



AMERICAN  
PSYCHOLOGICAL  
ASSOCIATION



the british  
psychological society



DGP

Deutsche Gesellschaft  
für Psychologie

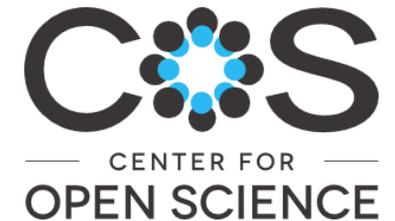
# Preregistration Standards for Psychology

A collaborative effort between the American Psychological Association,  
British Psychological Society, and German Psychological Society



ZPID

In partnership with the  
Leibniz Institute for Psychology and Center for Open Science



# Order of Events

- Introduction
- Dr. Simine Vazire: What is Transparency For?
- Dr. E.J. Wagenmakers: Problems and Promises of Preregistration
- Panel: Introduction of the Preregistration Standards for Quantitative Research in Psychology
- Q&A

# Preregistration

pre·reg·is·tra·tion (*noun*)

- Plan more comprehensively before you start
- Get feedback before you invest the time in doing the research
- Increase the credibility of your research



OSF  
**PREREGISTRATION**

# What is transparency for?

Simine Vazire

Melbourne School of Psychological Sciences

University of Melbourne

Where are the self-correcting mechanisms of science?

# Where are the self-correcting mechanisms of science?



James Heathers  
@jamesheathers



"Science is self-correcting" - sure, \*when we correct it\*,  
not because of Magical Progress (tm).

4:57 AM · Mar 26, 2017 · [Twitter Web Client](#)

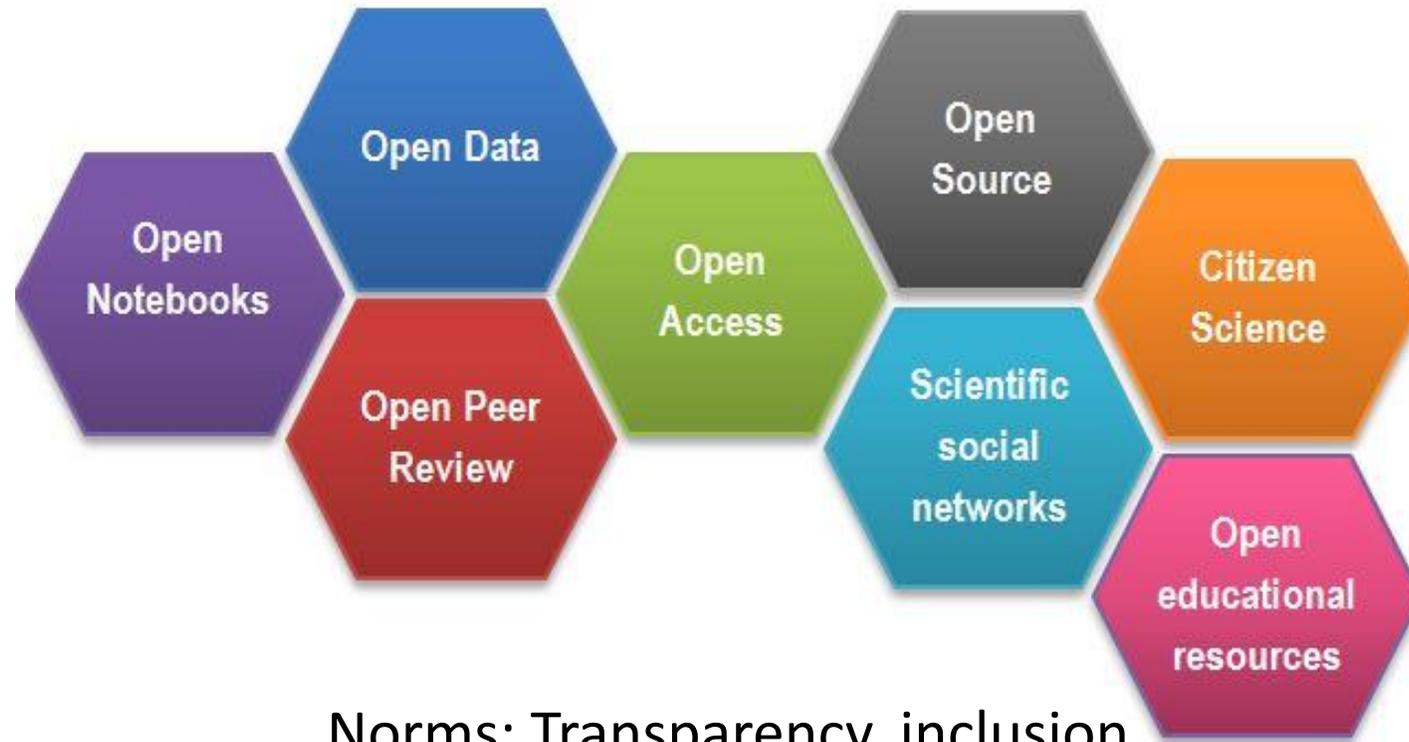
# Where are the self-correcting mechanisms of science?

“When we observe scientists, we find that they have developed a variety of practices for vetting knowledge – for identifying problems in their theories and experiments and attempting to correct them.”

