

TRUTH, BEAUTY, & DATA REVISITED

MPA 635: Data Visualization

December 11, 2018

PLAN FOR TODAY

Philosophy and data

Telling stories with data

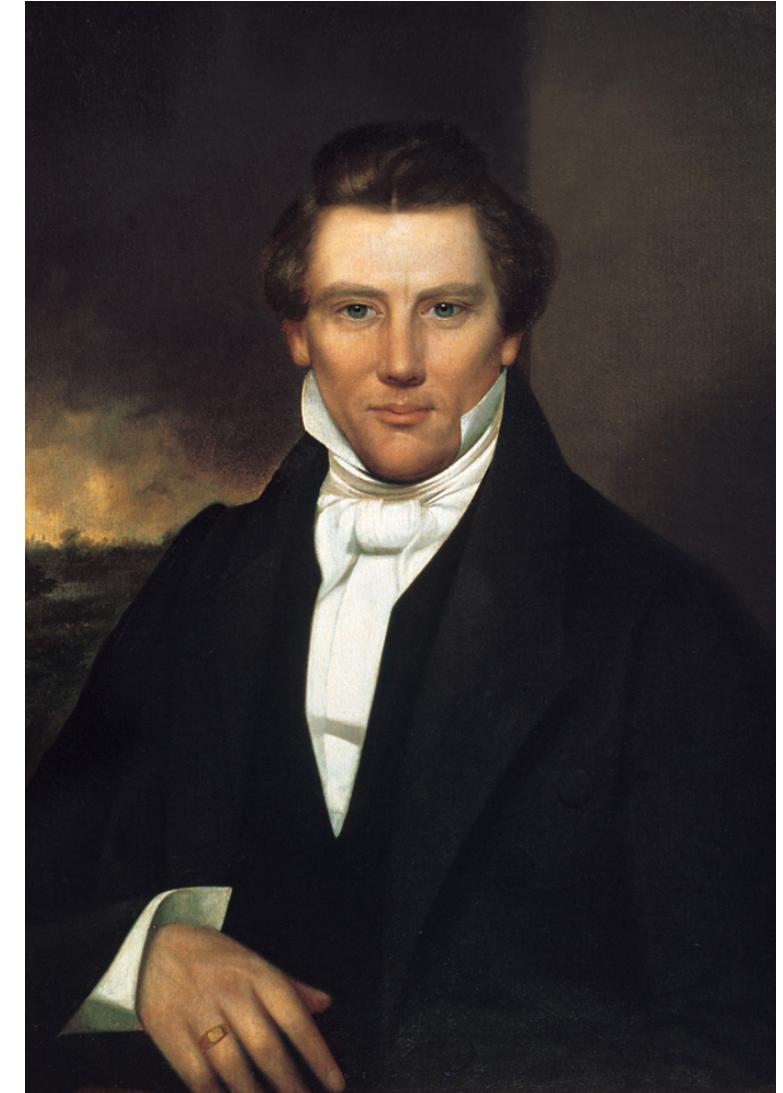
Curiosity

PHILOSOPHY AND DATA

WHAT IS TRUTH?

“The first and fundamental principle of our holy religion is, that we believe that we have a right to embrace all, and every item of truth”

“[R]eceive truth, let it come from whence it may”



EXPANDING TRUTH

“An expansive vision of truth can bring more depth, clarity and love into our lives and make us more willing to listen, more able to understand and more inclined to build up rather than tear down.”

λόγος

Res

Content

Essence

λέξις

Verba

Form

Structure

**Can something with
factual content be untrue
because of its form?**

**Can something with
unfactual content be true
because of its form?**

FACTS ≠ TRUTH

“Just because something happened does not mean that it is morally instructive; just because it never happened does not mean that it is not true.”

Michael Austin, *Re-reading Job: Understanding the Ancient World's Greatest Poem*, 20



TRUTH IS BEAUTIFUL

**Truth =
aesthetic combination
of content and form**

**Facts require
beauty to be true**

HUMANITIES AND DATA

“Using the humanities to enhance the search for truth is like putting a jet pack on our data; people can reach the proper conclusions more quickly, allowing them to take the data and do good with it faster and more effectively.”

Malissa Richardson

HUMANITIES AND SKEPTICISM

**“All this ‘philosophical
humanities stuff’ determines
how we create and interpret
data visualizations”**

Matt Widmer

Who made it?

Who paid for it?

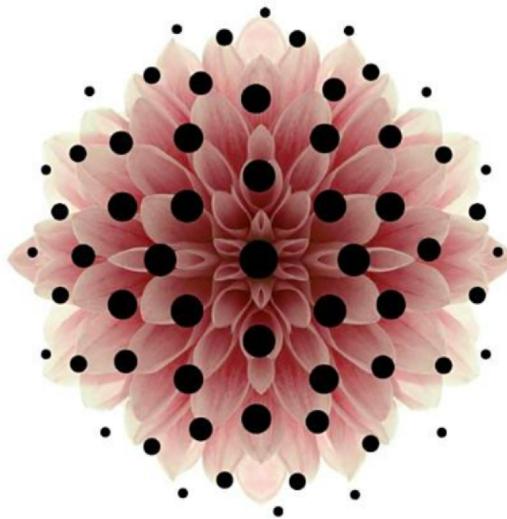
How was the study conducted?

Are the findings important?

WHAT ABOUT NON-HUMANITIES?

A BEAUTIFUL QUESTION

"Inspiring and
remarkably accessible."
—*The Chronicle
of Higher Education*



Winner of the
Nobel Prize in Physics

FINDING NATURE'S
DEEP DESIGN

FRANK
WILCZEK

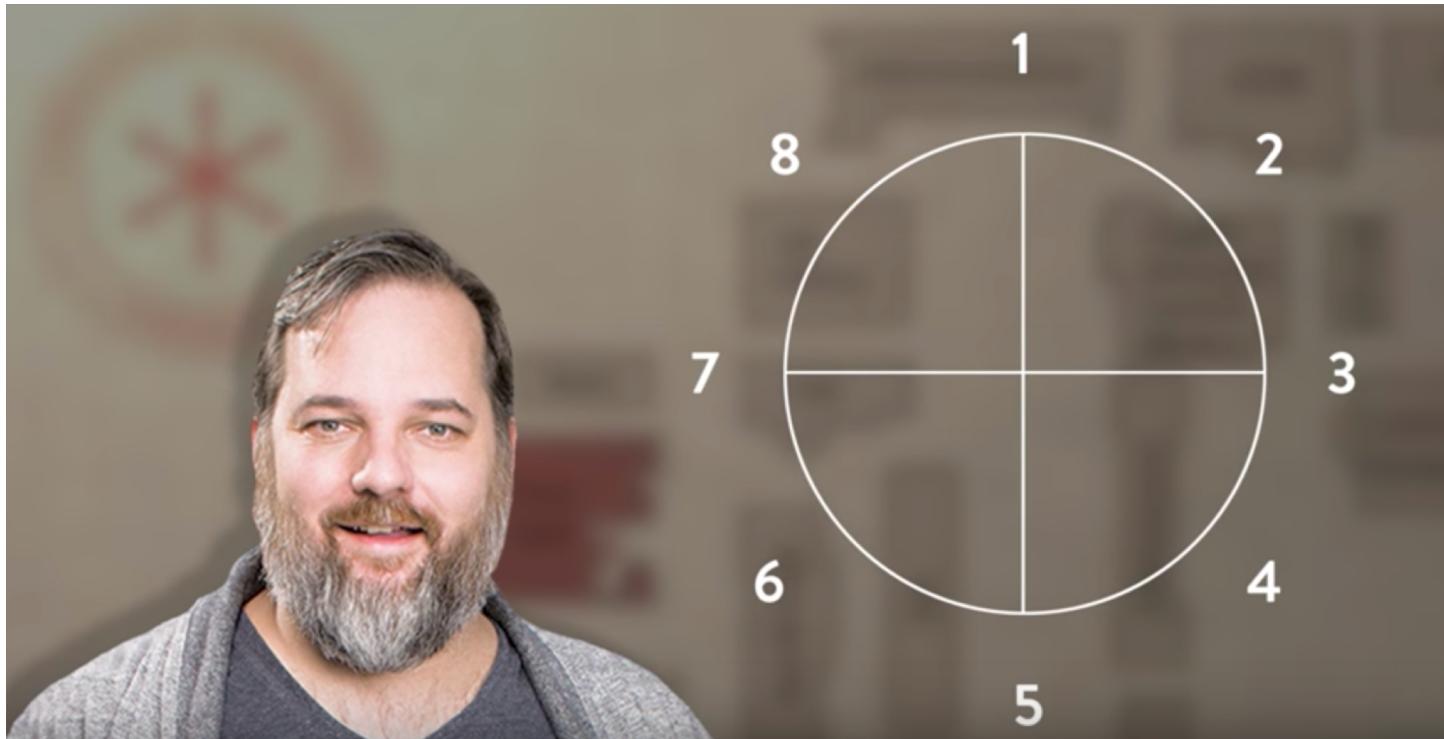
TELLING STORIES WITH DATA

Art is how we translate core,
essential **content** to different
forms for specific **audiences**

