Open science, replication, and teaching psychology

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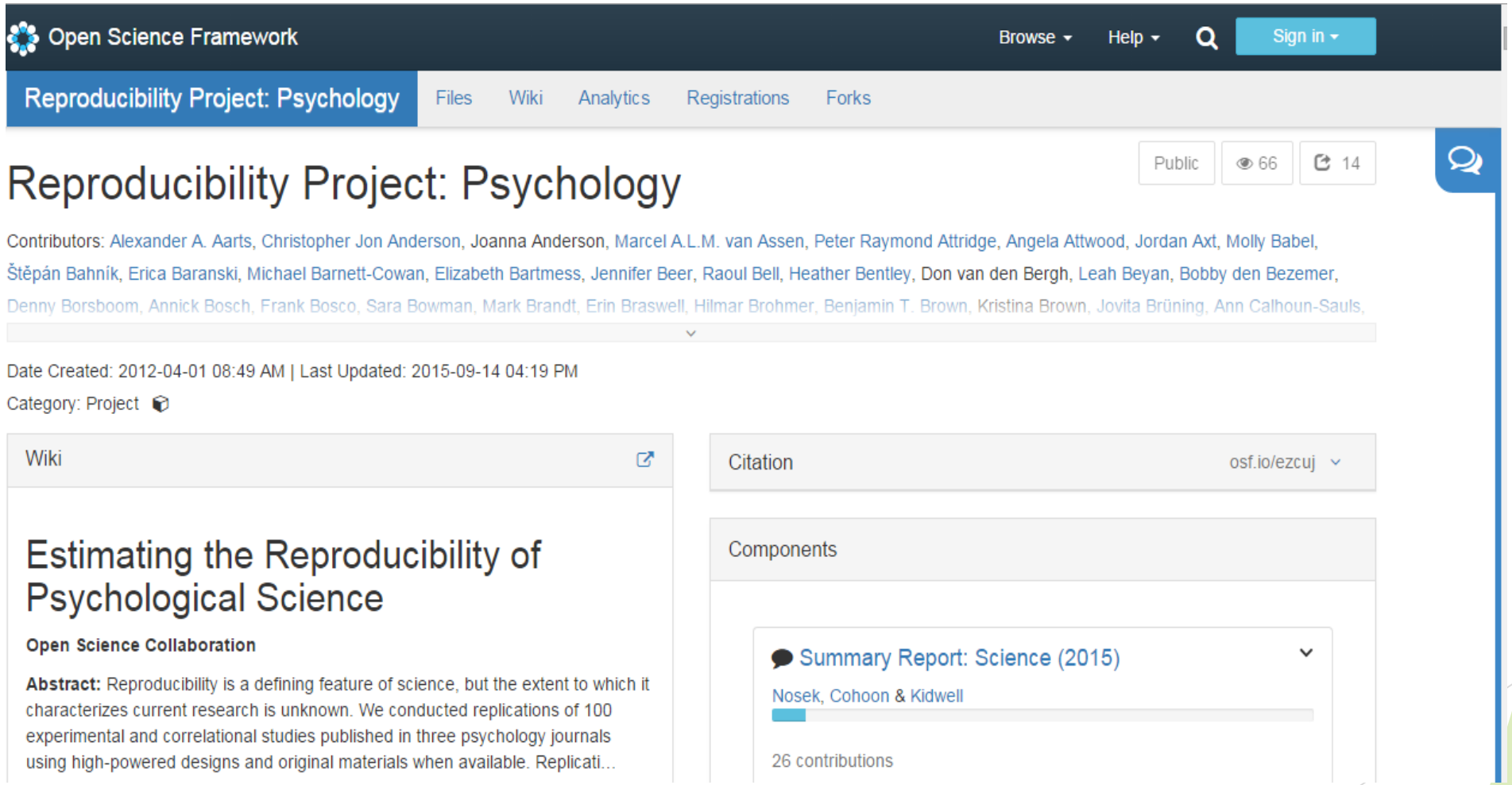
Replication: What are its roles in science?

