

# Welcome (Again!) to MATH 4100/COMP 5360 – Introduction to Data Science

## Data Science Ethics

February 20, 2025

While we are waiting for class to start, think  
about your answer to:

*What are ethics?*

# **What are ethics?**

# What are ethics?

- Shared principles and values that help us distinguish right from wrong.
- Cornerstone of civilization
- The basis for the rules we all voluntarily choose to follow for the betterment of all of us.

# Example: We don't steal due to our ethics.

- Even if we can get away with it!



Adapted from Dr. H.V. Jagadish Data Science Ethics at Future Learn  
Image from <https://openclipart.org/image/2000px/313728>

# Ethics are not Laws

Is it **legal** for me to lie to you?

Is it **ethical**?

# Ethics are not Laws

Is it **legal** for me to lie to you?

Is it **ethical**?

- Just because something is legal, does not mean it is ethical.
- Just because something is ethical, does not mean it is legal.

**Ethics are something you have to  
decide for yourself.**

**Ethics are something you have to  
decide for yourself.**

**...but often policies follow agreed  
upon ethics.**

# Abuses of human subjects in biomedical research led to modern codes of research ethics

Nazi experimentation on WWII concentration camp prisoners.

- Nuremberg Code
- Declaration of Helsinki



Image from  
[http://broughttolife.sciencemuseum.org.uk/broughttolife/techniques/  
nurembergcode](http://broughttolife.sciencemuseum.org.uk/broughttolife/techniques/nurembergcode)

# Abuses of human subjects in biomedical research led to modern codes of research ethics

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USA, Tuskegee Study of Untreated Syphilis in Black Men

- National Commission for the Protection of Human Subjects of Biomedical & Behavior Research
- Belmont report

# When did these experiments come to an end?



**Nuremberg hearings on Nazi concentration camp experiments**

Image from

<http://broughttolife.sciencemuseum.org.uk/broughttolife/techniques/nurembergcode>



**Tuskegee Study of Untreated Syphilis in Black Men**

[https://en.wikipedia.org/wiki/Tuskegee\\_syphilis\\_experiment#/media/File:Tuskegee-syphilis-study\\_doctor-injecting-subject.jpg](https://en.wikipedia.org/wiki/Tuskegee_syphilis_experiment#/media/File:Tuskegee-syphilis-study_doctor-injecting-subject.jpg)

# Abuses of human subjects in biomedical research led to modern codes of research ethics

Nazi experimentation on WWII concentration camp prisoners.

- Nuremberg Code (1947)
- Declaration of Helsinki (1964)

USA, Tuskegee Study of Untreated Syphilis in Black Men

- National Commission for the Protection of Human Subjects of Biomedical & Behavior Research (1974)
- Belmont report (1979)

**“But we’re data scientists.”**

**“We’re not doing medical experiments”**

**“But we’re data scientists.”**

**“We’re not doing medical experiments”**

**There are risks beyond medical experiments.**

# Social science research also shown to carry risks of harm

- Milgram's Obedience to Authority study



Adapted from CITI Program, Image from  
<http://content.time.com/time/health/article/0,8599,1867735,00.html>

## Public Announcement

**WE WILL PAY YOU \$4.00 FOR  
ONE HOUR OF YOUR TIME**

### **Persons Needed for a Study of Memory**

\*We will pay five hundred New Haven men to help us complete a scientific study of memory and learning. The study is being done at Yale University.

\*Each person who participates will be paid \$4.00 (plus 50c carfare) for approximately 1 hour's time. We need you for only one hour: there are no further obligations. You may choose the time you would like to come (evenings, weekdays, or weekends).

\*No special training, education, or experience is needed. We want:

Factory workers	Businessmen	Construction workers
City employees	Clerks	Salespeople
Laborers	Professional people	White-collar workers
Barbers	Telephone workers	Others

All persons must be between the ages of 20 and 50. High school and college students cannot be used.

\*If you meet these qualifications, fill out the coupon below and mail it now to Professor Stanley Milgram, Department of Psychology, Yale University, New Haven. You will be notified later of the specific time and place of the study. We reserve the right to decline any application.

\*You will be paid \$4.00 (plus 50c carfare) as soon as you arrive at the laboratory.

TO:

PROF. STANLEY MILGRAM, DEPARTMENT OF PSYCHOLOGY,  
YALE UNIVERSITY, NEW HAVEN, CONN. I want to take part in  
this study of memory and learning. I am between the ages of 20 and  
50. I will be paid \$4.00 (plus 50c carfare) if I participate.

NAME (Please Print) .....

ADDRESS .....

TELEPHONE NO. .... Best time to call you .....

AGE ..... OCCUPATION ..... SEX .....

CAN YOU COME:

WEEKDAYS ..... EVENINGS ..... WEEKENDS .....

# Social science research also shown to carry risks of harm

- Milgram's Obedience to Authority study (1961)
- Zimbardo's Stanford Prison experiment (1971)



Adapted from CITI Program, image from

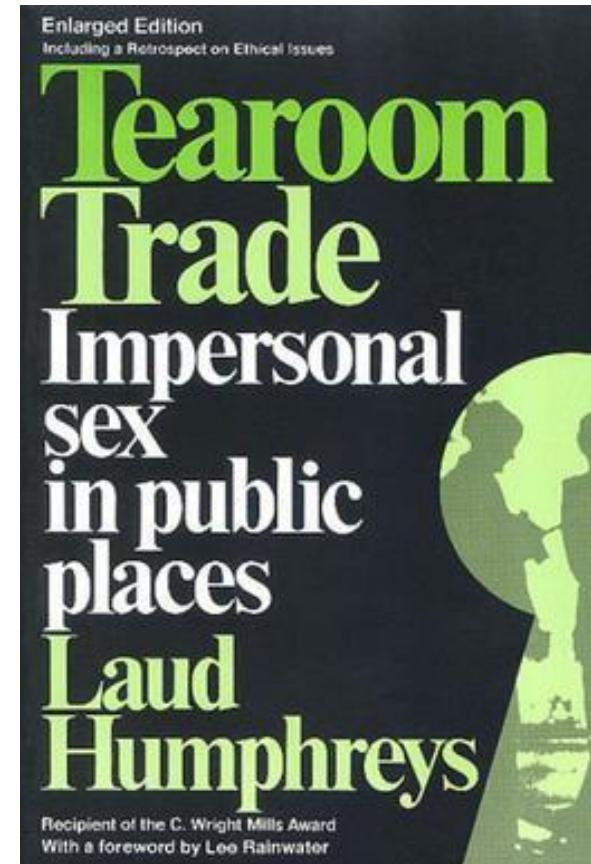
<https://www.insidehighered.com/news/2018/06/20/new-stanford-prison-experiment-revelations-question-findings>

# Social science research also shown to carry risks of harm

- Milgram's Obedience to Authority study (1961)
- Zimbardo's Stanford Prison experiment (1971)
- Humphreys' Tearoom Trade study (1970)

Risks:

- Psychological well-being
- Privacy
- Autonomy
- Reputation



# “Tastes, Ties, and Time” Study

THE CHRONICLE OF HIGHER EDUCATION NEWS OPINION AD

≡ SECTIONS FEATURED: The Latest on the Coronavirus and Higher Ed Supporting Students Through a Stressful Transition

TECHNOLOGY f t e m p 73

## Harvard Researchers Accused of Breaching Students' Privacy

Social-network project shows promise and peril of doing social science online



Collected data about students, matching Facebook data and university records.

Dataset was released publicly with names removed.

➤ However, it was not difficult to de-anonymize.

Students were not informed of this study.

**Would you be comfortable with this?**

**What if it was your internet search history?**

Adapted from CITI Program, “Five Ethical Provocations in HCI Research” (Brown et al. 2016), & <https://www.chronicle.com/article/Harvards-Privacy-Meltdown/128166>

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## Harvard Researchers Accused of Breaching Students' Privacy

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Collected data about students, matching Facebook data and university records.

- Student workers helped collect the Facebook data, some of whom may have privileged access to Harvard-only groups and settings

Dataset was released publicly with names removed.

- However, it was not difficult to de-anonymize.

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# Who owns data? Who controls data?

theverge.com/2023/1/17/23558516/ai-art-copyright-stable-diffusion-getty-images-lawsuit

**Getty Images is suing the creators of AI art tool Stable Diffusion for scraping its content** / Getty Images claims Stability AI ‘unlawfully’ scraped millions of images from its site. It’s a significant escalation in the developing legal battles between generative AI firms and content creators.

