Researcher degrees of freedom

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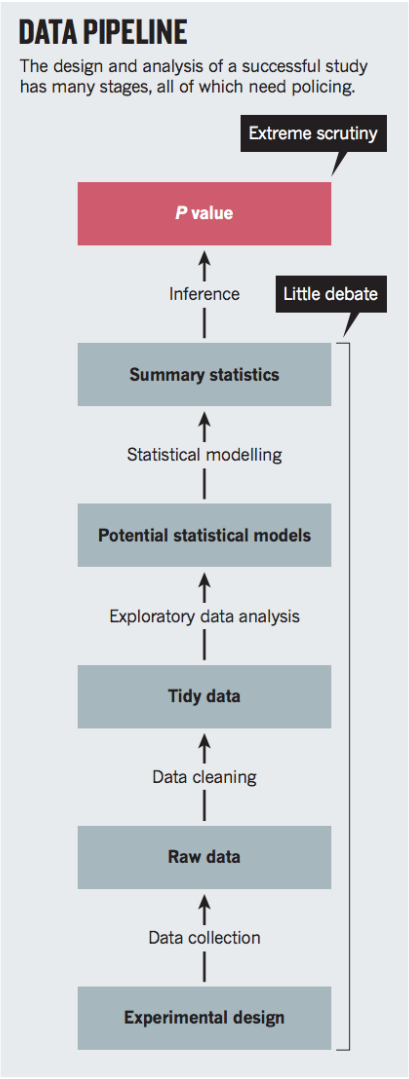
RDoF = the danger of trying too many statistical models on complicated data



http://www.ncbi.nlm.nih.gov/pubmed/25925460
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1850704

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

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May 23, 2011

Psychological Science, 2011

Abstract:
In this article, we accomplish two things. First, we show that despite empirical psychologists' nominal endorsement of a low rate of false-positive findings (≤ .05), flexibility in data collection, analysis, and reporting dramatically increases actual false-positive rates. In many cases, a researcher is more likely to falsely find evidence that an effect exists than to correctly find evidence that it does not. We present computer simulations and a pair of actual experiments that demonstrate how unacceptably easy it is to accumulate (and report) statistically significant evidence for a false hypothesis. Second, we suggest a simple, low-cost, and straightforwardly effective disclosure-based solution to this problem. The solution involves six concrete requirements for authors and four guidelines for reviewers, all of which impose a minimal burden on the publication process.