-Naomi Oreskes, 2019

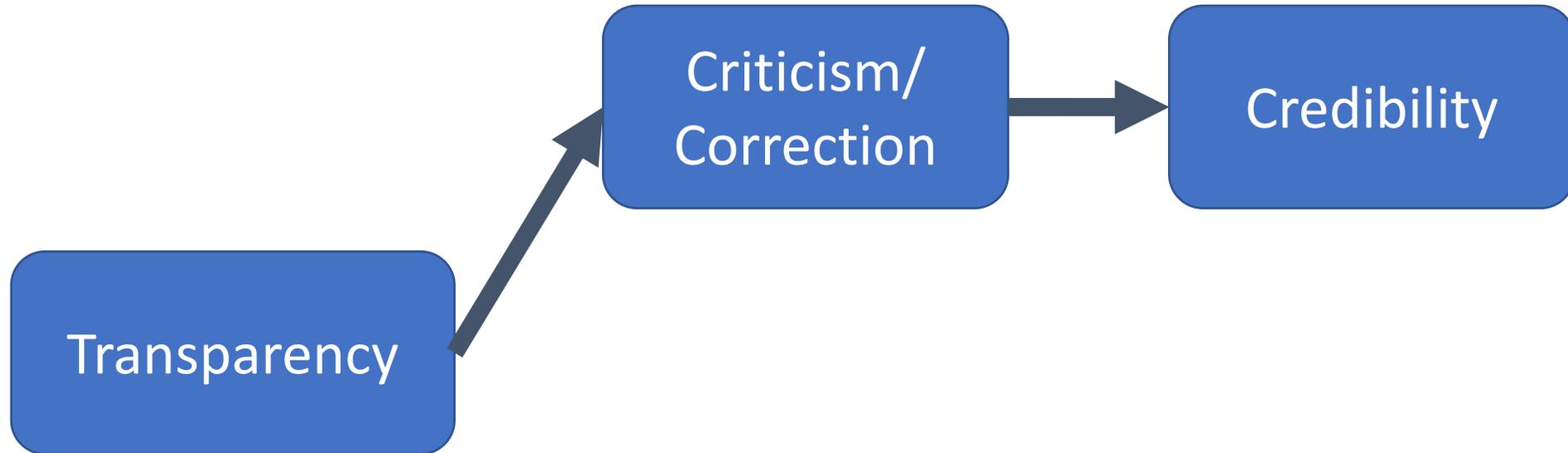
# The credibility revolution

Transparency

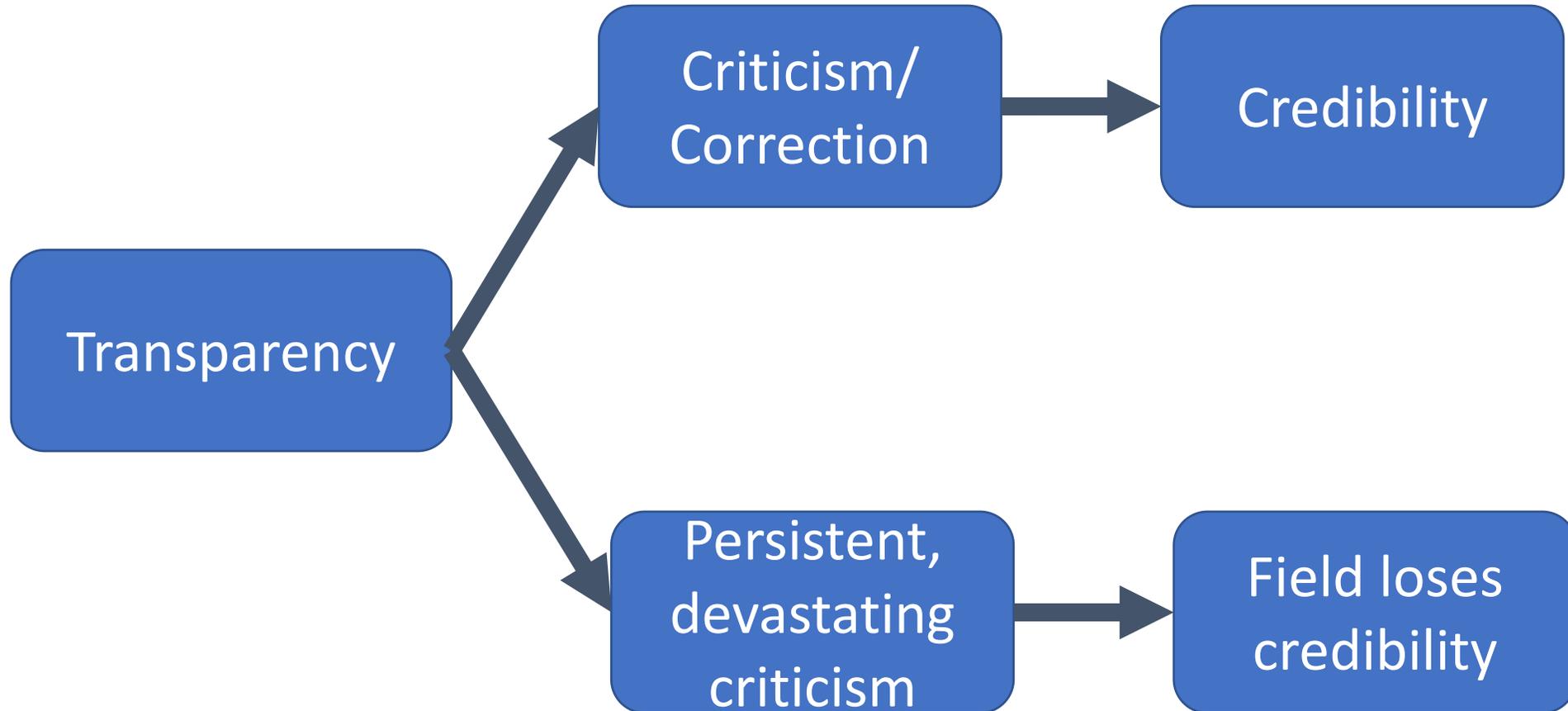


Norms: Transparency, inclusion  
Anti-norms: Secrecy, elitism

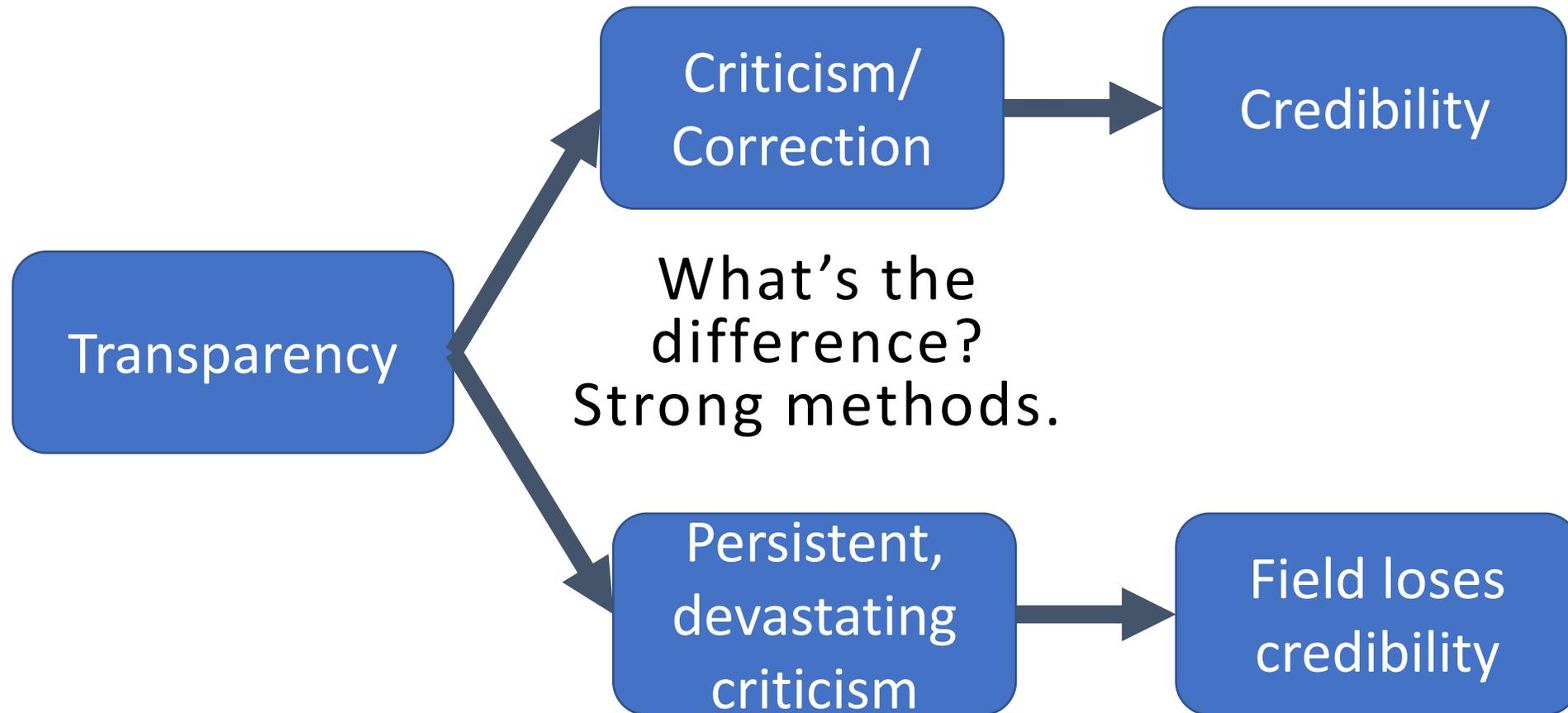
# The credibility revolution



# The credibility revolution

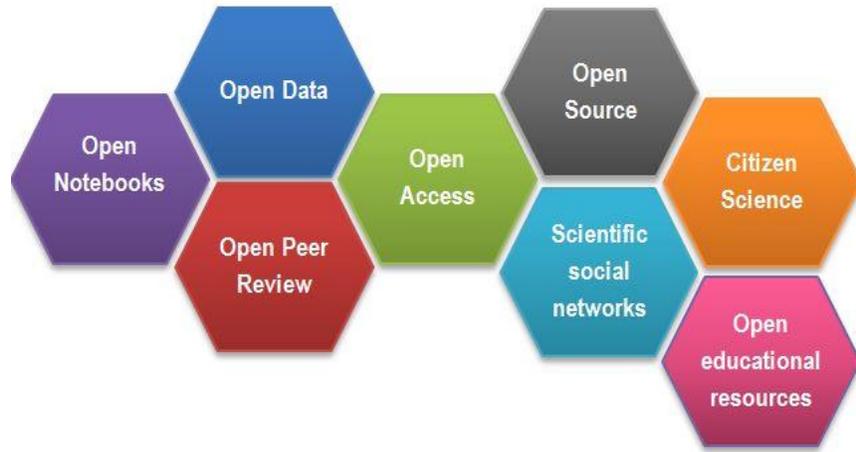


# The credibility revolution



# The credibility revolution

## Transparency



Norms: Transparency, inclusion  
Anti-norms: Secrecy, elitism

## Quality Control



Norms: Organized skepticism  
Anti-norms: Dogmatism, deference, credulity

# The credibility revolution

## Transparency



Norms: Transparency, inclusion  
Anti-norms: Secrecy, elitism

