



# The Reproducibility of Psychological Research

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Twitter: @RolfZwaan

Blog: <http://rolfzwaan.blogspot.nl/>

# How I Got Involved

- Not a methodologist
- Not a social psychologist

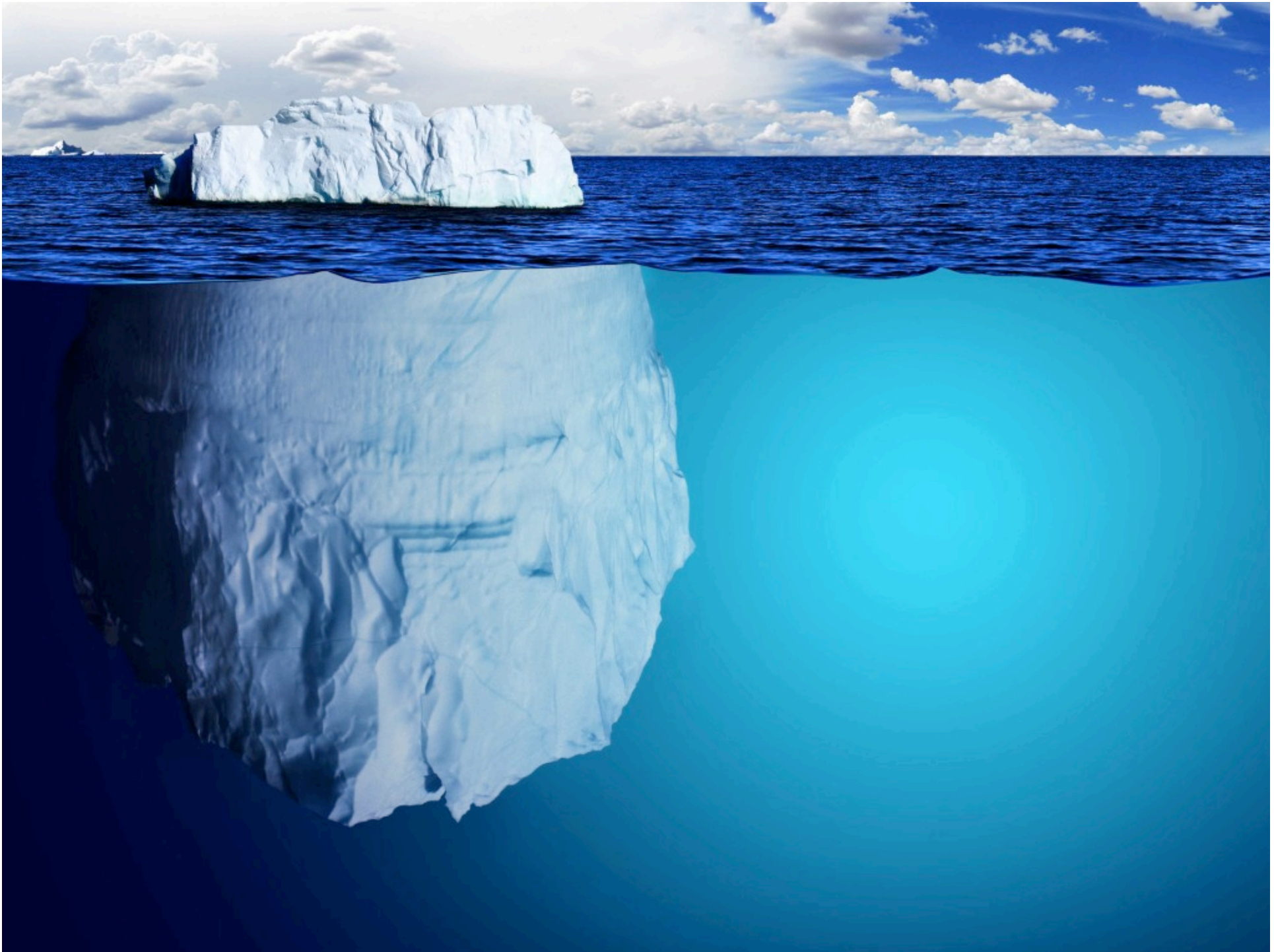


**“We have our own Stapel”**



Dirk Smeesters





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ESSAY

# Why Most Published Research Findings Are False

John P. A. Ioannidis

Published: August 30, 2005 • DOI: 10.1371/journal.pmed.0020124

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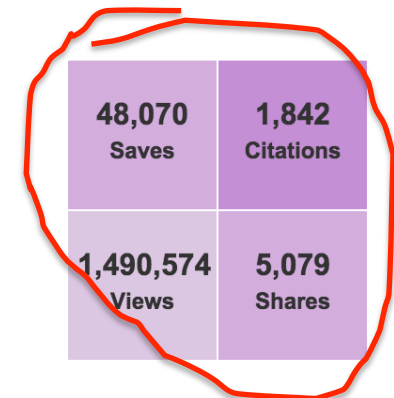
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# Why Most Published Research Findings Are False

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# Ioannides

- A research finding is less true when
  - N is smaller;
  - effect sizes are smaller;
  - there is greater flexibility in design, analysis, and reporting;
  - when there are greater incentives.

# Ioannides

- A research finding is less true when
  - N is smaller:
  - But this is biomedical research.
  - How about psychology?
  - there is greater flexibility,
  - when there are greater incentives.

