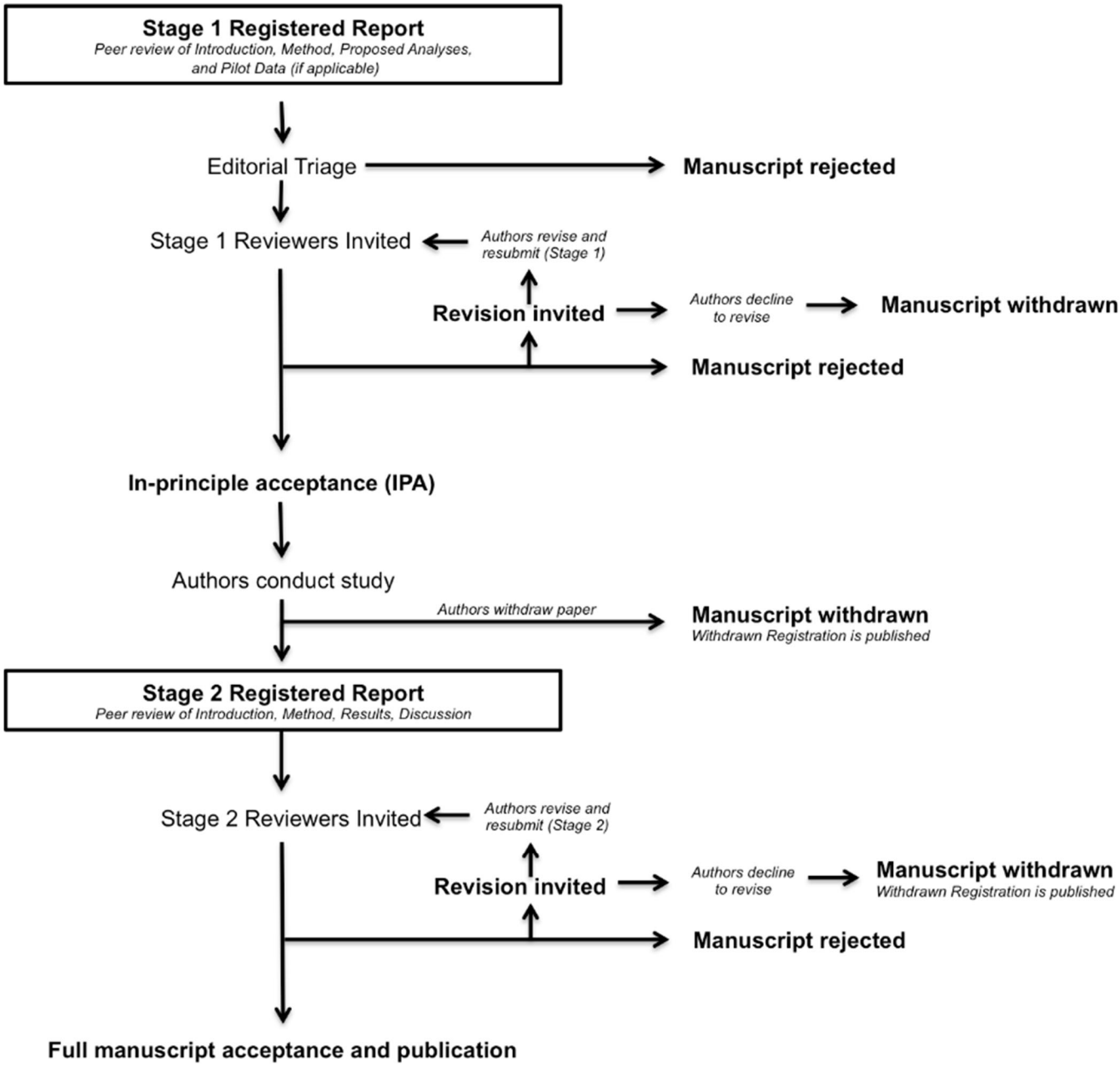
The cornerstone of the Registered Reports format is that a substantial portion of the manuscript is submitted to be assessed prior to data collection, with the highest quality submissions accepted in advance. Initial Registered Report submissions should include a description of the key research question(s) and background literature, hypotheses, methods/procedures, analysis pipeline, a statistical power analysis (or Bayesian equivalent), and pilot data (where applicable).