## Quality Control



Norms: Organized skepticism  
Anti-norms: Dogmatism, deference,  
credulity

# The credibility revolution

## Transparency



Norms: Transparency, inclusion  
Anti-norms: Secrecy, elitism

+

## Quality Control



Norms: Organized skepticism  
Anti-norms: Dogmatism, deference,  
credulity

# Why pre-registration?

- Pre-registration is a kind of transparency
  - Transparency about when decisions were made

# Why is timing important?



# Why pre-registration?

- Pre-registration is a kind of transparency
  - Transparency about when decisions were made
- Some claims depend on timing
  - $p$ -values depend on choosing the test ahead of time

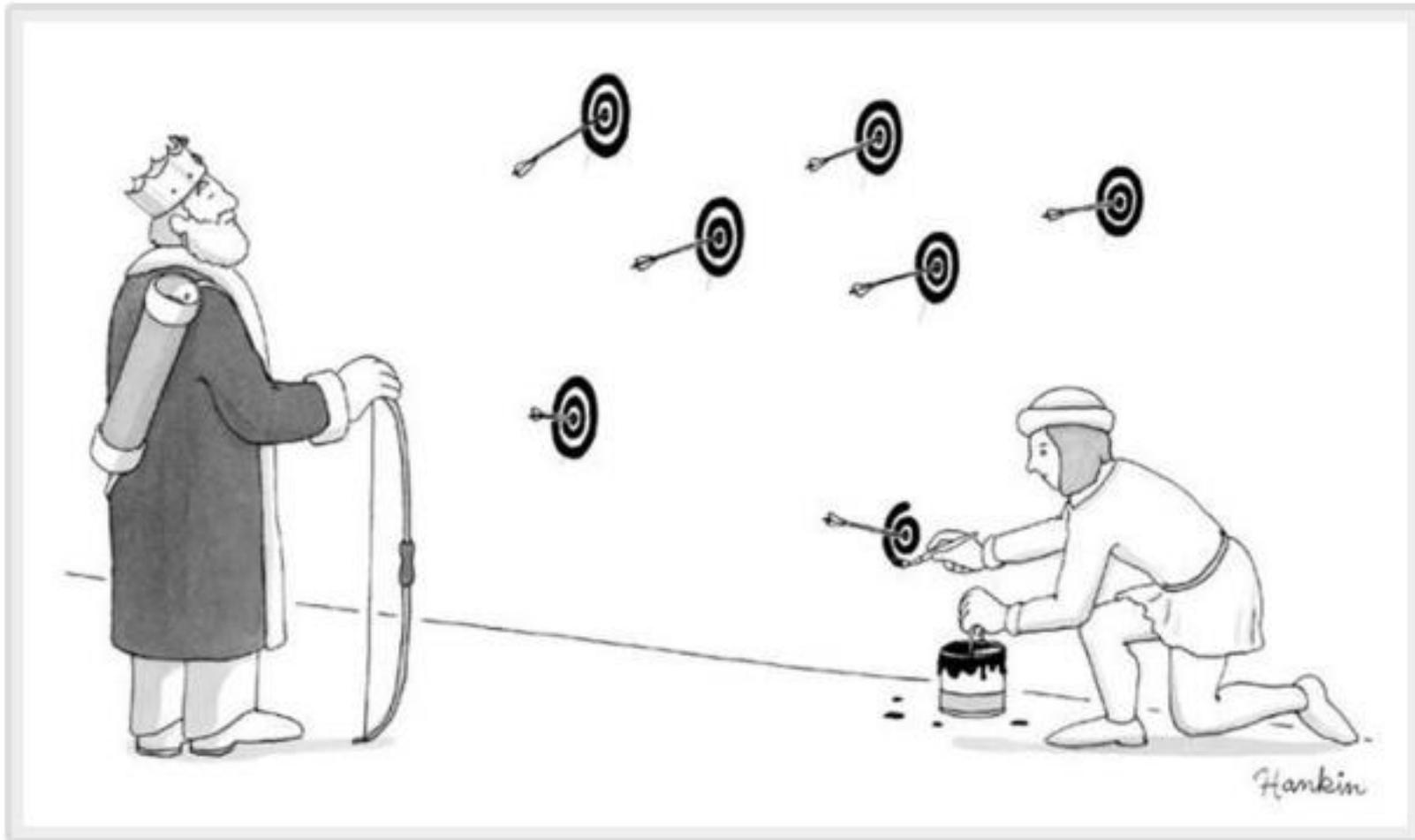
# Why pre-registration?

