

"Naïve inductivism": a belief that all scientists seeing the same data should come to the same conclusions.

In "Of P-Values and Bayes: A Modest Proposal", Steven N. Goodman, 2001

Cognitive Bias

By implication, anyone who draws a different conclusion must be doing so for nonscientific reasons.

It is a belief that scientific reasoning requires little more than statistical model fitting, or in our case, reporting odds ratios, P-values and the like, to arrive at the truth.



Source:

<http://www.nature.com/news/crowdsourced-research-many-hands-make-tight-work-1.18508>

Are football (soccer) referees more likely to give red cards to players with dark skin than to players with light skin?



Source: <http://www.nature.com/news/crowdsourced-research-many-hands-make-tight-work-1.18508>

ONE DATA SET, MANY ANALYSTS

Twenty-nine research teams reached a wide variety of conclusions using different methods on the same data set to answer the same question (about football players' skin colour and red cards).

Dark-skinned players four times more likely than light-skinned players to be given a red card.

- Statistically significant effect
- Non-significant effect

Twice as likely

Equally likely

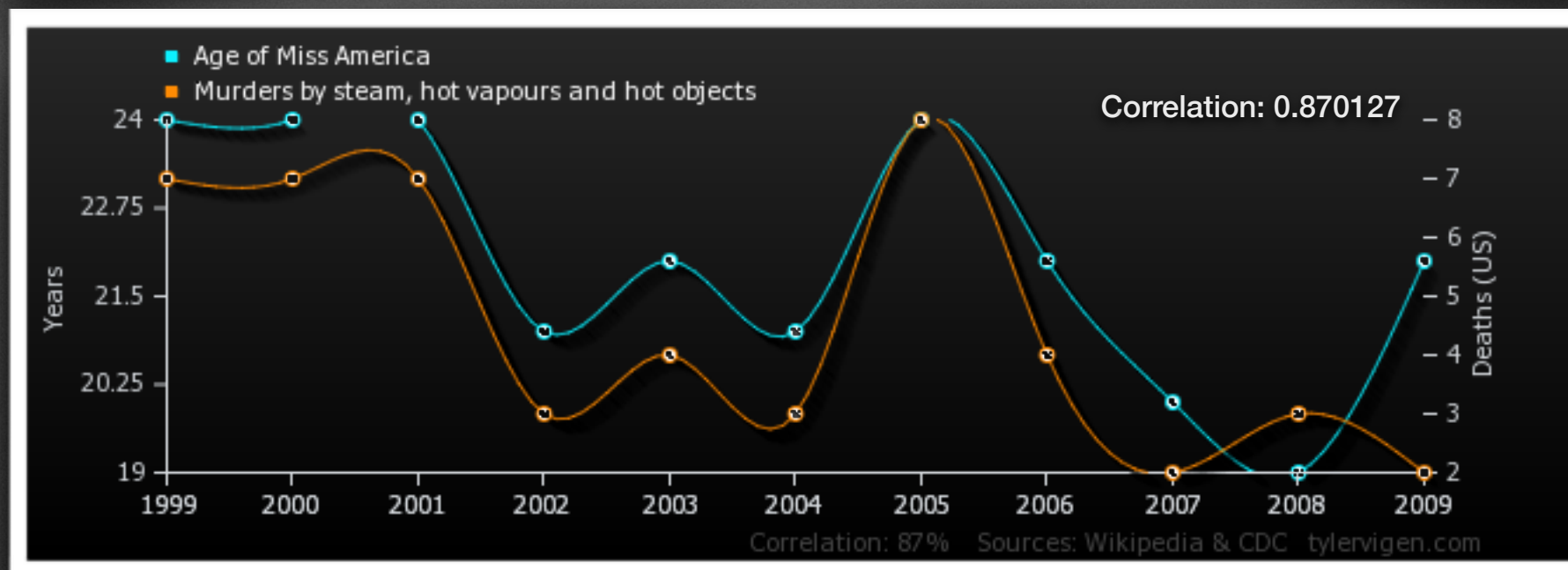
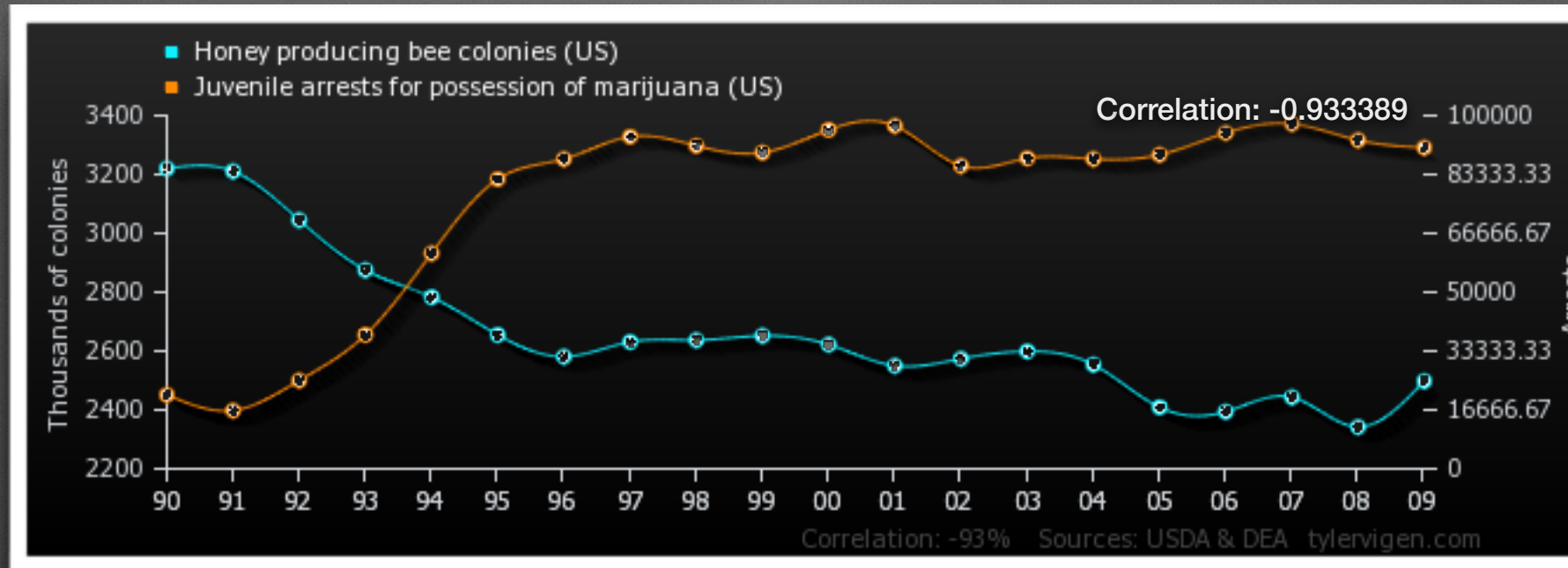
Point estimates and 95% confidence intervals. *Truncated upper bounds.