Like all *GCQ* submissions, initial submissions will be triaged by the editorial team for suitability. Those that are judged to be suitable for review, including that they have an appropriate sample and have broad enough implications and interest for the field, will be sent for in-depth peer review (Stage 1). Following review, the proposed study then will be either rejected or accepted in principle for publication (likely after revisions). Following the in principle acceptance (IPA), the authors then will proceed to conduct the study, adhering exactly to the peer-reviewed procedures and clearly indicating any additional analyses as having been conducted post hoc (i.e., they were not included in the Registered Report that received the IPA). When the study is complete the authors will submit their finalized manuscript for re-review (Stage 2). The authors also are encouraged to upload their data and materials to a publicly accessible file-sharing service. Pending passing of quality checks (e.g., the manuscript is written clearly and in accordance with APA stylistic guidelines, the Registered Report was adhered to, any pre-specified manipulation checks or other quality control measures were implemented) and a sensible interpretation of the findings, as determined by reviewers and editors, the manuscript will be published regardless of the statistical significance or effect size of the actual results or of the findings.

This document details the Review Process for Registered Reports including Author Guidelines for Stage 1 (Initial Manuscript) and Stage 2 (Full Manuscript) Submission and Review. **In addition to meeting the guidelines set forth in this document, Registered Reports must meet the *GCQ* Author Submission Guidelines for all submissions.**

Note that *GCQ* encourages the use of Registered Reports as a submission option for replication studies (which would allow for peer review prior to observing the study outcomes).

The Review Process for Registered Reports



Note that although we strive to have the Stage 2 resubmission considered by the same reviewers as in Stage 1, depending on reviewer availability and other editorial decisions, it also could be assessed by new reviewers.

Author Guidelines for Stage 1: Initial Manuscript Submission and Review

Stage 1 submissions should include the manuscript (as detailed below) and a brief cover letter. Please note that the editorial team will not agree to send manuscripts for in-depth review until a complete Stage 1 submission has been considered. At each stage, Registered Reports should follow all *GCQ* Author Submission Guidelines.

The **Stage 1 cover letter** should address:

- A **brief scientific case for consideration**. Authors are encouraged to refer to the likely replication value of the research. Replication studies are welcome in addition to studies of new topics.
- A statement confirming that **all necessary support** (e.g., funding, facilities) **and approvals** (e.g., IRB approval and any other ethics-related considerations) **are in place for the proposed research**. Note that manuscripts generally will be considered only for Registered Report studies that are able to commence immediately upon IPA; however, authors with alternative plans are encouraged to contact the editors for suggestions.
- An **anticipated timeline** for completing the study if the initial submission is accepted.
- A statement confirming that, **following Stage 1 *in principle acceptance*, the authors agree to register their approved protocol** on the Open Science Framework (https://osf.io/) or other recognized repository, either publicly or under private embargo until submission of the Stage 2 manuscript. Accepted protocols can be quickly and easily registered using a tailored mechanism for Registered Reports on the Open Science Framework: https://osf.io/rr/
- A statement confirming that if the authors **later withdraw** their paper, they agree to *Gifted Child Quarterly* publishing a short summary of the pre-registered study under a section *Withdrawn Registrations*.

