Four stages of embracing pre-registration

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What I hope to convince you

1. You should pre-register the analyses you are planning

2. Pre-registration is something that you can already do, somehow

3. Doing the most basic pre-registration is beats not pre-registering

The problems pre-registration solves

- Knowing what results mean depends on what you believed when you set up the study

- Confirmation is far more convincing than exploration: we must know which tests were confirmatory

Stage 1: Denial

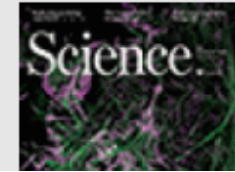# My first reaction to these problems

My first reaction . . .

. . . was wrong

Stage 2: Self-doubt

Basic research doesn't always replicate

Basic research doesn't always replicate

	Replications $P < 0.05$ in original direction	Percent	
Overall	35/97	36	
JPSP, social	7/31	23	
JEP:LMC, cognitive	13/27	48	
PSCI, social	7/24	29	
PSCI, cognitive	8/15	53	

- Could we be HARKing? (Yes)

- Could we be p-hacking? (Yes)

- Could we be presenting exploratory analyses as confirmatory? (Probably)

Yes, there is room for flexible data analysis

- Multiple ways to compute lots of "standard" dependent variables

- Unlimited options for "cleaning" data

- Often one dependent variaable is reported per manuscript, but multiple across manuscripts

Stage 3: Exploration

Using pre-registration

- Pre-registration: Specify beforehand 1) method, 2) analysis plan, 3) what you will look for in your data to make your argument

- Tool to prevent yourself from HARKing and incidental p-hacking. Ideas:

  - Specify stopping criterion

  - Limit outlier removal

  - Map DVs to interpretations

- There is not only one way to use pre-registration!

The spectrum of pre-registration options

- Low- or high-tech

- Quite informal to a contract with an editor

- Involve minimally changing the order of one step, possibly flipping the order of more steps

The most rigorous, formal choices might suit some projects but not others.

There is no pre-regsitration canon!

Document your hypothesis before seeing the data

- There are web tools for this (e.g., Open Science Framework)

- Anything that proves you planned the analysis before you saw the data is better than nothing

- Additional steps that clarify relationships between data and interpretation are great!

Using OSF for pre-registration

- First, make a "project"

- Doesn't need to be public

Make Private | Public | ⅌ 0

Extent of the Color-sharing Bonus

Contributors: **Candice Coker Morey**

Date created: 2014-10-12 04:37 PM | Last Updated: 2018-01-09 04:32 PM
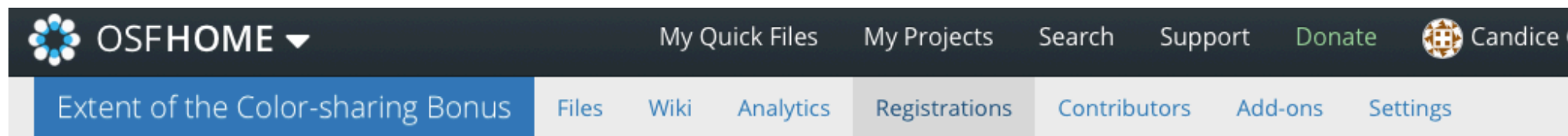
Create DOI

Category: 📦 Project

Description:

Morey et al. (see project Color-sharing Bonus) observed a color-sharing bonus in visual recognition similar to that shown previously (e.g., Peterson & Berryhill, 2 Cohen, 2012), but confirmed that the color-sharing bonus extends also to the non-repeated colors in the display. The aim of the current project is to probe the effect by further manipulating the amount of color repetition in the display. Eye movements will be recorded as in Morey et al.'s previous investigation in order their interpretation of eye movements as reflecting visual-spatial rehearsal.

License: Add a license

Say (somewhere) what you plan to do and how you think it will turn out

- Can be typed into project description

- Can be another document, uploaded to "Files"

- Can be simple written description, could also be accompanied by implementation tools (e.g., software, code)

How "registration" differs from the project

OSF HOME ▾   My Quick Files   My Projects   Search   Support   Donate   Candice C

Extent of the Color-sharing Bonus   Files   Wiki   Analytics   Registrations   Contributors   Add-ons   Settings

Extent of the Color-sharing Bonus

Make Private   Public   ⅄ C

Contributors: **Candice Coker Morey**

Date created: 2014-10-12 04:37 PM | Last Updated: 2018-01-09 04:32 PM

Create DOI

Category: 🔲 Project

Description:

- Make a "registration" to create a frozen version of your project's state a crucial time (e.g., before collecting data, after data published).

- The frozen version is dated.

New registrations

Registrations

There have been no completed registrations of this project. You can start a new registration by clicking the "New registration" button, and you have the option of saving as a draft registration before submission.

New registration

For a list of the most viewed and most recent public registrations on the Open Science Framework, click here.

Kinds of registration?

Register

Registration creates a frozen version of the project that can never be edited or deleted but can be withdrawn. Your original project remains editable but will now have the registration linked to it. Things to know about registration:

- Ensure your project is in the state you wish to freeze before registering.
- Consider turning links into forks.
- Registrations can have embargo periods for up to four years. If you choose an embargo period, the registration will automatically become public when the embargo expires.
- Withdrawing a registration removes the contents of the registrations but will leave behind a log showing when the registration was created and withdrawn.