- Pre-registration is a kind of transparency
  - Transparency about when decisions were made
- Some claims depend on timing
  - $p$ -values depend on choosing the test ahead of time
- For these claims, flexibility changes the meaning of the result

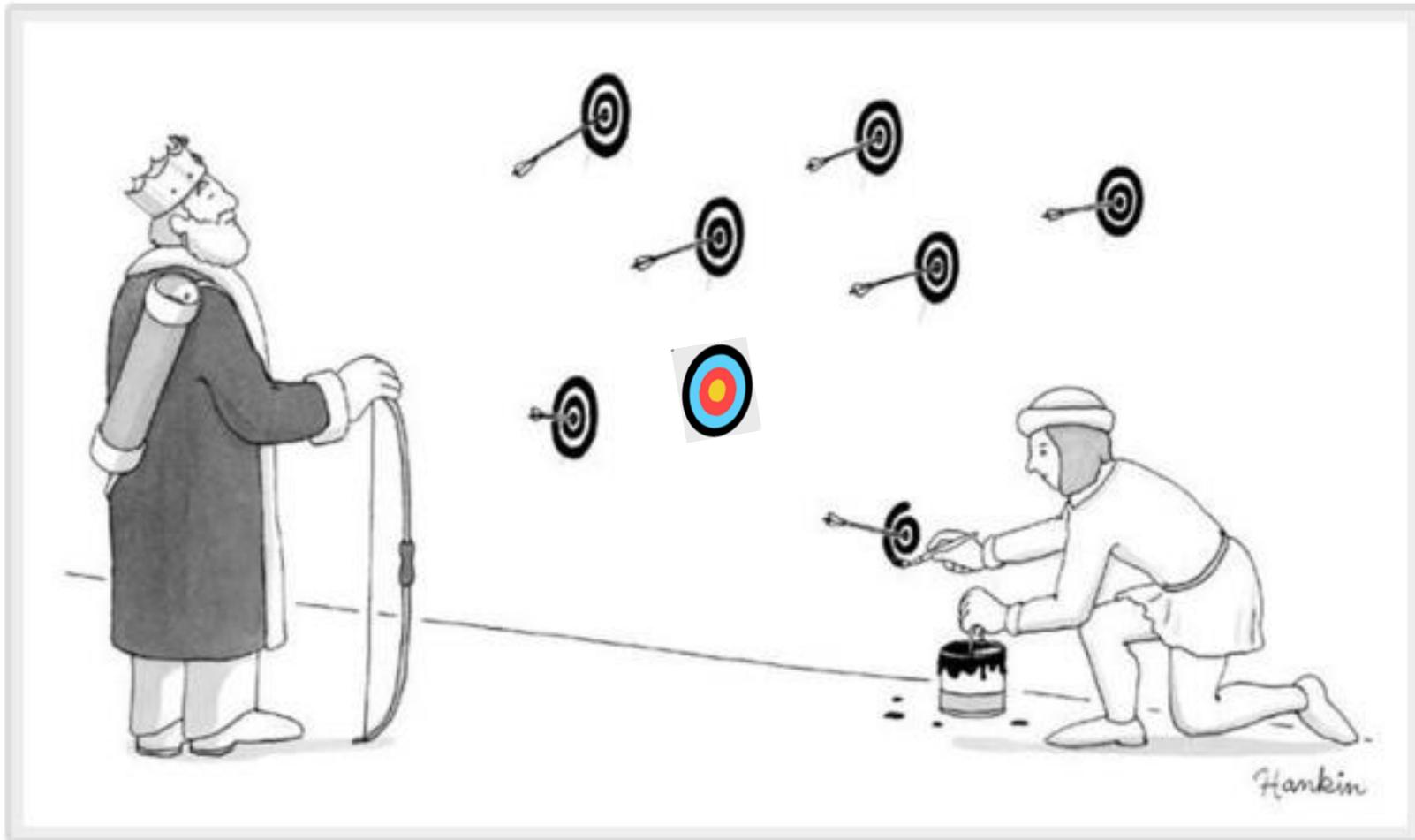
# Why pre-registration?

- Pre-registration is a kind of transparency
  - Transparency about when decisions were made
- Some claims depend on timing
  - $p$ -values depend on choosing the test ahead of time
- For these claims, flexibility changes the meaning of the result
- Pre-registration makes it easier for readers to identify these threats to validity

# Hidden threats to validity



# Hidden threats to validity



What's wrong with reporting unexpected findings?

# What's wrong with reporting unexpected findings?

- Scientific progress depends on serendipity to generate new hypotheses

# What's wrong with reporting unexpected findings?

- Scientific progress depends on serendipity to generate new hypotheses
- Presenting serendipitous results as if they were pre-planned tests harms science – gives readers the impression that a more stringent test was done

# What's wrong with reporting unexpected findings?

- Scientific progress depends on serendipity to generate new hypotheses
- Presenting serendipitous results as if they were pre-planned tests harms science – gives readers the impression that a more stringent test was done
- Readers need to know what was planned and what wasn't

# Why pre-registration?

# Why pre-registration?

- Pre-registration is about transparency
- Transparency  $\neq$  Quality
- Pre-registered  $\neq$  High quality
- Pre-registered = Easier for readers to judge quality

# Why pre-registration?

- Pre-registration is about transparency
- Transparency ≠ Quality
- Pre-registered ≠ High quality
- Pre-registered = Easier for readers to judge quality

What does high quality research look like?  
(Assuming good design, measurement, etc.)