Bad methodology

Cognitive Bias

Feature Engineering (Priors)

Randomness



Source: Spurious Correlations
<http://www.tylervigen.com/>

Randomness

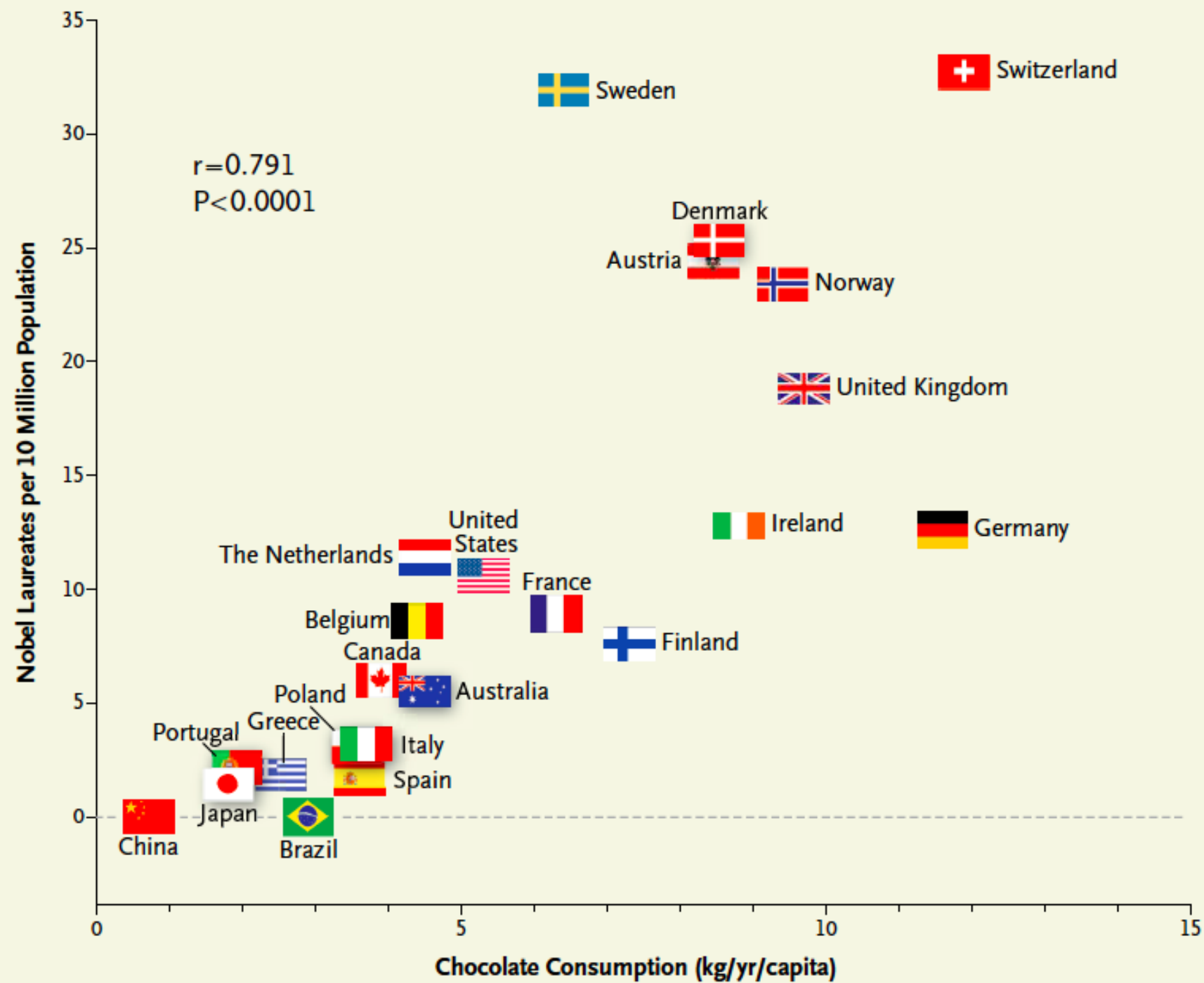


Figure 1. Correlation between Countries' Annual Per Capita Chocolate Consumption and the Number of Nobel Laureates per 10 Million Population.

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OCCASIONAL NOTES

Chocolate Consumption, Cognitive Function, and Nobel Laureates

Franz H. Messerli, M.D.

N Engl J Med 2012; 367:1562-1564 | [October 18, 2012](#) | DOI: 10.1056/NEJMon1211064Share: [f](#) [t](#) [g+](#) [in](#) [+](#)

Article

References

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Dietary flavonoids, abundant in plant-based foods, have been shown to improve cognitive function. Specifically, a reduction in the risk of dementia, enhanced performance on some cognitive tests, and improved cognitive function in elderly patients with mild impairment have been associated with a regular intake of flavonoids.^{1,2} A subclass of flavonoids called flavanols, which are widely present in cocoa, green tea, red wine, and some fruits, seems to be effective in slowing down or even reversing the reductions in cognitive performance that occur with aging. Dietary flavanols have also been shown to improve endothelial function and to lower blood pressure by causing vasodilation in the peripheral vasculature and in the brain.^{3,4} Improved cognitive performance with the administration of a cocoa polyphenolic extract has even been reported in aged Wistar-Unilever rats.⁵

Since chocolate consumption could hypothetically improve cognitive function not only in individuals but also in whole populations, I wondered whether there would be a correlation between a country's level of chocolate consumption and its population's cognitive function. To my knowledge, no data on overall national cognitive function are publicly available. Conceivably, however, the total number of Nobel laureates per capita could serve as a surrogate end point reflecting the proportion with superior cognitive function and thereby give us some measure of the overall cognitive function of a given country.