→ C



https://www.npr.org/2025/01/14/nx-s1-5258952/new-york-times-openai-m

BUSINESS

## 'The New York Times' takes OpenAI to court. ChatGPT's future could be on the line

UPDATED JANUARY 14, 2025 · 4:27 PM ET ⓘ



Bobby Allyn



JAMES VINCENT

17, 2023, 3:30 AM MST | ☰



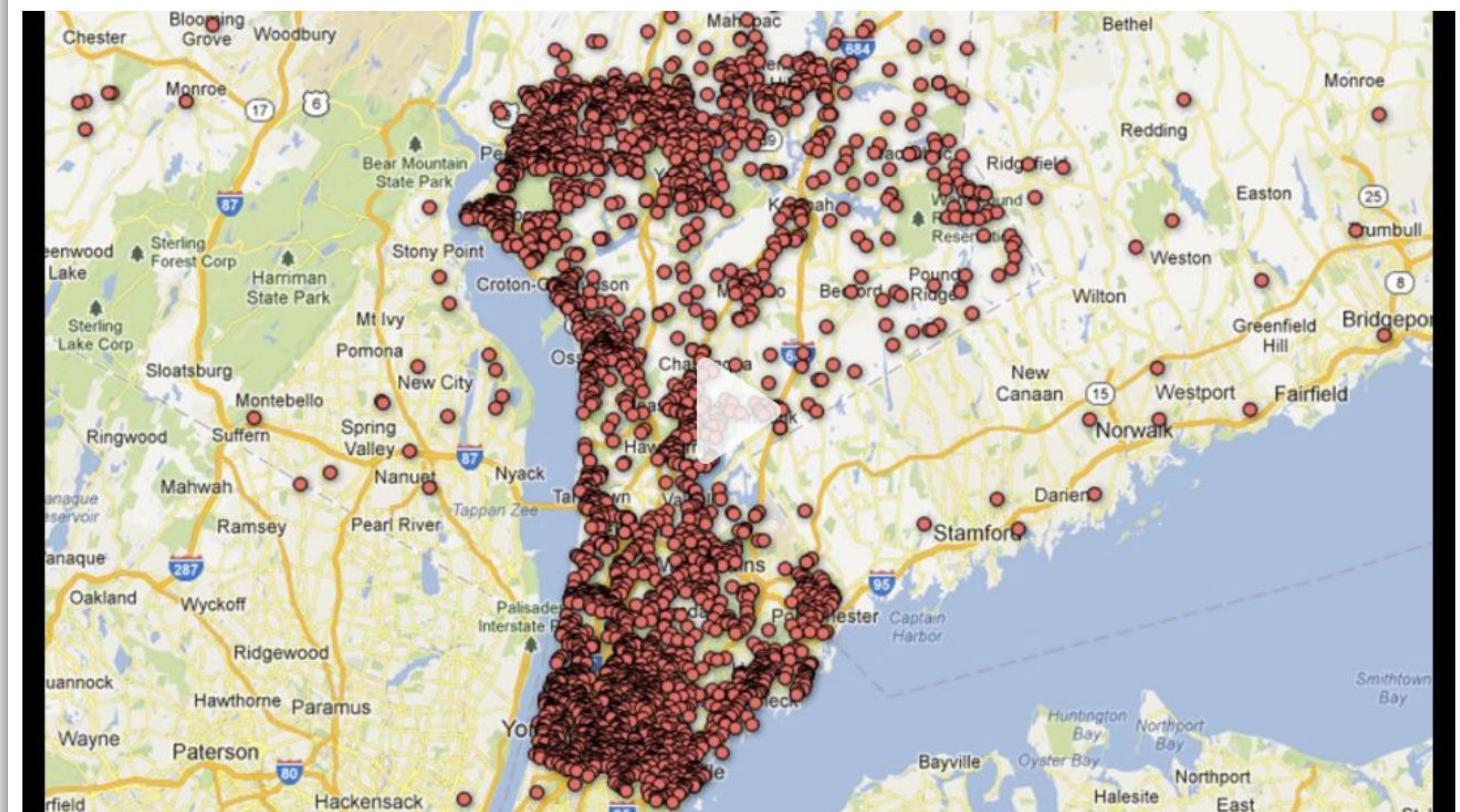
# Who owns data? Who controls data?

## What's private?

## Newspaper sparks outrage for publishing names, addresses of gun permit holders

KC Maas and Josh Levs, CNN

Updated 10:23 AM EST, Thu December 27, 2012



Newspaper's gun permit map causes outcry

Video Ad Feedback

02:40 - Source: [CNN](#)

# Is Facebook purposefully making you sad?

Facebook experiment biased shown posts to be either more positive or more negative to see how users would react.

Is this “just an A/B test”?



TECHNOLOGY

## ***Facebook Tinkers With Users’ Emotions in News Feed Experiment, Stirring Outcry***

By VINDU GOEL JUNE 29, 2014



Facebook revealed that it had altered the news feeds of over half a million users in its study. Karen Bleier/Agence France-Presse — Getty Images

To [Facebook](#), we are all lab rats.

Facebook routinely adjusts its users’ news feeds — testing out the number of ads they see or the size of photos that appear — often without their knowledge. It is all for the purpose, the company says, of creating a more alluring and useful product.

But last week, Facebook revealed

that it had manipulated the news feeds of over half a million randomly selected users to change the number of positive and negative posts they saw. It was part of a psychological study to

# Ethical Principles in Human Subjects Research

The Belmont Report put forth three key principles:

- Respect for persons
- Beneficence
- Justice



# Respect for Persons

*“individuals should be treated as autonomous agents, and second, that persons with diminished autonomy are entitled to protection”*

- **Autonomy** means people must be able to make informed decisions about their actions and well-being.
- Participation in research should be **Voluntary at all times**.
- **Informed Consent** is the process by which people exercise their autonomy to volunteer to participate.
- Included in the informed consent should be notification of any risks or harm that could occur.

# Beneficence

*Beneficence is an obligation to not only protect participants from harm, but “maximize possible benefits and minimize possible harms.”*

Common risks in non-medical research can include:

- Psychological distress
- Fatigue
- Loss of privacy
- Reputational harm

# Justice

*Justice is an obligation that those who bear the burdens of the research should not differ from those who receive the benefits.*

Historically, often the poor participated in the experiments while the rich received the rewards.

Similarly, prisoners have been used as subjects with no hope of receiving the rewards.

# Research experiments with human subjects require ethical review

Research organizations, like the University of Utah, have **Institutional Review Boards (IRB)** which must approve of proposed research before it can go forward.



The IRB considers the **balance** of respect for persons, beneficence, and justice when making their determination.

- Review includes informed consent documents
- Harms and benefits included in application
- Handling of personally identifiable information (privacy) also considered.

**IRB approval **does not** mean an experiment is ethical.**

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**Lack of IRB approval **does not** mean an experiment is unethical.**

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*IRB approval indicates to the scientific community that a panel of experts found the experiment to be consistent with ethical standards.*

# IRB approval does not mean an experiment is ethical.

The New York Times

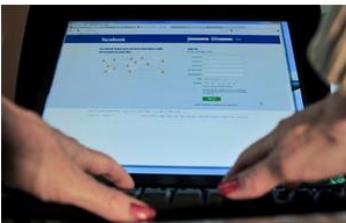
LOG IN

TECHNOLOGY

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216



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Facebook revealed that it had altered the news feeds of over half a million users in its study. Karen Bleier/Agence France-Presse — Getty Images

*This allegedly had IRB approval at one point...*

# But...

*Is Facebook trying to make you sad?*

IRB only consulted after experiment was run.  
Unclear if consent was in terms of service.

- Is consent in terms of service informed consent?

TECHNOLOGY

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# Some initial concerns...

The following issues are frequent:

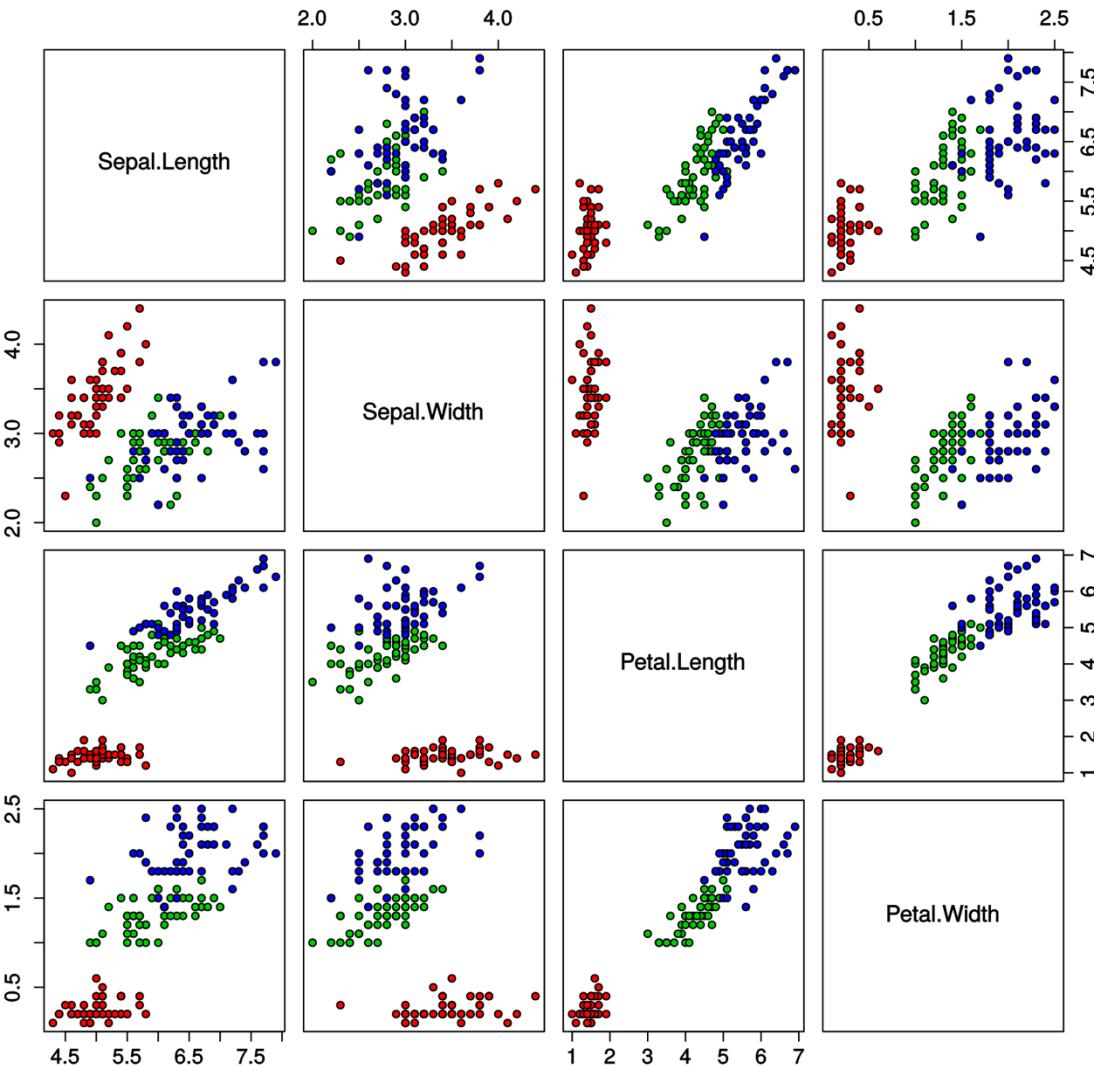
- Privacy, particularly in light of personalization & social media.
- Informed consent and volunteering
- Psychological well-being
  - With personal data or in special settings (e.g., medical apps & devices)
  - Frustration, Fatigue, Discovering you are color blind
- Applicability across cultural and demographic groups

