

# Studying Social Inequality with Data Science

INFO 3370 / 5371  
Spring 2023

**Reproducibility**

# Learning goals for today

By the end of class, you will be able to

- ▶ understand reproducibility as an essential floor for the credibility of science
- ▶ use RMarkdown to create reproducible documents

# Feeling the Future: Experimental Evidence for Anomalous Retroactive Influences on Cognition and Affect

Daryl J. Bem  
Cornell University

## Feeling the Future: Experimental Evidence for Anomalous Retroactive Influences on Cognition and Affect

Daryl J. Bem  
Cornell University

SCIENCE

# Daryl Bem Proved ESP Is Real

Which means science is broken.

BY DANIEL ENGBER

JUNE 07, 2017 • 2:57 PM

[Slate link.](#)

## Evaluating the replicability of social science experiments in *Nature* and *Science* between 2010 and 2015

Colin F. Camerer<sup>1,3,4</sup>, Anna Dreber<sup>2,3,5</sup>, Felix Holzmeister<sup>6,3,4</sup>, Teck-Hua Ho<sup>4,3,5</sup>, Jürgen Huber<sup>2,3,6</sup>, Magnus Johannesson<sup>7,2,8</sup>, Michael Kirchler<sup>4,3,5,9</sup>, Gideon Nave<sup>6,3,5</sup>, Brian A. Nosek<sup>10,3,4,11</sup>, Thomas Pfeiffer<sup>6,3,4</sup>, Adam Altmeld<sup>12</sup>, Nick Buttrick<sup>13</sup>, Taizan Chan<sup>14</sup>, Yiling Chen<sup>15</sup>, Eskil Forsell<sup>16</sup>, Anup Gampa<sup>17</sup>, Emma Heikensten<sup>1</sup>, Lily Hummer<sup>1</sup>, Taisuke Imai<sup>18</sup>, Siri Isaksson<sup>1</sup>, Dylan Manfredi<sup>1</sup>, Julia Rose<sup>1</sup>, Eric-Jan Wagenmakers<sup>14</sup> and Hang Wu<sup>15</sup>

## Evaluating the replicability of social science experiments in *Nature* and *Science* between 2010 and 2015

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## Essay: The Experiments Are Fascinating. But Nobody Can Repeat Them.

Science is mired in a “replication” crisis. Fixing it will not be easy.

Camerer et al. in Nature Human Behavior.

Gelman in NYTimes.

The ability to replicate a study with new participants is central to the credibility of psychology.

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How should we think about replication in other settings?



	<b>SIMILAR</b>	<b>DIFFERENT</b>
<b>OLD DATA</b>	<b>Verifiability</b>	<b>Robustness</b>
<b>NEW DATA</b>	<b>Repeatability</b>	<b>Generalization</b>

 Freese J, Peterson D. 2017.  
*Annu. Rev. Sociol.* 43:147–65

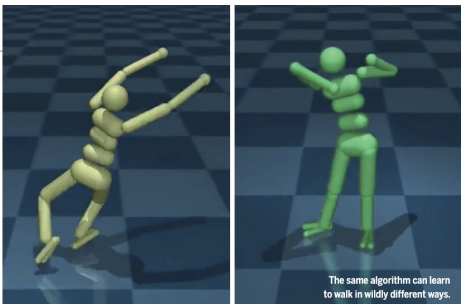
[Freese & Peterson 2017](#)

	SIMILAR	DIFFERENT
OLD DATA	Verifiability	Robustness
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 Freese J, Peterson D. 2017.  
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[Freese & Peterson 2017](#)

The bare minimum is **verifiability**



COMPUTER SCIENCE

## *Artificial intelligence faces reproducibility crisis*

Unpublished code and sensitivity to training conditions make many claims hard to verify

By **Matthew Hutson**

| (AAAI) in New Orleans, Louisiana, reproducibility was on the agenda, with some

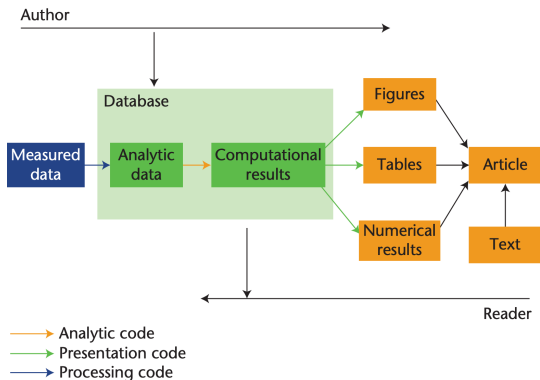


Figure 1. The research pipeline as a model for reproducible research. Each component of the pipeline exists in a semipersistent state and is reproducible by combining the preceding component with computer code.

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<https://doi.org/10.1177/2378023119849803>



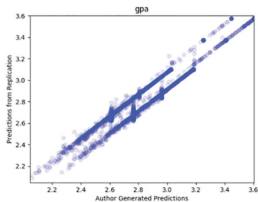
*Special Collection: Fragile Families Challenge*



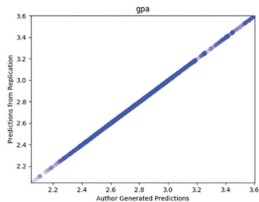
# **Successes and Struggles with Computational Reproducibility: Lessons from the Fragile Families Challenge**

**David M. Liu and Matthew J. Salganik**

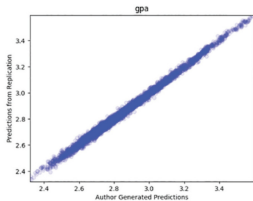
Liu & Salganik 2019



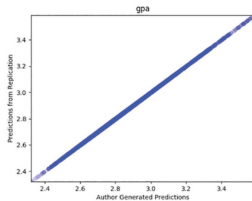
(a) Model 5 (GPA) before aligning package versions.



(b) Model 5 (GPA) after aligning package versions.



(c) Model 6 (GPA) before aligning package versions.



(d) Model 6 (GPA) after aligning package versions.

**Figure 6.** Examples from Raes (2019). Without specifying package versions, we could not replicate the results, even though we were using the exact same data and code. Furthermore, there was no clear pattern to the errors: sometimes they were off by a constant, and sometimes they were off by random noise. However, once we specified the exact package versions in our container, we were able to reproduce the original results exactly.

Every result you create should be **reproducible**.

RMarkdown will help

- ▶ [Software website](#)
- ▶ [R4DS Ch 27](#)

# In groups

- ▶ Take your code and interpretation from Monday
- ▶ Put them in a .Rmd file
- ▶ Build the PDF
- ▶ Upload the PDF as a post on Ed

Question Post Announcement

Title Describe where you are in the room

Category General Lectures Problem Sets Readings Exercise: First Rmd

Paragraph **B** *I* U <> ∞ ☰ ☷ 🖼️ ▶ 📎 ∑ <> 🌐 ✎ 👁

Put group member names here!



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Next up: Survey samples of individuals