Manuscript Preparation Guidelines – Stage 1

Initial Stage 1 submissions should include the following sections:

- **Introduction**
  - A **review of the relevant literature** that motivates the research question and a full description of the aims and hypotheses. Please note that following IPA, the Introduction section cannot be altered apart from correction of factual errors, typographic errors and altering of tense from future to past (see below).
- **Methods**
  - *Any description of prospective methods or analysis plans should be written in **future tense**.*
  - Full description of **proposed sample characteristics**, justified via power analysis (if relevant to the study design—see below), and **including criteria for data inclusion and exclusion** (e.g., outlier extraction). Specify the procedures for objectively defining exclusion criteria due to technical errors or for any other reasons, including details of how and under what conditions data would be replaced.
  - A description of **methodological procedures** in sufficient detail to allow another researcher to repeat the methods exactly, without further elaboration. These procedures must be adhered to exactly in the subsequent research or the Stage 2 manuscript can be rejected (see below for how to address any unplanned exploratory analyses).
  - **Proposed analysis pipeline**, including **all pre-processing steps** (e.g., data cleaning), and a **precise description of all planned analyses**, including appropriate correction for multiple comparisons. Any covariates or regressors must be stated. Where analysis decisions are contingent on the outcome of prior analyses, these contingencies must be specified and adhered to (e.g., through an analytic flow chart). Only pre-planned analyses can be reported in the main Results section of Stage 2 submissions. However, unplanned exploratory analyses are admissible

in a separate section of the Results (see below).
    - Studies involving Neyman-Pearson inference must include a **statistical power analysis**. Estimated effect sizes should be justified with reference to existing literature or theory. Because bias overinflates published estimates of effect size, power analysis must be based on the *lowest* available or meaningful estimate of the effect size. For frequentist analysis plans, the *a priori* power must be 0.8 or higher (as typically required by IES), ideally at least 0.9, for all proposed hypothesis tests. In the case of high uncertainty regarding likely effect sizes, a variable sample size and interim data analysis is permissible but with inspection points stated in advance, appropriate Type I error correction for 'peeking' employed, and a final stopping rule for data collection outlined.
    - Methods involving **Bayesian hypothesis testing are acceptable**. For studies involving analyses with Bayes factors, the predictions of the theory must be specified so that a Bayes factor can be calculated. Authors should indicate what distribution will be used to represent the predictions of the theory and how its parameters will be specified. For example, will you use a uniform up to some specified maximum, a normal/half-normal to represent a likely effect size, or a JZS/Cauchy with a specified scaling constant? For inference based on Bayes factors, authors must be able to guarantee data collection until the Bayes factor is at least 6 times in favor of the experimental hypothesis over the null hypothesis (or *vice versa*). Authors with resource limitations are permitted to specify a maximum feasible sample size at which data collection must cease regardless of the Bayes factor; however, to be eligible for advance acceptance this number must be sufficiently large that inconclusive results at this sample size would nevertheless be an important message for the field. For further advice on Bayes factors or Bayesian sampling methods, prospective authors are encouraged to read this key article by Schönbrodt and Wagenmakers.
    - Full descriptions must be provided for any **outcome-neutral criteria** that must be met for successful testing of the stated hypotheses. Such quality checks might include the absence of (or corrections for) floor or ceiling effects in data distributions, positive controls, manipulation checks, or other quality checks that are orthogonal to the experimental hypotheses.
    - **Timeline for completion of the study and proposed resubmission date** if Stage 1 review is successful. Extensions to this deadline can be negotiated with the Registered Reports editor.
- **Pilot Data**
    - **Pilot data are optional**. These data can be included to establish proof of concept, effect size estimations, or feasibility of proposed methods. Any pilot experiments will be published with the final version of the manuscript and should be clearly distinguished from data obtained for the pre-registered experiment(s).
- **Secondary Registrations**
    - The journal **welcomes submissions proposing secondary analyses** of existing data sets, provided authors can supply sufficient evidence (e.g., self-certification; letter from independent gatekeeper) to confirm that they have had no access to the data in question prior to the submission of the Registered Report. For guidance on the eligibility of specific scenarios, we encourage prospective authors to contact the editorial office.

Stage 1 submissions that are judged by the editorial team to be of sufficient quality and within the journal's scope will be sent out for in-depth peer review. In considering papers at the registration stage, reviewers will be asked to assess:

1. The importance (theoretical, applied, etc.) of the research question(s).
2. The logic and rationale for the proposed hypotheses.
3. The soundness and feasibility of the proposed methods and analysis, including statistical power analysis where appropriate.
4. Whether the clarity and degree of methodological detail provided is sufficient to exactly replicate the

proposed experimental procedures and analysis pipeline.