# Psychological Self-Reflection

*Research Article*



## Measuring the Prevalence of Questionable Research Practices With Incentives for Truth Telling

Psychological Science  
23(5) 524–532  
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DOI: 10.1177/0956797611430953  
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**Leslie K. John<sup>1</sup>, George Loewenstein<sup>2</sup>, and Drazen Prelec<sup>3</sup>**

<sup>1</sup>Marketing Unit, Harvard Business School; <sup>2</sup>Department of Social & Decision Sciences, Carnegie Mellon University; and <sup>3</sup>Sloan School of Management and Departments of Economics and Brain & Cognitive Sciences, Massachusetts Institute of Technology

# Psychological Self-Reflection

*This finding suggests that some questionable practices may constitute the prevailing research norm.*

Research

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<sup>1</sup>Market  
and <sup>3</sup>Slo  
Institute

# Psychological Self-Reflection

Article

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## Questionable Research Practices Revisited

Klaus Fiedler<sup>1</sup> and Norbert Schwarz<sup>2</sup>

Social Psychological and  
Personality Science

1-8

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DOI: 10.1177/1948550615612150

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### Abstract

The current discussion of questionable research practices (QRPs) is meant to improve the quality of science. It is, however, important to conduct QRP studies with the same scrutiny as all research. We note problems with overestimates of QRP prevalence and the survey methods used in the frequently cited study by John, Loewenstein, and Prelec. In a survey of German psychologists, we decomposed QRP prevalence into its two multiplicative components, proportion of scientists who ever committed a behavior and, if so, how frequently they repeated this behavior across all their research. The resulting prevalence estimates are lower by order of magnitudes. We conclude that inflated prevalence estimates, due to problematic interpretation of survey data, can create a descriptive norm (QRP is normal) that can counteract the injunctive norm to minimize QRPs and unwantedly damage the image of behavioral sciences, which are essential to dealing with many societal problems.



# Psychological Self-Reflection

Article

## Questionable Research Practices Revisited

Klaus Fiedler<sup>1</sup> and Norbert Schwarz<sup>2</sup>

Social Psychological and  
Personality Science

1-8

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DOI: 10.1177/1948550615612150

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*QRPs are not the norm.*

however,  
QRP pre-

valence and the survey methods used in the frequently cited study by John, Loewenstein, and Prelec. In a survey of German psychologists, we decomposed QRP prevalence into its two multiplicative components, proportion of scientists who ever committed a behavior and, if so, how frequently they repeated this behavior across all their research. The resulting prevalence estimates are lower by order of magnitudes. We conclude that inflated prevalence estimates, due to problematic interpretation of survey data, can create a descriptive norm (QRP is normal) that can counteract the injunctive norm to minimize QRPs and unwantedly damage the image of behavioral sciences, which are essential to dealing with many societal problems.

# Psychological Self-Reflection

*General Article*



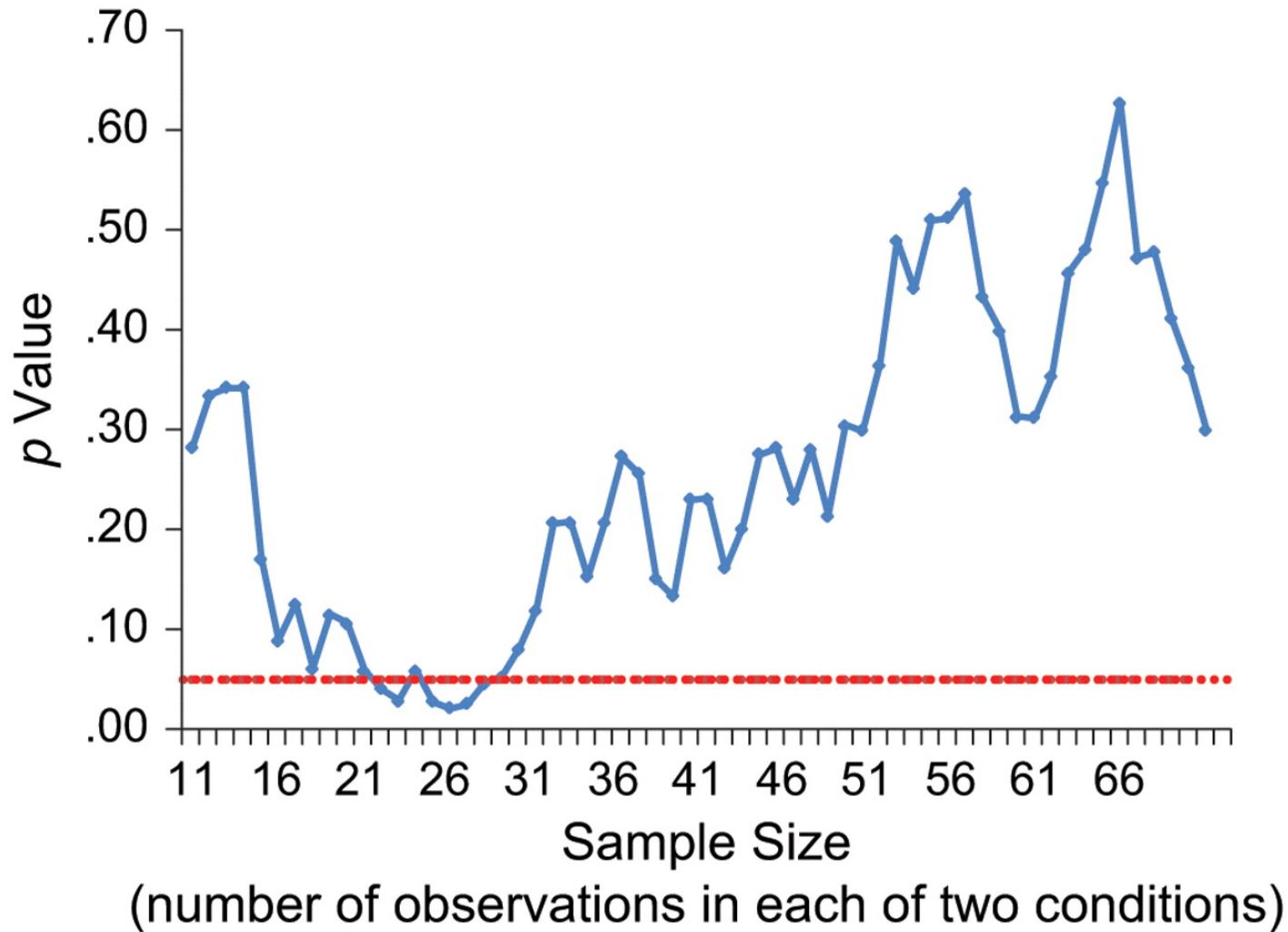
## **False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant**

