

# **Treating existing research as a hostile witness**

Dr. Ian Hussey

Digitalisation of Psychology

# Functions of Science

Why do we do science

## Rational

Discovery & integrated understanding

## Psychological

Entertainment

## Social

Application for societal benefit

Rarer these days?

Bernal (1939): “there is no economic system willing to pay scientists just to amuse themselves”

*“Nowadays funding is given to scientists to conduct their research. The research being conducted must be relevant to the society, and thus are not given to scientists purely for their amusement.”*

### **Psychological**

Entertainment

### **Rational**

Discovery & integrated understanding

### **Social**

Application for societal benefit

# What if generating questions is more appealing than generating answers?

How would I know whether I have made a discovery or integrated my understanding?

The continuous collection of facts does not automatically lead to integrated understanding  
(Forscher, 1963)

*Especially when we collect falsehoods as well as true facts*

**Psychological**

Entertainment

Dr. Ian Hussey

**Rational**

Discovery & integrated understanding

**Letters**

## Chaos in the Brickyard

Once upon a time, among the activities and occupations of man there was an activity called scientific research and the performers of this activity were called scientists. In reality, however, these men were builders who constructed edifices, called explanations or laws, by assembling bricks, called facts. When the bricks were sound and were assembled properly, the edifice was useful and durable and brought pleasure, and sometimes reward, to the builder. If the bricks were faulty or if they were assembled badly, the edifice would crumble, and this kind of disaster could be very dangerous to innocent users of the edifice as well as to the builder who sometimes was destroyed by the collapse. Because the quality of the bricks was so important to the success of the edifice, and because bricks were so scarce, in those days the builders made their own bricks. The making of bricks was a difficult and expensive undertaking and the wise builder avoided waste by making only bricks of the shape and size necessary for the enterprise at hand. The builder was guided in this manufacture by a blueprint, called a theory or hypothesis.

It came to pass that builders realized that they were sorely hampered in their efforts by delays in obtaining bricks. Thus there arose a new skilled trade known as brickmaking, called junior scientist to give the artisan proper

And then it came to pass that a misunderstanding spread among the brickmakers (there are some who say that this misunderstanding developed as a result of careless training of a new generation of brickmakers). The brickmakers became obsessed with the making of bricks. When reminded that the ultimate goal was edifices, not bricks, they replied that, if enough bricks were available, the builders would be able to select what was necessary and still continue to construct edifices. The flaws in this argument were not readily apparent and so, with the help of the citizens who were waiting to use the edifices yet to be built, amazing things happened. The expense of brickmaking became a minor factor because large sums of money were made available; the time and effort involved in brickmaking was reduced by ingenious automatic machinery; the ranks of the brickmakers were swelled by augmented training programs and intensive recruitment. It even was suggested that the production of a suitable number of bricks was equivalent to building an edifice and therefore should entitle the industrious brickmaker to assume the title of builder and, with the title, the authority.

And so it happened that the land became flooded with bricks. It became necessary to organize more and more storage places, called journals, and more and more elaborate systems of bookkeeping to record the inventory. In all of this the brickmakers retained

Unfortunately, the builders were almost destroyed. It became difficult to find the proper bricks for a task because one had to hunt among so many. It became difficult to find a suitable plot for construction of an edifice because the ground was covered with loose bricks. It became difficult to complete a useful edifice because, as soon as the foundations were discernible, they were buried under an avalanche of random bricks. And, saddest of all, sometimes no effort was made even to maintain the distinction between a pile of bricks and a true edifice.