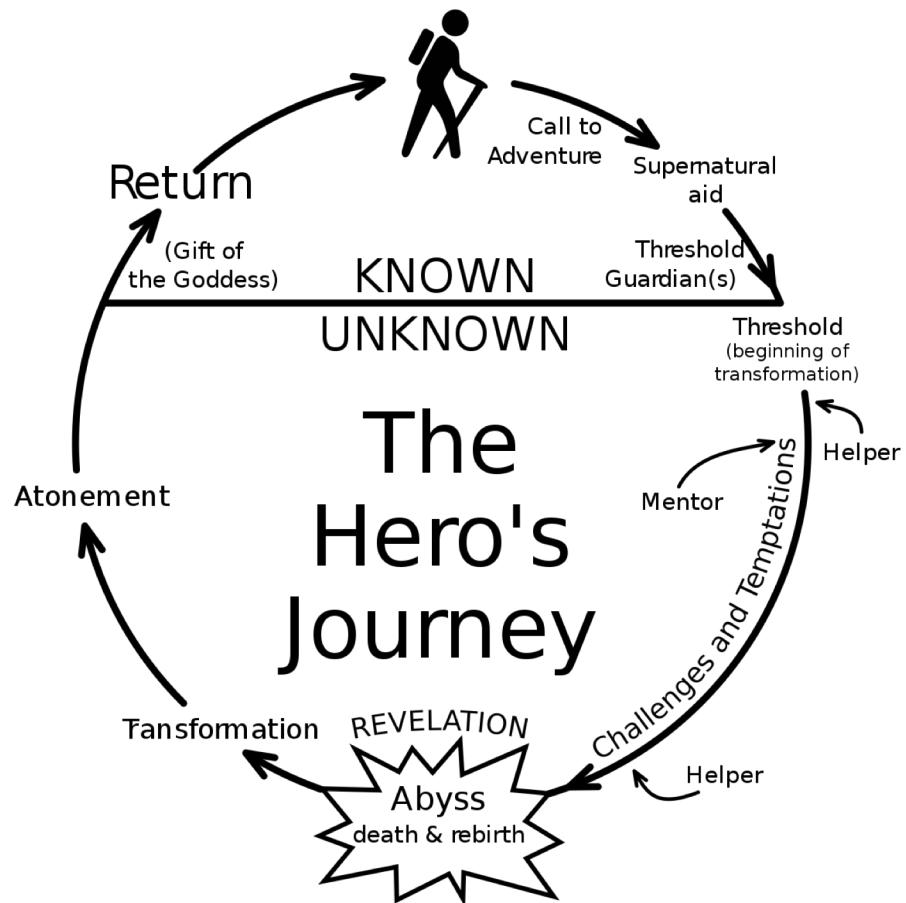
Stories are how we translate core,
essential **content** to different
forms for specific **audiences**

EVERY STORY IS THE SAME

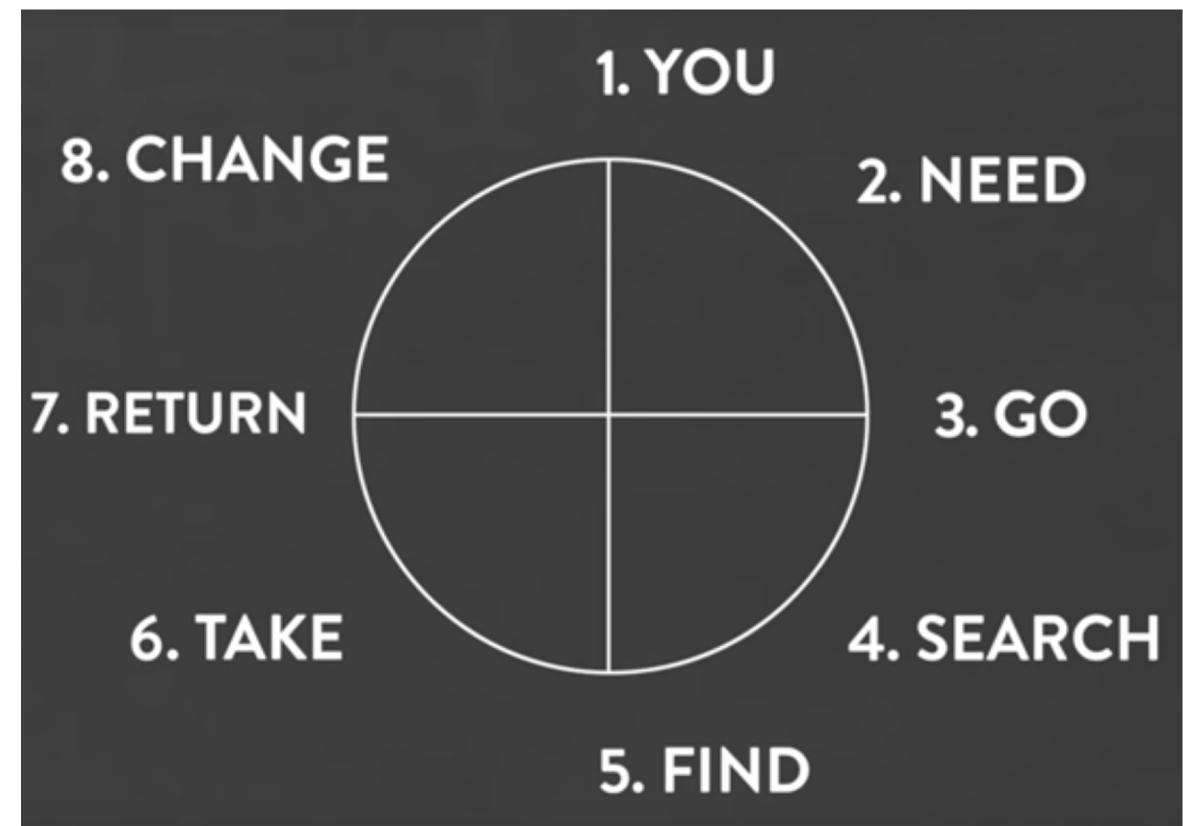
<https://www.youtube.com/watch?v=LuD2Aa0zFiA>



HEROES



The
Hero's
Journey



You are not the hero.

- About us
 - Company history
 - Market cap
 - # employees and # locations
- About our product and service
 - What it is
 - How it works
 - Why it's better than the alternative
- Call to action (ideally)

XYZ Co. Equity Partners, LLC

- Founded in 1988 in Anchorage, Alaska
- Invest in companies who:
 - Provide professional IT services
 - Offer exceptional technical and project management expertise
 - Deliver complex data and information management solutions as systems and/or applications integrators
- Average annual revenue: \$51.5M

XYZ Co. Software

- Established in 1984
- Headquarters: San Francisco, CA
- Integrated P&C Insurance software and services
- Focused on Alternative Risk & Self-Insured markets
- Recognized leader in risk management solutions
- Over 100 customers in U.S. and Canada

SHOULD YOU TELL STORIES THO?

Against storytelling of scientific results

To the Editor: Krzywinski and Cairo¹ beautifully illustrate the widespread view that scientific writing should follow a journalistic ‘storytelling’, wherein the choice of what data to plot, and how, is tailored to the message the authors want to deliver. However, they do not discuss the pitfalls of the approach, which often result in a distorted and unrepresentative display of data—one that does not do justice to experimental complexities and their myriad of interpretations.

Nature Methods | Correspondence

Reply to: "Against storytelling of scientific results"

Martin Krzywinski & Alberto Cairo

Info

Sections

References

Subjects

Publishing

Journal

Nature Methods **10**, 1045 (2013)

DOI

doi:10.1038/nmeth.2699

[Download Citation](#)

POSSIBLE PITFALLS

Manipulation

Don't make people do bad stuff

Ethos

Credentials ≠ ethos

Misinterpretation

Temper expectations

Equity

Don't dumb down

Amplify underrepresented voices

Manipulation

THIS AMERICAN LIFE

FROM WBEZ



555: The Incredible Rarity of Changing Your Mind

APR 24, 2015

It's rare for people to change what they believe, and if they do it, it's usually a long process. This week, stories of those very infrequent instances where people's opinions flip on fundamental things that they believe. Why does it happen in these particular and unusual circumstances? We explain. **NOTE: One of the authors of a study covered in this episode has asked that the study be retracted.**



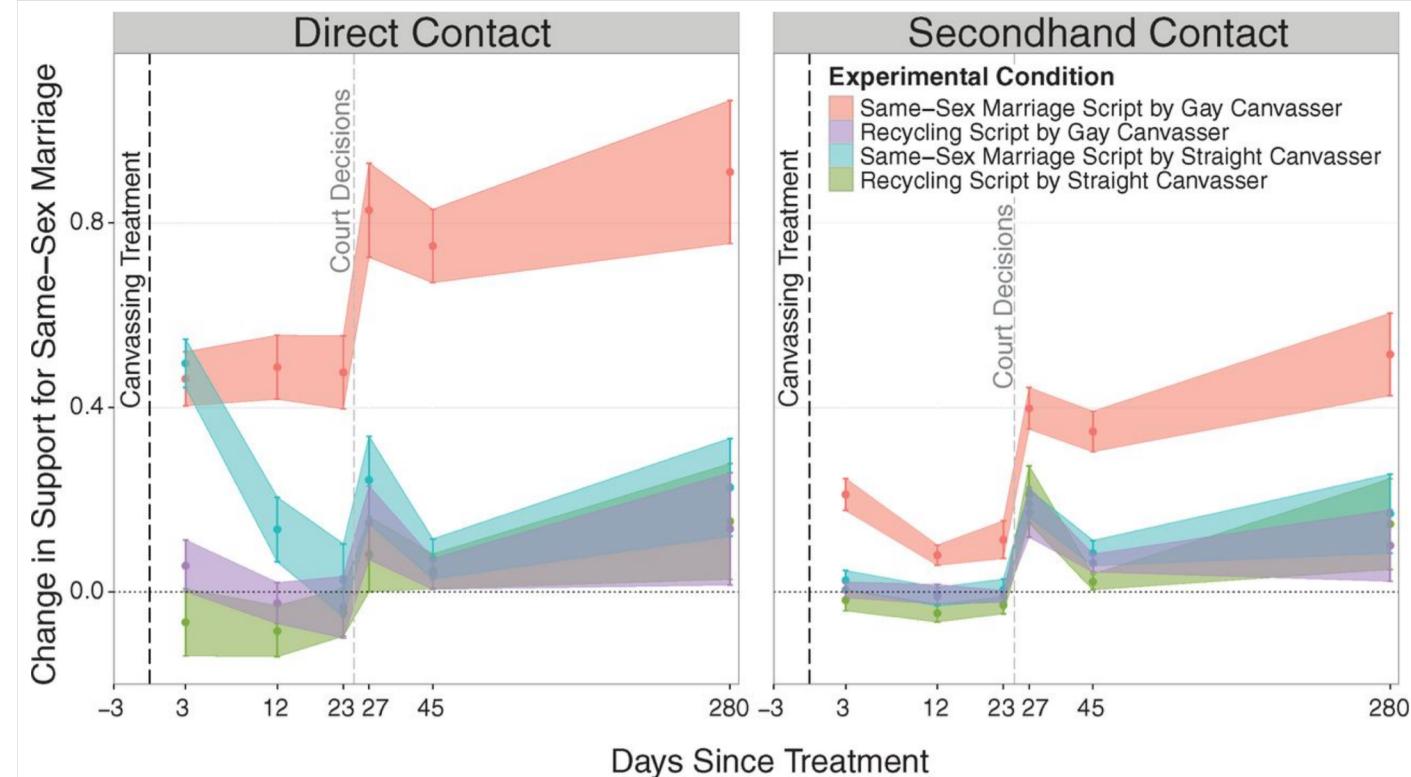
The iPad thing was LaCour's trademark. "He was sort of famous for taking his results from different studies he was working on, putting them on an iPad, and buttonholing people at the conferences and going over all of the research that he was doing, the different findings he had, and basically not letting the people go until they had an idea of what he was working on," says Tim Groeling, a communications professor at UCLA, who is listed as one of LaCour's references on his curriculum vitae. "It was infectious," continues Groeling. "Really cool stuff was on that iPad."