5. Whether the authors have pre-specified sufficient outcome-neutral tests to sufficiently test the stated hypotheses, including positive controls and quality checks.

Following Stage 1 peer review, manuscripts will be rejected outright, offered the opportunity to revise and resubmit, or accepted. Proposals judged to meet high standards for relevance to the field and scientific rigor will be issued an *in principle acceptance* (IPA), indicating that the article will be published pending completion of the approved methods and analytic procedures, passing of all pre-specified quality checks, and provision of a defensible interpretation of the results. Stage 1 protocols are not published by the journal following IPA. Instead, they are registered by the authors in a recognized repository (either publicly available, or under embargo until Stage 2) and then are integrated into a single completed article that is approved in the final Stage 2 review.

Authors are reminded that any deviation from the stated experimental procedures, regardless of how minor it may seem to the authors, could lead to rejection of the manuscript at Stage 2. In cases where the pre-registered protocol is altered after IPA due to unforeseen circumstances (e.g., change of equipment or unanticipated technical error), the authors must consult the editors immediately to request advice prior to the completion of data collection. Minor changes to the protocol may be permitted per editorial discretion. In such cases, IPA would be preserved, and the deviation would be reported in the Stage 2 submission. If the authors wish to alter the experimental procedures more substantially following IPA but still desire to publish their article as a Registered Report then the manuscript must be withdrawn and resubmitted as a new Stage 1 submission. Again, although registered analyses must be undertaken, additional unregistered analyses also can be included in the final Stage 2 manuscript (see below).

Author Guidelines for Stage 2: Full Manuscript Submission and Review

Once the study is complete, authors prepare and resubmit their manuscript for full review, with the following additions:

- **Cover letter**. The Stage 2 cover letter will confirm:
  - Whether the manuscript includes a link to the public archive containing anonymized study data, digital materials/code, and the laboratory log (if applicable). If the manuscript does, the cover letter should state the page number in the manuscript on which the URL for these components is listed.
  - That the manuscript contains a link to the approved Stage 1 protocol on the Open Science Framework or other recognized repository. The cover letter should state the page number in the manuscript that lists this URL.
  - That, for primary Registered Reports, no data for any pre-registered study (other than pilot data included at Stage 1) were collected prior to the date of IPA. For secondary Registered Reports, authors should confirm that no data (other than pilot data included at Stage 1) were subjected to the pre-registered analyses prior to IPA.

- **Submission of anonymized raw data (optional), digital study materials (optional), and laboratory log (optional)**
  - Anonymized raw data and digital study materials may be made freely available in a public repository/archive with a link provided within the Stage 2 manuscript. Authors are free to use any repository that renders data and materials freely and publicly accessible and provides a digital object identifier (DOI) to ensure that the data remain persistent, unique and citable. Potential repositories include (but are not limited to) Figshare, Harvard Dataverse, OSF, ICPSR, and Dryad. For a more comprehensive list of available data repositories, see http://www.re3data.org/
  - Data files or other relevant supporting documentation should be appropriately time stamped to

show that data were collected *after* IPA and not before. Other than pre-registered and approved pilot data, no data acquired *prior* to the date of IPA are admissible in the Stage 2 submission. Raw data should be accompanied by guidance notes, where required, to assist other scientists in replicating the analysis pipeline. Authors are encouraged to upload any relevant analysis scripts and other digital experimental materials that would assist in replication.
    - Any supplementary figures, tables, or other text (such as supplementary methods) can either be included as standard supplementary information that accompanies the paper, or they can be archived together with the data. Please note that the raw data itself should be archived (see above) rather than submitted to the journal as supplementary material.
    - **A basic log book or other time-stamped documentation should be provided** outlining the range of dates during which data collection took place. This log should be uploaded to the same public archive as the data and materials. *If the data and materials are not uploaded to a public archive, the log book or documentation can be submitted with the cover letter of the Stage 2 submission.*
    - The Stage 2 manuscript also **must contain a link to the registered protocol** (deposited following IPA) on the Open Science Framework or other recognized repository.