BERNARD K. FORSCHER  
Mayo Clinic, Rochester, Minnesota

## Cancer: Ether-Soluble Substance

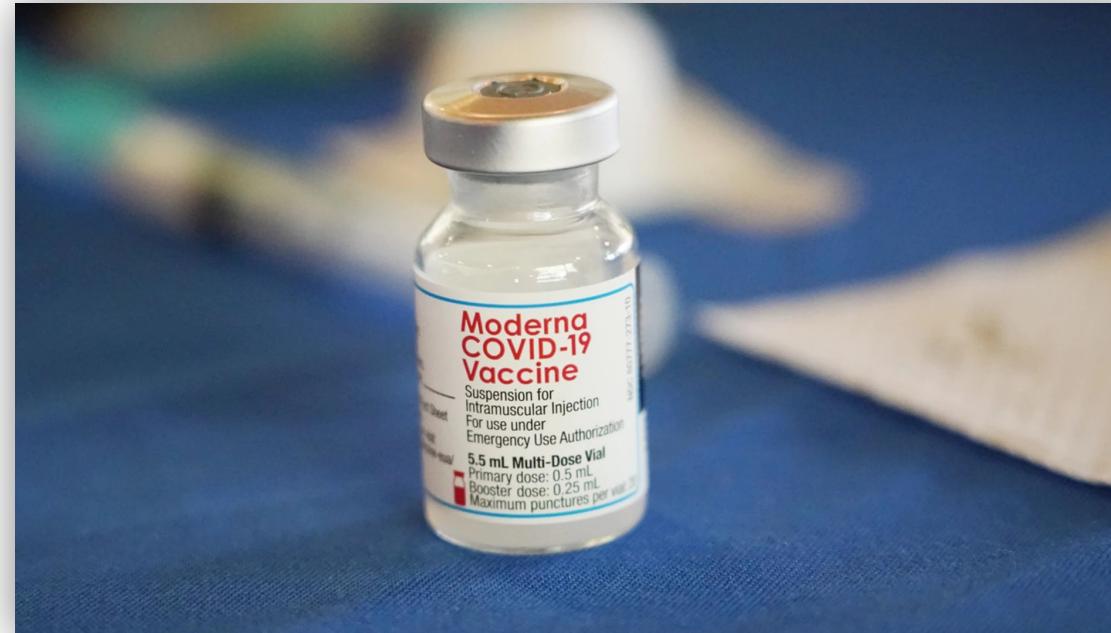
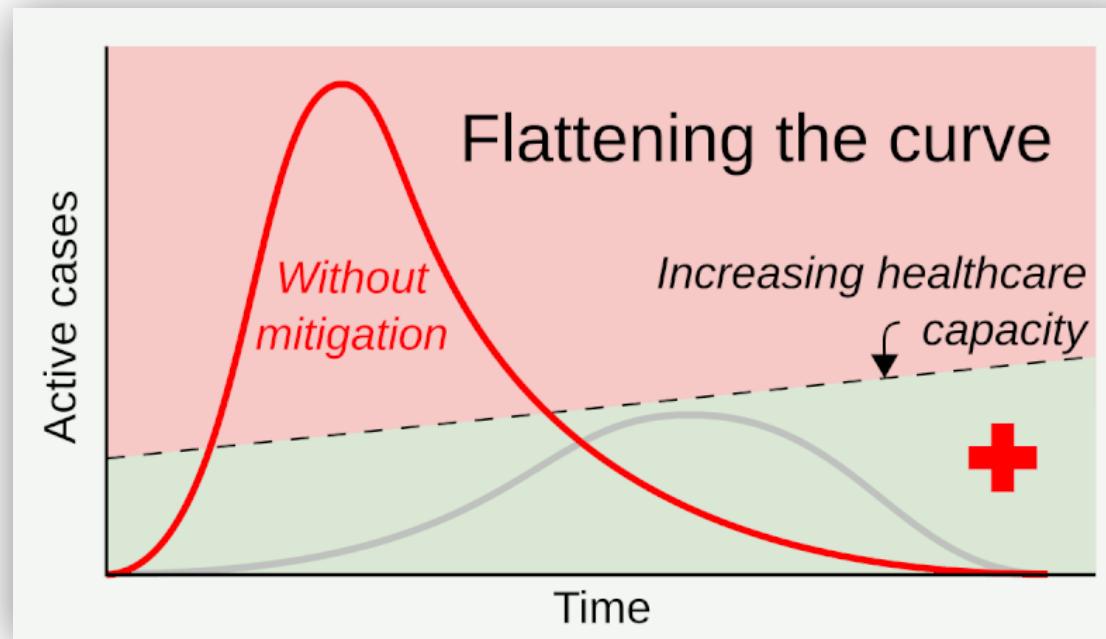
On reading the article "Cancer: a possible new approach" by Szent-Györgyi *et al.* [Science 140, 1391 (28 June 1963)], I was struck by the similarities between their findings and those of Reinke (*1*), which were later summarized by William H. Woglom (see *2*).

Reinke recorded an example of atypical epithelial growth which he had produced by injection of 4-percent ether into the eye of an adult salamander. The proliferating epithelium was transplanted intraperitoneally into other salamanders, where growth continued until the cells lost their similarity to lens epithelium and finally came to resemble carcinoma. However, this ether-educated mitosis was inhibited by the following process. Other salamander lenses were rubbed with ether, which was then allowed to evaporate. The residue from the lenses was resuspended in saline and injected into the eyes of salamanders that had been injected with a 4-percent-ether solution 8 days previously. Subsequently, few or no mitotic divisions were observed.