# **Data Science and Societal Consequence**

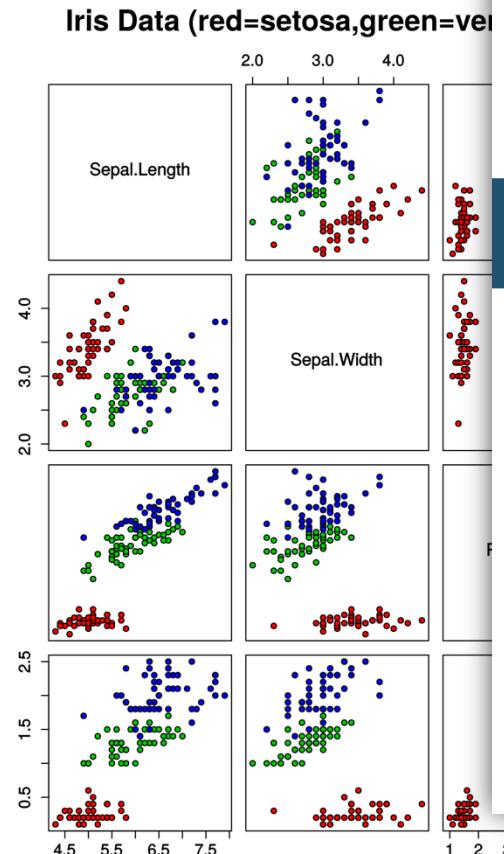
# Show of hands: How many of you are familiar with the Iris dataset?



Iris Data (red=setosa,green=versicolor,blue=virginica)



# Do you know where Fisher's iris data set was initially published?



Annals of Eugenics / Volume 7, Issue 2 / p. 179-188

Free Access

## THE USE OF MULTIPLE MEASUREMENTS IN TAXONOMIC PROBLEMS

R. A. FISHER Sc.D., F.R.S.

First published: September 1936

<https://doi.org/10.1111/j.1469-1809.1936.tb02137.x>

Citations: 8,332

About

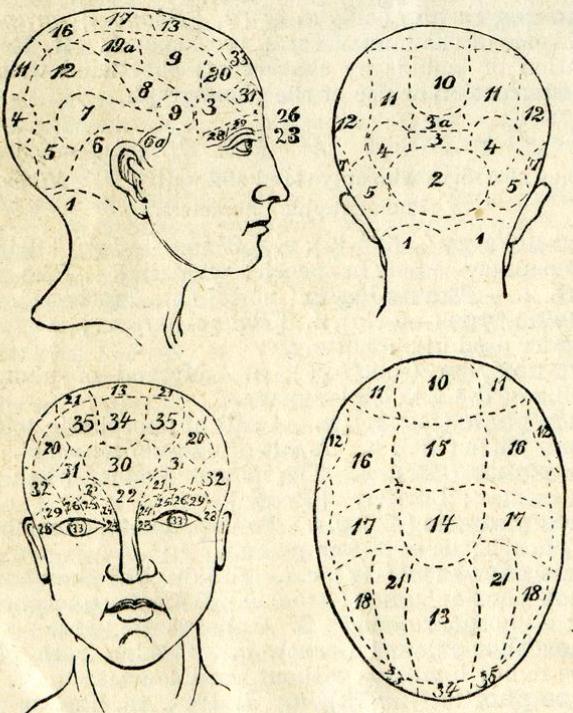


## Abstract

The articles published by the Annals of Eugenics (1925–1954) have been made available online as an historical archive intended for scholarly use. The work of eugenicists was often pervaded by prejudice against racial, ethnic and disabled groups. The online publication of this material for scholarly research purposes is not an endorsement of those views nor a promotion of eugenics in any way.

# Phrenology, 1895

**Phren'ol'o-gy** (-nōl'ō-jē), *n.* [Gr. φρήν, φρενός + -logy.] **1.** Science of the special functions of the several parts of the brain, or of the supposed connection between the faculties of the mind and organs in the brain. **2.** Physiological hypothesis that mental faculties, and traits of character, are shown on the surface of the head or skull; craniology. — **Phren'ol'o-gist**, *n.* — **Phren'ol'o-log'ic** (frēn'ō-lōj'ik), **Phren'ol'o-log'ic-al**, *a.*



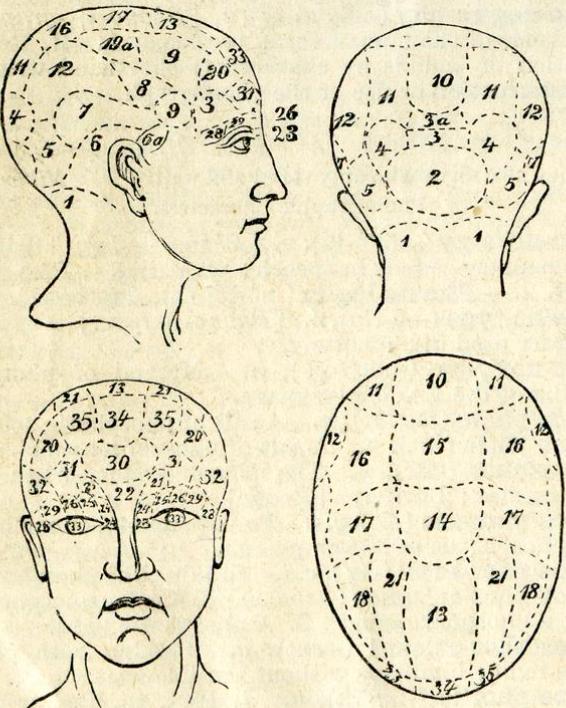
A Chart of Phrenology.

- 1** Amativeness ; **2** Philoprogenitiveness ; **3** Concentrateness ; **3 a** Inhabitiveness ; **4** Adhesiveness ; **5** Combativeness ; **6** Destructiveness ; **6 a** Alimentiveness ; **7** Secretiveness ; **8** Acquisitiveness ; **9** Constructiveness ; **10** Self-esteem ; **11** Love of Approval ; **12** Cautiousness ; **13** Benevolence ; **14** Veneration ; **15** Firmness ; **16** Conscientiousness ; **17** Hope ; **18** Wonder ; **19** Ideality ; **19 a** (Not determined) ; **20** Wit ; **21** Imitation ; **22** Individuality ; **23** Form ; **24** Size ; **25** Weight ; **26** Coloring ; **27** Locality ; **28** Number ; **29** Order ; **30** Eventuality ; **31** Time ; **32** Tune ; **33** Language ; **34** Comparison ; **35** Causality. [Some raise the number of organs to forty-three.]

It's all too easy to torture  
the data to say what one  
wants it to say

# Phrenology, 2016

**Phren/o-gy** (-nōl'ō-jē), *n.* [Gr. φρήν, φρενός + -logy.] **1.** Science of the special functions of the several parts of the brain, or of the supposed connection between the faculties of the mind and organs in the brain. **2.** Physiological hypothesis that mental faculties, and traits of character, are shown on the surface of the head or skull; craniology. — **Phren/o-gist**, *n.* — **Phren/o-log'ic** (frēn'ō-lōj'ik), **Phren/o-log'ic-al**, *a.*



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arXiv:1611.04135v2 [cs.CV] 21 Nov 2016

## Automated Inference on Criminality using Face Images

Xiaolin Wu

McMaster University

Shanghai Jiao Tong University

xwu510@gmail.com

Xi Zhang

Shanghai Jiao Tong University

zhangxi\_19930818@sjtu.edu.cn

### Abstract

We study, for the first time, automated inference on criminality based solely on still face images, which can remove any biases of subjective judgments of human criminality. Via supervised machine learning, we build four classifiers (logistic regression, KNN, SVM, CNN) using face images of 1856 real persons controlled for race, gender, age, and facial expressions, nearly half of whom were identified as criminals, for discriminating between criminals and non-criminals. All four classifiers perform consistently well, empirically establish the validity of automated face-based inference on criminality, despite the historical controversies surrounding this line of enquiry. Also, some distinguishing structural features for predicting criminality are found by machine learning. Above all, the most interesting discovery of this research is that criminal and non-criminal faces populate two quite distinctive manifolds, whose variation among criminal faces is significantly greater than that of the non-criminal faces. The two manifolds of criminal and non-criminal faces appear to be non-overlapping, with the criminal manifold lying in a higher-dimensional space, with a smaller span, exhibiting a law of "normative" faces of criminals. In other words, the faces of criminals have a greater degree of resemblance compared with the faces of non-criminals, or criminals have a higher degree of dissimilarity in facial appearance than non-criminals.



(a) Three samples in criminal ID photo set  $S_c$ .



(b) Three samples in non-criminal ID photo set  $S_n$ .

Figure 1. Sample ID photos in our data set.

of static face images [55]. This method can synthesize a representative (average) face image for a set of input face images scored closely on any of the four aforementioned social percepts. The ranking of these synthesized face im-

**Data Science allows us to discriminate so  
much faster now.**

# Is it okay for employers to do an internet search on interviewees?

## Google Targeted Advertising – Name Search

Ad related to latanya sweeney ⓘ

[\*\*Latanya Sweeney Truth\*\*](#)

[www.instantcheckmate.com/](http://www.instantcheckmate.com/)

Looking for Latanya Sweeney? Check Latanya Sweeney's Arrests.

Ads by Google

[\*\*Latanya Sweeney, Arrested?\*\*](#)

1) Enter Name and State. 2) Access Full Background Checks Instantly.

[www.instantcheckmate.com/](http://www.instantcheckmate.com/)

[\*\*Latanya Sweeney\*\*](#)

Public Records Found For: Latanya Sweeney. View Now.