**Joseph P. Simmons<sup>1</sup>, Leif D. Nelson<sup>2</sup>, and Uri Simonsohn<sup>1</sup>**

<sup>1</sup>The Wharton School, University of Pennsylvania, and <sup>2</sup>Haas School of Business, University of California, Berkeley

Psychological Science  
XX(X) 1–8  
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**Fig. 2. Illustrative simulation of p values obtained by a researcher who continuously adds an observation to each of two conditions, conducting a t test after each addition.**



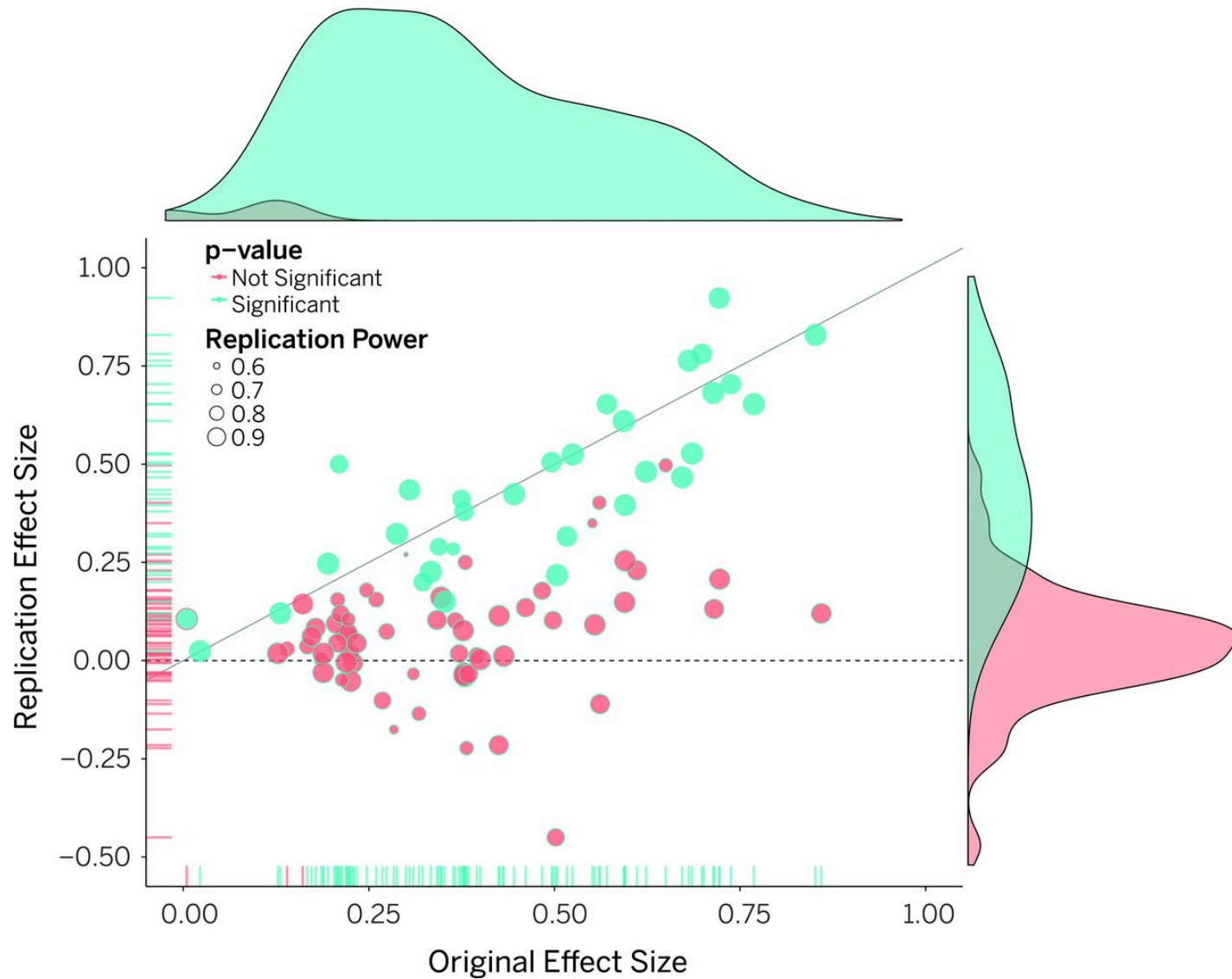
Joseph P. Simmons et al. *Psychological Science*  
2011;22:1359-1366