# More common these days?

## Incidentally useful discoveries

“COVID-19 is a perfect example, where millions of people relied on scientists to return to normality”



PERSPECTIVE  
<https://doi.org/10.1038/s41562-020-0884-z>

**nature human behaviour**

Check for updates

**Using social and behavioural science to support COVID-19 pandemic response**

Jay J. Van Bavel<sup>1,2</sup>, Katherine Baicker<sup>3</sup>, Paulo S. Boggio<sup>4</sup>, Valerio Capraro<sup>4</sup>, Aleksandra Cichocka<sup>5,6</sup>, Mina Cikara<sup>7</sup>, Molly J. Crockett<sup>8</sup>, Alia J. Crum<sup>9</sup>, Karen M. Douglas<sup>5</sup>, James N. Druckman<sup>10</sup>, John Drury<sup>11</sup>, Oeindrila Dube<sup>2</sup>, Naomi Ellemers<sup>12</sup>, Eli J. Finkel<sup>13</sup>, James H. Fowler<sup>14</sup>, Michele Gelfand<sup>15</sup>, Shihui Han<sup>16</sup>, S. Alexander Haslam<sup>17</sup>, Jolanda Jetten<sup>18</sup>, Shinobu Kitayama<sup>19</sup>, Dean Mobbs<sup>20</sup>, Lucy E. Napper<sup>21</sup>, Dominic J. Packer<sup>22</sup>, Gordon Pennycook<sup>23</sup>, Ellen Peters<sup>24</sup>, Richard E. Petty<sup>25</sup>, David G. Rand<sup>26</sup>, Stephen D. Reicher<sup>27</sup>, Simone Schnall<sup>28,29</sup>, Azim Shariff<sup>20</sup>, Linda J. Skitka<sup>31</sup>, Sandra Susan Smith<sup>32</sup>, Cass R. Sunstein<sup>33</sup>, Nassim Tabri<sup>34</sup>, Joshua A. Tucker<sup>35</sup>, Sander van der Linden<sup>28</sup>, Paul van Lange<sup>36</sup>, Kim A. Weeden<sup>37</sup>, Michael J. A. Wohl<sup>34</sup>, Jamil Zaki<sup>9</sup>, Sean R. Zion<sup>29</sup> and Robb Willer<sup>38,32</sup>

The COVID-19 pandemic represents a massive global health crisis. Because the crisis requires large-scale behaviour change and places significant neurological burdens on individuals, insights from the social and behavioural sciences can be used to