[www.publicrecords.com/](http://www.publicrecords.com/)

[\*\*La Tanya\*\*](#)

Search for La Tanya Look Up Fast Results now!

[www.ask.com/La+Tanya](http://www.ask.com/La+Tanya)

Ads by Google

[\*\*Kirsten Lindquist\*\*](#)

Get Kirsten Lindquist Find Kirsten Lindquist

[www.ask.com/Kirsten+Lindquist](http://www.ask.com/Kirsten+Lindquist)

[\*\*We Found:Kristen Lindquist\*\*](#)

1) Contact Kristen Lindquist - Free Info! 2) Current Phone, Address & More.

[www.peoplesmart.com/](http://www.peoplesmart.com/)

[Search by Phone](#)

[Background Checks](#)

[Public Records](#)

[Search by Email](#)

[Search by Address](#)

[Criminal Records](#)

[\*\*Kristen Lindquist\*\*](#)

Public Records Found For: Kristen Lindquist. View Now.

[www.publicrecords.com/](http://www.publicrecords.com/)

# instantcheckmate.com advertised for Latanya, not Kirsten, but...

**LATANYA SWEENEY**  
1420 Centre Ave  
Pittsburgh, PA 15219  
DOB: Oct 27, 1959 (53 years old)

**Personal**  
Name, aliases, birthdate, phone numbers, etc.

**Location**  
Detailed address history and related data, maps, etc.

**Related Persons**  
Known family members, business associates, roommates, etc.

**Marriage / Divorce**  
Marriage and divorce records on file...

**Criminal History**  
Arrest records, speeding tickets, mugshots, etc.

**Licenses**  
FAA licenses, DEA licenses, Other Licenses, etc.

**Sex Offenders**  
Sex offenders living near Latanya Sweeney's primary location.

**Possible Matching Arrest Records**

Name	County and State	Offenses	View Details
No matching arrest records were found.			

Rate This Content:

**CERTIFIED**

**KRISTEN LINDQUIST**  
730 Hawthorne Ln  
Charlotte, NC 28204  
DOB: Nov 30, 1984 (28 years old)

**Personal**  
Name, aliases, birthdate, phone numbers, etc.

**Location**  
Detailed address history and related data, maps, etc.

**Related Persons**  
Known family members, business associates, roommates, etc.

**Marriage / Divorce**  
Marriage and divorce records on file...

**Criminal History**  
Arrest records, speeding tickets, mugshots, etc.

**Licenses**  
FAA licenses, DEA licenses, Other Licenses, etc.

**Sex Offenders**  
Sex offenders living near Kristen Lindquist's primary location.

**Possible Matching Arrest Records**

Name	County and State	Offenses	View Details
1 Kristen Marie Lindquist	Individual NC courts	Criminal/traffic	<a href="#">View Details</a>
2 Kristen Marie Lindquist	NC Admin Office of Courts demographic criminal	Criminal/traffic	<a href="#">View Details</a>
3 Kristen Marie Lindquist	NC Admin Office of Courts demographic criminal	Criminal/traffic	<a href="#">View Details</a>

Rate This Content:

**CERTIFIED**



# Who is Latanya Sweeney?

The images on the previous slides are from her paper “Discrimination in Online Ad Delivery”

HOME / FACULTY PROFILES / LATANYA SWEENEY



**Daniel Paul Professor of the Practice of Government and Technology, HKS and FAS**

Contact: [Email](#)

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617-998-1726

[Profile](#)

[Selected Publications](#)

[Sponsored Projects](#)

[Outside Professional Activities](#)

**Latanya Sweeney** is the Daniel Paul Professor of the Practice of Government and Technology at the Harvard Kennedy School and in the Harvard Faculty of Arts and Sciences, director and founder of the [Public Interest Tech Lab](#), Editor-in-Chief of [Technology Science](#), director and founder of the [Data Privacy Lab](#), former Chief Technology Officer at the U.S. Federal Trade Commission and Distinguished Career Professor of Computer Science, Technology and Policy at Carnegie Mellon University, Latanya Sweeney has 3 patents, more than [100 academic publications](#), pioneered the field known as data privacy, launched the emerging area known as algorithmic fairness, and was first to present technology challenges in U.S. elections. Her work is explicitly cited in two U.S. regulations.



# But once we know about the problem, surely...

c cnn.com/2009/TECH/12/22/hp.webcams/index.html

## HP looking into claim webcams can't see black people

By Mallory Simon, CNN

December 23, 2009 7:25 p.m. EST



A YouTube video shows co-workers trying out an HP webcam with motion-tracking and facial recognition software.

**(CNN)** -- Can Hewlett-Packard's motion-tracking webcams see black people? It's a question posed on a now-viral YouTube video and the company says it's looking into it.

In the video, two co-workers take turns in front of the camera -- the webcam appears to follow Wanda Zamen as she sways in front of the screen and stays still as Desi Cryer moves about.

HP acknowledged in a statement e-mailed to CNN that the cameras may have issues with contrast recognition in certain lighting situations. The webcams, built into HP's new computers, are supposed to keep people's faces and bodies in proportion and centered on the screen as they move.

The video went viral over the weekend, garnering more than 400,000 YouTube page views and a slew of comments on Twitter.

It was something neither Zamen nor Cryer expected to happen.

### STORY HIGHLIGHTS

- NEW:** Video was meant to be humorous showing of software glitch, co-workers say

- Co-workers: Motion-tracking webcam moves with white woman, not black man

- "I think my blackness is interfering with the computer's ability to follow me," user says

# 11 years...

c cnn.com/2009/TECH/12/22/hp.webcams/index.html

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### Opinion

## Software that monitors students during tests perpetuates inequality and violates their privacy

The coronavirus pandemic created a surge in demand for exam proctoring tools. Here's why universities should stop using them.

by Shea Swauger

August 7, 2020



# 11 years...

c cnn.com/2009/TECH/12/22/hp.webcams/index.html

## HP locks black students out of tests

oppression like racism and sexism. Now these same biases are showing up in test proctoring software that disproportionately hurts marginalized students.

By Mallory Sims  
December 23, 2009



A YouTube video with motion-tracking software.

### STORY HIGHLIGHTS

- NEW: Video was a humorous show about a glitch, co-workers

- Co-workers: Motion-tracking webcam moves with white woman, not black man

- "I think my blackness is interfering with the computer's ability to follow me," user says

A Black woman at my university once told me that whenever she used Proctorio's test proctoring software, it always prompted her to shine more light on her face. The software couldn't validate her identity and she was denied access to tests so often that she had to go to her professor to make other arrangements. Her white peers never had this problem.

Similar kinds of discrimination can happen if a student is

tracking your skin tone. But if you're not a white person, it's even more likely to happen.

The video went viral over the weekend, garnering more than 400,000 YouTube page views and a slew of comments on Twitter.

It was something neither Zamen nor Cryer expected to happen.

Opinion

## That monitors students during tests creates inequality and violates their privacy

The pandemic created a surge in demand for exam proctoring tools. Here's why we should stop using them.

August 7, 2020



# 12 years...



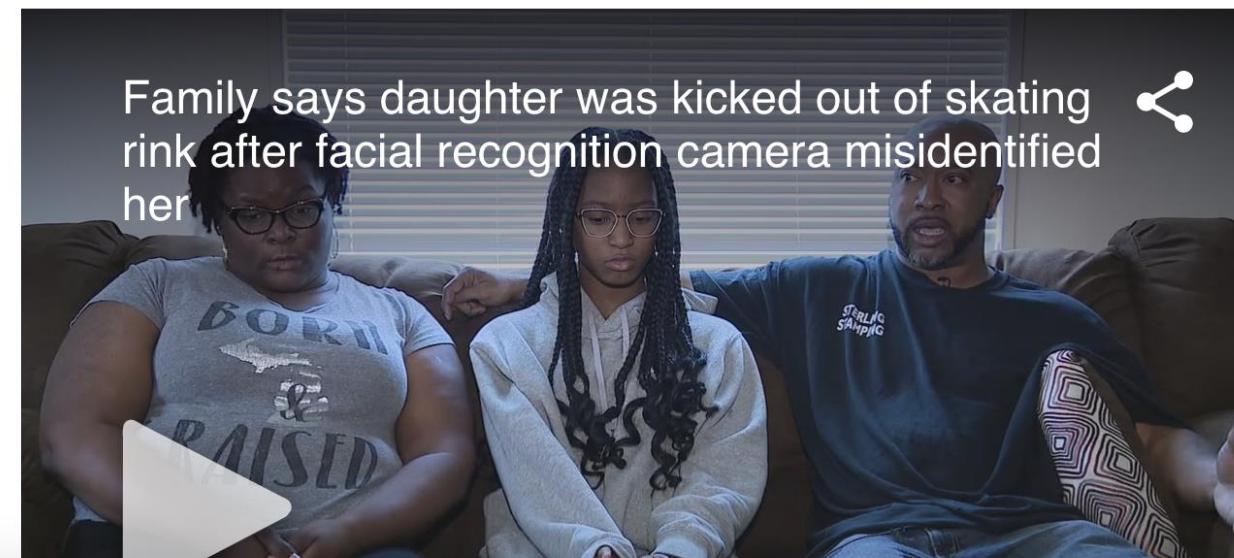
## HP looks at black oppression like racism showing up in test disproportionately

By Mallory Sims  
December 23, 2009



**FOX 2** - A local roller skating rink is coming under fire for its use of facial recognition software after a teenager was banned for allegedly getting into a brawl there.

"To me, it's basically racial profiling," said the girl's mother Juliea Robinson. "You're just saying every young Black, brown girl with glasses fits the profile and that's not right."