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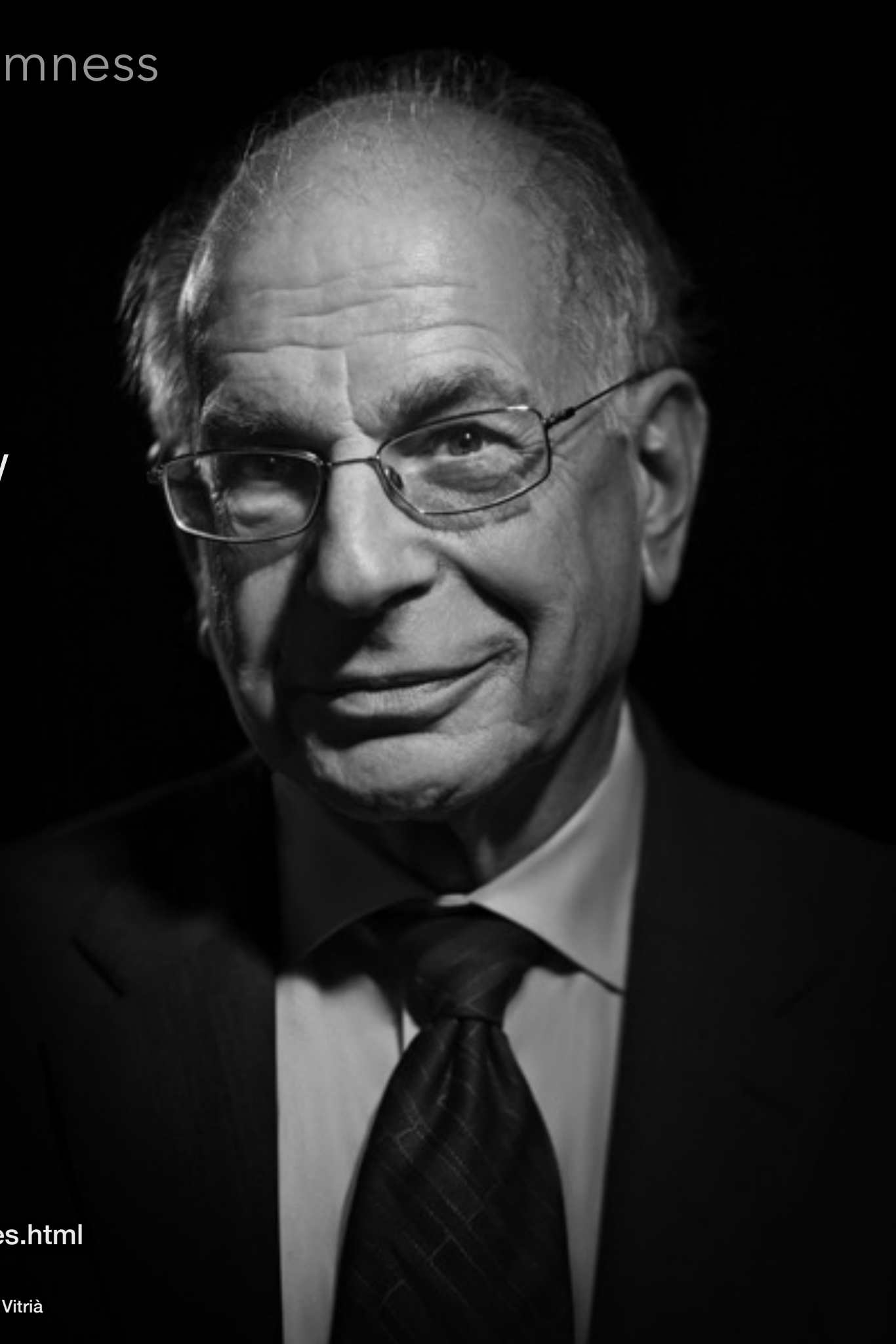
April 17, 2014 | R.G. Cury and C.H. Moreira

Randomness

In 2012 Professor Kahneman
wrote:

"90% of the students who saw
the CRT in normal font made
at least one mistake in the
test, but the proportion
dropped to 35% when the
font was barely legible. You
read this correctly:
performance was better with
the bad font."