# Psychological Self-Reflection

*We ... demonstrate how unacceptably easy it is to accumulate (and report) statistically significant evidence for a false hypothesis.*

# Original study effect size versus replication effect size (correlation coefficients).



# Salient

- 36% replication rate overall
- Social psychology
  - *Psychological Science* social: 29%
  - *JPSP*: 23%
- Cognitive Psychology
  - *Psychological Science* cognitive: 53%
  - *JEP:LMC*: 48%

# Social Priming

E.g., processing words like *Florida* and *grey* cause subjects to walk more slowly minutes later.

# Social Priming

## Between-subjects designs

- Low power
- Many dv's
- Conceptual replications



# Semantic priming

E.g., processing *doctor* facilitates lexical decision or naming of *nurse*.

# Semantic Priming

Within-subjects designs

- Higher power
- Two dvs (RT and accuracy)

Direct self-replications

# The Logic of Experimentation

## Rolf Zwaan

Zeistgeist: Psychological Experimentation, Cognition, Language, and Academia.

Wednesday, February 6, 2013

Bruce Springsteen and Lazy Susan: The Logic of Experimentation

Many papers have more than one experiment. How do researchers string together experiments?

About Me



 Rolf Zwaan

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# The Logic of Experimentation

## Rolf Zwaan

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Bruce Springsteen and Lazy Susan: The Logic of Experimentation

Many papers have more than one experiment. How do researchers string together experiments?

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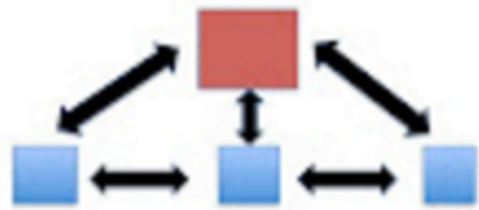
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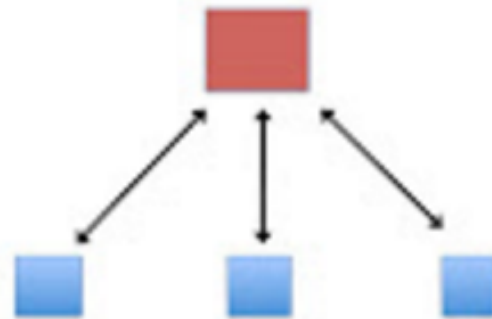
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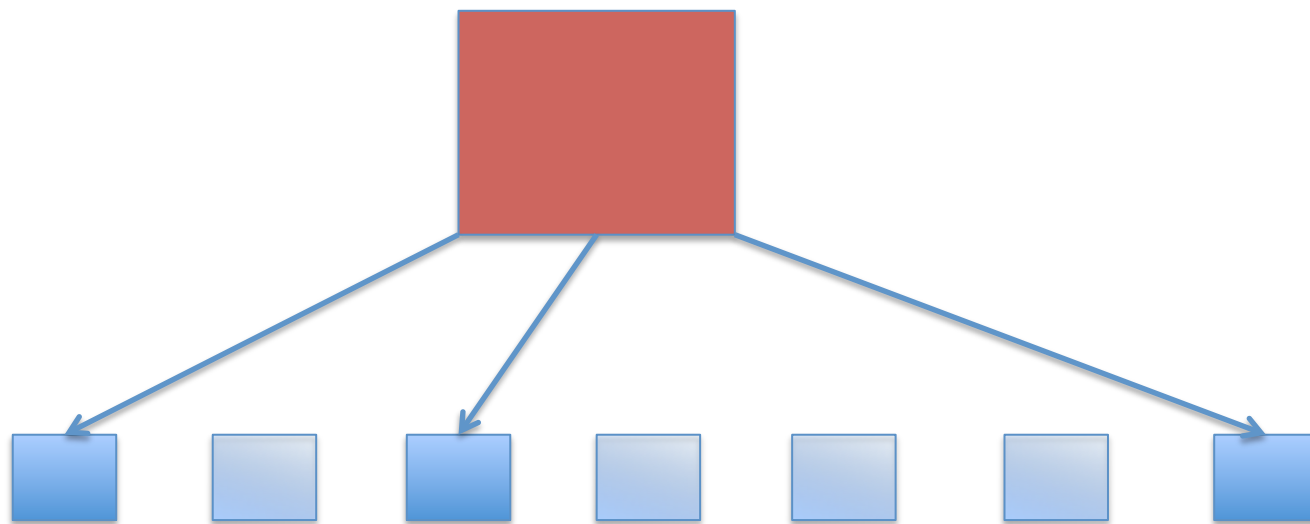
*Many papers have more than one experiment. How do researchers string together experiments?*