## STORY HIGHLIGHTS

- **NEW:** Video watch: Humorous show glitch, co-worker

- Co-workers: Motion-tracking webcam moves with white woman, not black man

- "I think my blackness is interfering with the computer's ability to follow me," user says

Similar kinds of discrimination are disproportionately

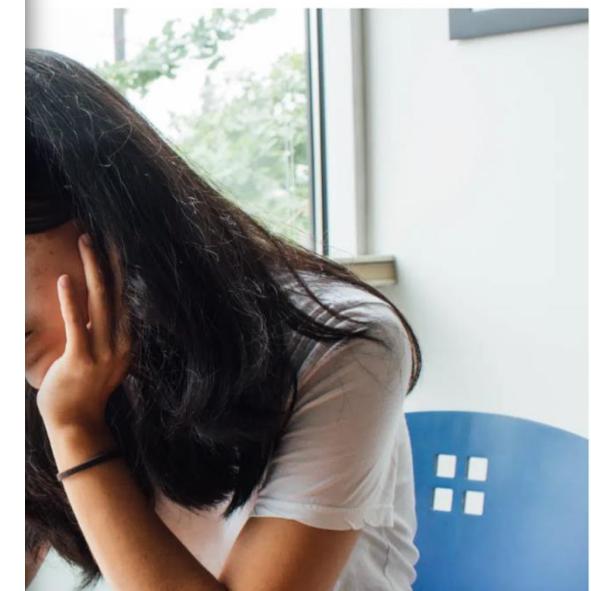
The video went viral on YouTube page via

It was something

## Students during tests violates their privacy

Demand for exam proctoring tools. Here's why

August 7, 2020



# 14 years...

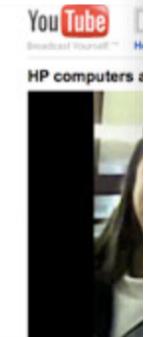
cnn.com/2009/TECH/12/22/hp.w...

## HP local black... oppression like racism showing up in test disproportionately

By Mallory Sims December 23, 2009

A Black woman at a roller skating rink says she used Proctorio's facial recognition software after a teenager was banned from the rink.

"To me, it's basically racial profiling," she says. "It's just saying every young Black, black person is bad."



A YouTube video with motion-tracking

### STORY HIGHLIGHTS

- NEW: Video was a humorous show about a glitch, co-workers say

- Co-workers: Motion-tracking webcam moves with white woman, not black man

- "I think my blackness is interfering with the computer's ability to follow me," user says

Similar kinds of dis...

transparency and...

The video went v...

It was something

FOX 2 DETROIT

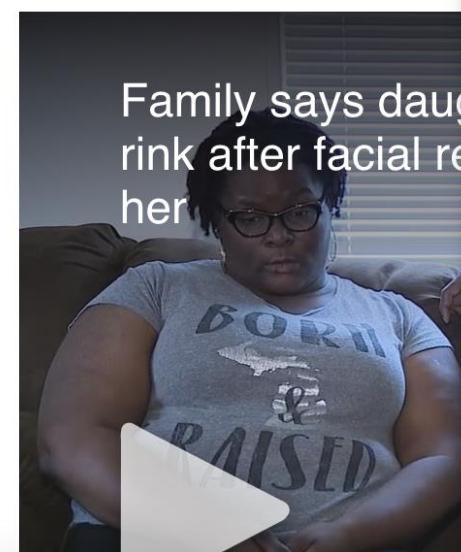
## Black teen kicked out of roller skating rink after facial recognition

By Randy Wimbley and David Komer online | Crime and Public Safety | FOX 2 Detroit



FOX 2 - A local roller skating rink has been using facial recognition software after a teenager was banned from the rink.

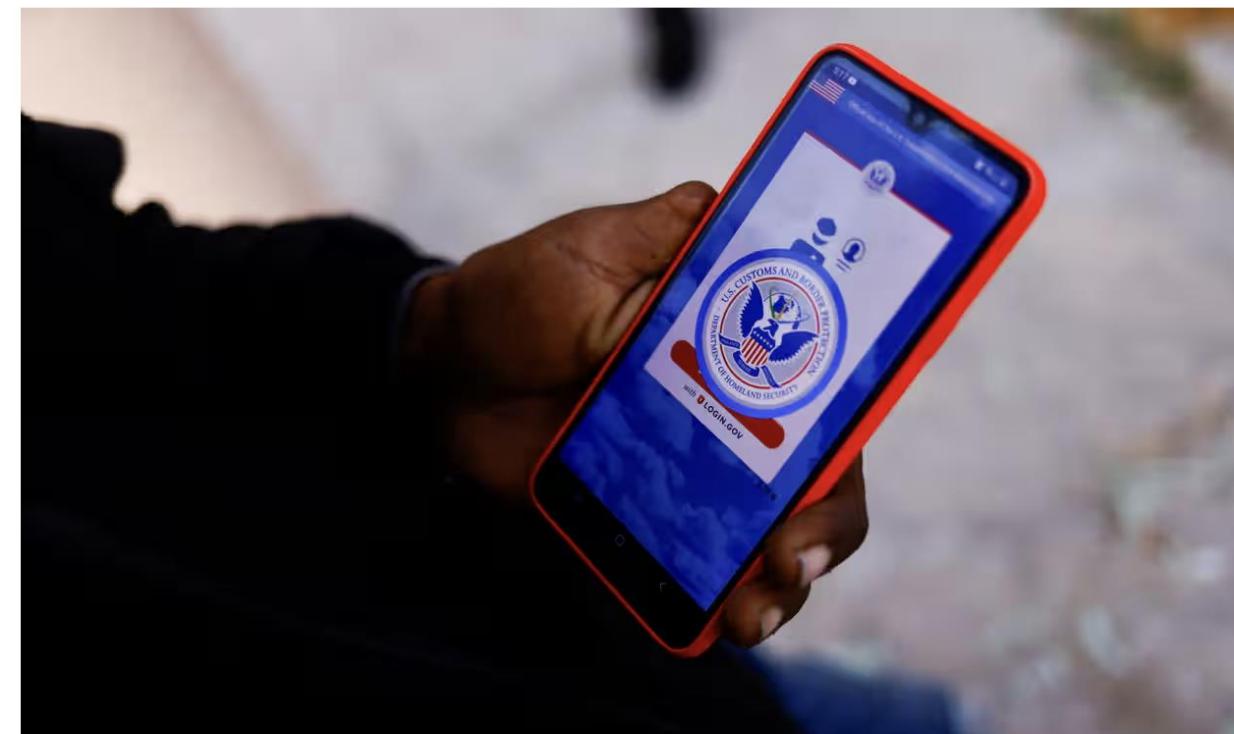
"To me, it's basically racial profiling," she says. "It's just saying every young Black, black person is bad."



the guardian.com/us-news/2023/feb/08/us-immigration-cbp-one-ap...

# Facial recognition bias frustrates Black asylum applicants to US, advocates say

Migrants from Africa and Haiti reportedly cannot utilize app to accept their photos, which is now required to apply for asylum



A migrant from Venezuela seeking asylum in the US uses his phone to access the CBP One application. Photograph: José Luis González/Reuters

**Melissa del Bosque in Tucson**

Wed 8 Feb 2023 06.00 EST

15 years...

**FOX 2**  
DETROIT

Black teen kicke

C



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Technology

By M  
Dece

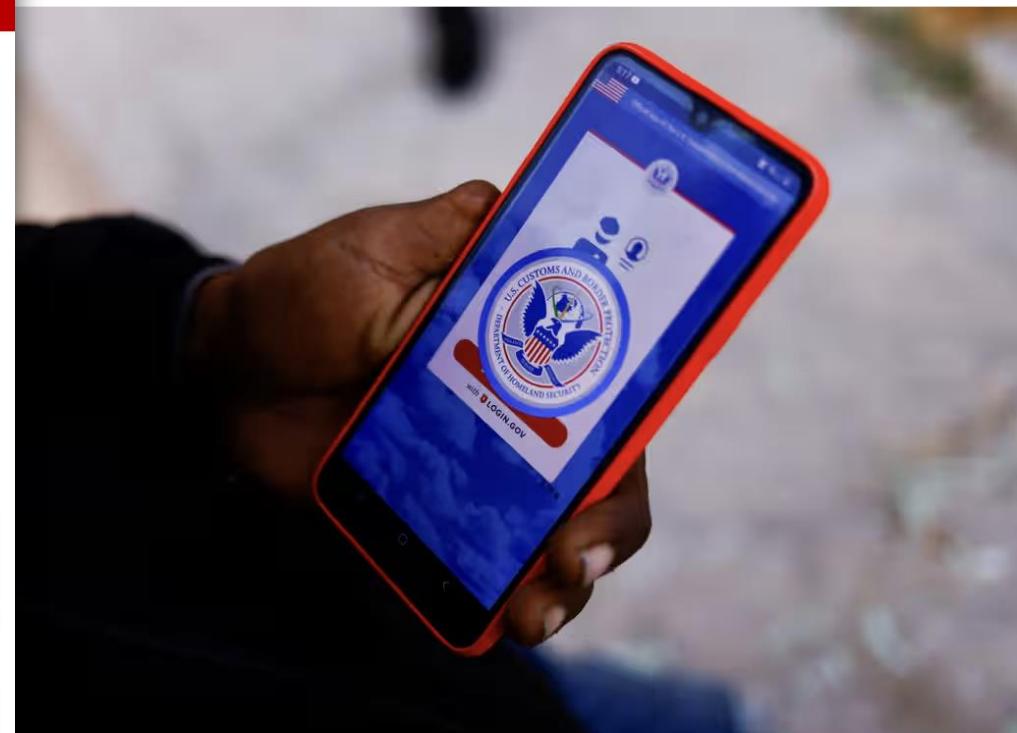
# Payout for Uber Eats driver over face scan bias case

26 March 2024



## Facial recognition bias frustrates Black asylum applicants to US, advocates say

om Africa and Haiti reportedly cannot utilize  
ot their photos, which is now required to apply



n Venezuela seeking asylum in the US uses his phone to access the CBP One  
ograph: José Luis González/Reuters

[Rosque in Tucson](#)

00 EST

15 years...