- Establish reliability and validity of methods and measures
- Uncover enduring, stable explanations for phenomena
- Account for potential sources of bias
  - Researcher biases, p-hacking
  - The file drawer problem
- To confirm results were not a fluke, e.g. a Type I error

Open Science Framework

https://osf.io/ezcuj/



RESEARCH ARTICLE

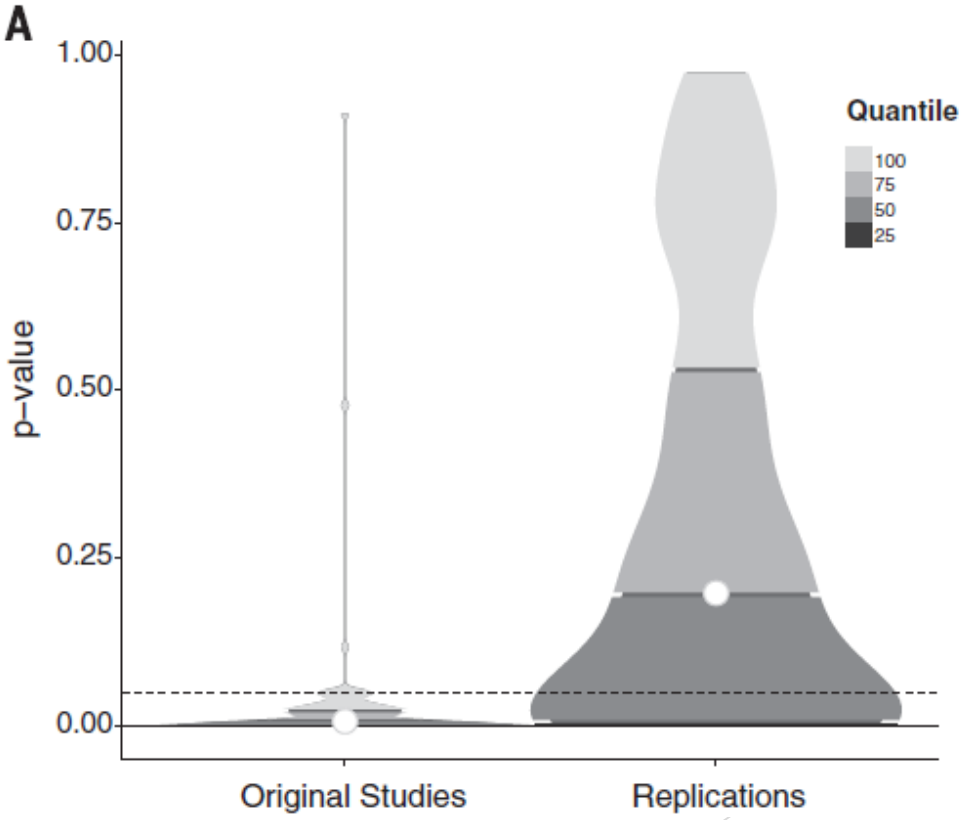
PSYCHOLOGY

Estimating the reproducibility of psychological science

Open Science Collaboration*†

SCIENCE sciencemag.org 28 AUGUST 2015 • VOL 349 ISSUE 6251

	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



