Preregistration Essentials: What It Is, Why It Matters, and How to Do It

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PREREGISTERED

Definition

A preregistration is a time stamped, read-only* declaration that a study is going to occur, posted in a public** registry.

Similar terms: registration, prospective registration, pre-analysis plans.

*Most registries allow for updates to plans, with notes about when and how they were changed.

**Some registries allow for a private embargo period.

Overview of preregistration

Pre-2000s problem: The government funds thousands of medical studies, but no central registry exists to connect patients with cutting edge treatments.

NIH U.S. National Library of Medicine
ClinicalTrials.gov

In addition to helping to open the file drawer, prereg in basic research can increase transparency and distinguish planned from unplanned work.

How prereg fits into open research

Ideal:	One preregistration per “study.” If a paper has multiple studies, multiple preregs is OK.
Reality:	One preregistration per data-collection effort.
Complex Reality:	Create a preregistration before data collection (or accessing a dataset) and if multiple papers result from it easy for the reader to trace the history of the project.

Preregistration Templates

- There are currently 11 templates on the OSF.
- A template helps make sure you have included sufficient information for the purpose of the preregistration.
- They vary from barebones to very thorough.

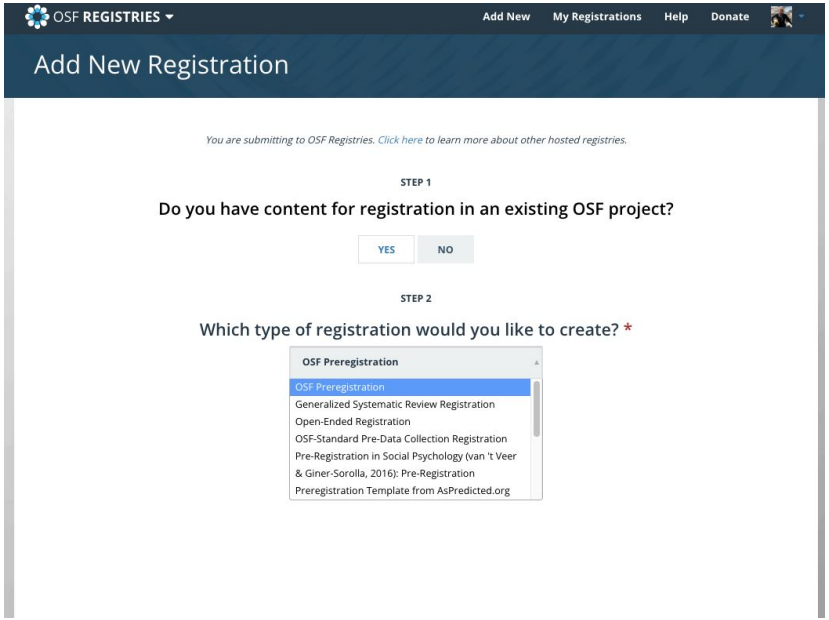
https://help.osf.io/article/229-select-a-registration-template

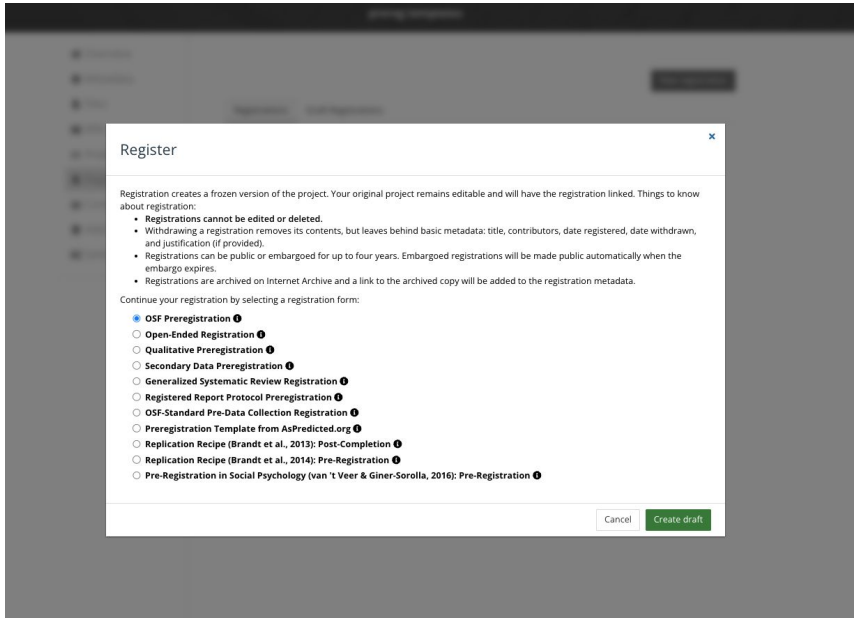
Preregistration Templates

- **OSF Preregistration**
  - Default. Thorough. Designed for many research types.
- **Preregistration template from AsPredicted.org**
  - Designed to contain just enough information to meet the common standards.
- **Generalized Systematic Review**
  - For all types of systematic reviews (not just health)
- **Secondary Data**
  - When you are using an existing dataset.
- **Qualitative Preregistration**
  - Qualitative or mixed methods.