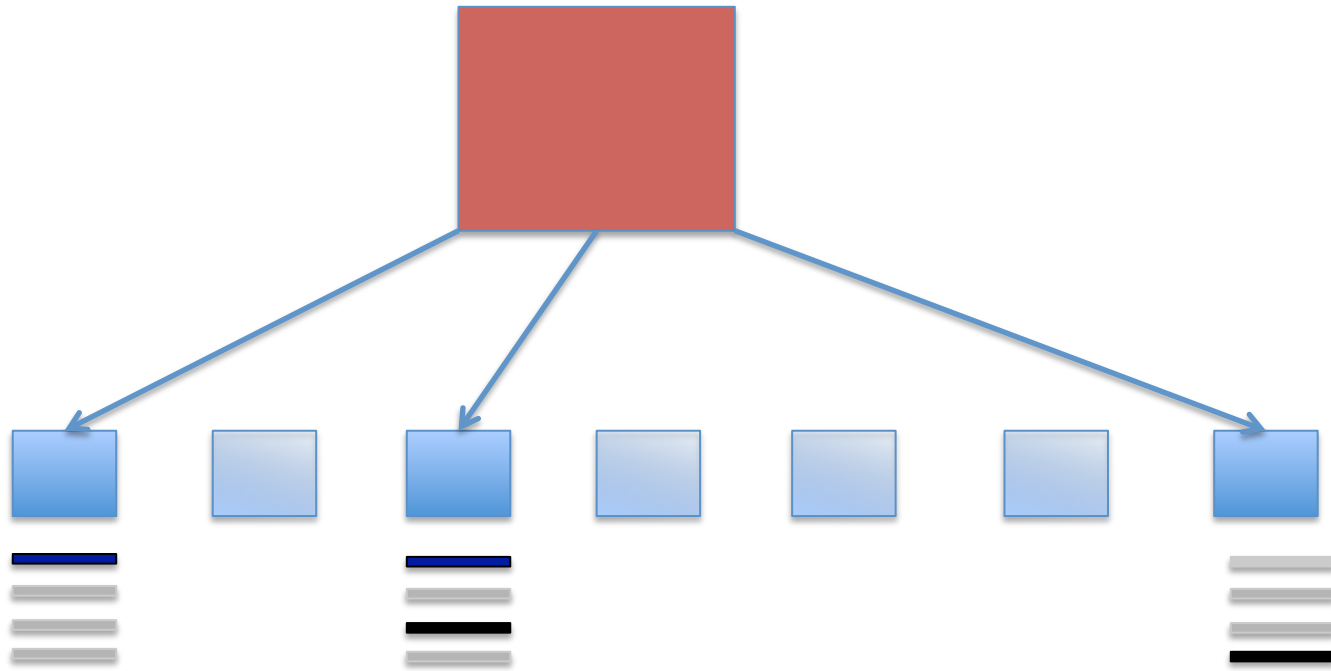
## Cognitive



## Social







# $p$ -Hacking

- Underpowered studies
- Optional stopping
- Selective removal of outliers
- Selective reporting of results
- HARKing



# It is/was a Systemic Problem

- Authors
- Co-authors
- Reviewers
- Editors

# It is an Old Problem

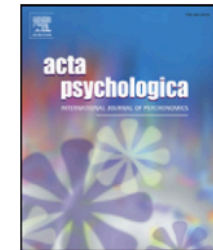
Acta Psychologica 148 (2014) 188–194



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Acta Psychologica

journal homepage: [www.elsevier.com/locate/actpsy](http://www.elsevier.com/locate/actpsy)

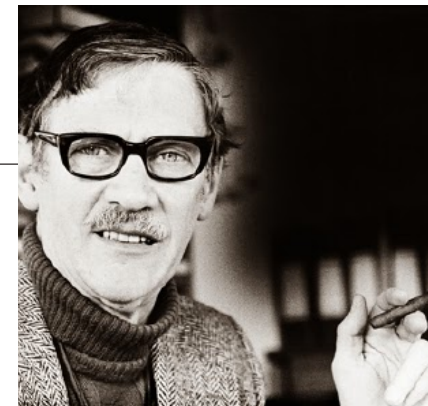


The meaning of “significance” for different types of research [translated and annotated by Eric-Jan Wagenmakers, Denny Borsboom, Josine Verhagen, Rogier Kievit, Marjan Bakker, Angelique Cramer, Dora Matzke, Don Mellenbergh, and Han L. J. van der Maas]★