When contact changes minds: An experiment on transmission of support for gay equality

Michael J. LaCour¹, Donald P. Green²

* See all authors and affiliations

Science 12 Dec 2014;
Vol. 346, Issue 6215, pp. 1366-1369
DOI: 10.1126/science.1256151





Irregularities in LaCour (2014)

David Broockman, Assistant Professor, Stanford GSB (as of July 1),
dbroockman@stanford.edu

Joshua Kalla, Graduate Student, UC Berkeley, kalla@berkeley.edu
Peter Aronow, Assistant Professor, Yale University, peter.aronow@yale.edu

May 19, 2015

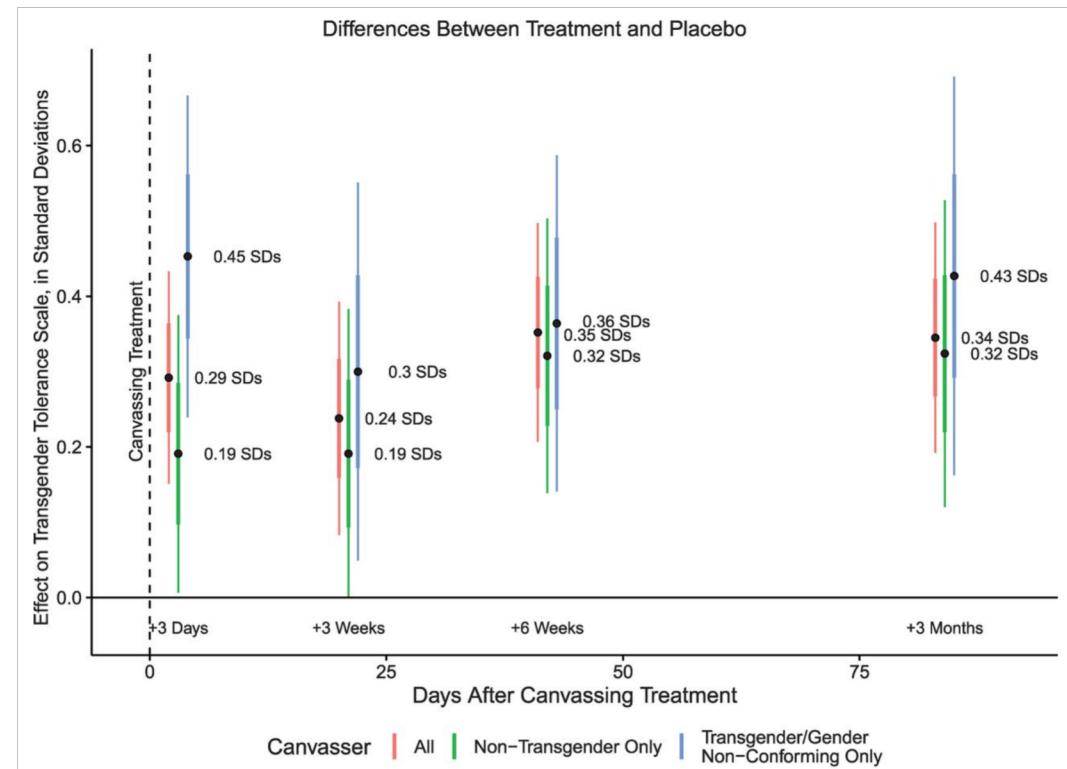
REPORT

Durably reducing transphobia: A field experiment on door-to-door canvassing

David Broockman^{1,*}, Joshua Kalla²

* See all authors and affiliations

Science 08 Apr 2016:
Vol. 352, Issue 6282, pp. 220-224
DOI: 10.1126/science.aad9713

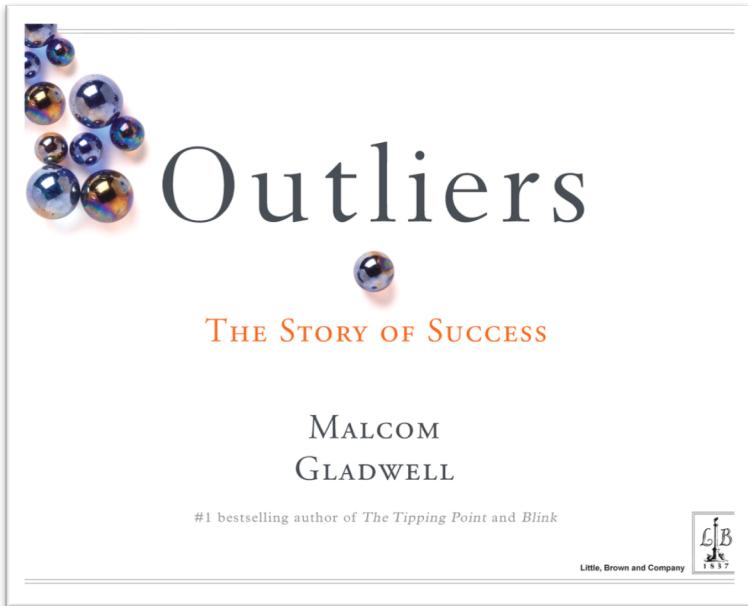


MANIPULATION

Don't lie

Emphasize the story,
but make full data available

Misinterpretation



10,000 hours

“the magic number
of greatness”

Psychological Review
1993, Vol. 100, No. 3, 363–406

Copyright 1993 by the American Psychological Association, Inc.
0033-295X/93/\$3.00

The Role of Deliberate Practice in the Acquisition of Expert Performance

K. Anders Ericsson, Ralf Th. Krampe, and Clemens Tesch-Römer

The theoretical framework presented in this article explains expert performance as the end result of individuals' prolonged efforts to improve performance while negotiating motivational and external constraints. In most domains of expertise, individuals begin in their childhood a regimen of effortful activities (deliberate practice) designed to optimize improvement. Individual differences, even among elite performers, are closely related to assessed amounts of deliberate practice. Many characteristics once believed to reflect innate talent are actually the result of intense practice extended for a minimum of 10 years. Analysis of expert performance provides unique evidence on the potential and limits of extreme environmental adaptation and learning.



APRIL 2017 | Foundations of Faith

When we watch a great athletic or musical performance, we often say that the person is very gifted, which is usually true. But the performance is based upon years of preparation and practice. One well-known writer, Malcolm Gladwell, has called this the 10,000-hour rule. Researchers have determined that this amount of practice is necessary in athletics, musical performance, academic proficiency, specialized work skills, medical or legal expertise, and so on. One of these research experts asserts “that ten thousand hours of practice is required to achieve the level of mastery associated with being a world-class expert—in anything.”¹

Training history, deliberate practise and elite sports performance: an analysis in response to Tucker and Collins review—what makes champions?

K Anders Ericsson

bodies of knowledge for a more complete understanding of the complex development of elite performance.¹ In their recent article, Tucker and Collins² criticised a popularised but simplistic view of our work circulated on the internet, which suggests that anyone who has accumulated sufficient number of hours of practise in a given domain will automatically become an expert and a champion. Unfortunately they incorrectly attributed this view to me and my colleagues and criticised our research on deliberate practise.

“[A] popularized but simplistic view of our work, which suggests that anyone who has accumulated sufficient number of hours of practice in a given domain will automatically become an expert and a champion.”

10,000 is average

Quality matters

There are other factors

Deliberate Practice and Performance in Music, Games, Sports, Education, and Professions: A Meta-Analysis



**Brooke N. Macnamara¹, David Z. Hambrick², and
Frederick L. Oswald³**

¹Princeton University; ²Michigan State University; and ³Rice University

Abstract

More than 20 years ago, researchers proposed that individual differences in performance in such domains as music, sports, and games largely reflect individual differences in amount of *deliberate practice*, which was defined as engagement in structured activities created specifically to improve performance in a domain. This view is a frequent topic of popular-science writing—but is it supported by empirical evidence? To answer this question, we conducted a meta-analysis covering all major domains in which deliberate practice has been investigated. We found that deliberate practice explained 26% of the variance in performance for games, 21% for music, 18% for sports, 4% for education, and less than 1% for professions. We conclude that deliberate practice is important, but not as important as has been argued.