https://help.osf.io/article/229-select-a-registration-template

Preregistration Templates





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Significance in Enhancing Research

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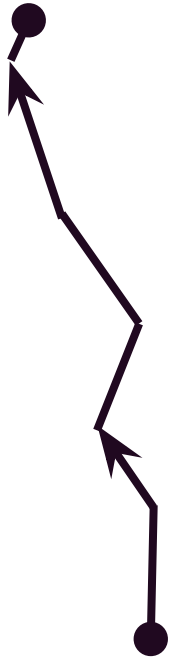
The Research Process

A garden of forking paths

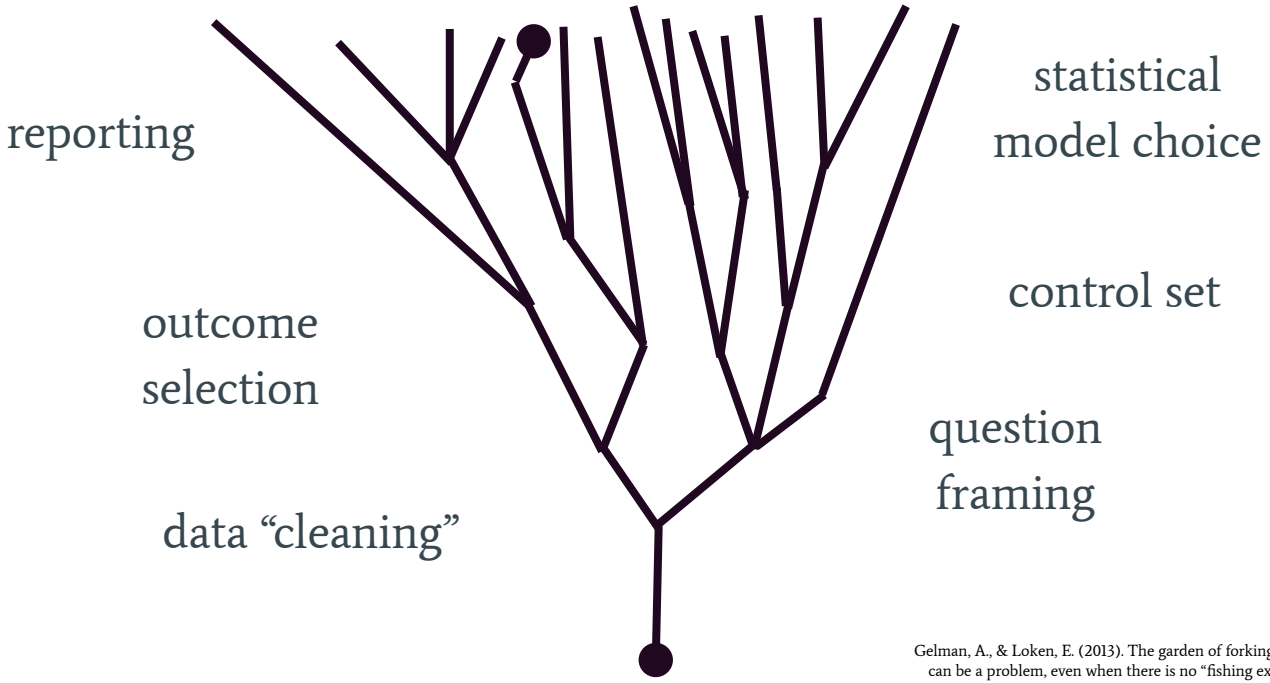


Result: People with X were found to be Y times more likely to have Z (p=.044)

Question

The Research Process

A garden of forking paths



Gelman, A., & Loken, E. (2013). The garden of forking paths: Why multiple comparisons can be a problem, even when there is no “fishing expedition” or “p-hacking” and the research hypothesis was posited ahead of time. Department of Statistics, Columbia University. Retrieved from http://www.stat.columbia.edu/~gelman/research/unpublished/p_hacking.pdf

Exploration vs. Confirmation

Exploration	Confirmation
• Data-driven • Discovery oriented • Push knowledge into new areas • Find unexpected relationships • Model and theory-informing	• Hypothesis-driven • Traditional (frequentist) hypothesis testing • Higher standards for rigorous evaluation • More direct decision impact

Research consumer

Is what you see the whole story?

Result: People with X were found to be Y times more likely to have Z (p=.044)

Where did this result come from?

Was this analysis as planned, or was it changed in some way?

Was it part of a fishing exercise, p-hacked, or HARKed?

How can we use this result if we can’t know where it came from?