# Why pre-registration?

- Pre-registration is about transparency
- Transparency ≠ Quality
- Pre-registered ≠ High quality
- Pre-registered = Easier for readers to judge quality

What does high quality research look like?  
(Assuming good design, measurement, etc.)

Results of a planned test  
Presented as new evidence  
Hypothesis testing

# Why pre-registration?

- Pre-registration is about transparency
- Transparency  $\neq$  Quality
- Pre-registered  $\neq$  High quality
- Pre-registered = Easier for readers to judge quality

What does high quality research look like?  
(Assuming good design, measurement, etc.)

Results of an unplanned test

Presented as provisional

Hypothesis generation

Results of a planned test

Presented as new evidence

Hypothesis testing

Pre-registration:

Putting flexibility front & center

# Pre-registration: Putting flexibility front & center

- Flexibility isn't bad – it's useful when exploring new topics
- Leaving something open, or deviating from a pre-registered plan, is sometimes the right thing to do

# Pre-registration: Putting flexibility front & center

- Flexibility isn't bad – it's useful when exploring new topics
- Leaving something open, or deviating from a pre-registered plan, is sometimes the right thing to do
  - Flexibility should be disclosed
  - Flexibility should temper conclusions

# Pre-registration: Putting flexibility front & center

- Flexibility isn't bad – it's useful when exploring new topics
- Leaving something open, or deviating from a pre-registered plan, is sometimes the right thing to do
  - Flexibility should be disclosed
  - Flexibility should temper conclusions
- Earlier stage research: More flexibility, more provisional claims

# Pre-registration: Putting flexibility front & center

- Flexibility isn't bad – it's useful when exploring new topics
- Leaving something open, or deviating from a pre-registered plan, is sometimes the right thing to do
  - Flexibility should be disclosed
  - Flexibility should temper conclusions
- Earlier stage research: More flexibility, more provisional claims
- Eliminating flexibility is a worthy goal, but we can't skip the early steps

Pre-registration:  
Giving your critics ammunition

# Pre-registration: Giving your critics ammunition

- Pre-registering will not protect you from criticism
- It'll make it *easier* for readers to detect *p*-hacking etc.

# Pre-registration: Giving your critics ammunition

- Pre-registering will not protect you from criticism
- It'll make it *easier* for readers to detect  $p$ -hacking etc.
- This is one of things that makes pre-registration admirable

# Pre-registration: Giving your critics ammunition

- Pre-registering will not protect you from criticism
- It'll make it *easier* for readers to detect  $p$ -hacking etc.
- This is one of things that makes pre-registration admirable
- Also why we shouldn't expect readers to give us the benefit of the doubt when we don't pre-register
  - Penalizes researchers who pre-register & can be checked

Pre-registration:  
Why do it then?

# Pre-registration: Why do it then?

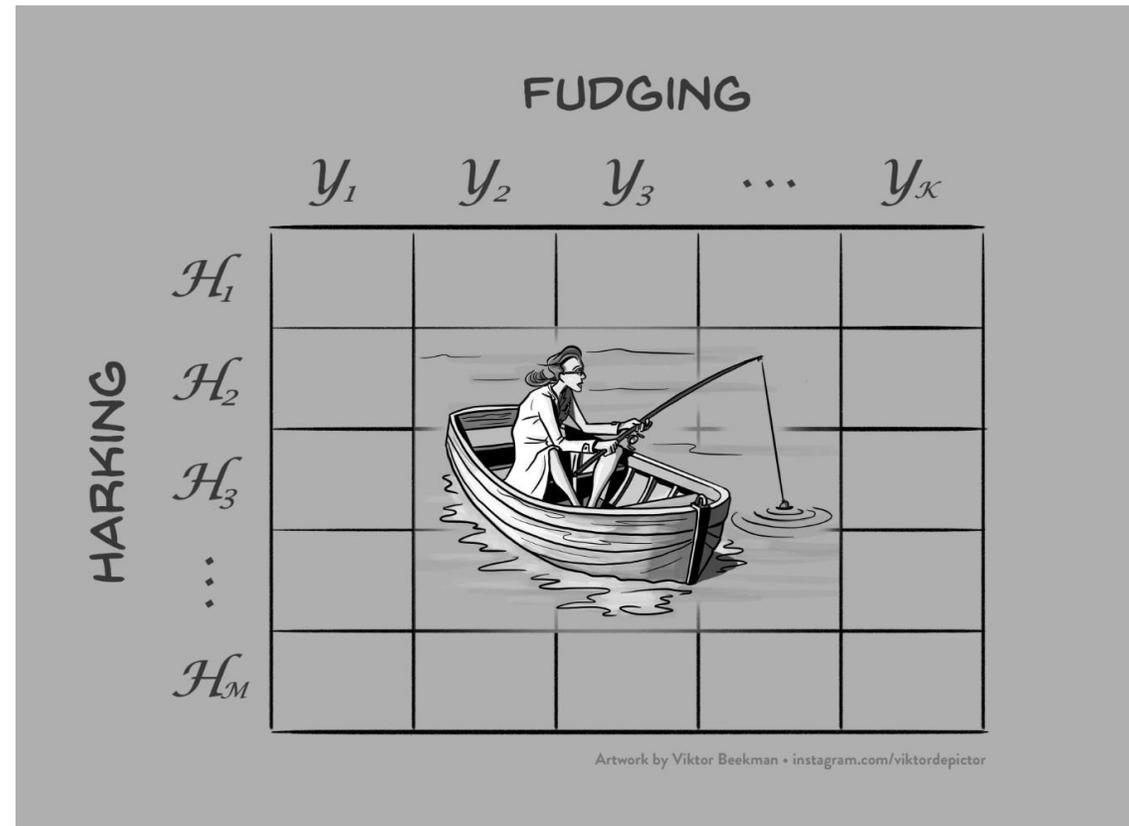
- Early-stage research:
  - Constrain what you can
  - Commit to being upfront about remaining flexibility
  - Tie yourself to the mast

# Pre-registration: Why do it then?

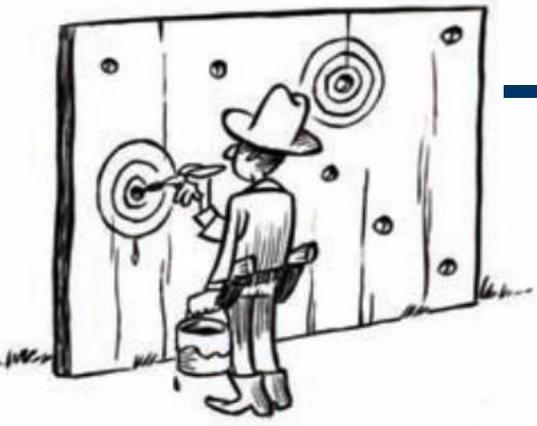
- Early-stage research:
  - Constrain what you can
  - Commit to being upfront about remaining flexibility
  - Tie yourself to the mast
- Late-stage research:
  - Plan your test
  - If it works, make strong claims
  - Let others evaluate for themselves if you achieved this