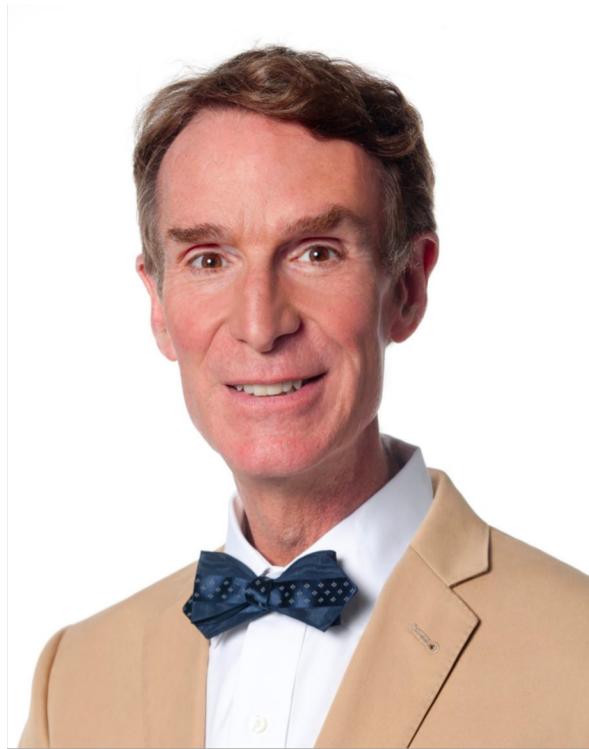
MISINTERPRETATION

Be narrative, but not too narrative

Temper expectations

Ethos

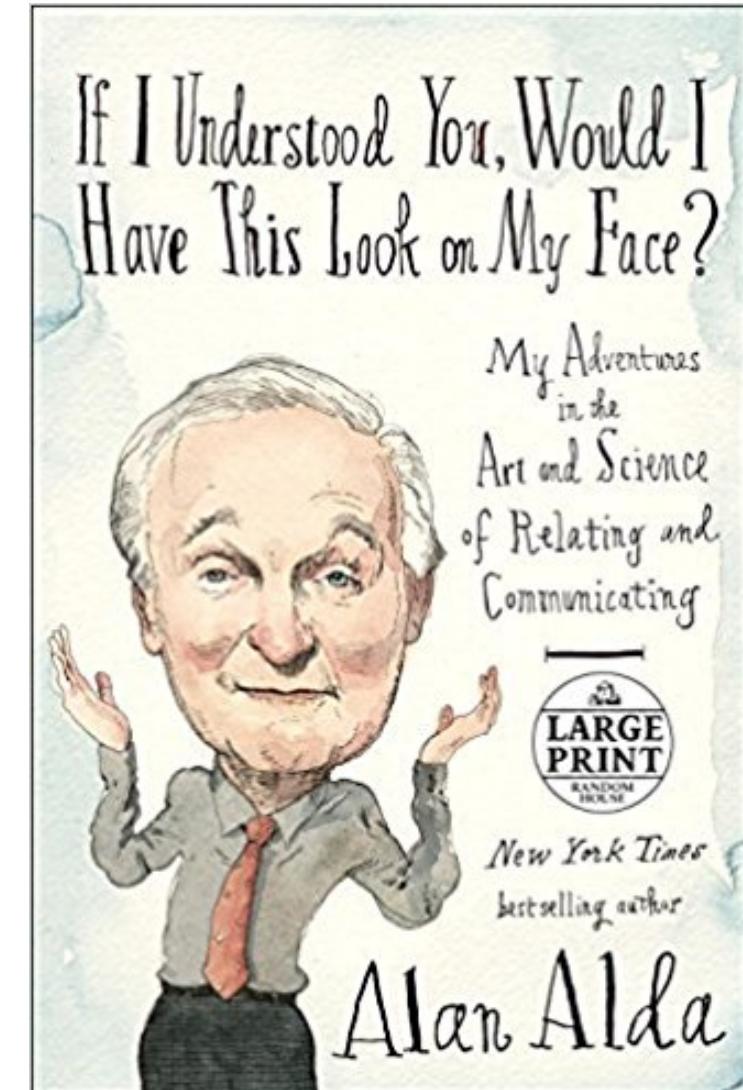
WHO CAN TALK ABOUT SCIENCE?



theblaze TV Channels Radio

Commentary: Can we stop pretending Bill Nye is a science guy already?

⌚ Apr 24, 2017 9:10 pm





ETHOS

Credentials do not make an expert

Credentials do not not make an expert

Credentials ≠ ethos

Equity

DUMBING DOWN VS. TRANSLATION

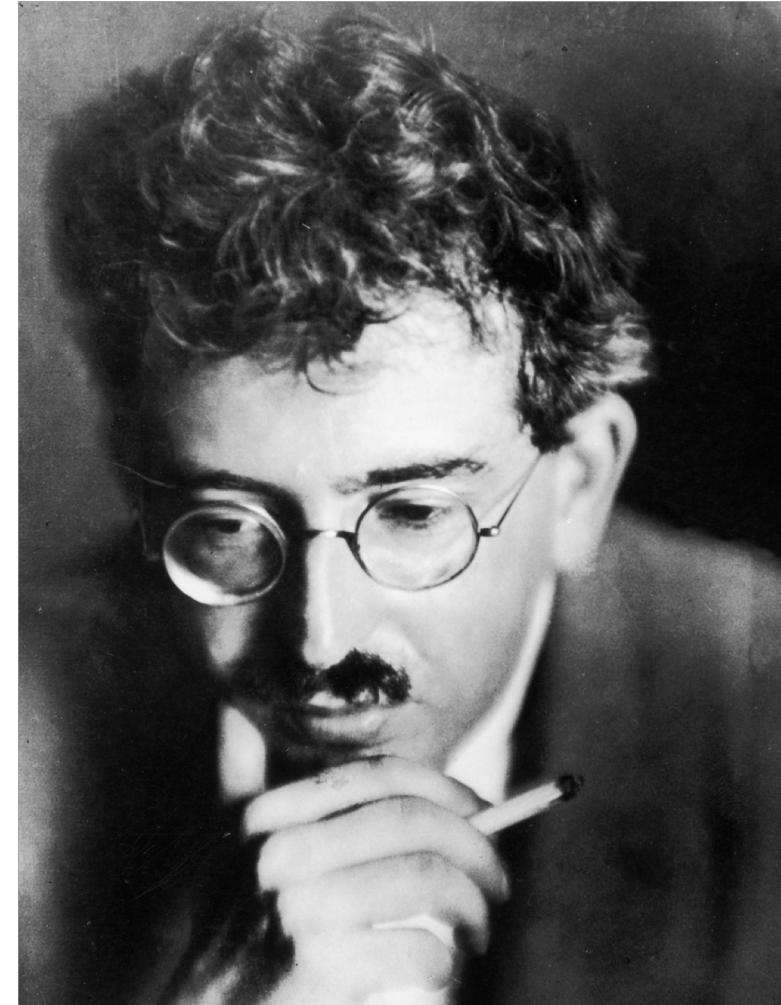


<https://www.youtube.com/watch?v=opqla5Jiwuw>

TRANSLATION

“...the task of the translator consists in finding that intended effect upon the language into which he is translating which produces in it the echo of the original”

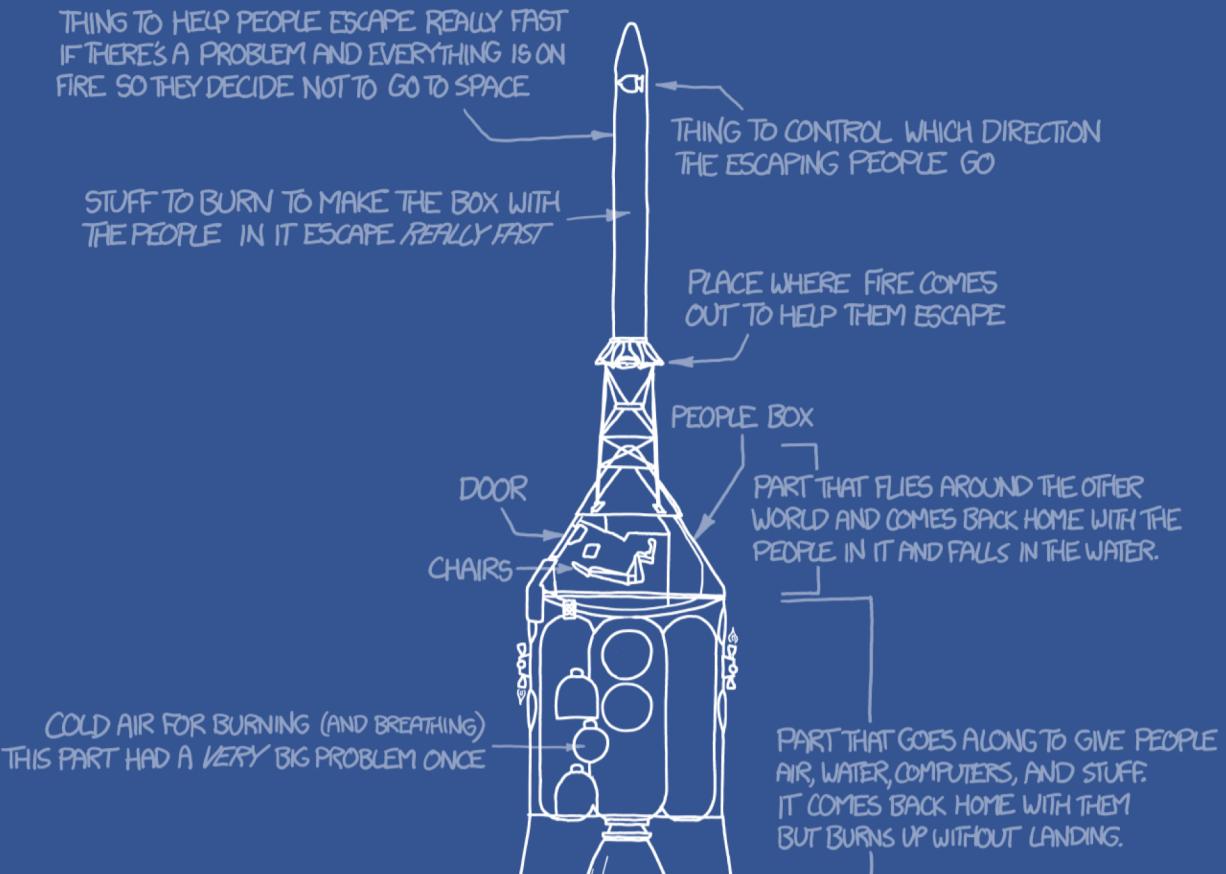
Walter Benjamin, *The Task of the Translator*



US SPACE TEAM'S UP GOER FIVE

THE ONLY FLYING SPACE CAR THAT'S
TAKEN ANYONE TO ANOTHER WORLD

(EXPLAINED USING ONLY THE TEN HUNDRED
WORDS PEOPLE USE THE MOST OFTEN)



THE INTERFACE
NEEDS TO BE SO
SIMPLE THAT YOUR
MOTHER COULD
USE IT.