Research producer

How preregistration can help

Enhanced planning

- Comprehensive view of study
- Prevents unforced errors discovered too late

Enhanced feedback

- Feedback when it can change the most
- Clarity on *what* is being critiqued

Credibility improvement

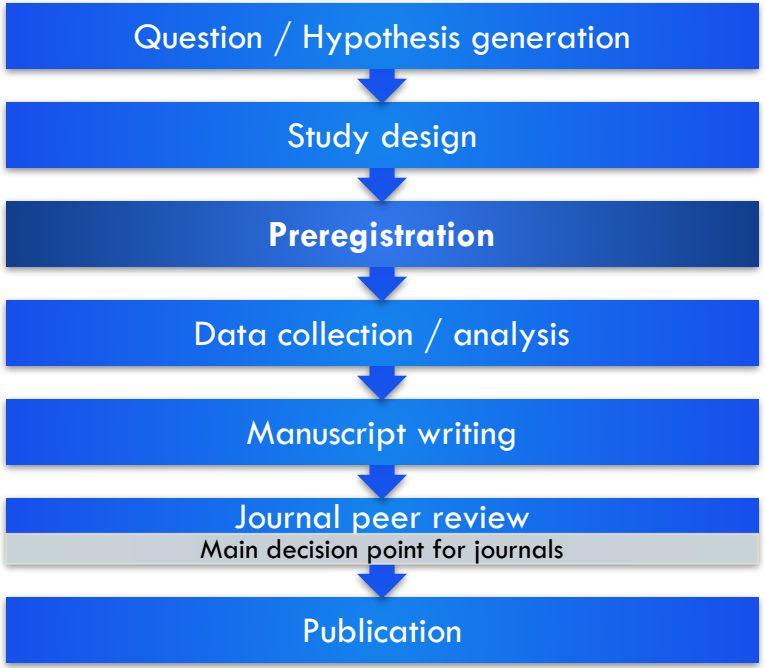
- …sometimes, particularly for confirmatory tests

Research protection

- Scoop or anti-scoop?
- Record of work in case of research cancellation

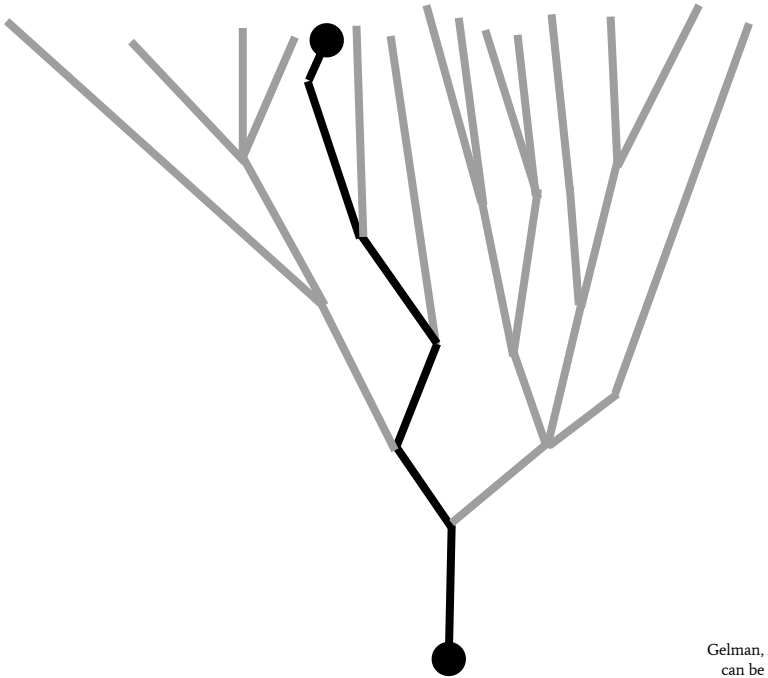
Limiting temptation for QRPs

- Default to sticking to the plan



The Process

A garden of forking paths



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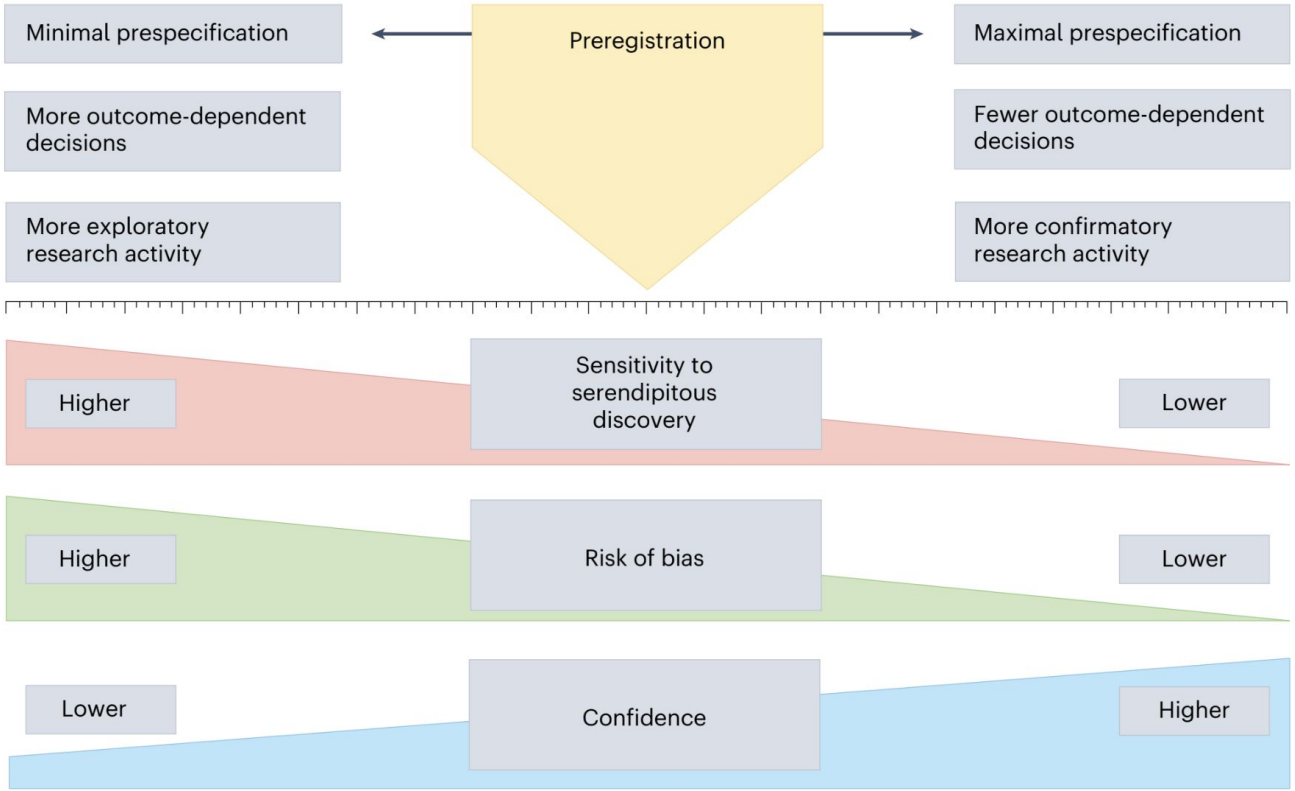
Many ways/whys/hows for preregistration