The end

# Problems, and Promises of Preregistration



Eric-Jan Wagenmakers

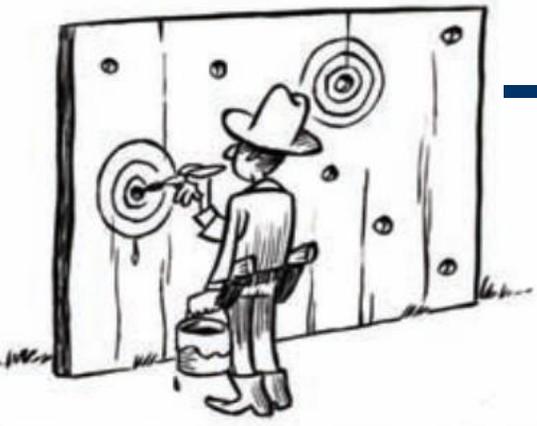


---

# Overview

---

- ◆ Disease
- ◆ Symptoms
- ◆ Cure



---

# Overview

---

- ◆ Disease
- ◆ Symptoms
- ◆ Cure



---

# The Main Dilemma

---

- ◆ Dr. X has a favorite theory that she has worked on and published about previously.
- ◆ Dr. X designs an experiment to test a prediction from her theory.
- ◆ Dr. X collects the data, a painstaking and costly process. Part of her career and those of her students ride on the outcome.



---

# The Main Dilemma

---

- ◆ Now the data need to be analyzed.
- ◆ If  $p < .05$ , the experiment is deemed a *success*;  
if  $p > .05$ , it is deemed a *failure*.

Who is, without a shadow of a doubt, the most biased analyst in the entire galaxy, past, present, and future?

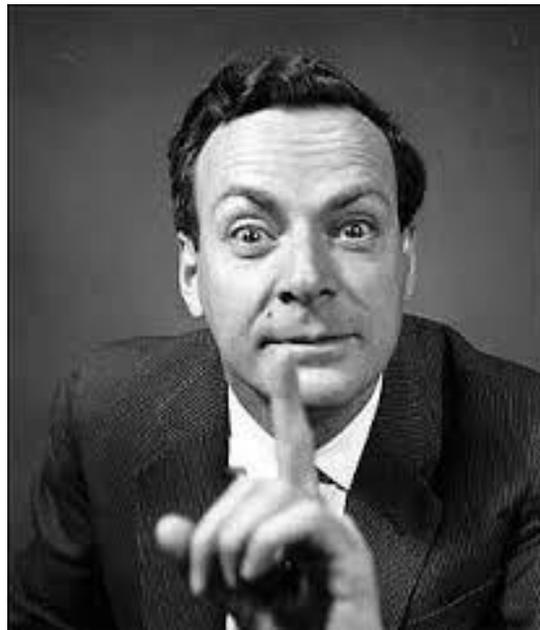
Who is, without a shadow of a doubt, the most biased analyst in the entire galaxy, past, present, and future?

*X*



# Richard Feynman

“The first principle is that you must not fool yourself—and you are the easiest person to fool”





---

# The Main Dilemma

---

- ◆ So the world's most biased analyst, Dr. X, the easiest person to fool, proceeds to analyze the data.
- ◆ Dr. X can do this alone, without any oversight whatsoever. In most cases, the data and analysis code never leave the lab.



---

# A Perfect Storm

---

- ◆ Data are analyzed with no accountability, by the person who is easiest to fool, often with limited statistical training, who has every incentive imaginable to produce  $p < .05$ .
- ◆ When  $p < .05$ , the result is declared “significant” and any further doubt is frowned upon, as it violates an implicit social contract [at least in psychology].



---

# What Researchers Want

---

- ◆ To discover the ‘truth’, but also:
  - To present compelling data that leave no room for doubt or dissent;
  - To develop a coherent theoretical framework;
  - To publish papers that make interesting claims.