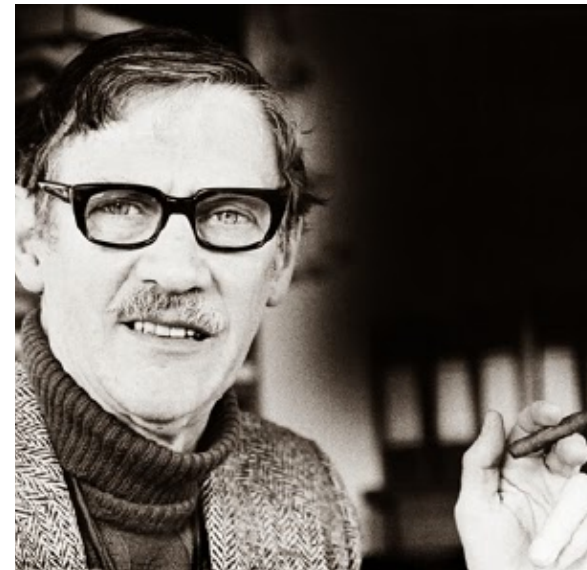
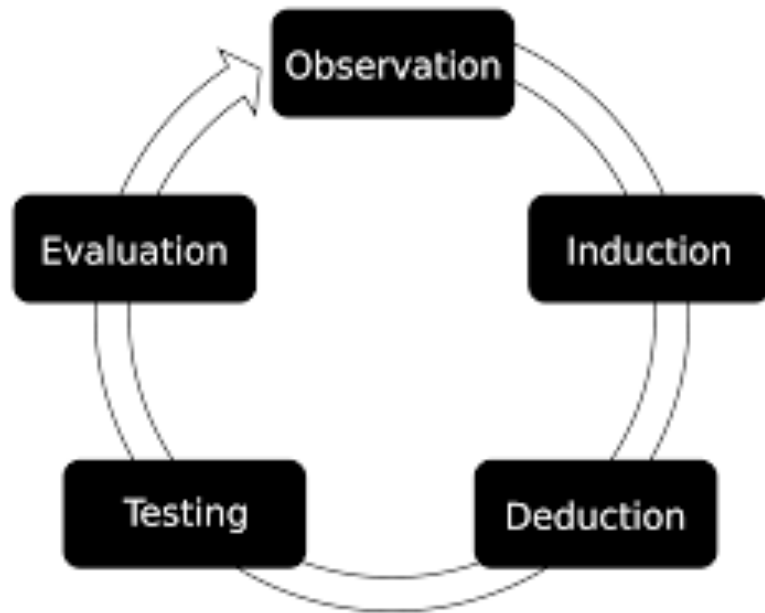


Dr. A.D. de Groot

*From the Psychological Laboratory of the University of Amsterdam*



# It is an Old Problem



# 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

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DOI: 10.1177/1745691612463078

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**Exploratory  
Research**



**Confirmatory  
Research**

# Crisis, What Crisis?



# Responses to the Crisis

- Ostriches
- Small Dogs
- Squid
- Tasmanian Devils
- Ant colonies
- Owls









The Opinion Pages | OP-ED CONTRIBUTOR

# Psychology Is Not in Crisis

By LISA FELDMAN BARRETT SEPT. 1, 2015

But the failure to replicate is not a cause for alarm; in fact, it is a normal part of how science works.







Shameless little bullies, replication mafia, replication police,  
McCarthyite nightmare, Hostile replicators,  
mindless replicators, god's chosen soldiers in a great jihad,  
Witch hunt, A bunch of self-righteous, self-appointed sherifs,  
replication hysteria, ...