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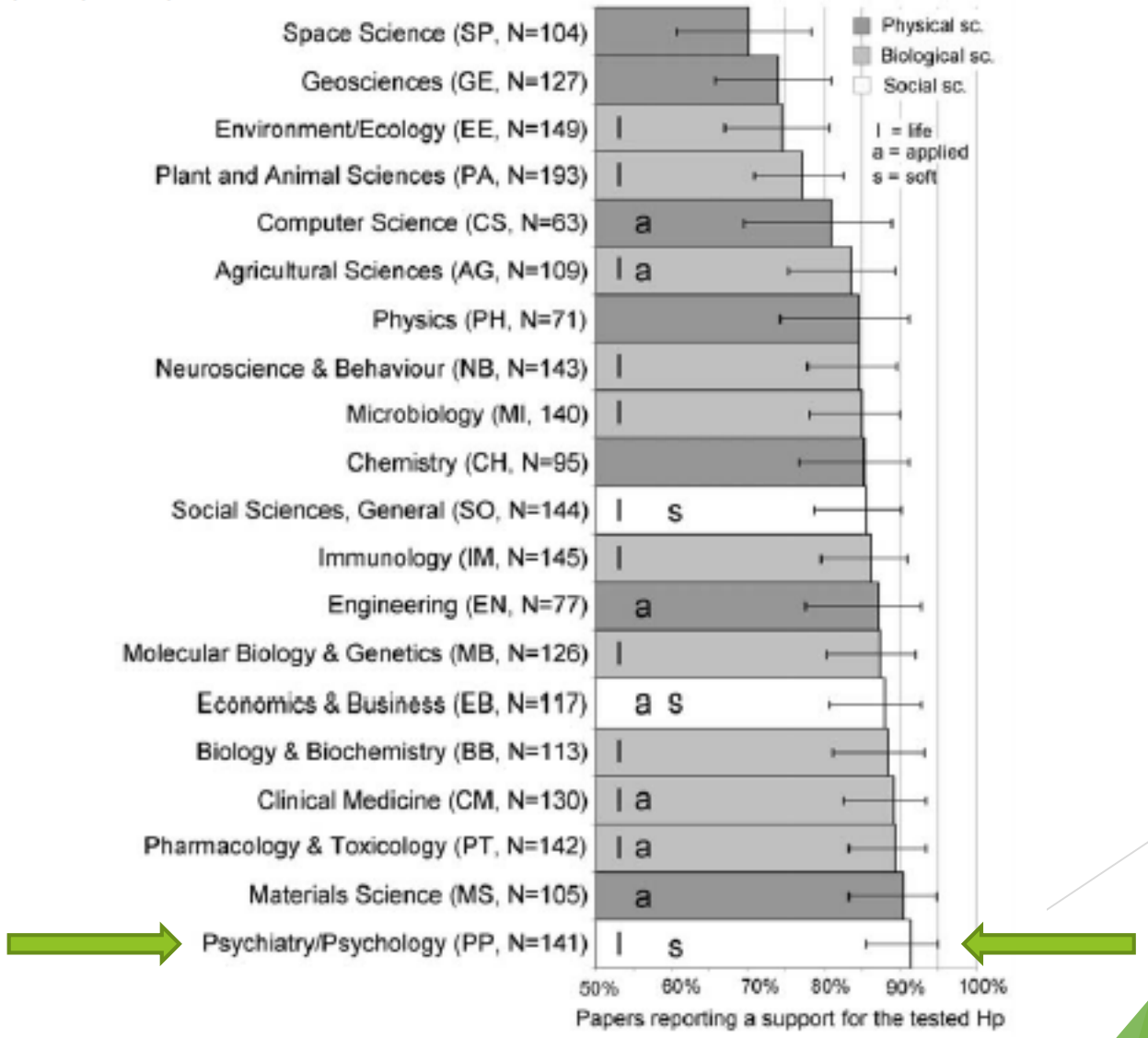
PLoS one

''Positive'' Results Increase Down the Hierarchy of the Sciences

Daniele Fanelli*

INNOGEN and ISSTI-Institute for the Study of Science, Technology & Innovation, The University of Edinburgh, Edinburgh, United Kingdom



What now?

Why do we fear snakes?

...

Experimental condition	Conditioned stimulus	Unconditioned stimulus (shock)	Result
Nonthreatening			Low conditioned fear
Acquired threat			Moderate conditioned fear
Biological threat			High conditioned fear