MY MOTHER TAUGHT
HERSELF RUBY ON RAILS
OVER A WEEKEND.



THEN
IMAGINE
SOMEONE
ELSE'S
MOTHER.



CAN I
IMAGINE
A SEXIST
IMBECILE?





Casey Johnston @caseyjohnston · 4h

So many “solutions” to the lack of women in tech don’t get at the actual problems [arstechnica.com/business/2014/...](http://arstechnica.com/business/2014/)



8



16

...

[View summary](#)



Tomas Sancio @tsancio · 2h

@caseyjohnston read the full article. There's a chicken and egg problem w/
female tech role models. Men want to be the next Jobs/Gates/etc.



...

[View conversation](#)



Casey Johnston @caseyjohnston · 45m

@tsancio I wrote the article



3



52

...

[View conversation](#)

Quantitative evaluation of gender bias in astronomical publications from citation counts

Neven Caplar , Sandro Tacchella & Simon Birrer

Nature Astronomy **1**, Article number: 0141

(2017)

doi:10.1038/s41550-017-0141

The Gender Citation Gap in International Relations

Daniel Maliniak, Ryan Powers and Barbara F. Walter

International Organization / *FirstView Article* / August 2013, pp 1 - 34
DOI: 10.1017/S0020818313000209, Published online: 28 August 2013

 OPEN ACCESS

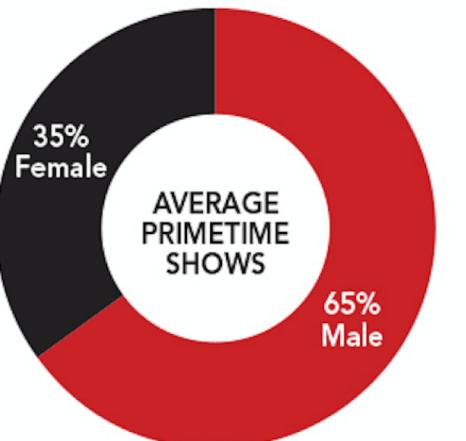
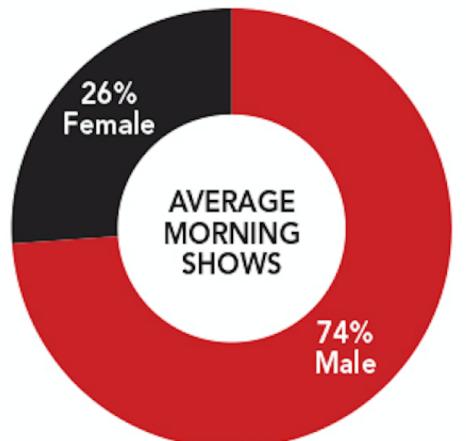
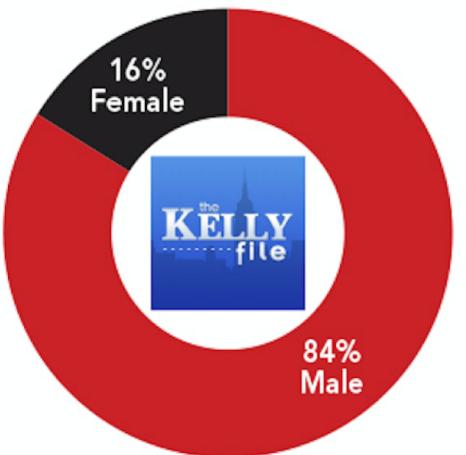
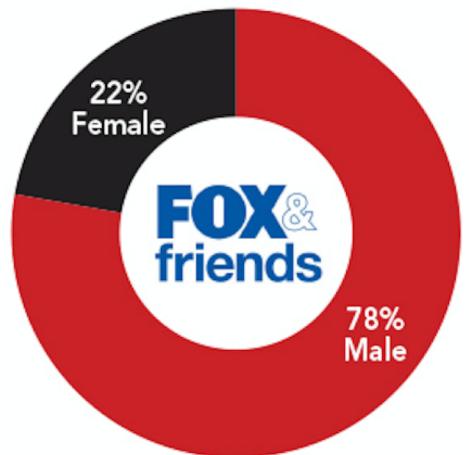
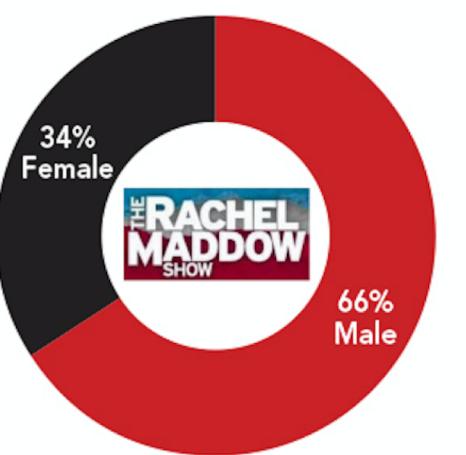
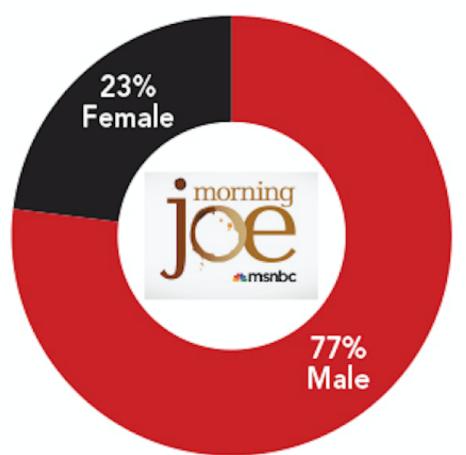
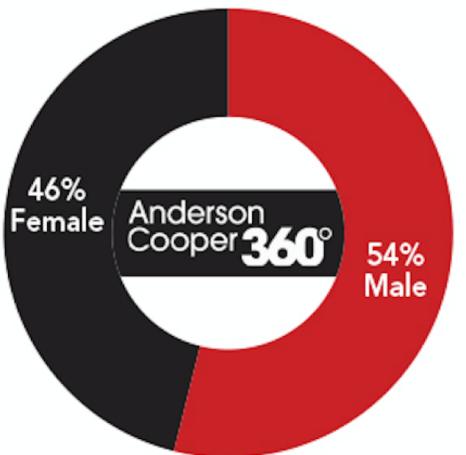
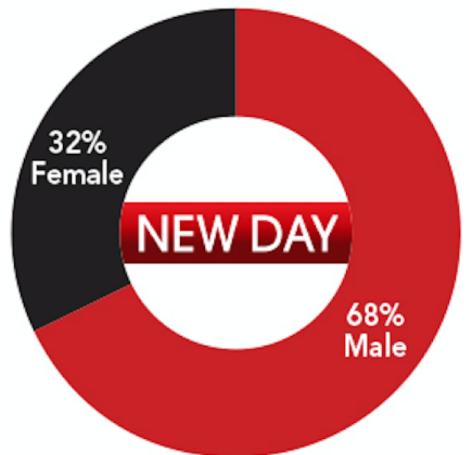
 PEER-REVIEWED

RESEARCH ARTICLE

On the Compliance of Women Engineers with a Gendered Scientific System

Gita Ghiasi , Vincent Larivière, Cassidy R. Sugimoto

Published: December 30, 2015 • <https://doi.org/10.1371/journal.pone.0145931>



Women Also Know Stuff



LGBT Scholar Network
@LGBTscholars Follows you



BYUWomen in Business
@BYUWIB

WIB is a club at BYU created to help bring women interested in business together through mentoring, networking, and learning.



Academic Women in PA
@AWPARocks

A network of women who are (or seeking to be) faculty in public administration seeking to address gender issues in the field.



POCAAlsoKnowStuff
@POCalsoknow

People of color also know stuff! (inspired by @womentalsoknow)

Gender Balance Assessment Tool (GBAT)

Women are cited less often than men, and are also underrepresented in syllabi. Yet even well-meaning scholars may find that they have difficulty assessing how gender-balanced their bibliographies and syllabi really are. Counting is tedious and prone to human error, and scholars may not know the gender identities of all the authors listed in their bibliographies. This tool can help with that, by automating the process of evaluating a reading list. You enter the names of the readings, and it finds the gender identity of each author by matching their name and then providing an estimate of what percentage of the readings were written by women.

Your assigned readings are approximately

47.43

percent woman-authored.

Race breakdown (probabilistic)

6.48% Asian, 14.39% Black, 2.74% Hispanic,
2.68% Other, 73.71% White

<https://jlsumner.shinyapps.io/syllabustool/>

EQUITY

Don't dumb down your findings

You are a translator

Treat audience with respect

Amplify underrepresented voices

CURIOSITY

How do I keep learning R?