Source: Felix Schönbrodt  
<https://osf.io/4bzrv/>



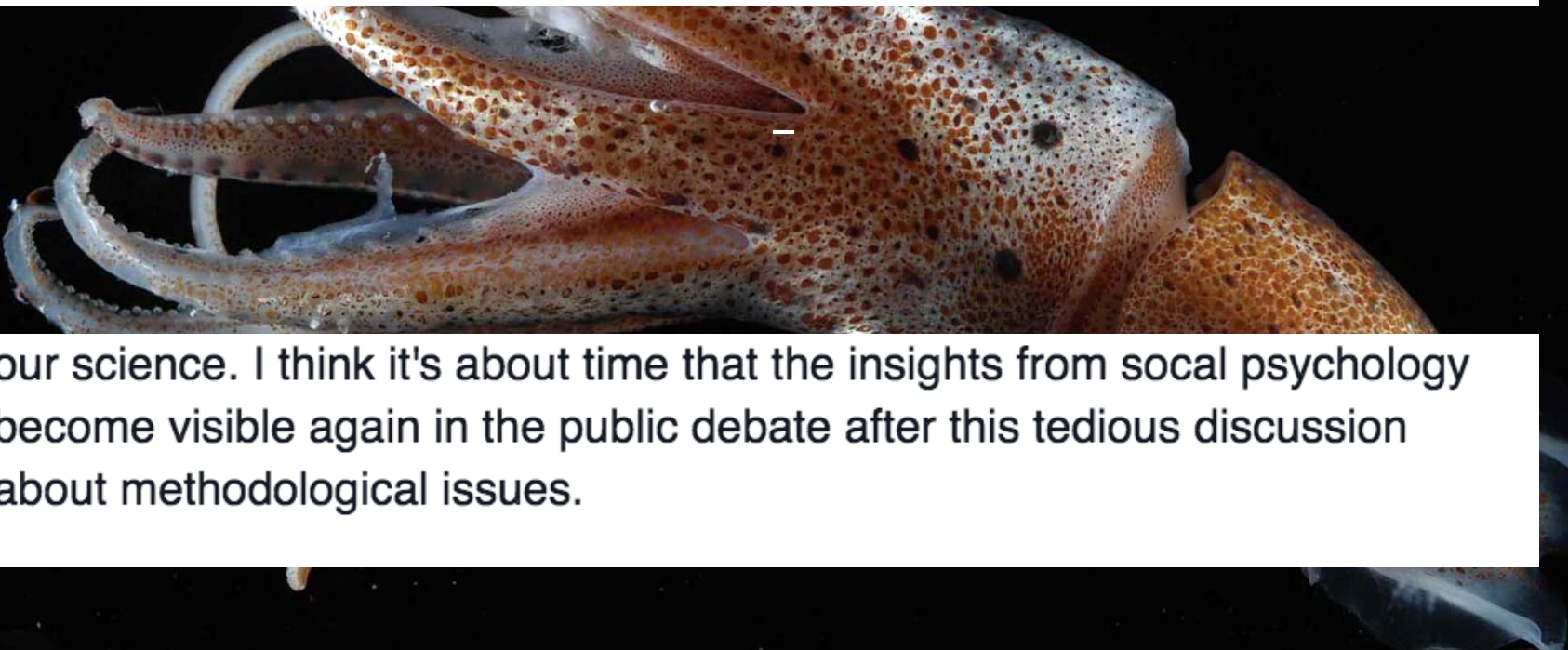




**Fritz Strack**

16 november om 18:43

The terrorist attack in France is a challenge for social psychology. I think social psychologists should actively participate in the public discourse and harness their knowledge to explain crucial aspects of the current events.



our science. I think it's about time that the insights from social psychology become visible again in the public debate after this tedious discussion about methodological issues.









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PNAS

Proceedings of the National Academy of Sciences of the United States of America

Proc Natl Acad Sci U S A. 2015 Mar 3; 112(9): 2688–2692.

PMCID: PMC4352797

Published online 2015 Feb 17. doi: [10.1073/pnas.1417712112](https://doi.org/10.1073/pnas.1417712112)

Psychological and Cognitive Sciences

## Hunger promotes acquisition of nonfood objects

[Alison Jing Xu](#),<sup>a,1</sup> [Norbert Schwarz](#),<sup>b,c</sup> and [Robert S. Wyer, Jr.](#)<sup>d</sup>

Proc







**Uli Schimmack** Examples like this explain why the replicability in 2015 is no different than replicability in 2010 (before Bem, 2011 = ground zero): old-school p-hacking is still publishable, especially in journals that have no expertise in psychology like PNAS.



**Greg Francis** It reads like a parody. The reported statistics scream of p-hacking.



**Daniel Lakens** As I've said before - imagine looking back at your career when someone p-curves it, or does a meta-analysis while correcting for publication bias, and see all you thought you contributed to the literature evaporate. It must be really tough. Really, we are so lucky for learning this now.







**Many Labs**

**Registered  
Replication  
Reports**





A close-up photograph of an owl's face, looking directly at the camera. The owl has large, bright yellow eyes with black pupils. Its feathers are a mix of brown, grey, and white, with a prominent white patch on its throat. The background is a blurred, natural setting. Overlaid on the center of the owl's face is the text "What Can I Learn From This?" in a white, bold, sans-serif font with a blue outline.

**What Can I Learn From This?**







A painting depicting a woman in a vibrant red dress lying face down on a rocky bank next to a stream. Her body is curled, and her head is buried in the ground. The scene is set in a natural, wooded environment with large rocks and a flowing stream in the background. The overall mood is one of despair or self-destruction.

**Self-reflection should not  
become self-obsession**





**A meta-perspective is fine  
for methodologists  
but what can the rest of us do?**

# Some Practical Tips

# Open Up Your Science

- Data
- Methods
- Stimuli
- Reviews



# Preregister

- Separate confirmatory from exploratory analyses.

# Increase Your Power

- Power analyses
- Sequential analyses

—

## Article

Behavior Research Methods, Instruments, & Computers  
December 1998, Volume 30, Issue 4, pp 690-697

First online:

## A better stopping rule for conventional statistical tests

Robert W. Frick 

— <http://onlinelibrary.wiley.com/doi/10.1002/ejsp.2023/abstract>

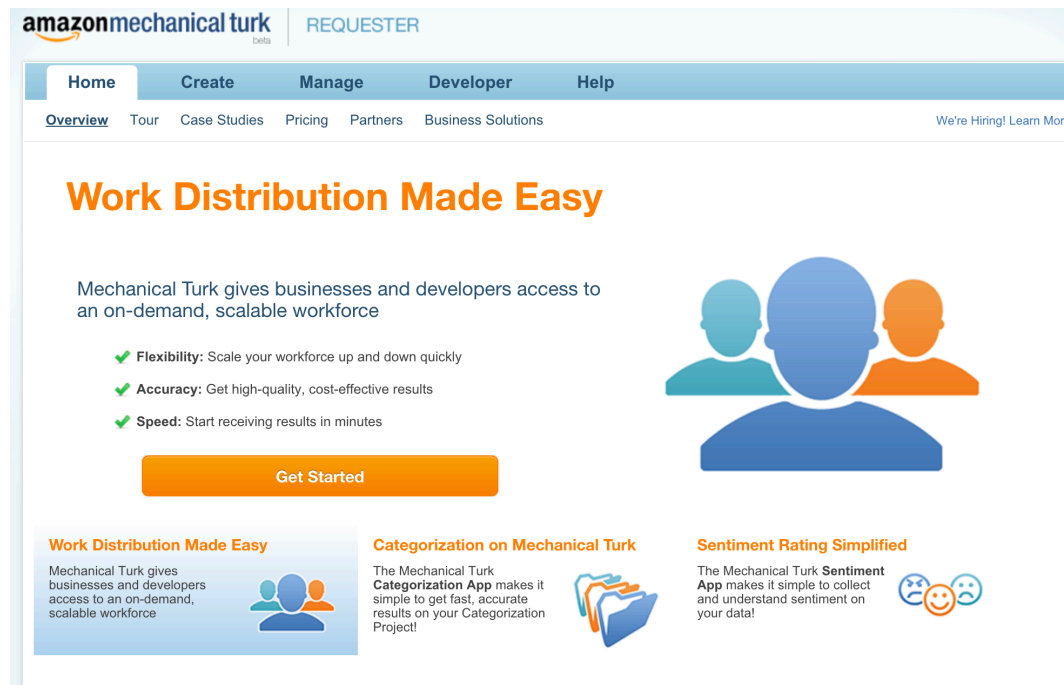
- Bayesian analysis  
<http://journal.frontiersin.org/article/10.3389/fpsyg.2015.00494/abstract>