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DETROIT

Black teen kicke

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Technology

By M  
Dece

## Payout for Uber Eats driver over scan bias case

26 March 2024



CBC

Top Stories Local Climate World Canada Politics Indigenous

Canada

## How a New Jersey man was wrongly arrested through facial recognition tech now in use in Ontario

Peel, York police recently announced they were implementing Idemia's facial recognition system



Thomas Daigle · CBC News · Posted: Jun 13, 2024 2:00 AM MDT | Last Updated: June 14, 2024





Andreas Mueller

@amuellerml



Follow

Gender neutral pronouns get translated to gender stereotypes by Google translate #FATML

The screenshot shows two separate instances of the Google Translate interface. In the top instance, the input is "o bir doktor" (a doctor) and the output is "he is a doctor". In the bottom instance, the input is "o bir hemşire" (a nurse) and the output is "she is a nurse". Both results are displayed in light blue boxes with edit icons and a green checkmark.



AI predictions for 2019 from Yann LeCun, Hilary Mason, Andrew Ng, and Rumman Chowdhury [wp.me/p8wLEc-ahoT](https://wp.me/p8wLEc-ahoT) by @kharijohnson



AI predictions for 2019 from Yann LeCun, Hilary Mason, Andrew Ng, and Rum...

VentureBeat spoke with Google Brain cofounder Andrew Ng, Fast Forward Labs founder Hilary Mason, Facebook AI Research founder Yann LeCun, and ...

venturebeat.com



**Tony "Abolish (Pol)ICE" Arcieri**   
@bascule



Trying a horrible experiment...

Which will the Twitter algorithm pick: Mitch McConnell or Barack Obama?



The tweet on the experiment with the faces of Mitch McConnell and Barack Obama combined on a long stretching original that requires cropping.



Rumman  
Chowdhury

[@ruchowdh](#)

Director, Twitter META

Only on Twitter

[@Twitter](#)

[#OnlyOnTwitter](#)

# Sharing learnings about our image cropping algorithm

By [Rumman Chowdhury](#)

Wednesday, 19 May 2021

In [October](#) 2020, we held our [image cropping algorithm](#). As part of our [commitment](#) that we'd analyze our models over time, our teams have been assessing algorithms for potential bias and understanding of whether there was a problem at hand. Today we're sharing our assessment and a link to [reproducing](#) our analysis.

Here's what we found:

- In comparisons of men and women, there was an 8% difference from demographic parity in favor of women.
- In comparisons of black and white individuals, there was a 4% difference from demographic parity in favor of white individuals.
- In comparisons of black and white women, there was a 7% difference from demographic parity in favor of white women.
- In comparisons of black and white men, there was a 2% difference from demographic parity in favor of white men.



Rumman  
Chowdhury

@ruchowdh

Director, Twitter ML Engineering

Only on Twitter

@Twitter

#OnlyOnTwitter

Insights

# Sharing learnings about our image cropping algorithm

By [Rumman Chowdhury](#)

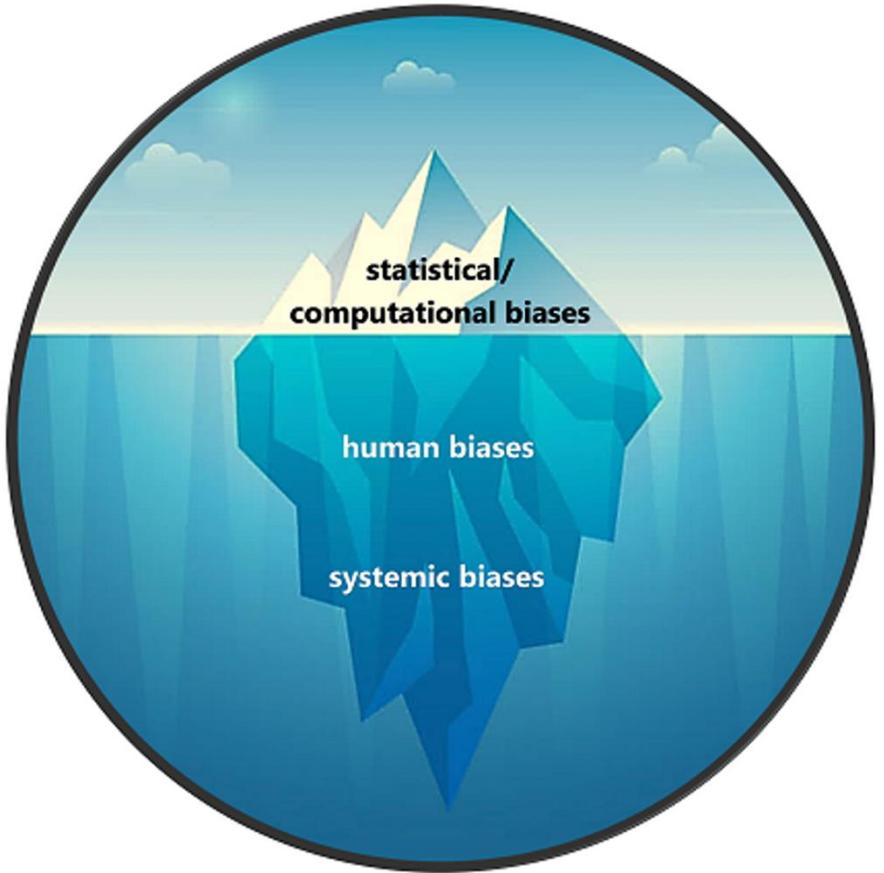
## Twitter's world-class ML Ethics, Transparency and Accountability (META) team was fired when Elon Musk bought the company

- In comparisons of men and women, there was an 8% difference from demographic parity in favor of white men.
- In comparisons of black and white individuals, there was a 4% difference from demographic parity in favor of white individuals.
- In comparisons of black and white women, there was a 7% difference from demographic parity in favor of white women.
- In comparisons of black and white men, there was a 2% difference from demographic parity in favor of white men.

# Is data enough?



*"Better than an answer—I have a tremendous amount of data."*



**Fig. 1.** The challenge of managing AI bias

**It's dangerous (but easy) to assume your data represents the whole story.**

**Your data has bias.**

# Data often isn't an accurate sample of the population we generalize the results to...

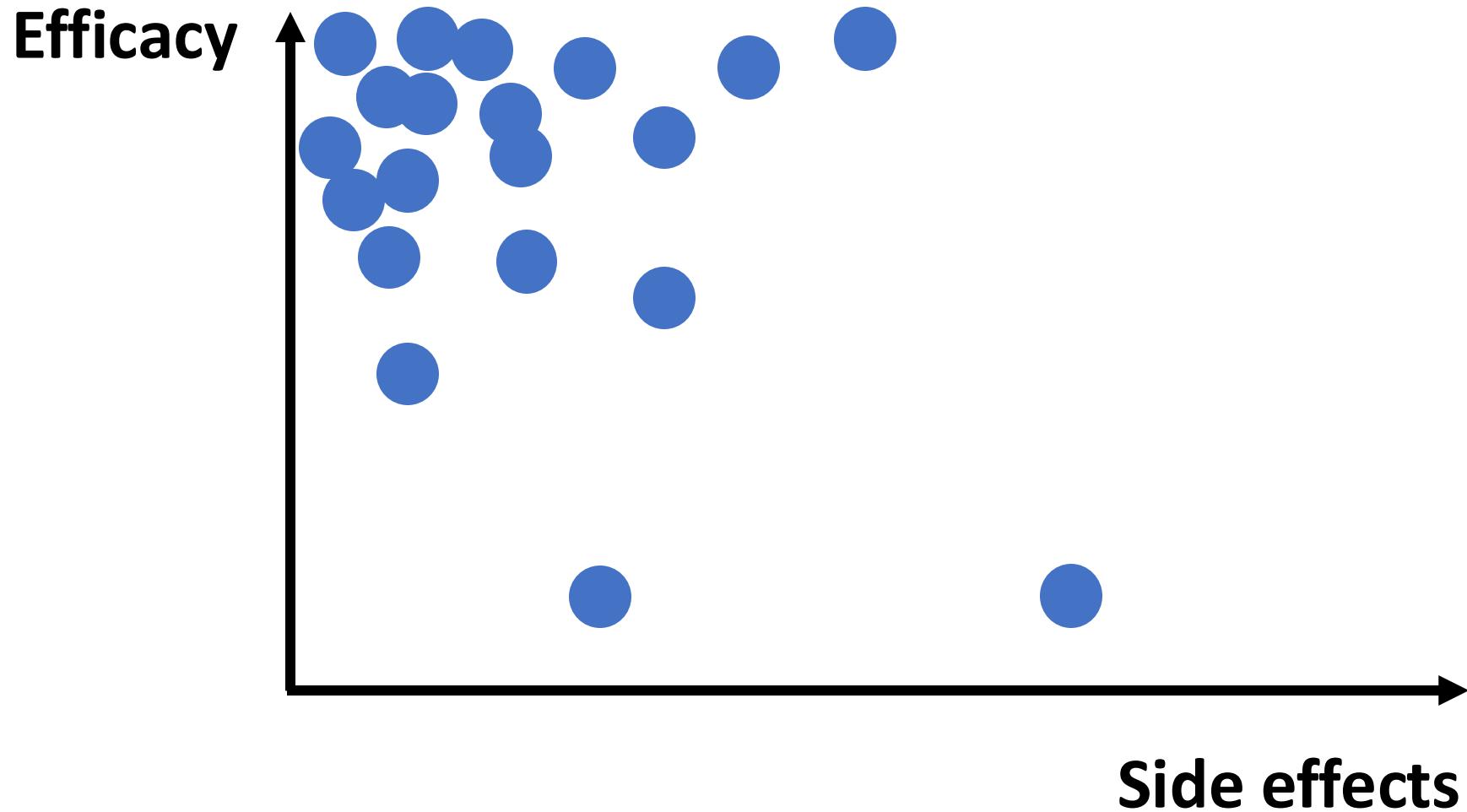
Many medical studies greatly restrict participants.