### Psychological

Entertainment

### Rational

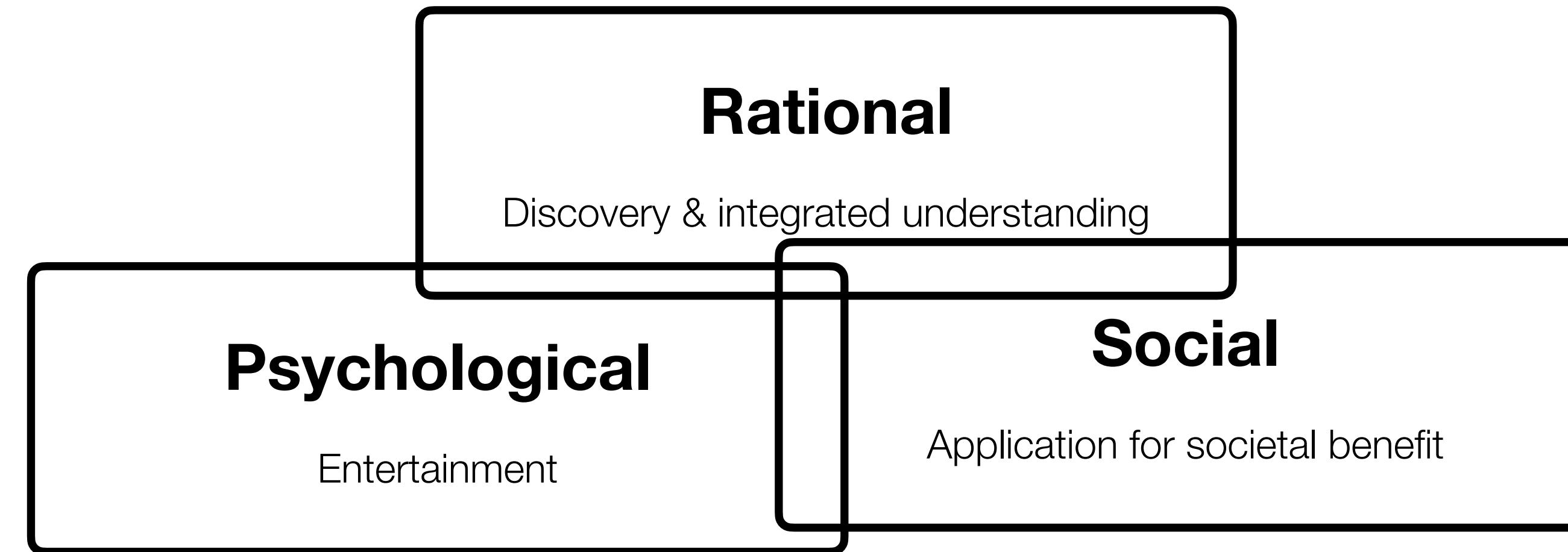
Discovery & integrated understanding

### Social

Application for societal benefit

# Functions of Science

Why do we do science

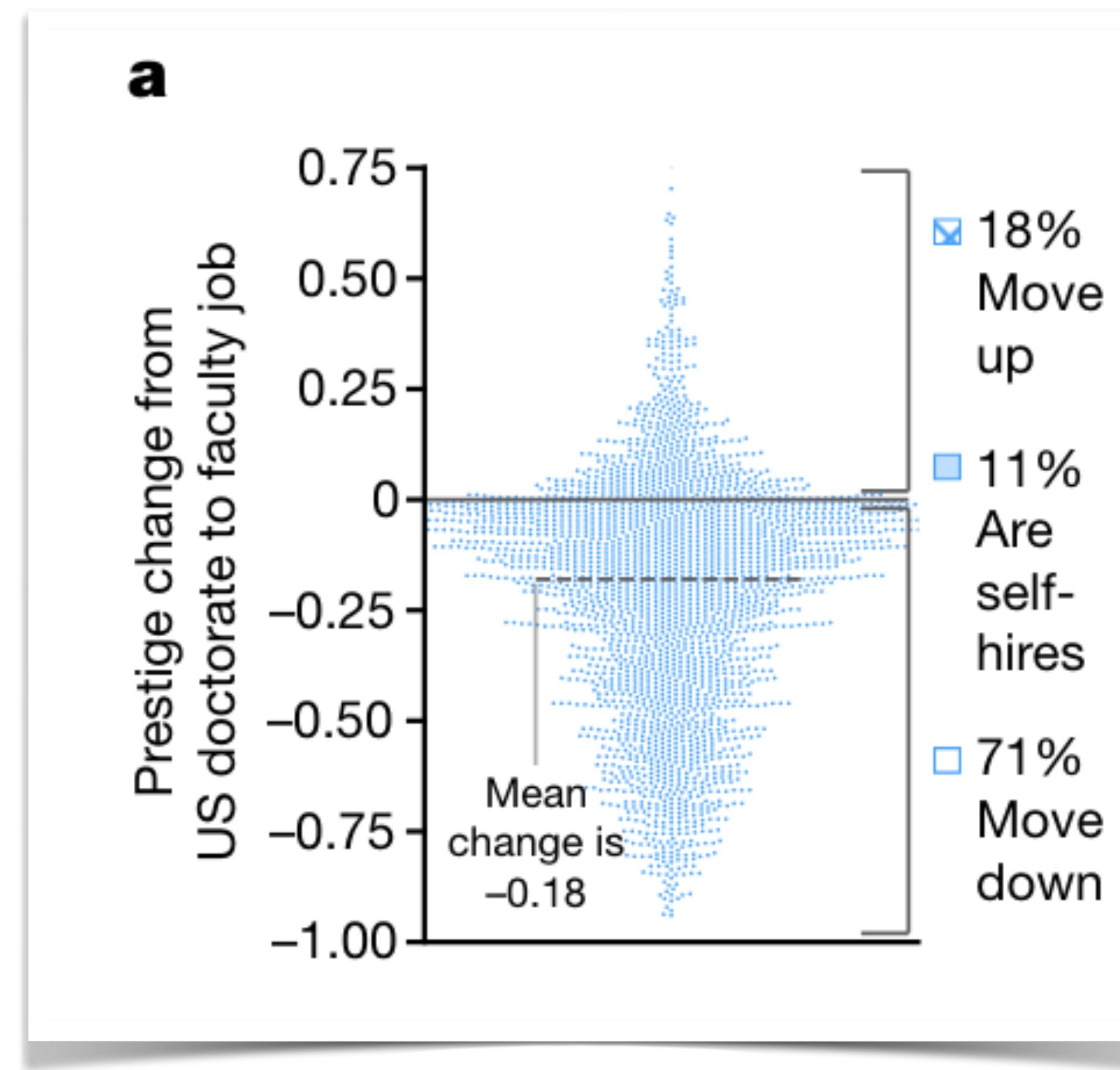


**How would we tell the difference?**

**How scientific are our beliefs about science?**

**Meta-science is the science of science**

# “Today, science is more meritocratic”



**Parents' education.** Faculty tend to come from highly educated families. Nearly a quarter (22.2%) report at least one of their parents holds a Ph.D., and 3.7% of faculty report both parents hold Ph.D.s. Across all eight disciplines, over half (51.8%) of faculty have at least one parent with a masters degree or Ph.D. (29.6% and 22.2%, respectively; Table 1). In comparison, among adults in the United States aligned to when faculty were born, on average, less than 1% held a Ph.D., and just 7.4% held a graduate degree of any kind.

We calculated the relative likelihood that a faculty member has a parent with a Ph.D., compared with either the US adult population or parents of Ph.D. recipients, by estimating upper and lower bounds. These bounds correspond to differences in whether these datasets described individuals (US Census and NSF SED) versus households. Across all eight fields, we estimate that faculty are on average between 12 and 25 times more likely to have a parent with a Ph.D. than the general population, and about twice as likely as other individuals who hold a Ph.D. (Fig. 1 and Supplementary Note C).

Combining these quantities, we estimate that the probability of becoming a faculty member given that one's parents hold a Ph.D.  $\text{Pr}(\text{faculty} | \text{Ph.D. Parent})$  is 9.5%, indicating a strong degree of both educational heritability and substantial professional advantage.

Morgan (2022) Socioeconomic roots of academic faculty

# Existing Mechanisms

To estimate credibility

## Funding bodies

Ensures quality & relevance

## Journals

Ensures quality

## Peer review

Ensures quality

Only roughly one third of psychology results replicate (OSC, 2015)

Journal prestige is not/negatively correlated with replicability (Brembs, 2018)

Failure to replicate doesn't greatly impact later citations of the original article (Arslan & Eleftheriadou, 2019)

Non-replicable work is cited more than replicable work (Serra-Garcia et al., 2021)

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There is little evidence that “science is self correcting”

(Vazire & Holcombe, 2022, *Where Are the Self-Correcting Mechanisms in Science?*)

Science is only self-correcting when we correct it (Vazire, 2020)

Scientific fraud can have a staggering death toll (Piper, 2024)

Scientific fraud is not a crime (Dal-Ré et al., 2020)