(Hardwicke, T.E., Wagenmakers, EJ. Reducing bias, increasing transparency and calibrating confidence with preregistration. Nat Hum Behav 7, 15–26 (2023). https://doi.org/10.1038/s41562-022-01497-2)

Navigating Preregistration Workflows on the OSF

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Preregistration Challenges and Solutions

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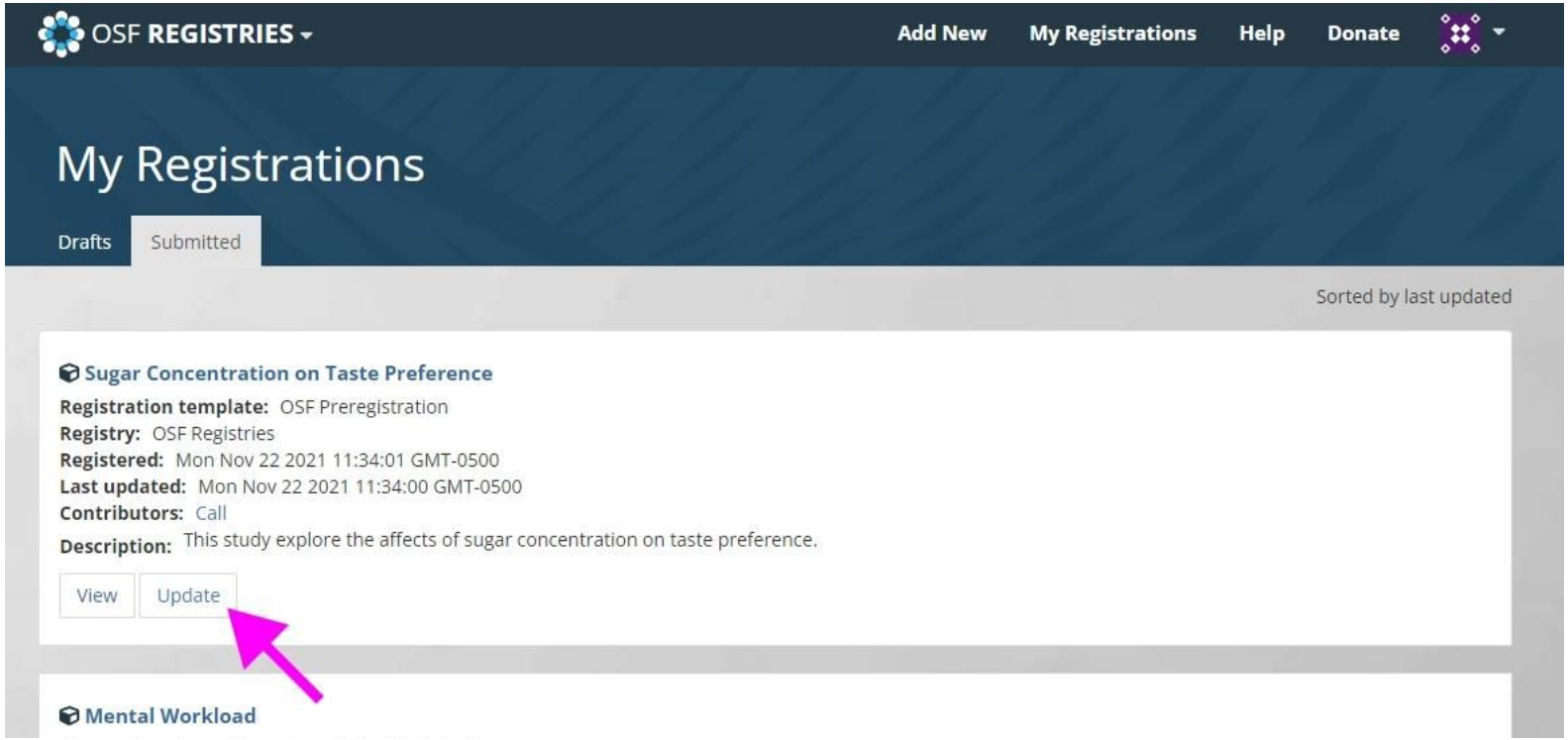
Challenge: I need to update my preregistration!