PSYCHOLOGICAL SCIENCE

Research Article

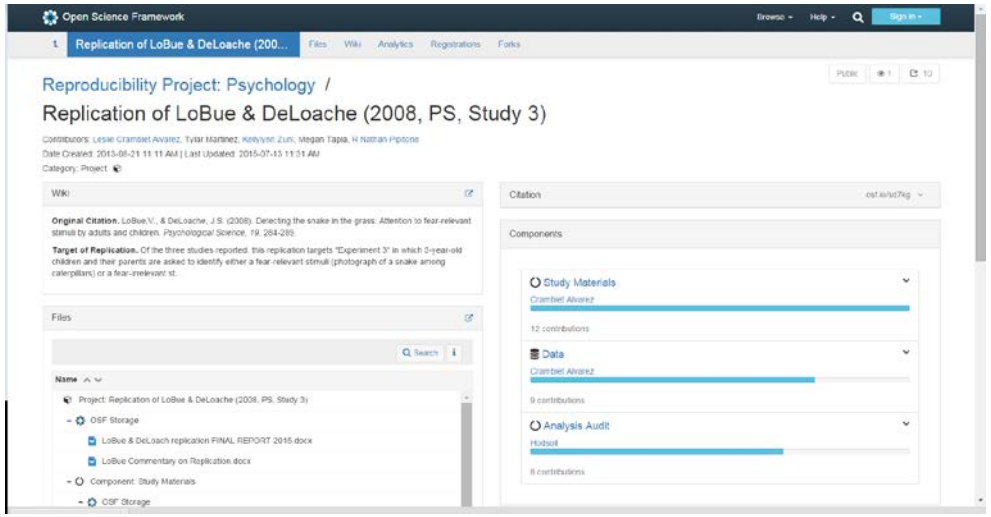
Detecting the Snake in the Grass

Attention to Fear-Relevant Stimuli by Adults and Young Children

Vanessa LoBue and Judy S. DeLoache

University of Virginia

Fig. 1. A preschool child identifying the single flower target among eight snake distractors by touching the flower image on a touch-screen monitor.



Research Article

Adaptive Memory

The Comparative Value of Survival Processing

James S. Nairne, Josefa N.S. Pandeirada, and Sarah R. Thompson

Purdue University

original study

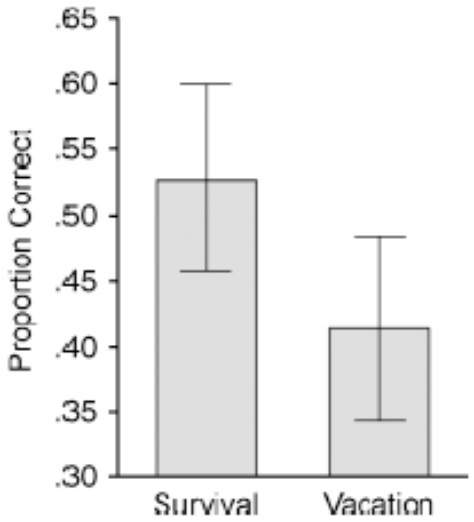


Fig. 2. Average proportion of words recalled for each scenario in Experiment 2. Error bars represent 95% confidence intervals (as per Masson & Loftus, 2003).

replication

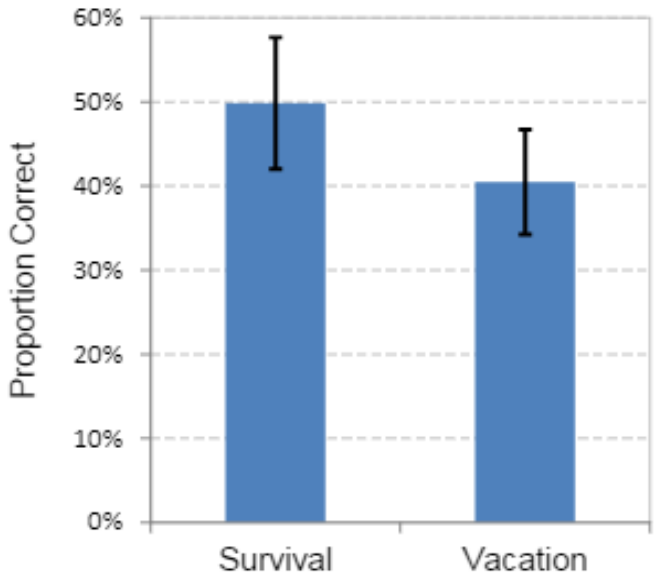


Figure 1: Average proportion of words recalled for each scenario in Experiment 2. Error bars indicate 95% confidence intervals.