What class should I take next?

What book should I read next?



Katie Mack

@AstroKatie

Following



A surprisingly large part of having expertise in a topic is not so much knowing everything about it but learning the language and sources well enough to be extremely efficient in google searches.

9:34 AM - 8 Dec 2018

3,607 Retweets 14,911 Likes



195

3.6K

15K





LIVED THROUGH THE GOLDEN AGE OF TRAINED CHICKENS

FOLLOW US

FAMILY

I'm a Developer. I Won't Teach My Kids to Code, and Neither Should You.

By JOE MORGAN

DEC 06, 2018 • 5:55 AM

Every step—precisely measuring ingredients, gauging mixed dough for smoothness and consistency, placing precision cuts to minimize waste—taught him something about quality. It's hard to teach the difference between merely executing steps, such as following a recipe, and doing something well. It can only be passed on through feel and experience. And every time you involve your kids when you work on something you value, you are teaching them how to do things well. You are preparing them to write code.

But you're not only teaching them that. You're teaching them the world is full of interesting things to discover. You're showing them how to be passionate and look for that ephemeral sense of quality in everything they do. The best part is that even if they don't become coders—most shouldn't and won't—the same skills can be used in nearly any career, in every hobby, in every life. When we force kids to learn syntax, we reinforce the idea that if something is not a blatantly employable skill, it's not valuable. Adults can learn syntax. Only kids can learn to embrace curiosity. ■

EMBRACE CURIOSITY

Find excuses to use R

(This is why I subjected you to the code-through assignment)

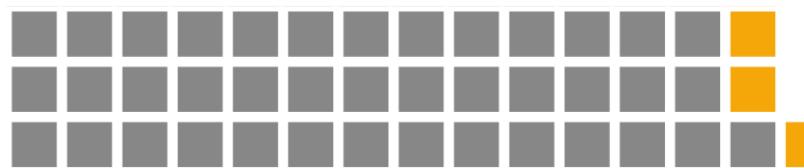
Dumb dinky projects

Data play time

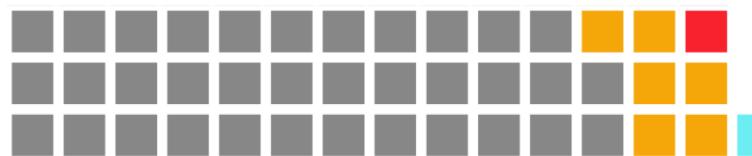
Actual projects

2016-17

Political science (43)



Public administration and policy (41)



2017-18

Political science (11)

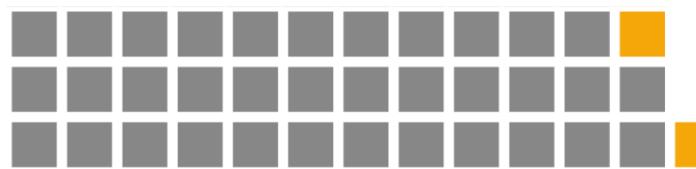


Public administration and policy (31)



2018-19

Political science (37)

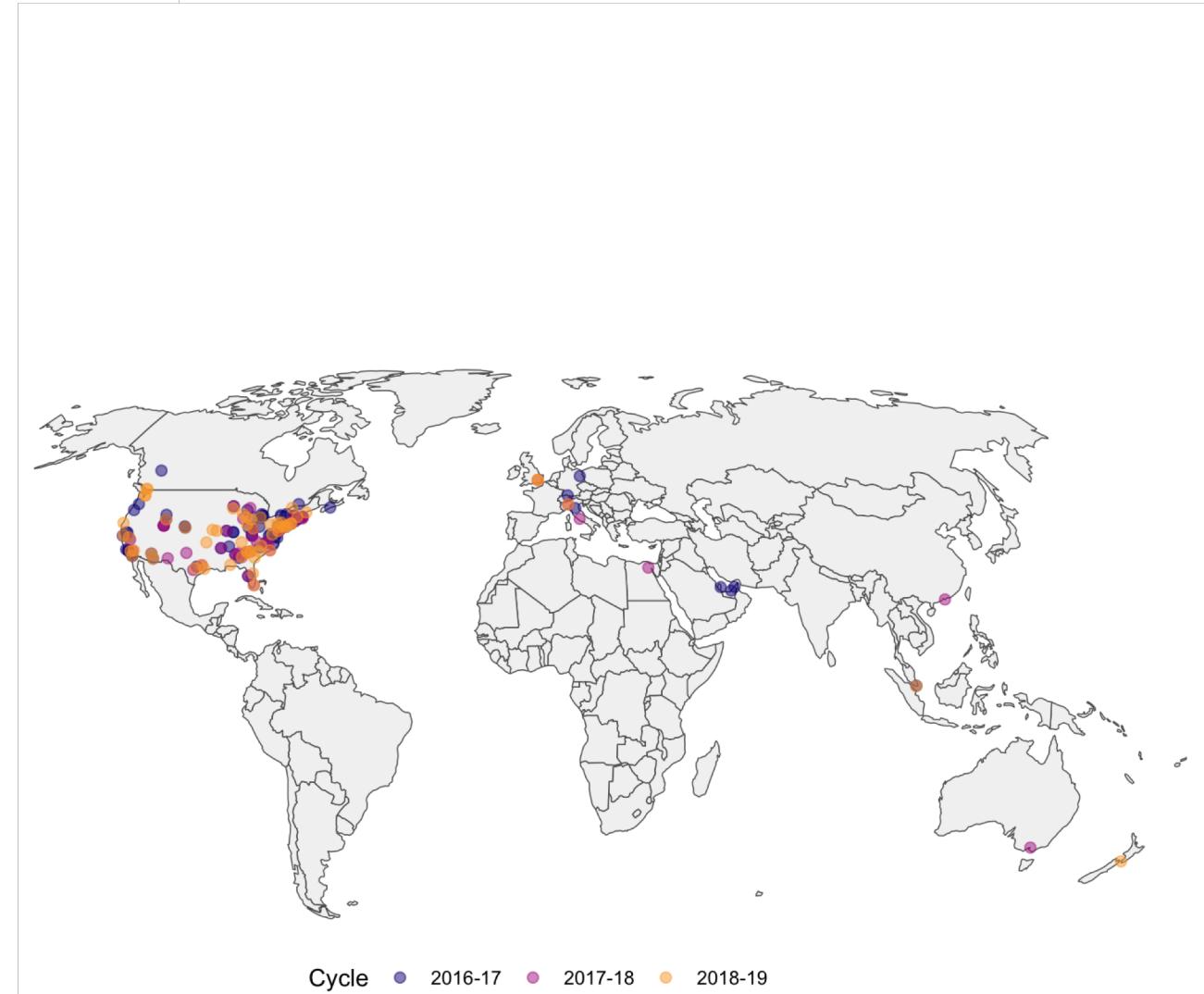


Public administration and policy (23)

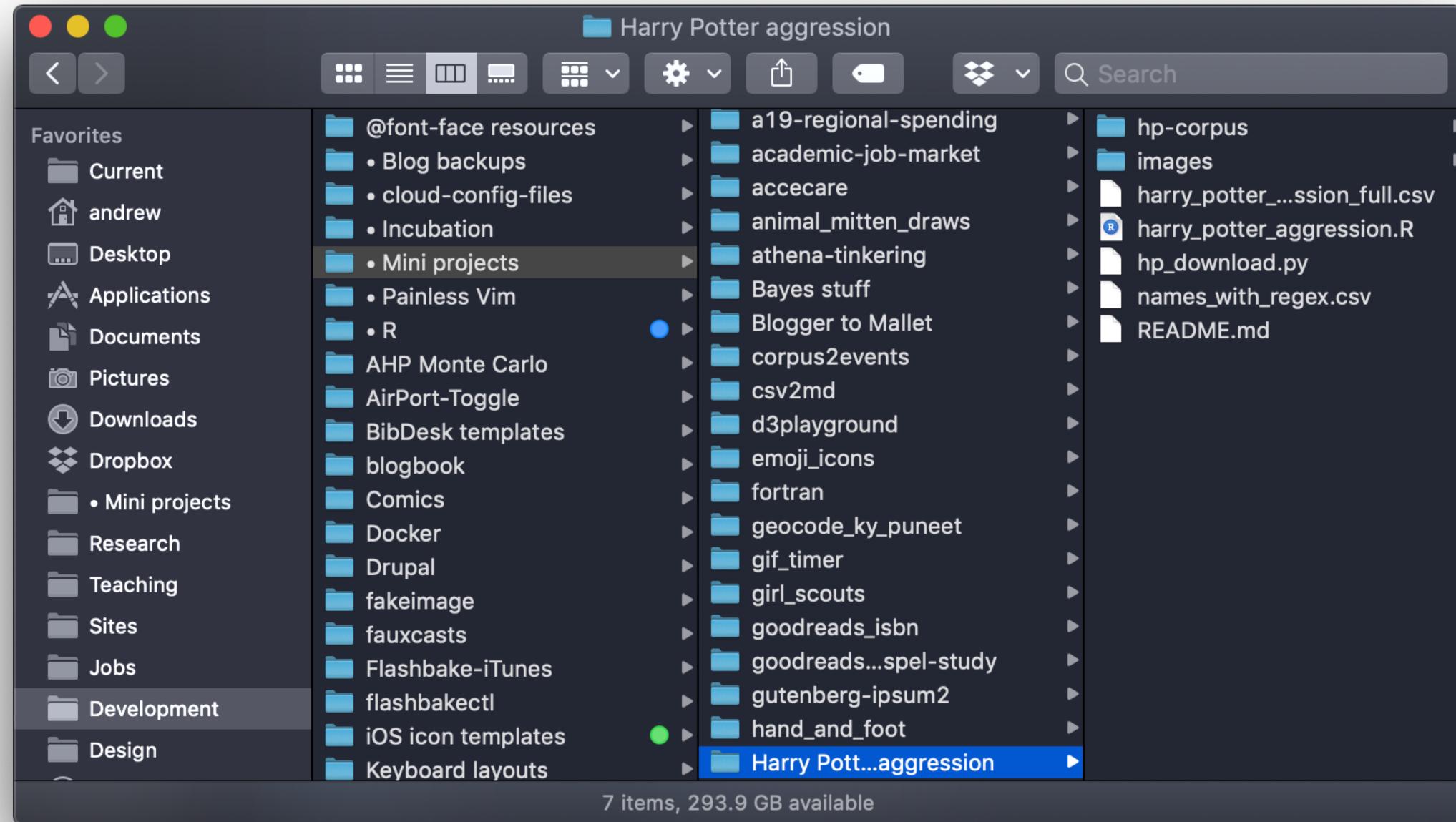


■ Nothing ■ Skype, no flyout ■ Flyout, no offer ■ Visiting offer ■ Tenure-track offer