Things could change between the time you preregister and your analyses. For example, you could:

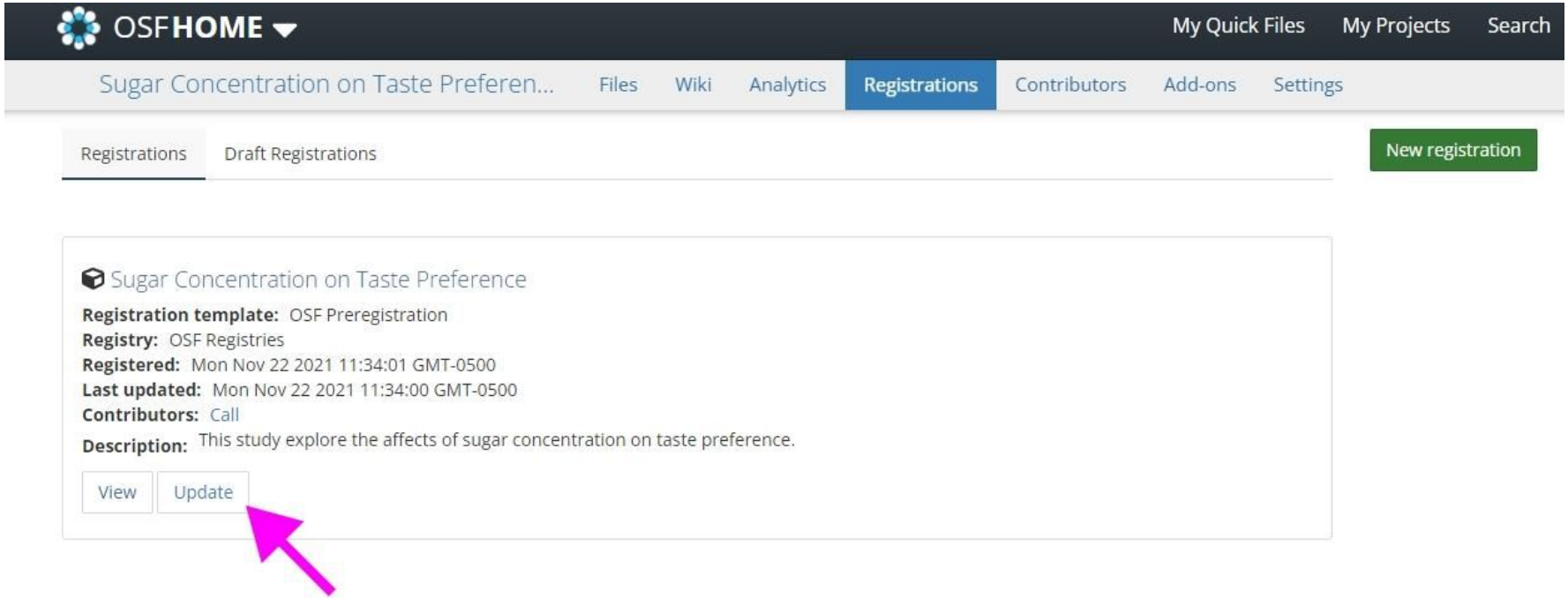
- notice an error in your preregistration
- decide to add analyses
- learn about a more appropriate data analysis strategy
- realize you have to make adjustments to your design

Solution: Update the preregistration



Remember that any changes should be accompanied by a justification.