Too Impatient to Smell the Roses: Exposure to Fast Food Impedes Happiness

Social Psychological and Personality Science
2014, Vol. 5(5) 534-541

DOI: 10.1177/1948550613511498
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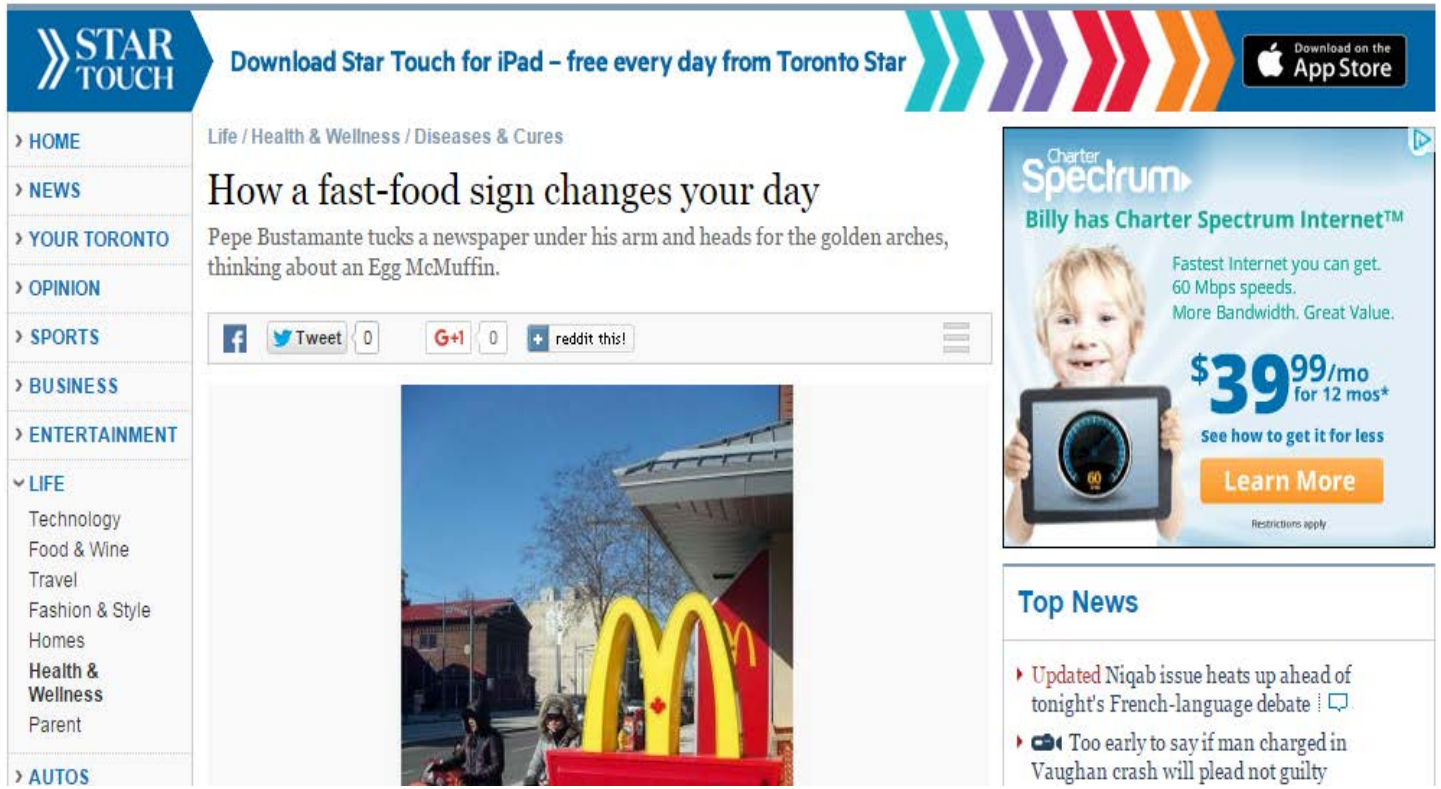
Julian House[1], Sanford E. DeVoe[1], and Chen-Bo Zhong[1]