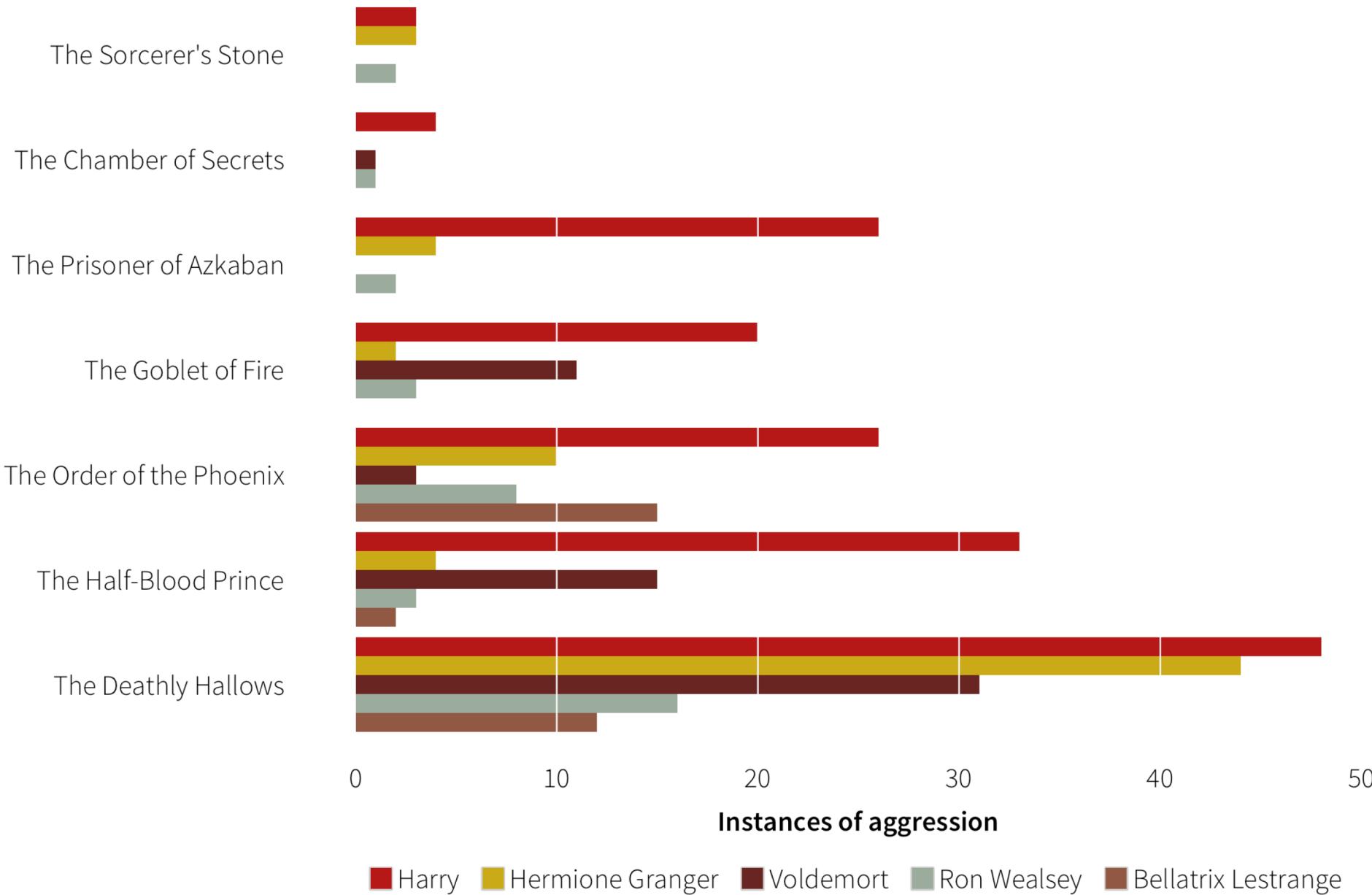
One box = one job posting



Cycle ● 2016-17 ● 2017-18 ● 2018-19

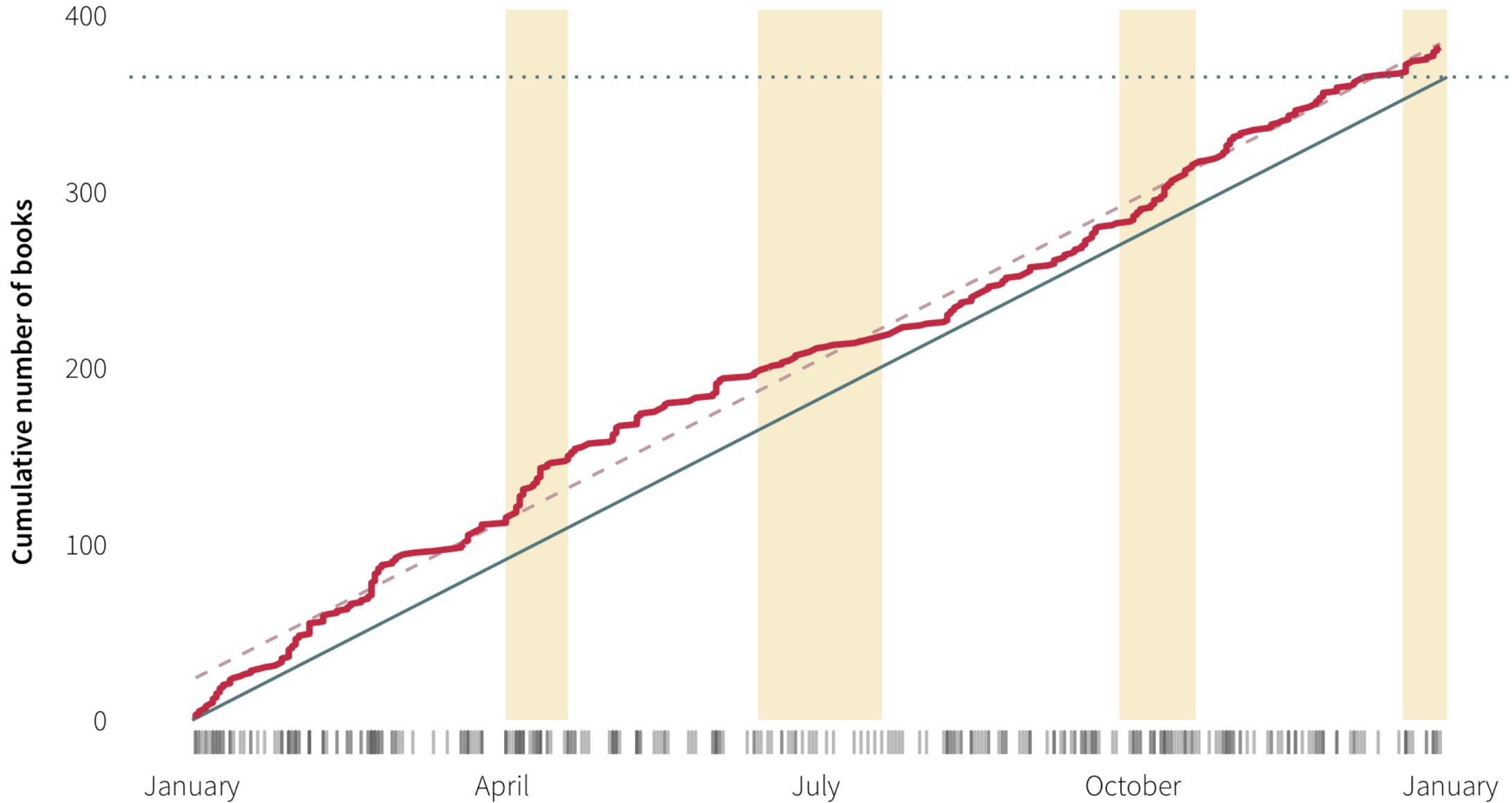


Most aggressive characters in the Harry Potter series

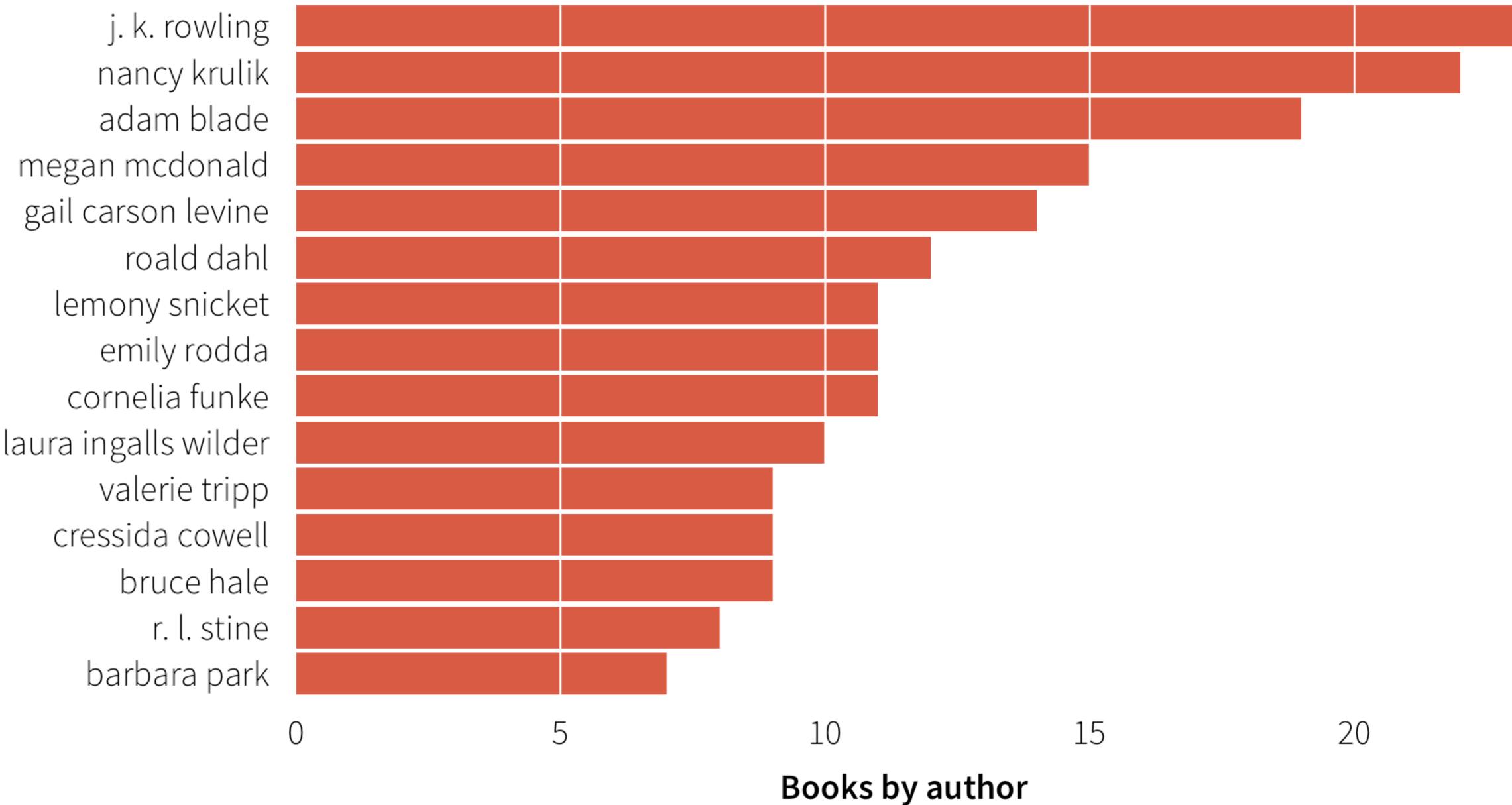


Progress toward 2014 goal

School breaks shaded in yellow

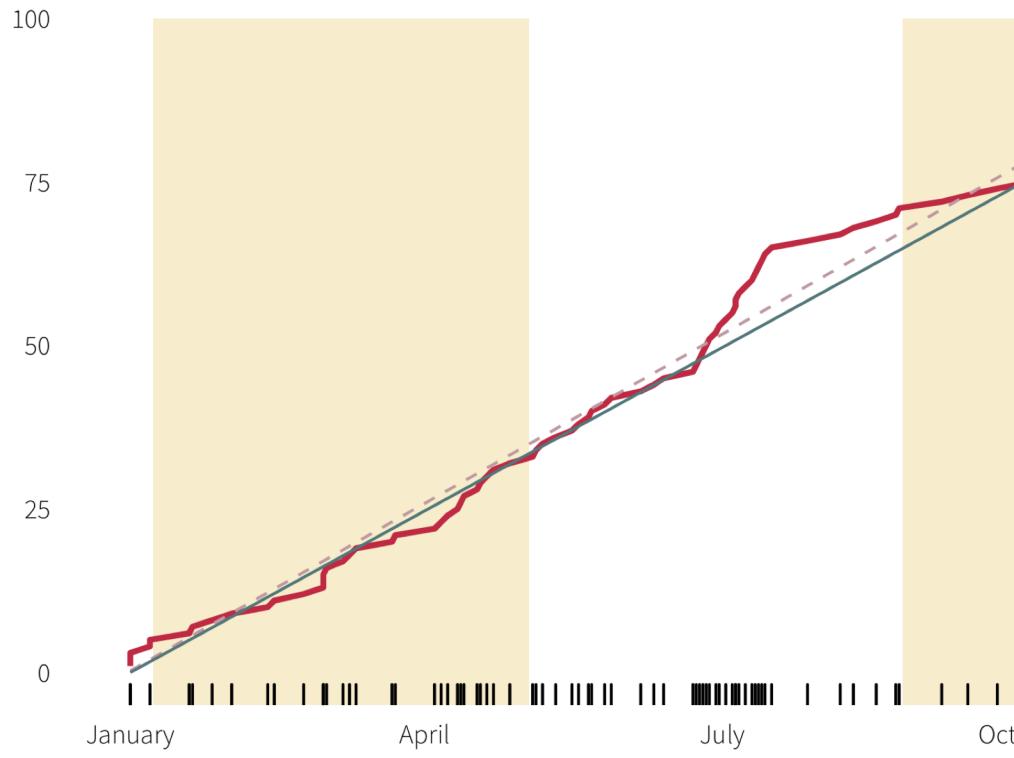