This article talks about not including females due to different hormonal factors making them “suboptimal” for study.

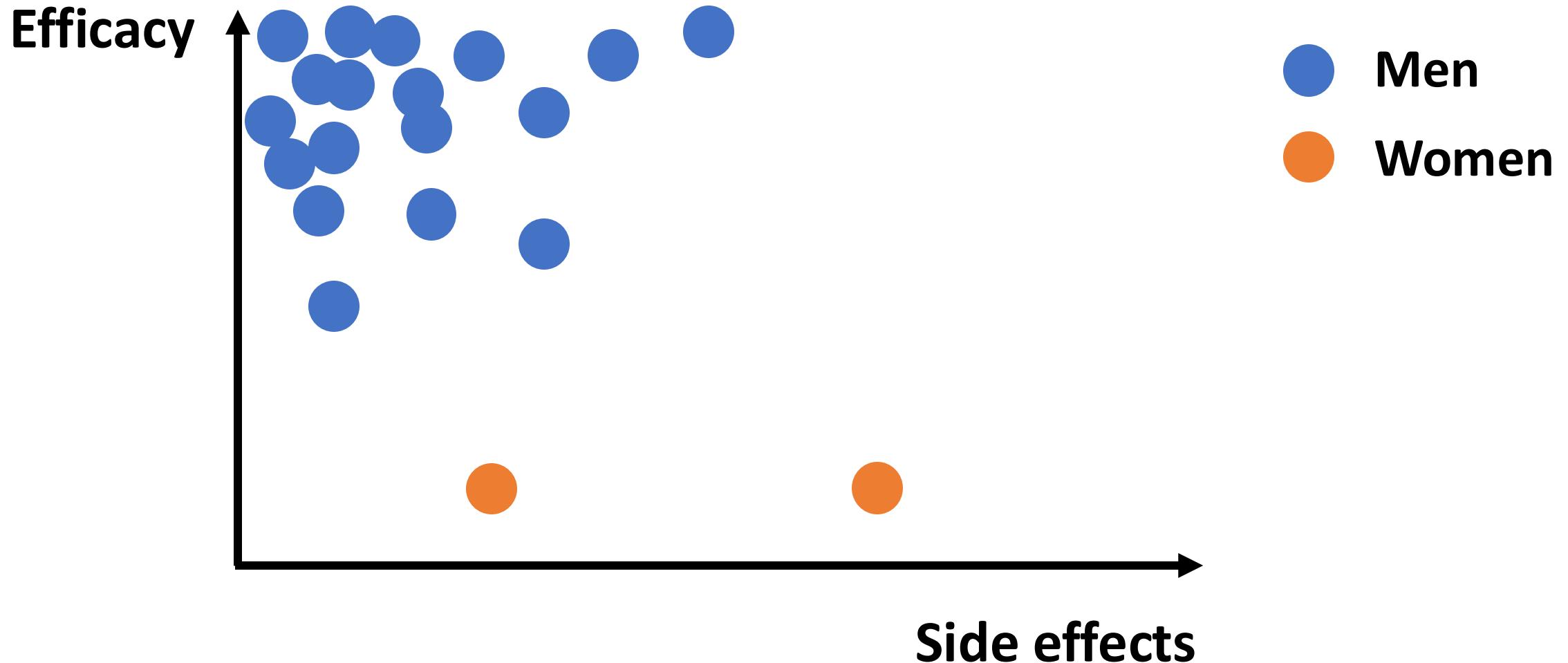
Women have mainly been excluded from studies in pharmacology. This manifests in the exclusion of subject sex in the data parameters/summary and lack of separate analyses between male and female data. Possible dangers of sex exclusion within pharmacological studies include disproportionate burden of adverse side effects and a lack of drug educational materials, all of which call for increased discussion, accountability and regulation within research.

Researchers mention the female reproductive cycle and hormone differences as potential reasons for the lack of female experimentation in pharmacological studies. During the stages of [menopause](#), women experience changes in reproductive hormones (mainly estrogen) and physical state, which is perceived by researchers as a [change in baseline conditions](#) and increased difficulty for accurate study. Additionally, [at least 26.1% of women aged 15-49 in the United States from 2015 to 2017 were using some form of hormonal birth control](#), which disrupts natural hormone levels in those women. The most popular form of birth control, the oral contraceptive pill, [contains and releases estrogen and/or progestin](#) to prevent pregnancies. Thus, women using hormonal contraception may also be classified as suboptimal for study, similar to menopausal women.

# The drug works great for 90% of the people!



# The drug works great for 90% of the people!

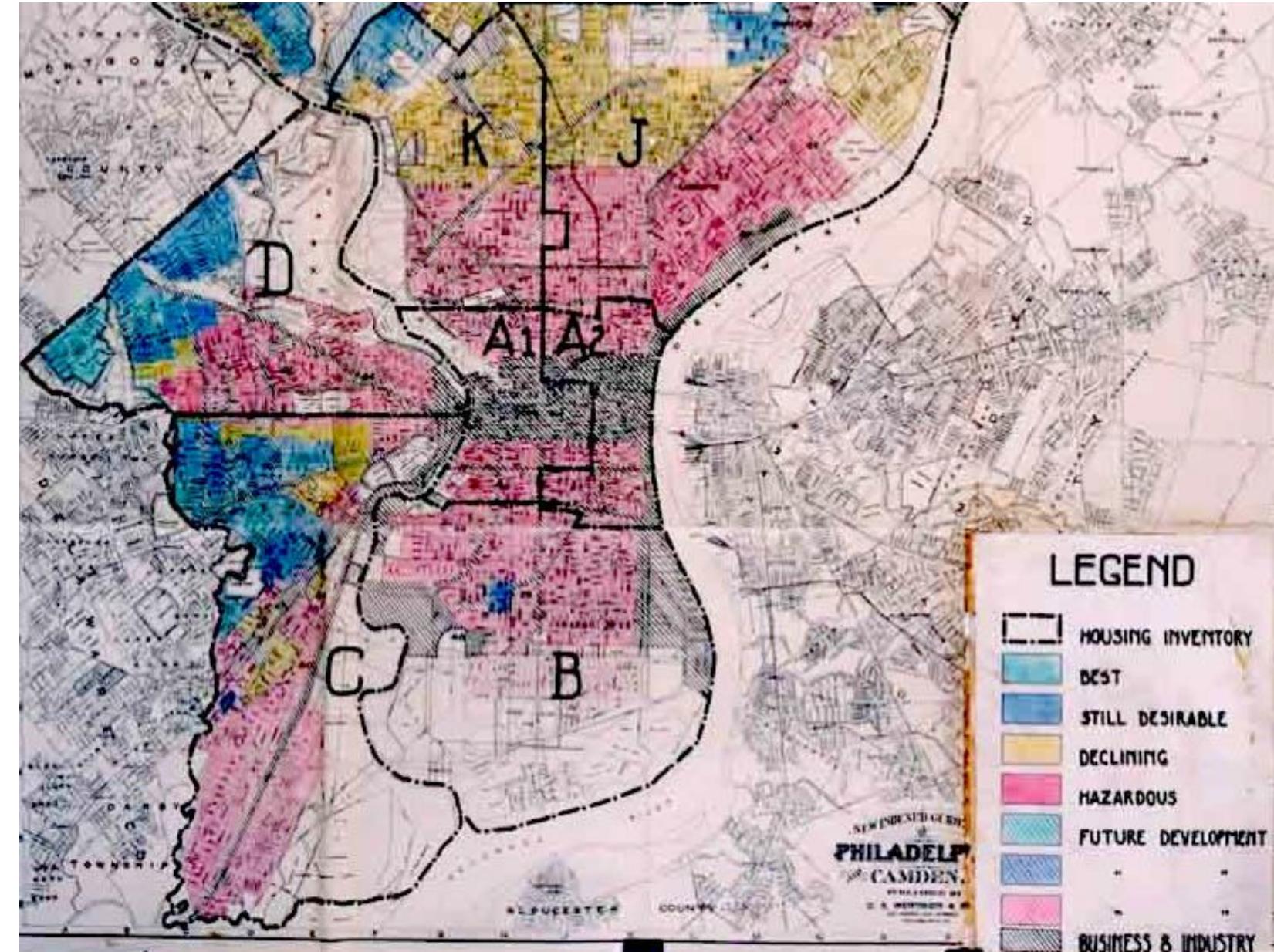


Attributes can proxy.

## Redlining

Rather than directly discriminate on race, banks discriminated based on location.

The result was the same.



World

## Insight - Amazon scraps secret AI recruiting tool that showed bias against women

By Jeffrey Dastin

October 10, 2018 6:50 PM MDT · Updated 5 years ago

Aa



SAN FRANCISCO (Reuters) - Amazon.com Inc's mac

uncovered a big problem: their new recruiting engine did not like women.

The team had been building computer programs sin  
resumes with the aim of mechanizing the search for  
with the effort told Reuters.

Automation has been key to Amazon's e-commerce  
warehouses or driving pricing decisions. The compar  
artificial intelligence to give job candidates scores ranging from one to five stars -  
much like shoppers rate products on Amazon, some of the people said.

But by 2015, the company realized its new system was not rating candidates for software developer jobs and other technical posts in a gender-neutral way.

That is because Amazon's computer models were trained to vet applicants by observing patterns in resumes submitted to the company over a 10-year period. Most came from men, a reflection of male dominance across the tech industry. (For a graphic on gender breakdowns in tech, see: [tmsnrt.rs/2OfPWoD](https://tmsnrt.rs/2OfPWoD))

In effect, Amazon's system taught itself that male candidates were preferable. It penalized resumes that included the word "women's," as in "women's chess club captain." And it downgraded graduates of two all-women's colleges, according to people familiar with the matter. They did not specify the names of the schools.