- **Background, Rationale and Methods**
    - Apart from minor stylistic revisions, **the Introduction cannot be altered from the approved Stage 1 submission, and the stated hypotheses cannot be amended or appended**. For Stage 2, any description of the rationale or proposed methodology that was written in future tense within the Stage 1 manuscript should be changed to past tense. Any textual changes to the Introduction or Methods (e.g., correction of typographic errors) must be clearly marked in the Stage 2 submission. Any relevant literature that appeared following the date of IPA should be covered in the Discussion.

- **Results and Discussion**
    - **The outcome of all registered analyses must be reported in the manuscript**, except in rare instances where a registered and approved analysis is subsequently shown to be logically flawed or unfounded. In such cases, the authors, reviewers, and editor must agree that a collective error of judgment was made and that the previously-specified analysis was inappropriate. In such cases the analysis still would be mentioned in the Method but its omission would be justified in the Results.
    - It is reasonable that **authors may wish to include additional analyses** that were not included in the registered submission. For instance, a new analytic approach might become available between IPA and Stage 2 review, or a particularly interesting and unexpected finding may emerge. Such analyses are admissible but must be clearly justified in the text, appropriately caveated, and reported in a separate section of the Results titled "*Exploratory Analyses.*" Authors should be careful not to base their conclusions entirely on the outcome of statistically significant *post hoc* analyses.
    - Authors reporting null hypothesis significance tests are required to **report exact *p* values and effect sizes, with confidence intervals**, for all inferential analyses.

Although we strive to have the Stage 2 resubmission considered by the same reviewers as in Stage 1, depending on their availability and other editorial decisions, it also could be assessed by new reviewers. In considering papers at Stage 2, reviewers and/or the editorial team will be asked to decide:

1. Whether the data are able to test the authors' proposed hypotheses by satisfying the approved outcome-neutral conditions (such as quality checks, positive controls)
2. Whether the Introduction, rationale, and stated hypotheses are the same as the approved Stage 1 submission

(required)

3. Whether the authors adhered precisely to the registered experimental procedures
4. Whether any unregistered *post hoc* analyses added by the authors are justified, methodologically sound, and informative
5. Whether the authors' conclusions are justified given the data

Reviewers are informed that editorial decisions are not to be based on the perceived importance, novelty or conclusiveness of the results. Thus, although reviewers are free to enter such comments on the record, they will not influence editorial decisions. Reviewers at Stage 2 may suggest that authors report additional *post hoc* tests on their data; however, authors are not obliged to do so unless such tests are necessary to satisfy one or more of the Stage 2 review criteria.

Manuscript Withdrawal and *Withdrawn Registrations*

It is possible that authors with IPA may wish to withdraw their manuscript following or during data collection. Possible reasons could include major technical error, an inability to complete the study due to other unforeseen circumstances, or the desire to submit the results to a different journal. In all such cases, manuscripts can, of course, be withdrawn at the authors' discretion. However, the journal will publicly record each case in a section called *Withdrawn Registrations*. This section will include the authors, proposed title, the abstract from the approved Stage 1 submission, and brief reason(s) explaining the failure to complete the study. Partial withdrawals are not possible; i.e., authors cannot publish part of a registered study by selectively withdrawing one of the planned experiments. Such cases must lead to withdrawal of the entire paper. (Authors may then choose to submit the paper as a regular manuscript submission that would go through the traditional review process with new reviewers. In such cases, the new submission would need to include a link back to the original Registered Report in an end note that also explains why the Registered Report criteria were not met in carrying out the study.) Studies that are not completed by the agreed Stage 2 submission deadline (which can be extended in negotiation with the editorial office) will be considered withdrawn and will be subject to a Withdrawn Registration.