# Increase Your Power

- Use within-subjects designs

# Increase Your Power

- Online resources like Mechanical Turk
  - Good for cognitive experiments
  - Careful with well-known experiments



The screenshot shows the Amazon Mechanical Turk Requester interface. At the top, the logo "amazonmechanicalturk" is on the left, and "REQUESTER" is on the right. Below the logo is a navigation bar with "Home", "Create", "Manage", "Developer", and "Help". Underneath is a secondary navigation bar with "Overview", "Tour", "Case Studies", "Pricing", "Partners", "Business Solutions", and "We're Hiring! Learn More". The main content area features a large heading "Work Distribution Made Easy" in orange. Below this is a paragraph: "Mechanical Turk gives businesses and developers access to an on-demand, scalable workforce". To the right of this text is an icon of three stylized human figures in blue, teal, and orange. Below the paragraph are three bullet points, each with a green checkmark: "Flexibility: Scale your workforce up and down quickly", "Accuracy: Get high-quality, cost-effective results", and "Speed: Start receiving results in minutes". A large orange button labeled "Get Started" is positioned below the bullet points. At the bottom of the page, there are three smaller promotional boxes. The first, titled "Work Distribution Made Easy", repeats the main text and includes a small icon of three people. The second, titled "Categorization on Mechanical Turk", describes the "Categorization App" and includes an icon of a folder with papers. The third, titled "Sentiment Rating Simplified", describes the "Sentiment App" and includes an icon of three smiley faces.

amazonmechanicalturk DATA REQUESTER

Home Create Manage Developer Help

Overview Tour Case Studies Pricing Partners Business Solutions [We're Hiring! Learn More](#)

## Work Distribution Made Easy

Mechanical Turk gives businesses and developers access to an on-demand, scalable workforce

- ✓ **Flexibility:** Scale your workforce up and down quickly
- ✓ **Accuracy:** Get high-quality, cost-effective results
- ✓ **Speed:** Start receiving results in minutes

[Get Started](#)

**Work Distribution Made Easy**  
Mechanical Turk gives businesses and developers access to an on-demand, scalable workforce

**Categorization on Mechanical Turk**  
The Mechanical Turk **Categorization App** makes it simple to get fast, accurate results on your Categorization Project!

**Sentiment Rating Simplified**  
The Mechanical Turk **Sentiment App** makes it simple to collect and understand sentiment on your data!

# Replicate, but with Moderation

- Only if it's relevant to your own research or teaching.
  - If you want to build on someone else's research.
  - If you want to know about the reliability of the findings you're teaching.

For a similar view...



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## **A Short (Personal) Future History of Revolution 2.0**

**Barbara A. Spellman**  
University of Virginia

Perspectives on Psychological Science  
2015, Vol. 10(6) 886–899  
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DOI: 10.1177/1745691615609918  
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*We have not yet made  
the needed advances in  
the way we accumulate,  
connect, and draw  
conclusions from our  
aggregated research.*

A  
Re

Bar  
Unive

*However, we are now  
ready to move forward  
adopting incremental  
changes.*

**A S**  
**Re**

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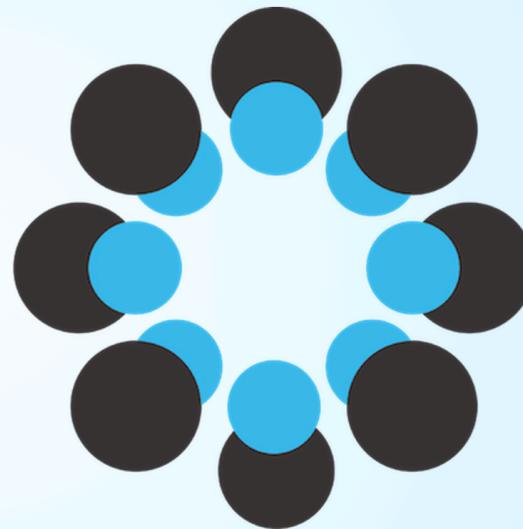
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Frontiers in Cognition (Mechanisms of self-soothing)

Frontiers in Cognition ('Replication Attempts of Important Results in the Study of Cognition') †

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# Peer Reviewers' Openness Initiative

- Data
- Stimuli
- Reasons for unavailability
- Code
- Location of files

# ROYAL SOCIETY OPEN SCIENCE



**With small, incremental steps,  
we'll be getting there,  
slowly but surely.**





**Thank You!**