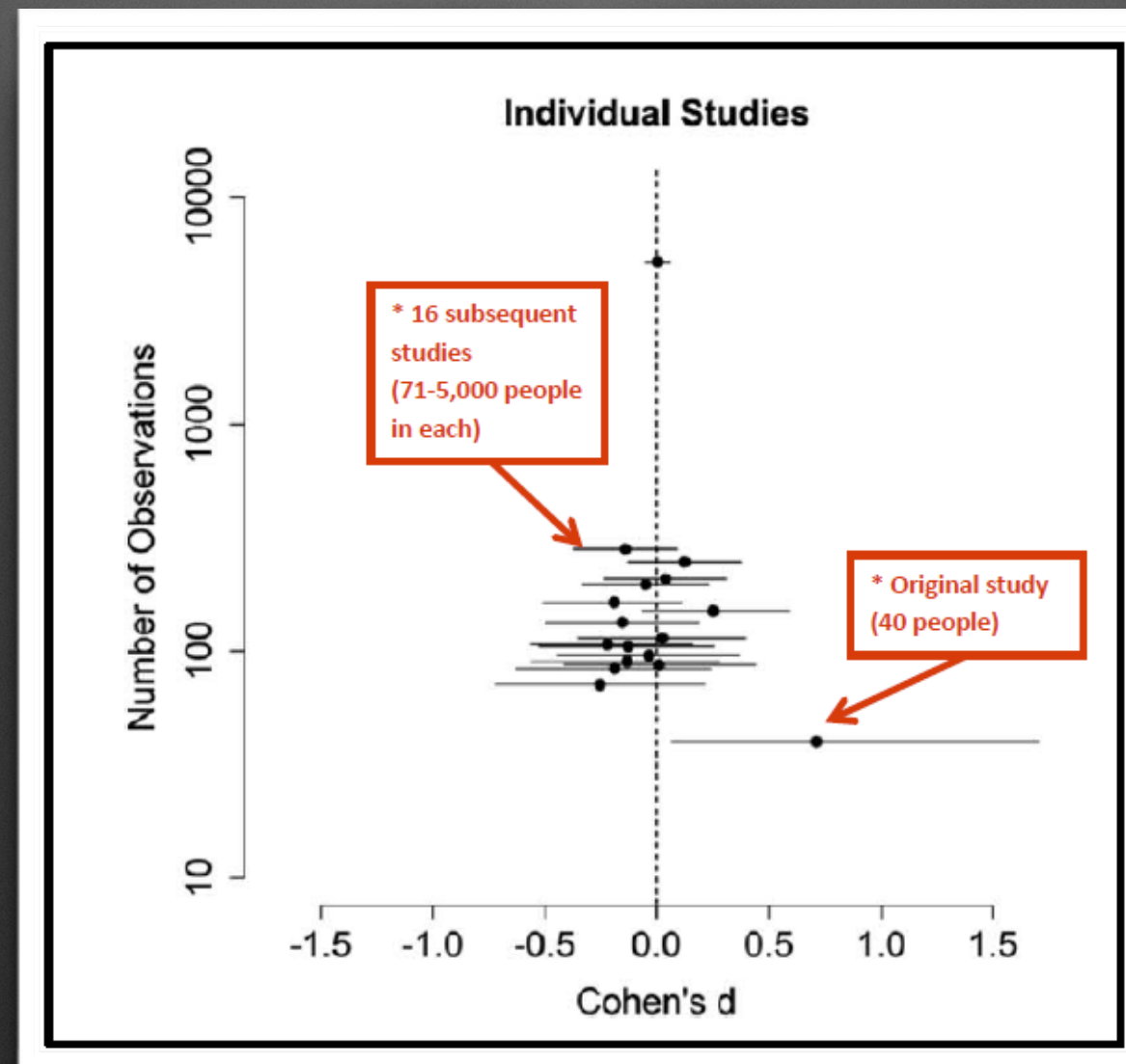
<http://www.terryburnham.com/2015/04/a-trick-for-higher-sat-scores.html>