## Funding bodies

Ensures quality & relevance

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Ensures quality

**Southern Italy has one of the highest rate  
of 100+ years old people**

**Why?**

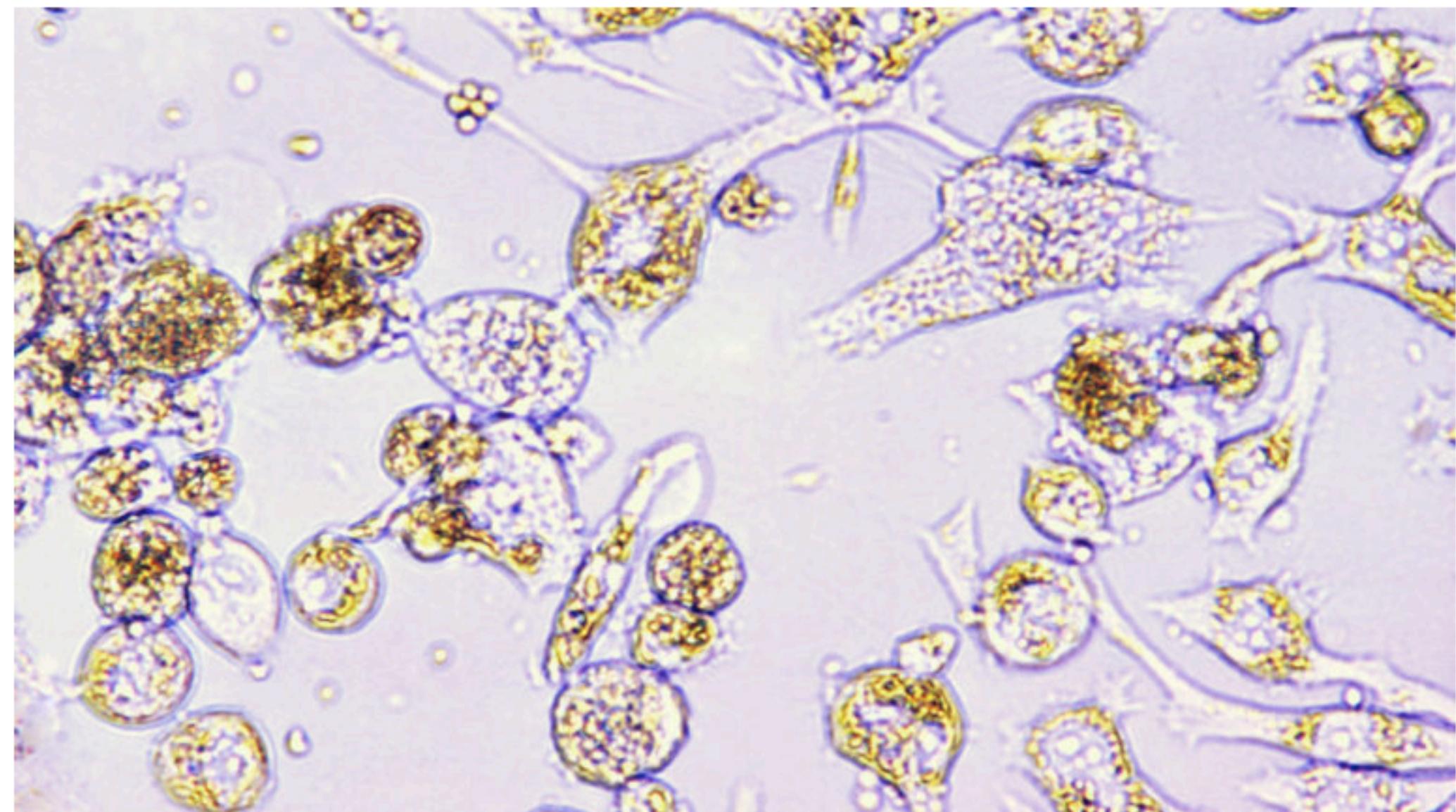
**“clerical errors and pension fraud”**

**Newman (2024)**

# Thousands of studies used the wrong cells, and journals are doing nothing

By [Ivan Oransky](#) and [Adam Marcus](#) July 21, 2016

[Reprints](#)



The so-called HeLa cells are a frequent contaminant in other laboratory cell lines.