Solution: Update the preregistration



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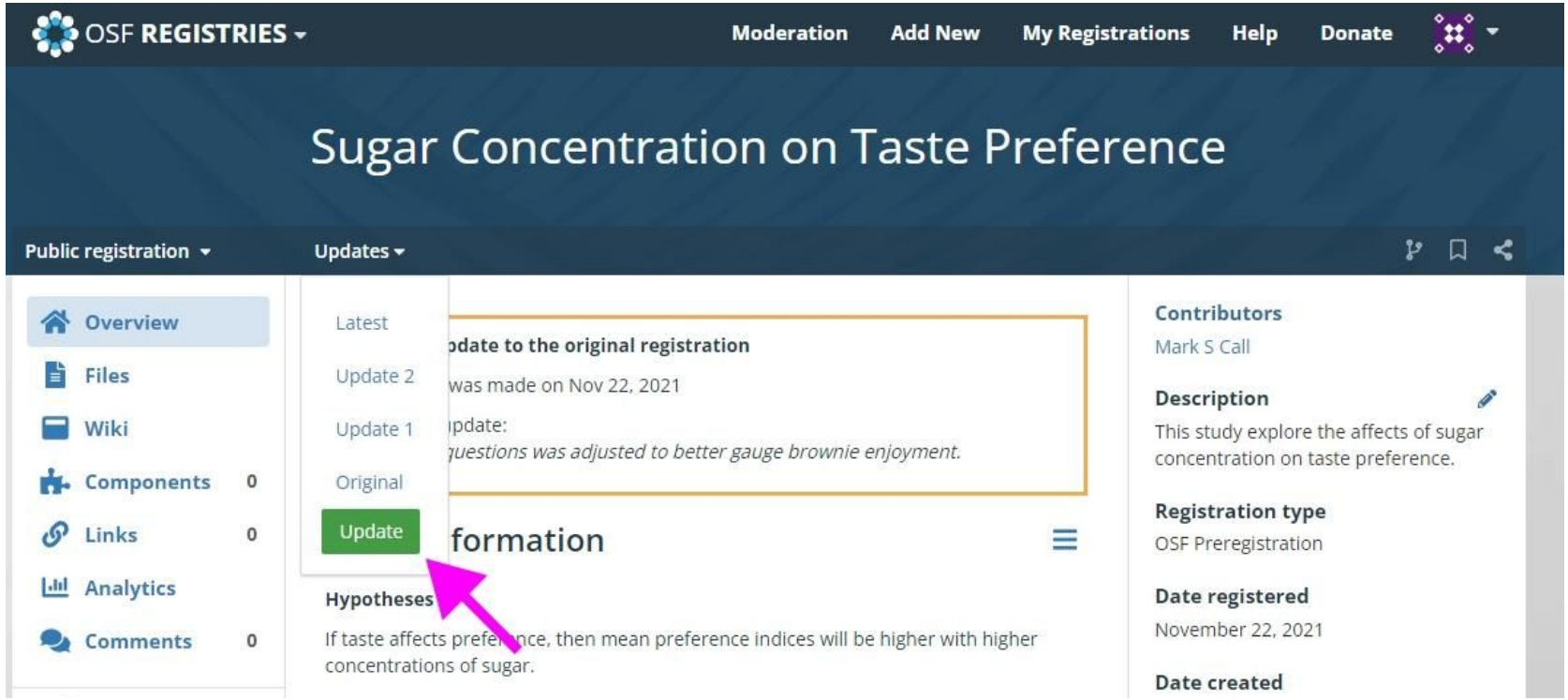
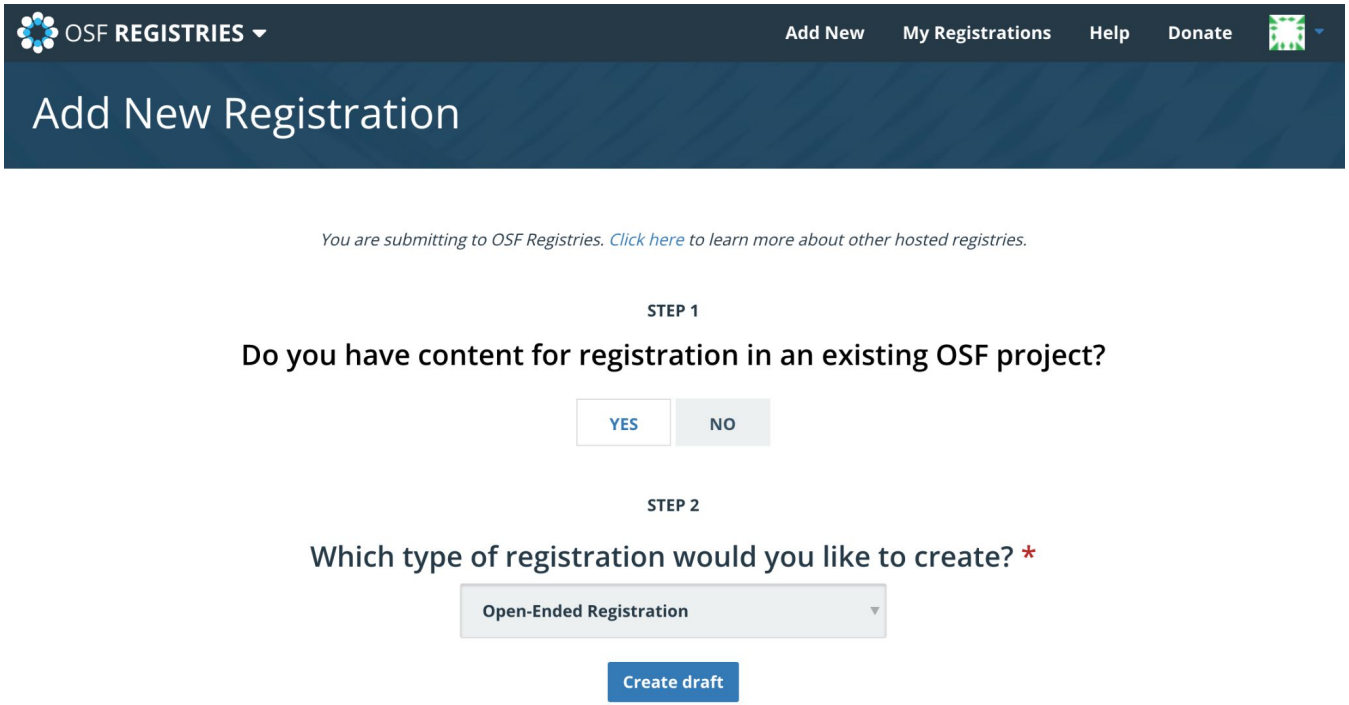


Remember that any changes should be accompanied by a justification.