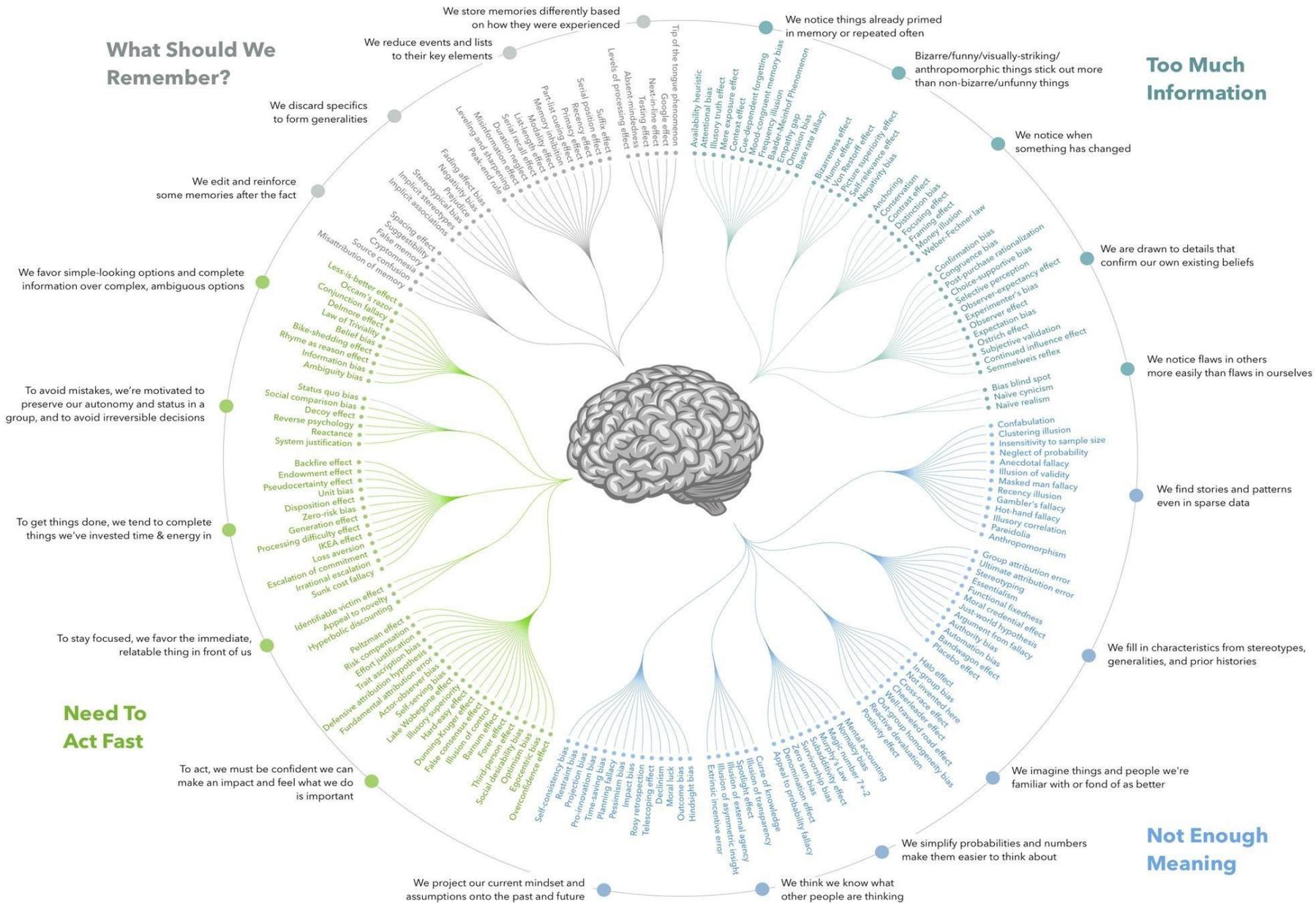


---

# What Does Psychology Say?

---

# COGNITIVE BIAS CODEX, 2016



Design:  
John Manoogian III  
Categorization:  
Buster Benson



---

# What Does Psychology Say?

---

- ◆ Hindsight bias
- ◆ Motivated reasoning
- ◆ Anchoring
- ◆ Survivorship bias
- ◆ Etc.

What Should We Remember?

Too Much Information

166 biases that torment our research participants and people in their daily lives. But are we immune?

Not Enough Meaning

To stay focused, we favor the immediate, relatable thing in front of us

Need To Act Fast

To act, we must be confident we can make an impact and feel what we do is important

We favor simple-looking options and complex information over complex, ambiguous options

To avoid mistakes, we're motivated to preserve our autonomy and status in a group, and to avoid irreversible decisions

To get things done, we tend to complete things we've invested time & energy in

We store memories differently based on how they were experienced

We notice things already primed in memory or repeated often

Bizarre/funny/visually-striking/ anthropomorphic things stick out more than non-bizarre/unfunny things

We notice when something has changed

We are drawn to details that confirm our own existing beliefs

We notice flaws in others more easily than flaws in ourselves

We find stories and patterns even in sparse data

We fill in characteristics from stereotypes, generalities, and prior histories

We imagine things and people we're familiar with or fond of as better

We simplify probabilities and numbers make them easier to think about

We think we know what other people are thinking

We project our current mindset and assumptions onto the past and future

Design: John Manoogian III  
Categorization: Buster Benson



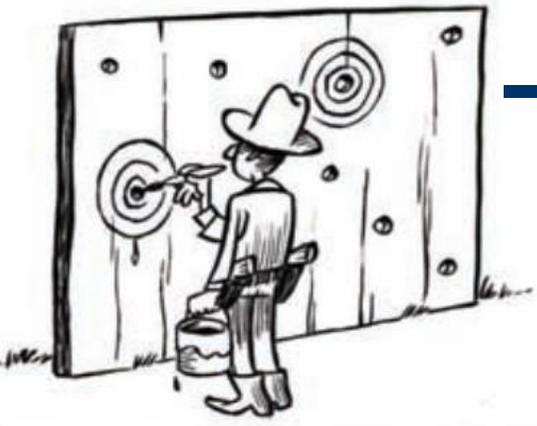
---

# No, Researchers Are Probably Not Immune

---

◆ Bias blind spot





---

# Overview

---

- ◆ Disease
- ◆ Symptoms
- ◆ Cure



---

# Symptoms of a Systemic Problem

---

- ◆ Publication bias
- ◆ Fudging
- ◆ HARKing



---

# Publication Bias

---

- ◆ Unflattering findings are rarely published.
- ◆ So the literature is populated mostly by flattering findings.
- ◆ Consequence: literature stops being a reliable guide to knowledge.



---

# The Brady Rule

---

- ◆ In criminal law, the prosecution is required to share exculpatory evidence with the defense.
- ◆ If exculpatory evidence is suppressed, a fair trial is impossible.
- ◆ [This “Brady rule” requirement is regularly flouted.]



---

# Symptoms of a Systemic Problem

---

- ◆ Publication bias
- ◆ Fudging
- ◆ HARKing

MESSAGING THE DATA ('FUDGING')



VARIABLES, TRANSFORMATIONS,  
ANALYSIS PIPELINES

$y_1$     $y_2$     $y_3$    ...    $y_x$

FINDING YOUR HYPOTHESIS  
IN THE DATA ('HARKING')



HYPOTHESES

$\mathcal{H}_1$

$\mathcal{H}_2$

$\mathcal{H}_3$

⋮

$\mathcal{H}_M$



MESSAGING THE DATA ('FUDGING')



VARIABLES, TRANSFORMATIONS,  
ANALYSIS PIPELINES

$y_1$     $y_2$     $y_3$    ...    $y_x$

FINDING YOUR HYPOTHESIS  
IN THE DATA ('HARKING')



HYPOTHESES

This Fishing is Problematic  
for Frequentists  
AND  
Bayesians

⋮  
 $\mathcal{H}_M$

MESSAGING THE DATA ('FUDGING')



VARIABLES, TRANSFORMATIONS,  
ANALYSIS PIPELINES

$y_1$     $y_2$     $y_3$    ...    $y_x$

FINDING YOUR HYPOTHESIS  
IN THE DATA ('HARKING')



HYPOTHESES

Consequence:  
Overconfident Claims and  
Spurious Results  
That Do Not  
Replicate

$\mathcal{H}_M$



---

# Overview

---

- ◆ Disease
- ◆ Symptoms
- ◆ Cure



---

# Preregistration of Analysis Plans

---

- ◆ Separates what was post-hoc from what was pre-planned.
- ◆ Prevents researchers from fooling themselves and others.
- ◆ Does not rule out exploratory expeditions; just labels them as such.



---

# Preregistration of Analysis Plans

---

- ◆ Separates what was post-hoc from what was pre-planned.
- ◆ Prevents researchers from fooling themselves and others.
- ◆ Does not rule out exploratory expeditions; just labels them as such.