How many times Rachel read a book by each author

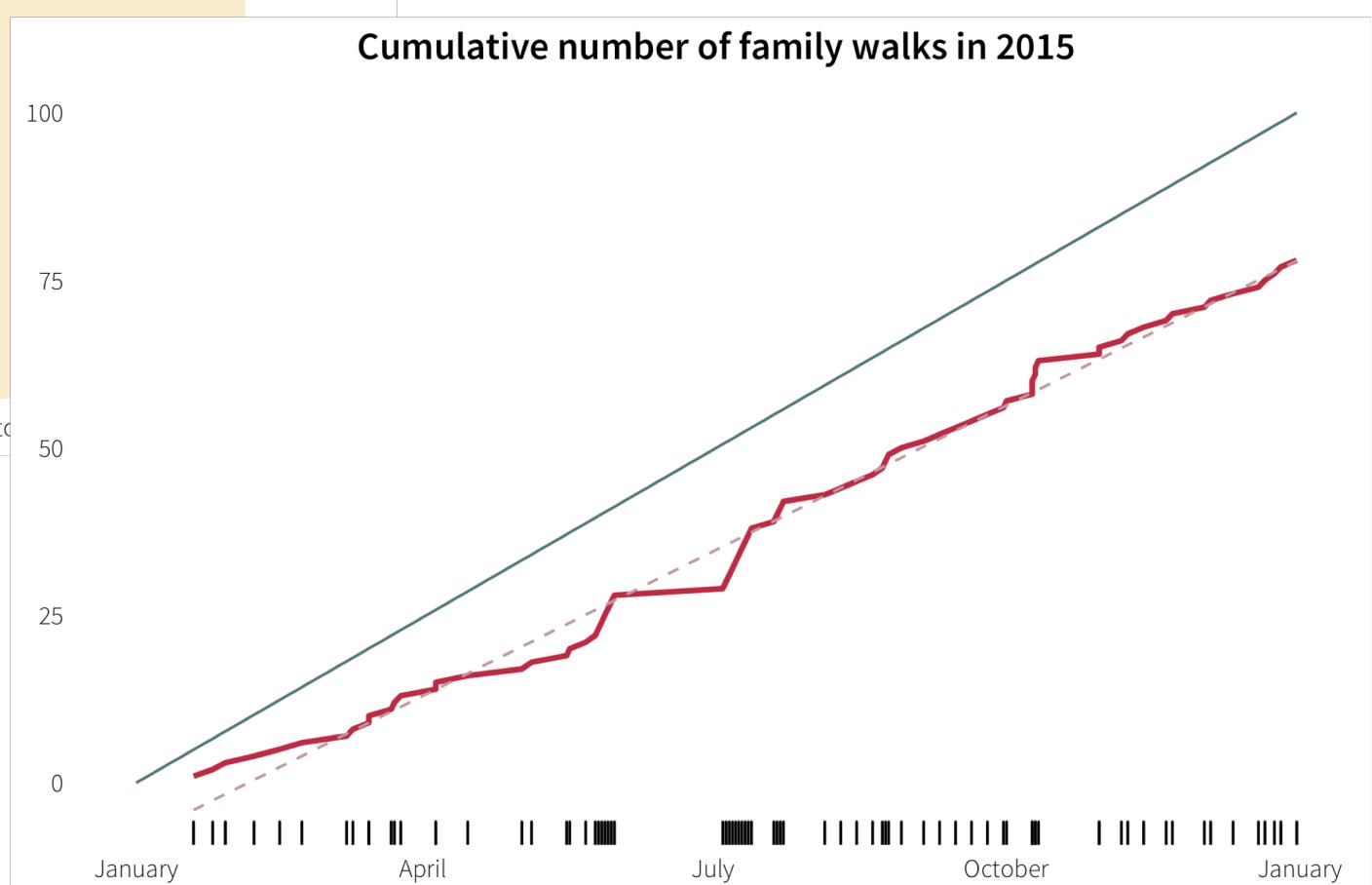


Cumulative number of family walks in 2014

Duke semesters shaded in yellow



Cumulative number of family walks in 2015



GET OUT IN PUBLIC

Share everything

GitHub + Twitter + websites

#rstats

R User Groups

SLC RUG

#rladies

You are all expert
enough now.

Go make stuff!