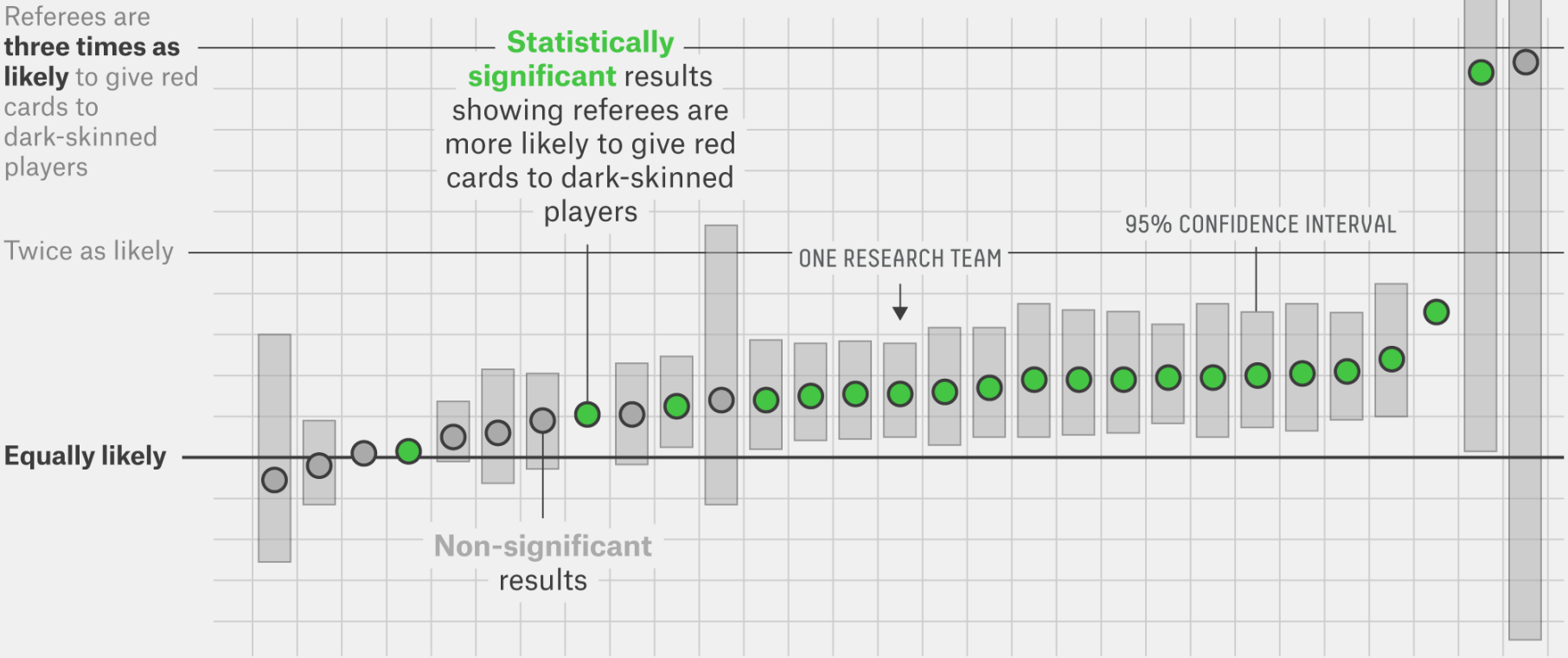
Number of Pages in PDF File: 8

Keywords: Methodology, Motivated Reasoning, Publication, Disclosure

Same Data, Different Conclusions

http://fivethirtyeight.com/features/science-isnt-broken/

Twenty-nine research teams were given the same set of soccer data and asked to determine if referees are more likely to give red cards to dark-skinned players. Each team used a different statistical method, and each found a different relationship between skin color and red cards.



FIVETHIRTYEIGHT

SOURCE: BRIAN NOSEK ET AL.

The model you fit changes the hypothesis you are studying

simplystats

http://bit.ly/1NDsgD3

20
AUG

If you ask different questions you get different answers - one more way science isn't broken it is just really hard

POSTED BY JEFF LEEK / UNCATEGORIZED

If you haven't already read the amazing piece by Christie Aschwanden on why Science isn't Broken you should do so immediately. It does an amazing job of capturing the nuance of statistics as applied to real data sets and how that can be misconstrued as science being "broken" without falling for the easy "everything is wrong" meme.

One thing that caught my eye was how the piece highlighted a crowd-sourced data analysis of soccer red cards. The key figure for that analysis is this one:

The “garden of forking paths” is the set of modeling decisions you make after you see the data

http://www.stat.columbia.edu/~gelman/research/unpublished/p_hacking.pdf

The garden of forking paths: Why multiple comparisons can be a problem, even when there is no "fishing expedition" or "p-hacking" and the research hypothesis was posited ahead of time*

Andrew Gelman† and Eric Loken‡

14 Nov 2013

"I thought of a labyrinth of labyrinths, of one sinuous spreading labyrinth that would encompass the past and the future . . . I felt myself to be, for an unknown period of time, an abstract perceiver of the world." — Borges (1941)

Abstract

Researcher degrees of freedom can lead to a multiple comparisons problem, even in settings where researchers perform only a single analysis on their data. The problem is there can be a large number of *potential* comparisons when the details of data analysis are highly contingent on data, without the researcher having to perform any conscious procedure of fishing or examining multiple p-values. We discuss in the context of several examples of published papers where data-analysis decisions were theoretically-motivated based on previous literature, but where the details of data selection and analysis were not pre-specified and, as a result, were contingent on data.

Ways to avoid forking paths

- Have a specific hypothesis
- Pre-specify analysis plan
- Use training/testing sets
- Analyze your data once or report all analyses