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration does *not* improve the underlying theoretical framework, the research question, or the experimental design. *It does not transform frogs into princes.*



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration does *not* improve the underlying theoretical framework, the research question, or the experimental design. *It does not transform frogs into princes.*
- ◆ However, the extra thought that goes into the planning stage may increase the quality of the research.



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration alone does *not* prevent publication bias.



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration alone does *not* prevent publication bias.
- ◆ However, it is a small step from preregistration to Registered Reports, a format that *does* prevent publication bias.



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration is not the only cure.
- ◆ Preregistration is not meant to stop fraud.
- ◆ Preregistration can be ignored.



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration is not the only cure.
- ◆ Preregistration is not meant to stop fraud.
- ◆ Preregistration can be ignored. This merely underscores its value.



---

# Beware of the Nirvana Fallacy

---

- ◆ Preregistration does not apply to all research endeavors.
- ◆ Preregistration does not imply that confirmatory research is superior to exploratory research.



---

# Concluding Comments

---

- ◆ The goal of preregistration is to *inoculate* researchers against the biases that beset *all* human beings.
- ◆ At its core, preregistration is about furthering the core scientific values of transparency and honesty.



---

# Concluding Comments

---

- ◆ Preregistration does not forbid any particular analysis from being carried out or reported.
- ◆ What it forbids is the presentation of a cherry-picked, data-inspired analysis as if it were pre-planned.



---

# Concluding Comments

---

- ◆ In medicine, preregistration is a *requirement* for clinical trials.
- ◆ It is encouraging to see the field of psychology promote preregistration as well.

# Thanks for Your Attention



Acta Psychologica  
Volume 148, May 2014, Pages 188-194



The meaning of “significance” for different types of research [translated and annotated by Eric-Jan Wagenmakers, Denny Borsboom, Josine Verhagen, Rogier Kievit, Marjan Bakker, Angelique Cramer, Dora Matzke, Don Mellenbergh, and Han L. J. van der Maas] ☆

## An Agenda for Purely Confirmatory Research

**Eric-Jan Wagenmakers, Ruud Wetzels, Denny Borsboom,  
Han L. J. van der Maas, and Rogier A. Kievit**

University of Amsterdam, The Netherlands

Perspectives on Psychological Science  
7(6) 632–638

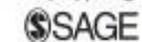
© The Author(s) 2012

Reprints and permission:

[sagepub.com/journalsPermissions.nav](http://sagepub.com/journalsPermissions.nav)

DOI: 10.1177/1745691612463078

<http://pps.sagepub.com>





AMERICAN  
PSYCHOLOGICAL  
ASSOCIATION



the british  
psychological society



DGP

Deutsche Gesellschaft  
für Psychologie

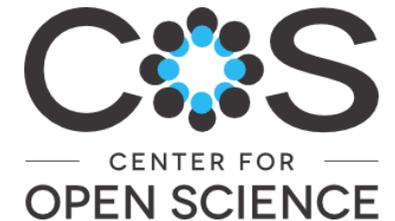
# Preregistration Standards for Psychology

A collaborative effort between the American Psychological Association,  
British Psychological Society, and German Psychological Society



ZPID

In partnership with the  
Leibniz Institute for Psychology and Center for Open Science





**"Establishing common open science standards for Psychology"** panel session at the German Psychological Society Congress, Frankfurt, September 2018  
L-R: Mario Gollwitzer, Aljoscha Neubauer, Rose Sokol-Chang, Conny Antoni, Nicola Gale, Daryl O'Connor, Jan Theeuwes & Michael Bosnjak

# Preregistration Template for Quantitative Research in Psychology

## 6 Sections:

- T Title and Title Page
- A Abstract
- I Introduction
- M Method
- AP Analysis Plan
- O Other Information (Optional)



AMERICAN  
PSYCHOLOGICAL  
ASSOCIATION



the british  
psychological society



DGP<sub>s</sub>

Deutsche Gesellschaft  
für Psychologie

# Preregistration Template for Quantitative Research in Psychology

## 6 Sections:

T	Title and Title Page
A	Abstract
I	Introduction
M	Method
AP	Analysis Plan
O	Other Information (Optional)

## Multiple Items per Section, e.g.:

- I1 Theoretical Background
- I2 Objectives and Research Question(s)
- I3 Hypothesis (H1, H2, ...)
- I4 Exploratory Research Questions  
(if applicable: E1, E2, ...)

... 44 items in total

# Preregistration Template for Quantitative Research in Psychology

## 6 Sections:

T	Title and Title Page
A	Abstract
I	Introduction
M	Method
AP	Analysis Plan
O	Other Information (Optional)

## Multiple Items per Section, e.g.:

I1	Theoretical Background
I2	Objectives and Research Question(s)
I3	Hypothesis (H1, H2, ...)
I4	Exploratory Research Questions (if applicable: E1, E2, ...)
... 44 items in total	

## 2 Sub-sections for Method:

M3-M9	Sampling Procedure and Data Collection
M10-M14	Conditions and Design

# Preregistration Template for Quantitative Research in Psychology

<b>6 Sections:</b>		<b>Multiple Items per Section, e.g.:</b>		<b>2 Sub-sections for Method:</b>	
T	Title and Title Page	I1	Theoretical Background	M3-M9	Sampling Procedure and Data Collection
A	Abstract	I2	Objectives and Research Question(s)	M10-M14	Conditions and Design
I	Introduction	I3	Hypothesis (H1, H2, ...)		
M	Method	I4	Exploratory Research Questions (if applicable: E1, E2, ...)		
AP	Analysis Plan				
O	Other Information (Optional)		... 44 items in total		

## Each item has a description with instructions, e.g.:

I3 Hypothesis (H1, H2, ...) Provide hypothesis for predicted results. If multiple hypotheses, uniquely number them (e.g. H1, H2a, H2b, ...) and refer to them the same way at other points in the registration document and in the manuscript.

# Preregistration Template for Quantitative Research in Psychology

- Partly taking the APA Style Journal Article Reporting Standards (**JARS**) as reference
- Stressing **flexibility**
  - Not every item relevant for every study
  - Journals, editors, registries, researchers may adjust as needed
  - Template will be made available under CC-BY license
- Promoting the explicit use of **item labels** throughout the template and – optimally – also in later manuscript



AMERICAN  
PSYCHOLOGICAL  
ASSOCIATION



the british  
psychological society



DGPs

Deutsche Gesellschaft  
für Psychologie



AMERICAN  
PSYCHOLOGICAL  
ASSOCIATION



the british  
psychological society



DGP

Deutsche Gesellschaft  
für Psychologie

# Thank you for attending!

You will receive a link to the recorded webinar later today.

A link to the preregistration template as well as these slides are available on the Resources window on your screen.



ZPID