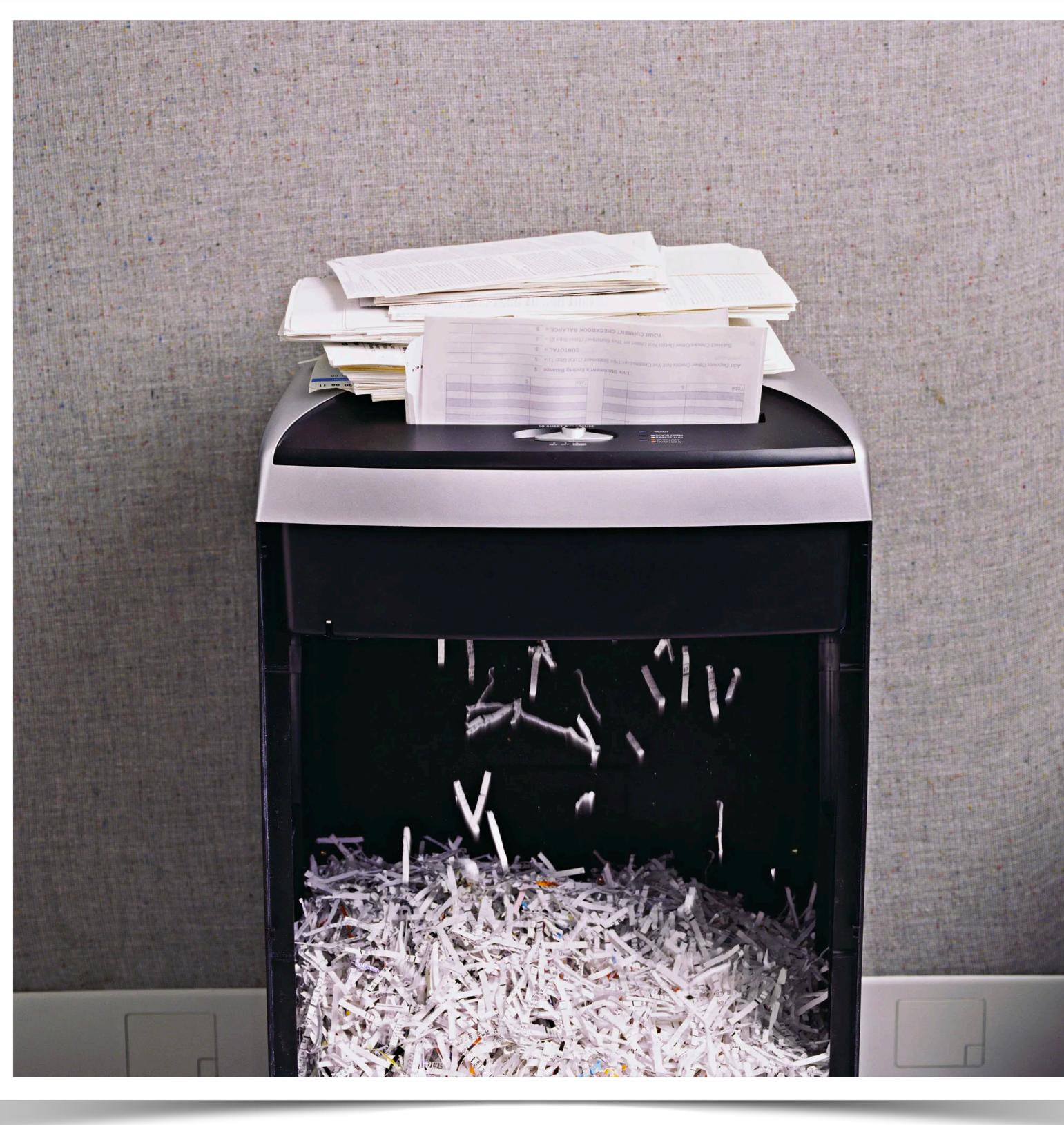
DR. A.J. SULZER/CDC

Lucey et al. (2009)

What you type	What you see	How Excel stores it
MARCH1	1-MAR	42430
SEPT2	2-SEP	42615

20% of genetics papers have errors  
due to Microsoft Excel  
Still prevalent today

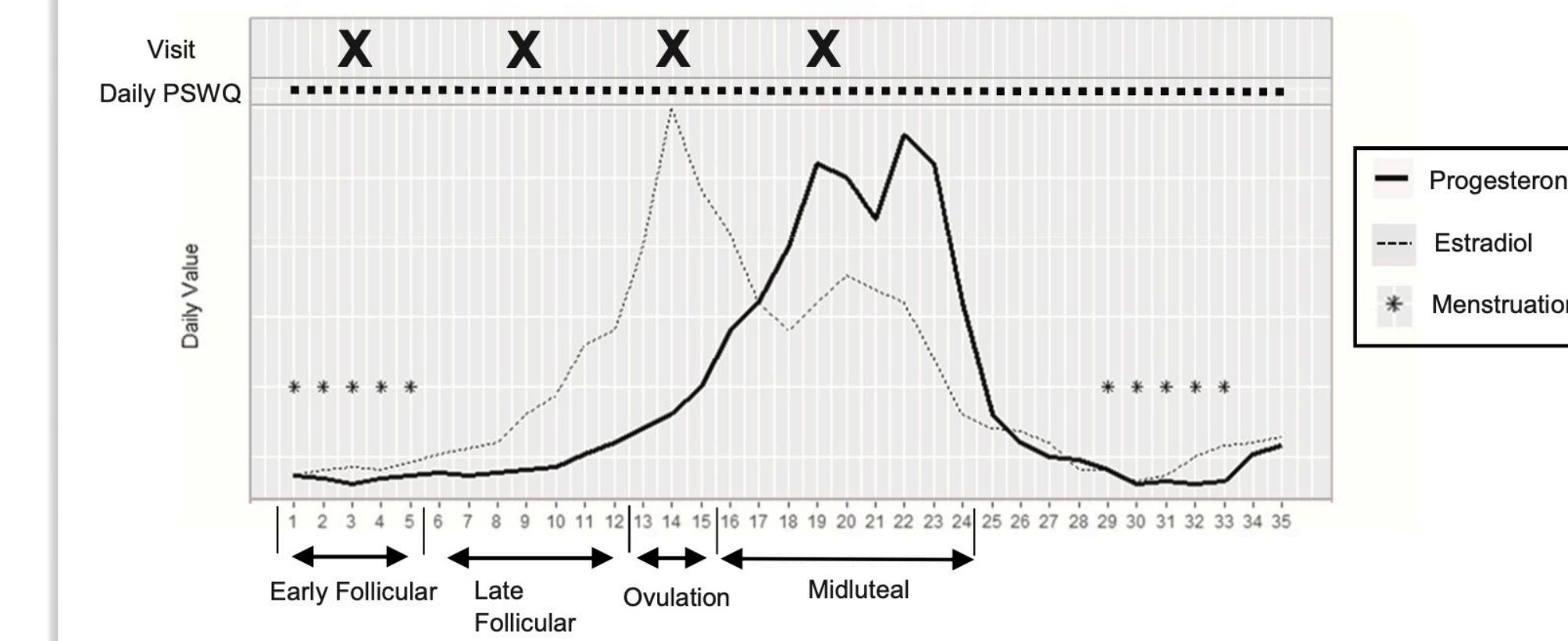
Zeeberg et al. (2004)