Research Article

Keeping One's Distance

The Influence of Spatial Distance Cues on Affect and Evaluation

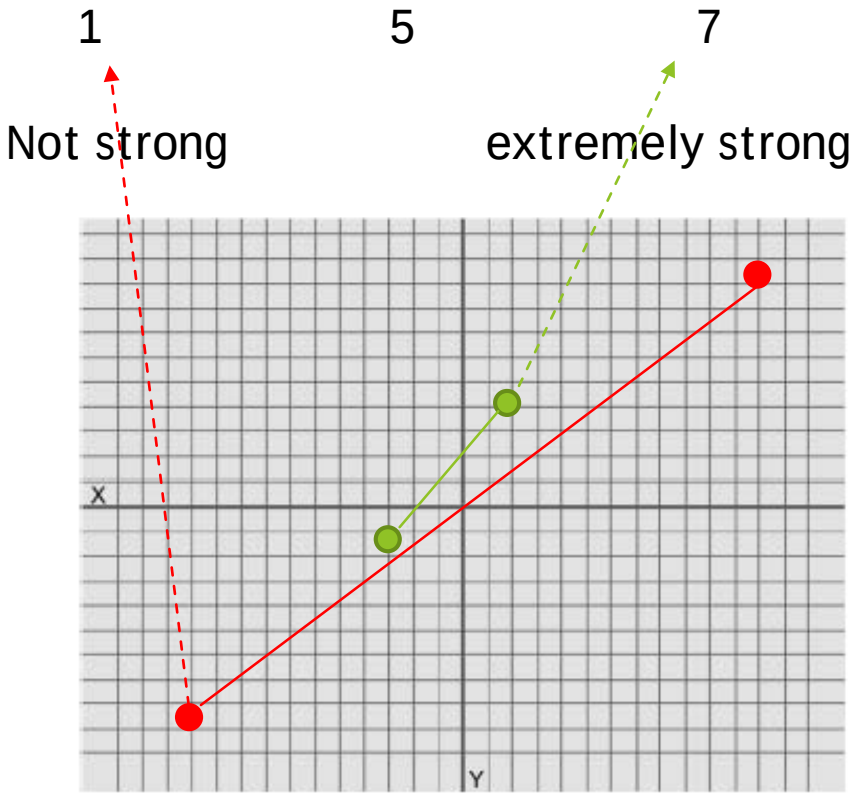
Lawrence E. Williams and John A. Bargh

Yale University

- Does physical distance affect psychological distance?
  - Sensation and perception
  - Thought and language
  - Social psychology

- Close: place a point at (2,4) and (-3,-1)
- Distance: Place a point at (12,10) and (-11, -8)

Rate the strength of your bond to your family and hometown:

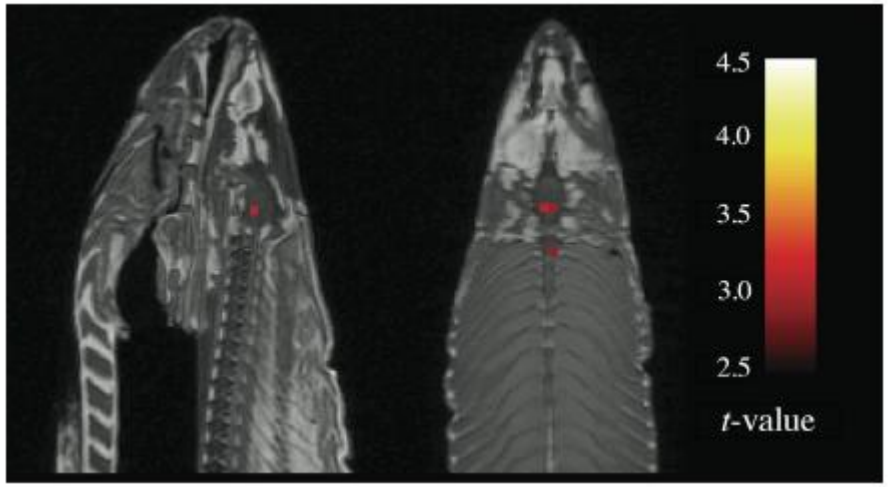


Neuroimaging

Neural correlates of interspecies perspective taking in the post-mortem Atlantic Salmon: An argument for multiple comparisons correction