Continue your registration by selecting a registration form:

- ○ Prereg Challenge ❶
- ● Open-Ended Registration ❶
- ○ AsPredicted Preregistration ❶
- ○ Registered Report Protocol Preregistration ❶
- ○ OSF-Standard Pre-Data Collection Registration ❶
- ○ Replication Recipe (Brandt et al., 2013): Pre-Registration ❶
- ○ Replication Recipe (Brandt et al., 2013): Post-Completion ❶
- ○ Pre-Registration in Social Psychology (van 't Veer & Giner-Sorolla, 2016): Pre-Registration ❶

Cancel   Create draft

Most basic: Open-ended Registration

- All you need to get a legitimate time stamp

- Prompts you for a short text describing what is being registered

- E.g., "This registration records the state of the project before data collection began."

Other types that may be interesting

- Prereg Challenge: To enter your project into OSF's Prereg Challenge. First 1000 to publish a Prereg Challenge project are given $1000.

- AsPredicted, OSF Standard: Prompts for additional information, to help you figure out whether you have all the information recorded before data collection that reviewers and editors might like to see.

Registration not just for pre-data collection!

- You can create multiple registrations to record the state of the project at various milestones.

Register

Summary

Summary:

Provide a narrative summary of what is contained in this registration, or how it differs from prior registrations.

At the time of this registration, a manuscript describing the project was submitted for evaluation at the British Journal of Psychology.

Continue editing

- When else? When major changes are made (e.g., submit new version, hand project over to different RA)

Registration not necessarily public

Before you continue...   ×

- The content and version history of **Wiki and OSF Storage** will be copied to the registration.
- Tags on a registration can be modified at any time to enhance discoverability.

Registration Choice

✓ Make registration public immediately
  Enter registration into embargo

Cancel   Submit

- Registrations become public after embargo (can be up to 4 years), or when you switch it to "public".

- Not a privacy issue if your registered project page excludes sensitive data.

Publishing a pre-registered project

- Make registration public

- Provide a link in your paper or cover letter

- Readers will be able to examine the elements of the project that were registered

Example: Current versus frozen project

- Shows reviewers: Elements frozen on 2014-10-15 include hypothesis, analysis plan, the to-be-run experimental software

- Is it "pre"? Additional elements on project (if public) will be dated later than the frozen registration.

Open-ended pre-registration is

- Easy - requires no additional planning, relies on point-and-click web-based tools

- Flexible - can be a single paragraph just to provide evidence that hypothesis pre-dates data, can be more detailed

- Quick - minimal steps include very little beyond what you normally do (e.g., write a paragraph about what you will do)

- Helpful - for communicating about plans and hypotheses within own research group

- But does it ultimately aid publication?

That reviewer who can't be satisfied

Stage 4: Enthusiasm

The Registered Report

Project is considered by the journal in two phases

- Stage 1: You submit your Introduction, Methods, and Analysis Plan for peer review. Data have not been collected.

- There are no results yet. Reviewers must focus on the rationale and design of study, the appropriateness of analysis plan.

- Editor may ask you to revise your Method based on reviewers' suggestions.

- Stage 1 manuscript gets in-principle acceptance. This part is frozen.

- You collect the data, run the planned analyses, and finish the Stage 2 paper.

- Stage 2 paper can only be rejected if you did not follow the approved Stage 1 plan.

Could also call this a "flipped" paper.

Yes! Let's do that!

- You only have to persuade about the rationale and design.

- Allows you to plan a risky project: Results are not known during evaluation.

- Reviewers: Much easier to review a prospective project.

- Team of researchers: Hard work is done up front.

No way!

- Too much work!

- Interpretation of results could be embarassing.

- Takes too long to start project.

- What if I find something that I didn't predict?

- What if I could have published in a better journal?

- Editors: What happens when results don't make sense?

There's something interesting that I failed to predict!

- You can still report it! That's no problem.

- You cannot re-frame your introduction to make it seem like you predicted it all along. No problem, right?

Not more work - different sequence of same work

- You do this:

    - Plan experiment

    - Collect data

    - Analyze data

    - Write manuscript

    - Persuade journal

Not more work - different sequence of same work

- Registered report:

    - Plan experiment

    - Write 75% of manuscript

    - Persuade journal

    - Collect data

    - Analyze data

    - Write remainder of manuscript

Does it take more time?

- Be sure to consider the same end points!

- End of RR procedure: Paper is published

- End of usual approach: Data are (partly) analyzed, manuscript is (partly) written, disposition remains unknown

What if results do not make sense?

- If you want to do an exploratory project, writing an RR is not appropriate.

- If you want to do a confirmatory project, what's the problem?

As editor: RR proposals are clear

As author: Preparing an RR is hard, enlightening

- Currently preparing an RR and an RRR (Registered Replication Report), both with collaborators

- Did not realize how many details are usually decided in the moment, or by whoever is programming

- Perhaps that's more time spent planning?

- But: Less time fixing errors caused by running confounded or less-than-optimal experiments

- The constraint is intimidating.

- I will not miss the search for a publisher.

Hesitations?

- What about projects on a fixed time frame?

- What about student-led projects? What if our predictions differ?

- Not the only good way to persuade that your data say what you say they say (see also multiverse analysis, Steegen et al., 2016)

Summary

- You can use pre-registration to convince yourself and your readers that your predictions preceded your data.

- There are a range of perfectly valid ways to pre-register.

- You can try pre-registration without learning any new technical skill or risking much.

- You can build in more constraints as you become comfortable.

Thanks for your attention!

Editor-in-chief, www.journalofcognition.org (We consider registered reports

and we like pre-registration!)

My data and materials are publicly available on Open Science Framework

(https://osf.io/4xwa8)

Blogging at The Mnemonic Lode, candicemorey.org

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