Dr. Ian Hussey

L.M. Gloe et al.

*Psychoneuroendocrinology* 131 (2021) 105285



**Fig. 1.** Illustration of study data collection across the menstrual cycle. Day 1 is the first day of menstruation. The Penn State Worry Questionnaire (PSWQ) was completed and saliva samples were collected every day for 35 days. The N-back task was completed at each of the four visits illustrated by X's above. For each participant, visits were scheduled to fall in different phases using menstrual cycle projection based on the length of the past three menstrual cycles. For the purposes of the current analysis, only estradiol, progesterone and PSWQ scores on the day of visits will be utilized.



# **“Approximately 1 in 7 Scientific Papers Are Fake”**

## **James Heathers (2024)**

# **How are our intuitions for non-credible research?**



**<https://80000hours.org/psychology-replication-quiz/>**

## The Critique Paradox

**If we have good intuitions for non-credible claims,  
why is that work published?**

## Time to assume that health research is fraudulent until proven otherwise?

July 5, 2021

Health research is based on trust. Health professionals and journal editors reading the results of a clinical trial assume that the trial happened and that the results were honestly reported. But about 20% of the time, said Ben Mol, professor of obstetrics and gynaecology at Monash Health, they would be wrong. As I've been concerned about research fraud for 40 years, I wasn't that surprised as many would be by this figure, but it led me to think that the time may have come to stop assuming that research actually happened and is honestly reported, and assume that the research is fraudulent until there is some evidence to support it having happened and been honestly reported. The Cochrane Collaboration, which purveys "trusted information," has now taken a step in that direction.



As he described in a webinar last week, Ian Roberts, professor of epidemiology at the London School of Hygiene & Tropical Medicine, began to have doubts about the honest reporting of trials after a colleague asked if he knew that his systematic review showing the mannitol halved death from head injury was based on trials that had never happened. He didn't, but he set about investigating the trials and confirmed that they hadn't ever happened. They all had a lead author who purported to come from an institution that didn't exist and who killed himself a few years later. The trials were all published in prestigious neurosurgery journals and had multiple co-authors. None of the co-authors had contributed patients to the trials, and some didn't know that they were co-authors until after the trials were published. When Roberts contacted one of the journals the editor responded that "I wouldn't trust the data." Why, Roberts wondered, did he publish the trial? None of the trials have been retracted.

Gelman's Law:

**Any sufficiently crappy research is  
indistinguishable from fraud.**

**In this class,  
we will treat all research as non-credible  
until proven otherwise**

**A few outsiders and weirdos saw the problems  
by doing something the others never thought to do:**

**They looked.**

# Assignment

StatCheck

## Read

- Heathers (2024) Approximately 1 in 7 Scientific Papers Are Fake
- Nuijten et al. (2015) The prevalence of statistical reporting errors in psychology
- Schmidt (2016) Sources of false positives and false negatives in the StatCheck algorithm

## Apply StatCheck

- You have been assigned three articles, they'll be shared with you via Slack
- Paste results to our shared Google Sheet
- More detailed instructions will be on Slack
- (Pass/fail assignment)

## Next week

- You will explain in class how statcheck works, and when it can fail, based on the above readings
- We will discuss your results

# Questions?