Craig M. Bennett[1], Abigail A. Baird[2], Michael B. Miller[1], and George L. Wolford[3]

[1] Psychology Department, University of California Santa Barbara, Santa Barbara, CA; [2] Department of Psychology, Vassar College, Poughkeepsie, NY; [3] Department of Psychological & Brain Sciences, Dartmouth College, Hanover, NH



Ann. N.Y. Acad. Sci. ISSN 0077-8923

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
Issue: *The Year in Cognitive Neuroscience*

How reliable are the results from functional magnetic resonance imaging?

Craig M. Bennett and Michael B. Miller

Department of Psychology, University of California at Santa Barbara, Santa Barbara, California

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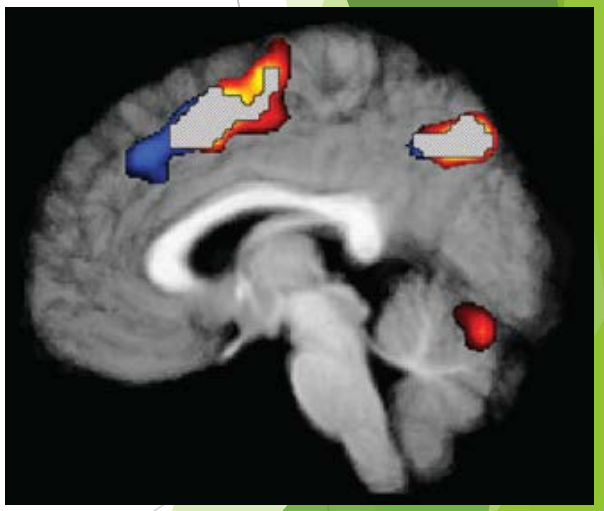

CORTEX 66 (2015) 115–133

Available online at www.sciencedirect.com

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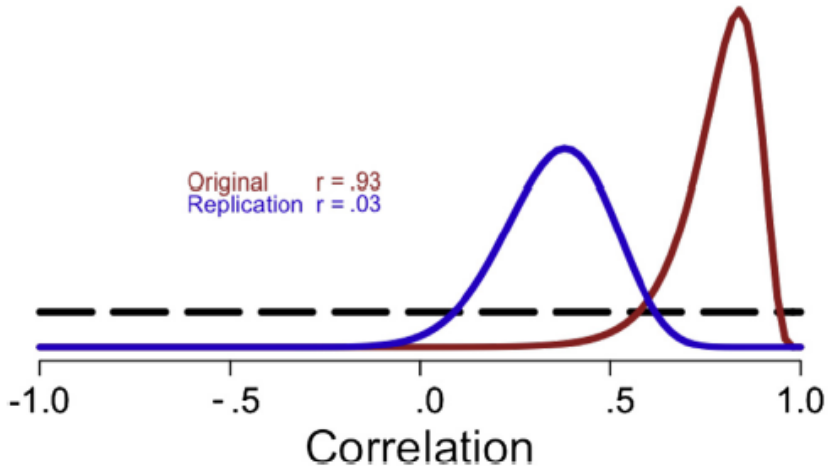
Research report

A purely confirmatory replication study of structural brain-behavior correlations

Wouter Boekel [a,*], Eric-Jan Wagenmakers [a], Luam Belay [a], Josine Verhagen [a], Scott Brown [b] and Birte U. Forstmann [a]

[a] University of Amsterdam, Amsterdam, The Netherlands
[b] University of Newcastle, Australia