Challenge: There isn’t a template for my kind of research!

Potential Solutions: Use the open ended registration template



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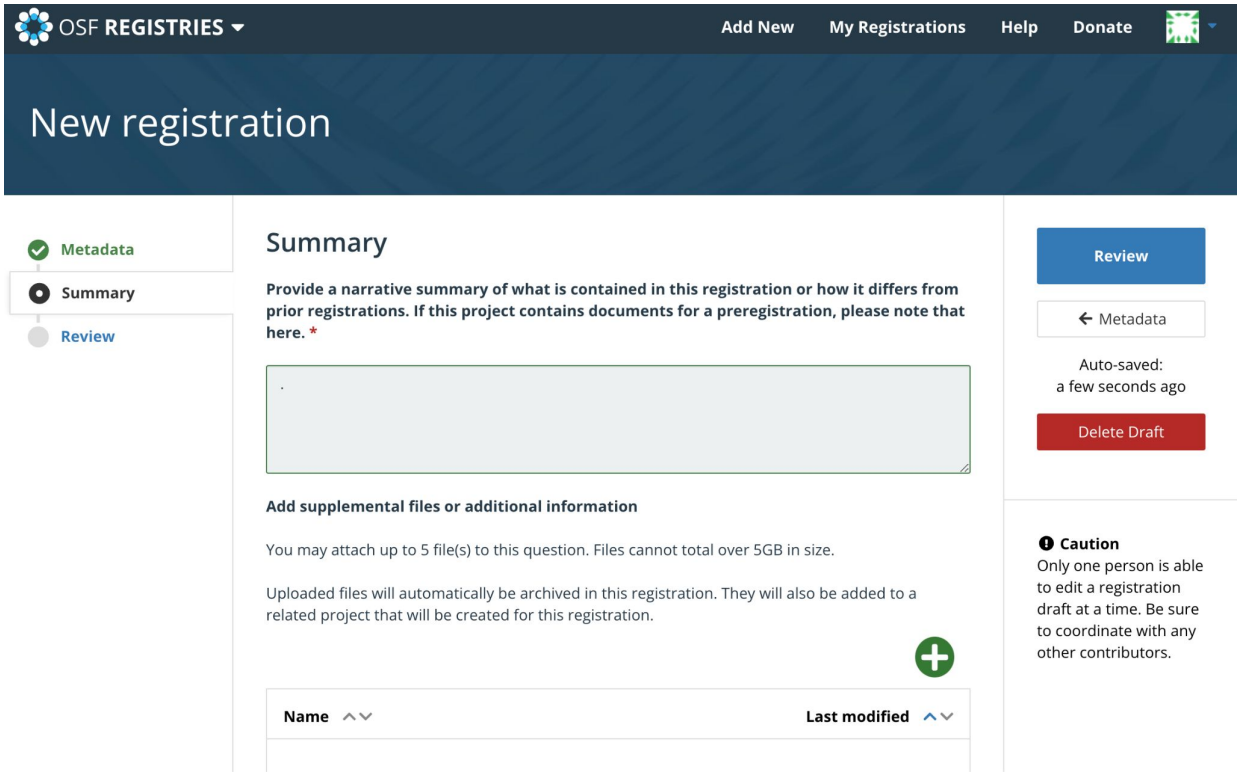
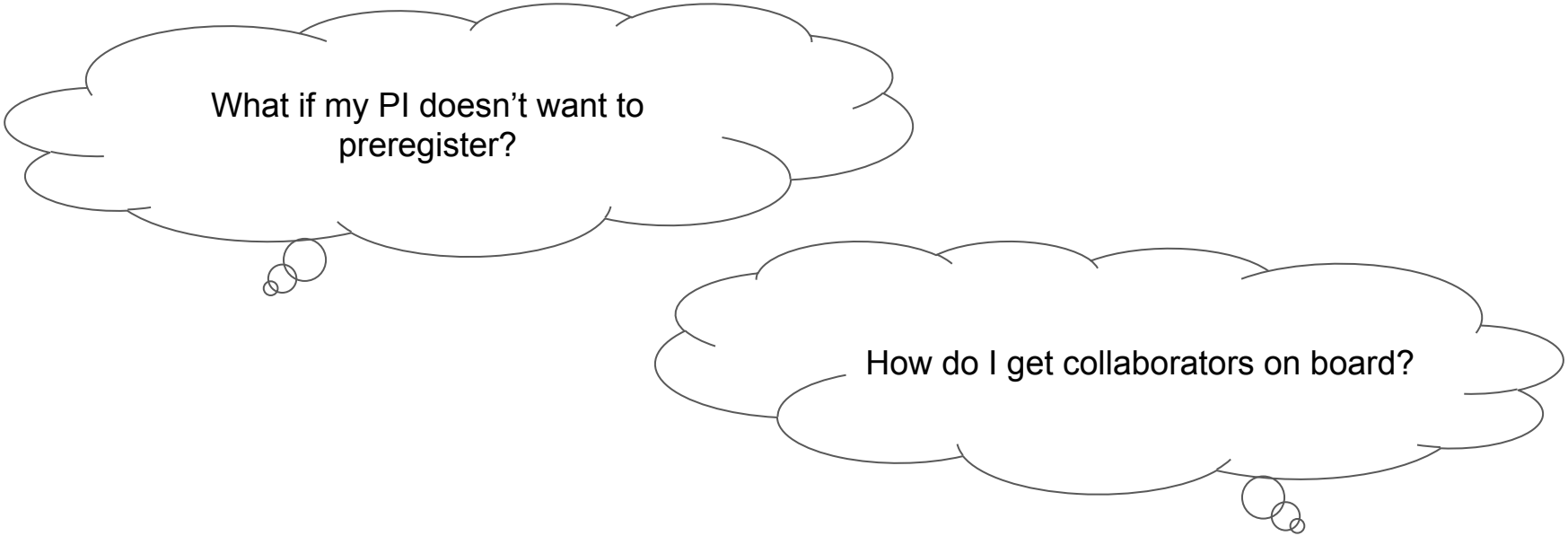
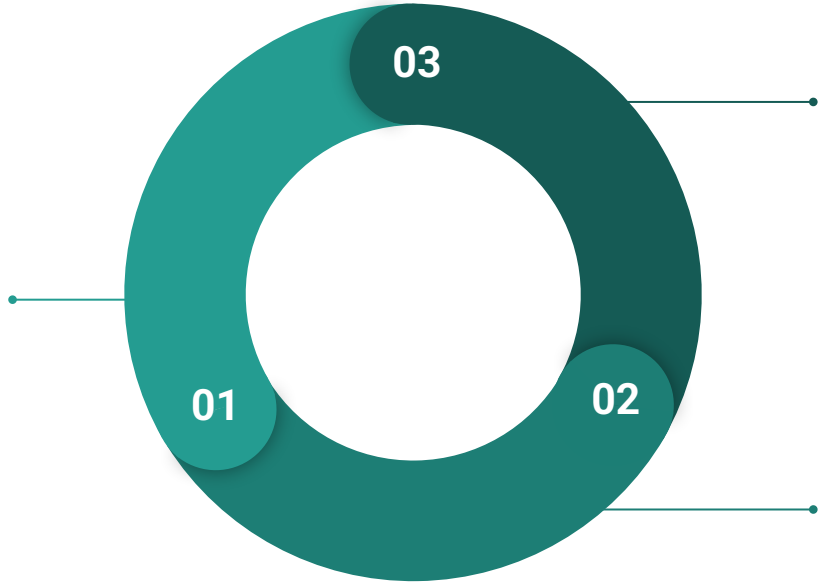