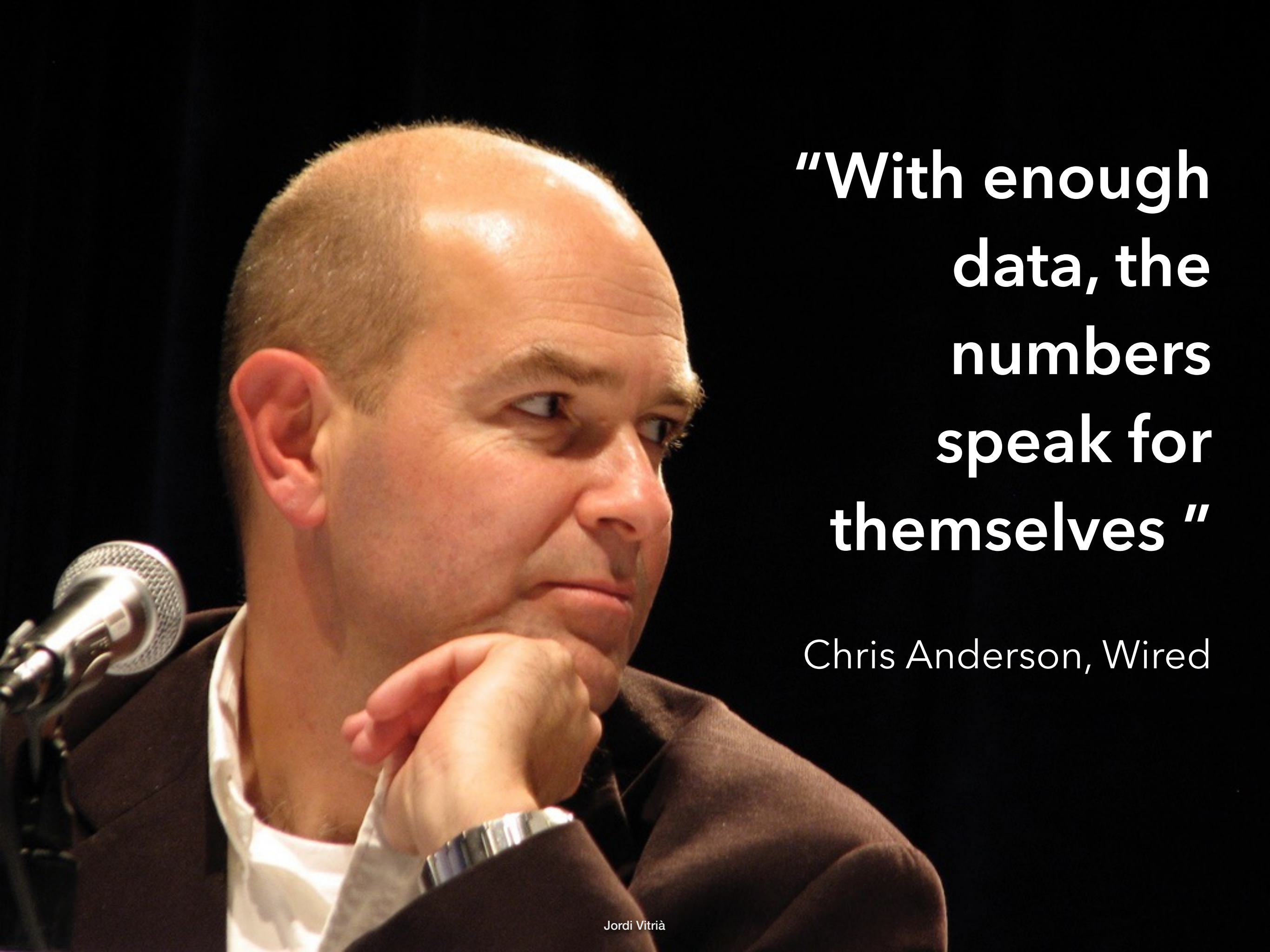
Randomness

The original paper reached its conclusions based on the test scores of 40 people.