Incremental Registrations

Authors may add experiments to approved submissions. In such cases, the approved Stage 2 manuscript will be accepted for publication, and authors can propose additional experiments for Stage 1 consideration. Where these experiments extend the approved submission (as opposed to being part of new submissions), the editorial team will seek to fast-track the review process. This option may be particularly appropriate where an initial experiment reveals a major serendipitous finding that warrants follow-up within the same paper. In cases where an incremented submission is rejected (at either Stage 1 or 2), authors will retain the option of publishing the most recently approved version of the Registered Report manuscript. For further advice on specific scenarios for incremental registration, authors are invited to contact the editorial office.

Tips for Avoiding Desk Rejection at Stage 1

Many Registered Report submissions to various journals are desk rejected at Stage 1, prior to in-depth review, for failing to sufficiently meet the Stage 1 editorial criteria. In many such cases, authors are invited to resubmit once specific shortcomings are addressed, although major problems can lead to outright rejection. To help minimize the likelihood of a submission being desk rejected, we list below the top 10 reasons across different journals for why Stage 1 submissions are rejected prior to review:

1. The **Cover letter** doesn't include the required statements concerning ethics, data archiving, and so forth (see above).

2. The protocol contains insufficient **methodological detail** to enable replication and prevent researcher degrees of freedom. One frequently neglected area is the **criteria for excluding data**, both at the level of participants and at the level of data within participants. In the interests of clarity, we recommend listing these criteria systematically in a table or figure rather than presenting them in prose.

3. Lack of **correspondence between the scientific hypotheses and the pre-registered statistical tests**. This is a common problem, and in severe cases the Registered Report is likely to be desk rejected outright. To maximize clarity of correspondence between predictions and analyses, authors are encouraged to number their hypotheses in the Introduction and then number the proposed analyses in the Methods to make clear *which analysis tests which prediction*. Ensure also that power analysis, where applicable, is based on the actual test procedures that will be employed to test those hypotheses (e.g., don't propose a power analysis based on an ANOVA but then suggest a linear mixed effects model to test the hypothesis).

4. **Power analysis**, where applicable, fails to reach the minimum level stated in journal policy (i.e., for frequentist analysis plans, the *a priori* power must be 0.8 or higher (as typically required by IES), ideally at least 0.9, for all proposed hypothesis tests.)

5. **Power analysis** is overly-optimistic (e.g., based on previous literature but not taking into account publication bias) or is insufficiently justified (e.g., is based on a single point estimate from a pilot experiment or a single previous study). Proposals should be powered to detect the smallest effect that is plausible and of theoretical value. Pilot data can help inform this estimate but are unlikely to offer sufficient justification, by themselves, for a target effect size.

6. Intention is evident to **infer support for the null hypothesis from statistically non-significant results**, without proposing use of Bayes factors or frequentist equivalence testing.

7. Inclusion of exploratory analyses in the analysis plan. Manuscripts **proposing exploratory analyses** will usually be desk rejected until such analyses are removed because the inclusion of exploratory "plans" at Stage 1 blurs the line between confirmatory and exploratory outcomes at Stage 2. Instead, such analyses may be added at Stage 2 and need not be pre-registered. Under some circumstances, exploratory analyses could be discussed at Stage 1 where they are necessary to justify study variables or procedures that are included in the design exclusively for exploratory analysis.

8. Failure to **clearly distinguish work that has already been done from work that is planned**. Where a proposal contains a mixture of pilot work that has already been undertaken and a proposal for work not yet undertaken, authors should use the past tense for pilot work but the future tense for the proposed work. At Stage 2, all descriptions must be shifted to past tense.

9. Lack of **pre-specified positive controls or other quality checks**, or failure to provide an appropriate justification for their absence (See Stage 1 criterion 5). We recognize that positive controls are not possible with all study designs, in which case authors should explain why they are not included. Where applicable, lack of **power analysis** within proposed positive controls that depend on hypothesis testing.

10. Poorly-written Stage 2 manuscript that obscures study findings.