Challenge: How do I convince collaborators/my PI?



Potential Solutions: Discussions



Describe how preregistration can help them address their concerns and goals

Connect their concerns and questions to values

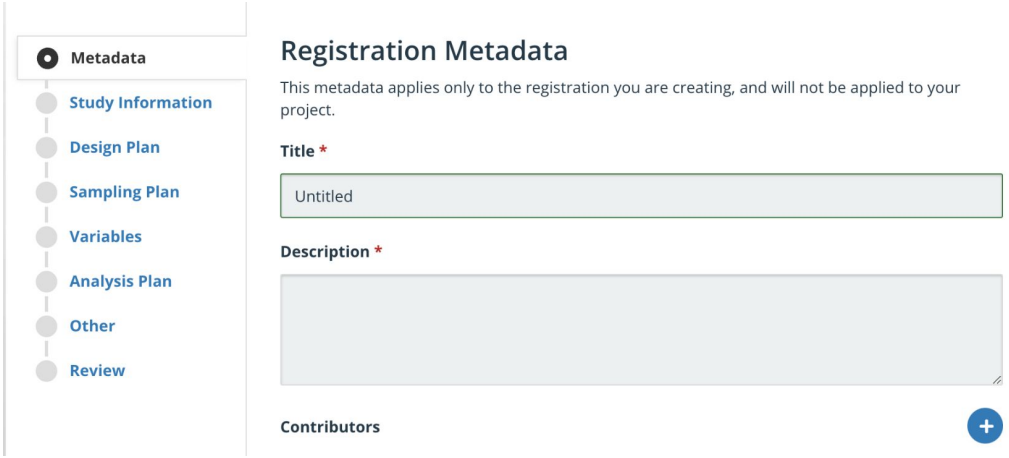
Listen to their concerns and questions

Question: Can I preregister in a different language?

I’m more comfortable writing about research in a non-English language. Is that okay?

Potential Solutions: English metadata

Preregister in the language you feel you can be most accurate in - then include both that language and English in the metadata, especially in tags



Other considerations

- What language(s) does your funder accept?
- What language(s) does the journal you want to submit to accept?
- If you register in multiple languages, you will need to make any updates in both languages

Q&A

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