If you analyze a total of over 7,000 people by looking at the original study and 16 additional studies:




<http://www.terryburnham.com/2015/04/a-trick-for-higher-sat-scores.html>



**“With enough
data, the
numbers
speak for
themselves”**

Chris Anderson, Wired

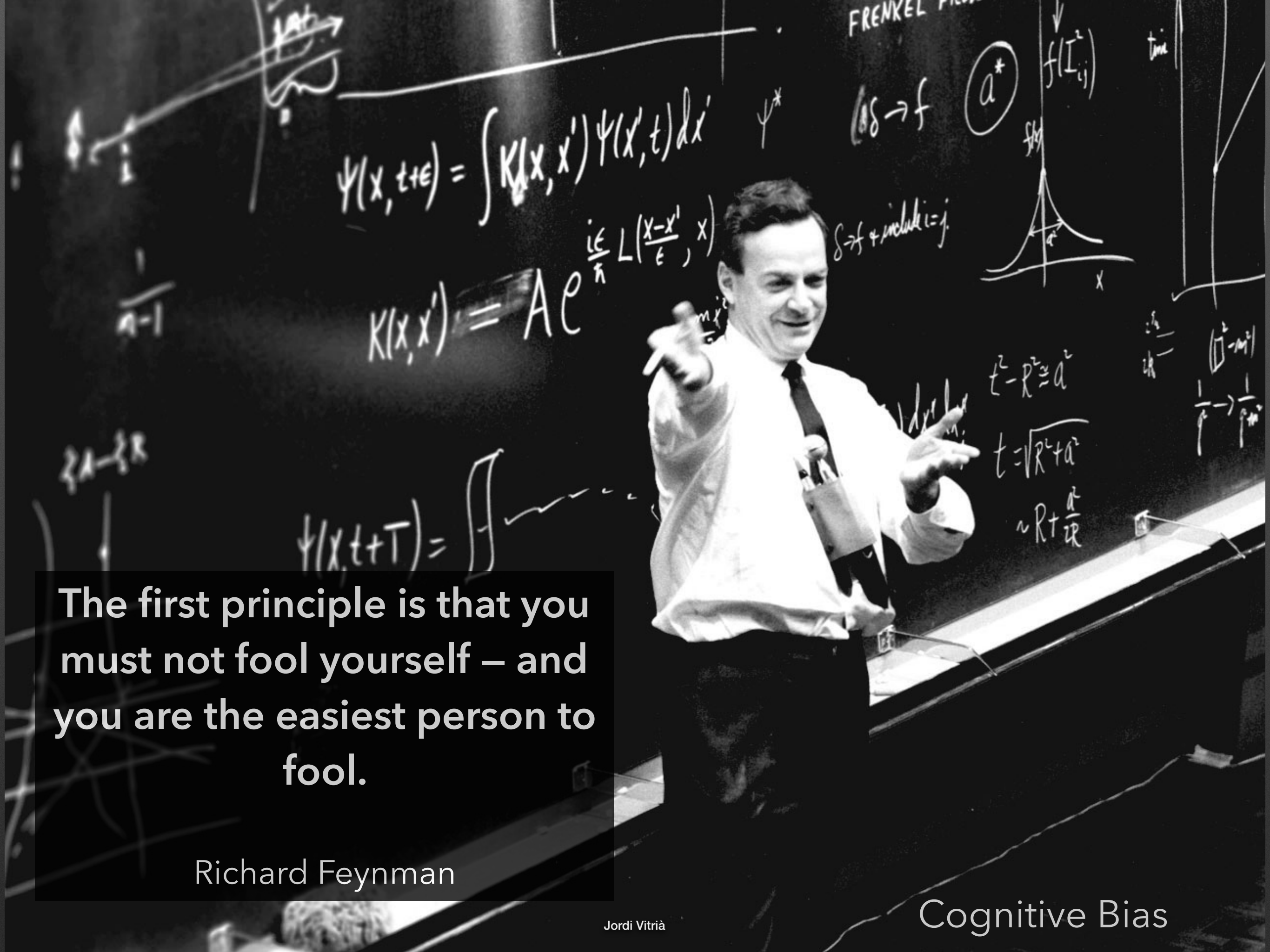
A close-up portrait of Nate Silver, a man with short brown hair and glasses, wearing a brown jacket over a blue shirt. He is looking directly at the camera with a neutral expression. The background is a blurred outdoor setting with warm tones.