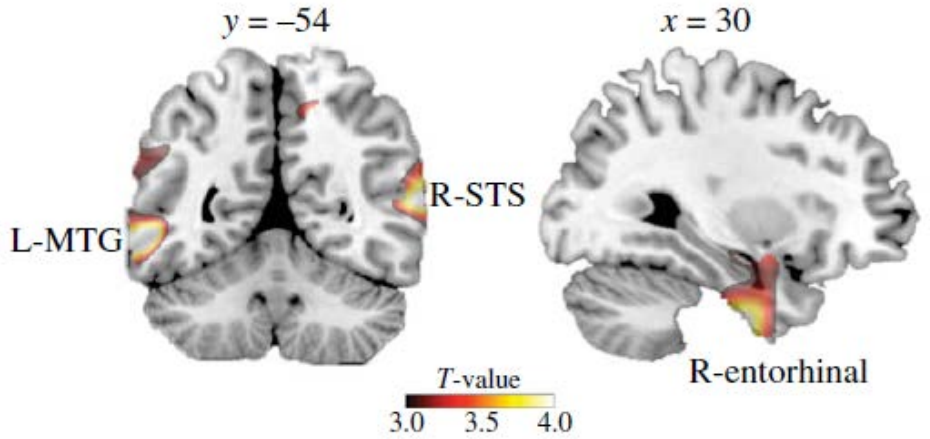
PROCEEDINGS OF THE ROYAL SOCIETY B

FirstCite e-publishing

Proc. R. Soc. B
doi:10.1098/rspb.2011.1959
Published online

Online social network size is reflected in human brain structure

R. Kanai[1,*], B. Bahrami[1,2,3,4], R. Roylance[5] and G. Rees[1,2]



Replication: Interpretation

- Fidelity of methods
- Statistical significance vs. effect sizes
- Researcher biases (for both original & replication studies)
- Pitfalls:
  - All-or-none thinking
  - Confirmation bias
  - Replications as votes

Is Psychology Suffering From a Replication Crisis?

What Does "Failure to Replicate" Really Mean?

Scott E. Maxwell — *University of Notre Dame*
Michael Y. Lau — *Teachers College, Columbia University*
George S. Howard — *University of Notre Dame*

September 2015 • American Psychologist

Implications for our teaching

OMG IS SCIENCE BROKEN?! What do we tell our students?!

- Replication is useful in teaching scientific and critical thinking
  - Explain its roles in science
  - Discuss how to cautiously and correctly interpret replication efforts
- Replication can help us directly address course content
  - The study in your textbook has been replicated
  - The study in your textbook did not replicate
  - No direct replication attempts reported
- As we often say, teach the controversy

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PLOS | BIOLOGY

Essay

Contesting the "Nature" Of Con and Zimbardo's Studies Really S

S. Alexander Haslam[1]*, Stephen D. Reicher[2]

1 School of Psychology, University of Queensland, St. Lucia, Australia, 2 School of Psychology,

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Screening of Shock Room at LSE

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New PLoS ONE paper restages and reinterrogates Milgram's OtA paradigm

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grant is not a migrant by other name

Replication in Introductory Psychology

- (is done)…to increase confidence in the validity of the original findings
- (is the) repetition of a research study to confirm the results
- repeating a study or experiment to see if the same results will be obtained in an effort to demonstrate reliability of results
- a process of repeating a study and finding a similar outcome each time
- to repeat or duplicate a scientific study
- repeating the essence of a research study, usually with different participants in different situations, to see whether the basic finding extends to other participants and circumstances
- Median coverage in 12 popular Introductory Psychology textbooks is 66 words, range from no explicit coverage to two full paragraphs of over 150 words.

Recommendations for teaching

- Use capstone and senior thesis projects as opportunities to replicate in meaningful ways
- Engage in critical thinking exercises about the concept and practice of replication
- Use original study and replication results from the open science framework to:
  - Teach students about research methods
  - Reveal how statistical results are interpreted in actual studies
- Use replication efforts to enhance student skills at consuming scientific information

- Questions? Comments?