**"The numbers
have no way of
speaking for
themselves"**

Nate Silver

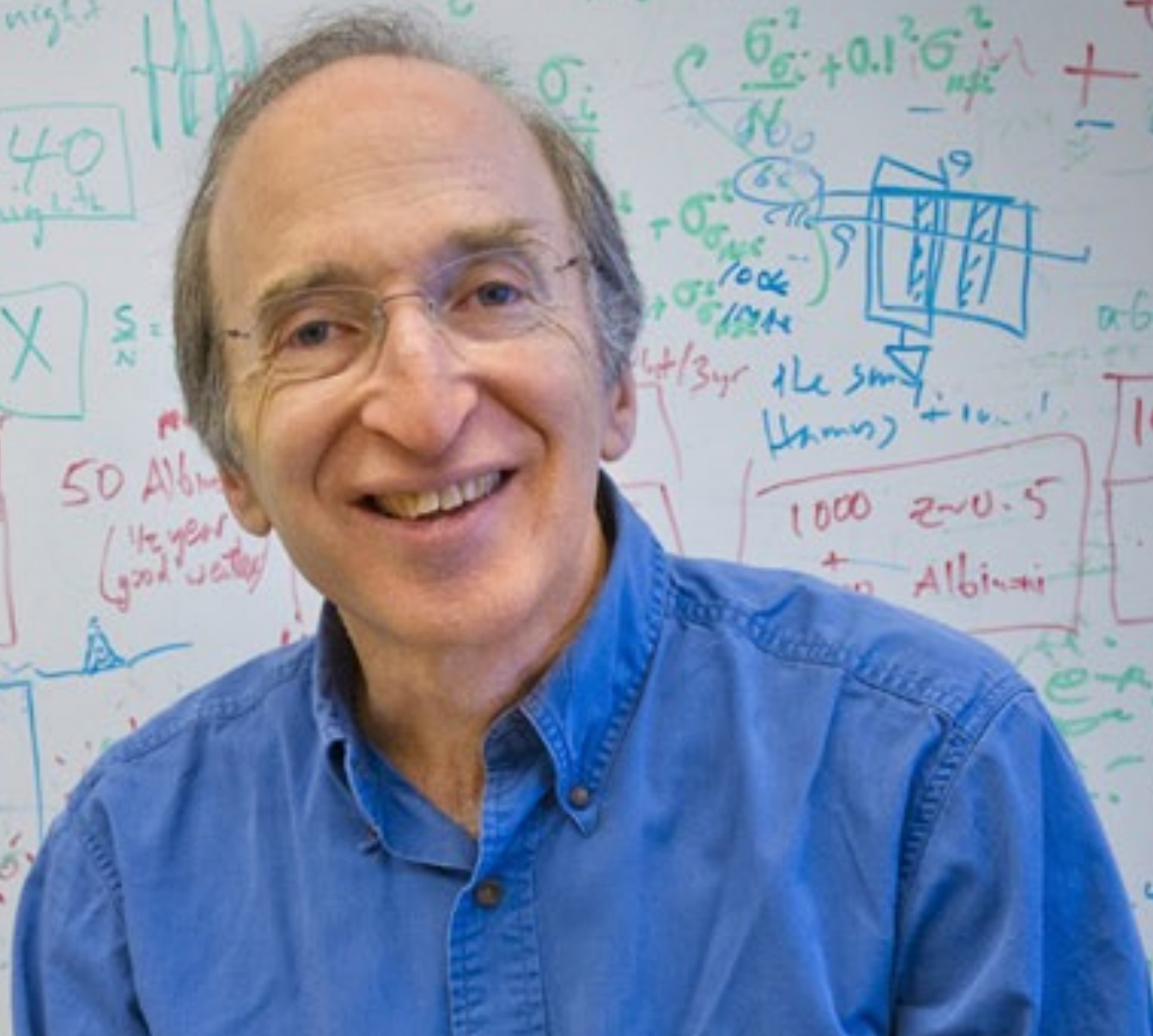
The first principle is that you must not fool yourself – and you are the easiest person to fool.

Richard Feynman



Data science is **difficult**, but not more difficult than general science.

Science is an ongoing race between our inventing ways to fool ourselves, and our inventing ways to avoid fooling ourselves.



Saul Perlmutter, Astrophysicist, UC Berkeley