August 23, 2023 | GT ALERT

# EEOC Secures First Workplace Artificial Intelligence Settlement

Related Professionals

Lily M. McNulty

Capabilities

Artificial Intelligence | Labor &amp; Employment | Workplace

Offices

Compliance &amp; Counseling

Phoenix

On Aug. 9, 2023, a tutoring company agreed to pay \$365,000 to settle an artificial intelligence (AI) lawsuit with the Equal Employment Opportunity Commission (EEOC). The settlement comes on the heels of multiple EEOC warnings to employers about potential discrimination associated with the use of AI for hiring and workplace decisions.

According to the EEOC's complaint against iTutorGroup, the Company programmed its application review software to automatically reject female applicants aged 55 or older and male applicants aged 60 or older. One rejected applicant realized they may have been the victim of discrimination when, after resubmitting an application with a more recent birth date but which was otherwise identical to the rejected application, they were offered an interview.

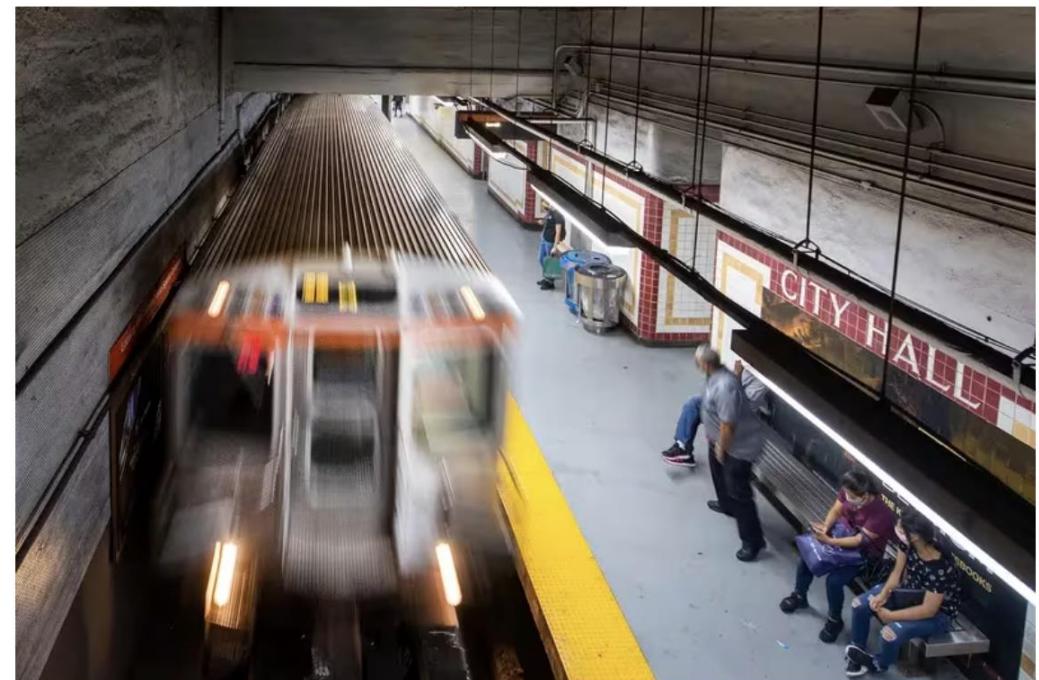
In its [press release](#), EEOC Chair Charlotte A. Burrows wrote, "Even when technology automates the discrimination, the employer is still responsible ... This case is an example of why the

OPINION &gt; COMMENTARY



## Will SEPTA's new artificial intelligence security system racially profile riders?

Some of the analytical features used for the ZeroEyes algorithm could be inherently related to race and socioeconomic status, including skin color and clothing style.

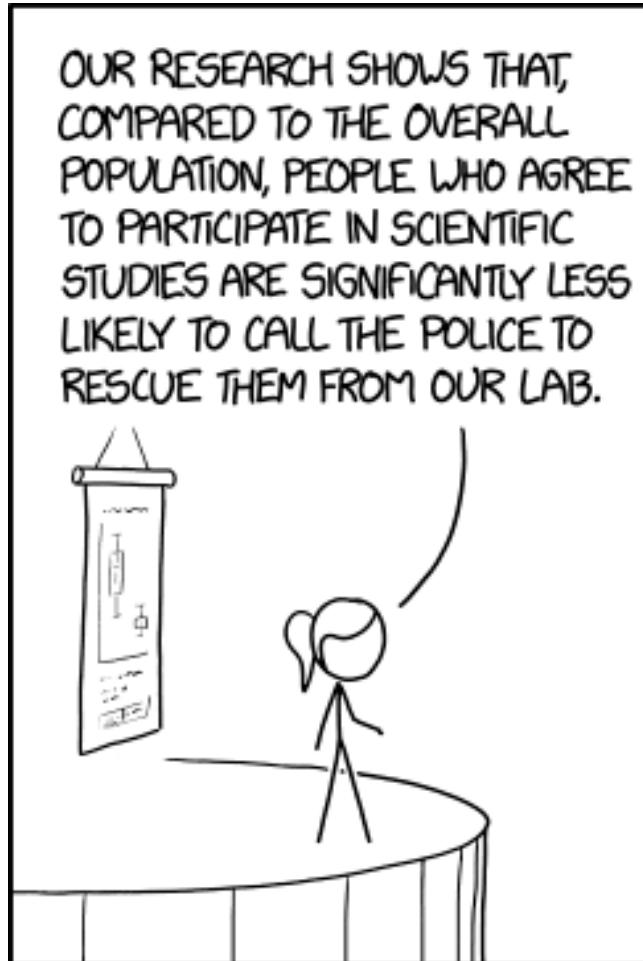


SEPTA riders wait for a subway train at the City Hall station in September 2021. Next month, SEPTA will roll out artificial-intelligence gun detection program on N ... [Read more](#)  
JOSE F. MORENO / Staff Photographer

**Have you considered what data your  
data set is missing?**

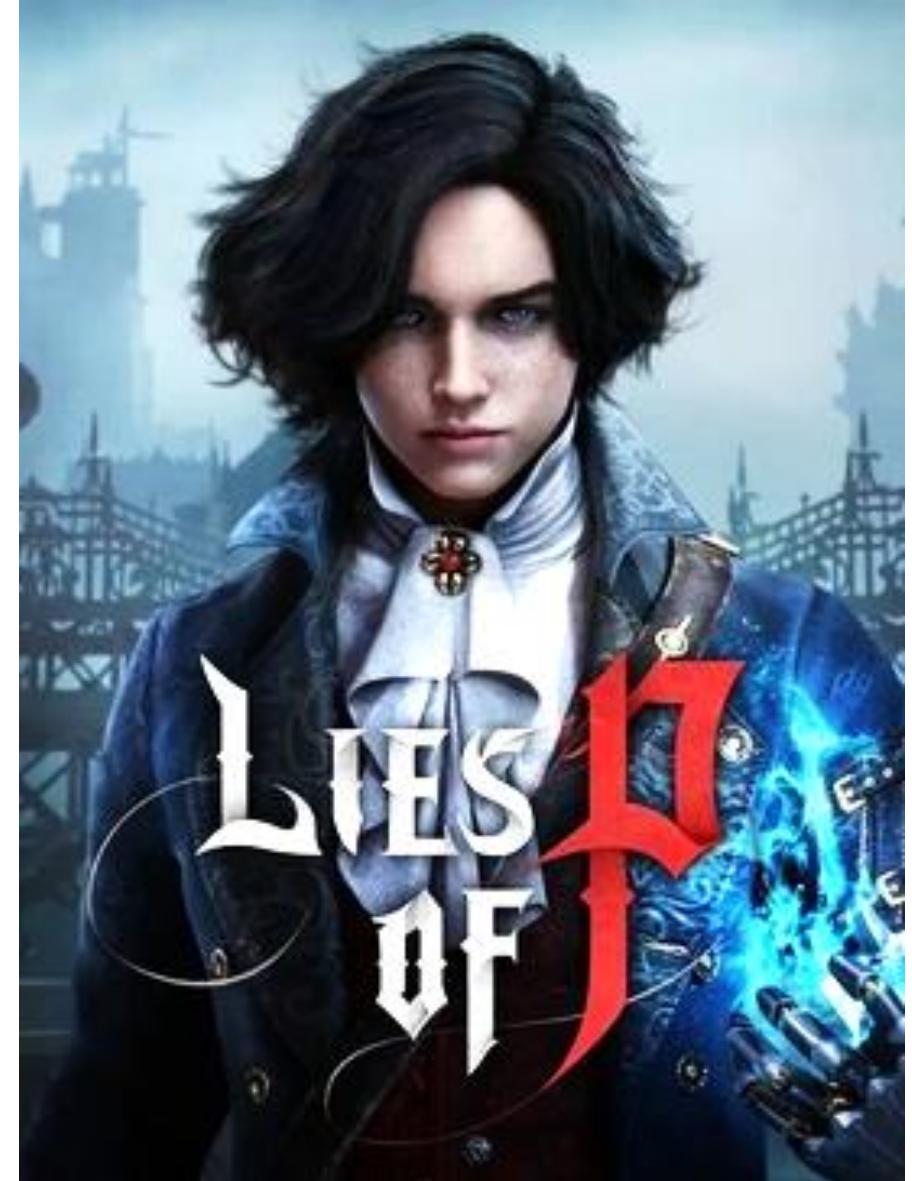
**What factors it doesn't have?**

**What biases might exist in collection?**



XKCD

# Interpreting Data Science: Over-reliance on p and p-hacking



# Recall p-values

A **p-value** is the probability of obtaining a test statistic more extreme than the one you observed from your data, assuming the null hypothesis is true.

In other words, if the Null Hypothesis were true, the p-value is the probability that due to random variation you would sample data more contradictory.

It's the Type I error rate if you were to run the experiment many times.

# What the p-value **IS NOT**

The **p-value IS NOT** guaranteeing anything about your particular experiment. It considers if you were to repeat your experiment many times.

The **p-value IS NOT** the probability that the null hypothesis is true.

The p-value is a measure of both size of the effect and precision of the measurement.

$$t = \frac{\bar{x} - \mu_0}{s / \sqrt{n}}$$

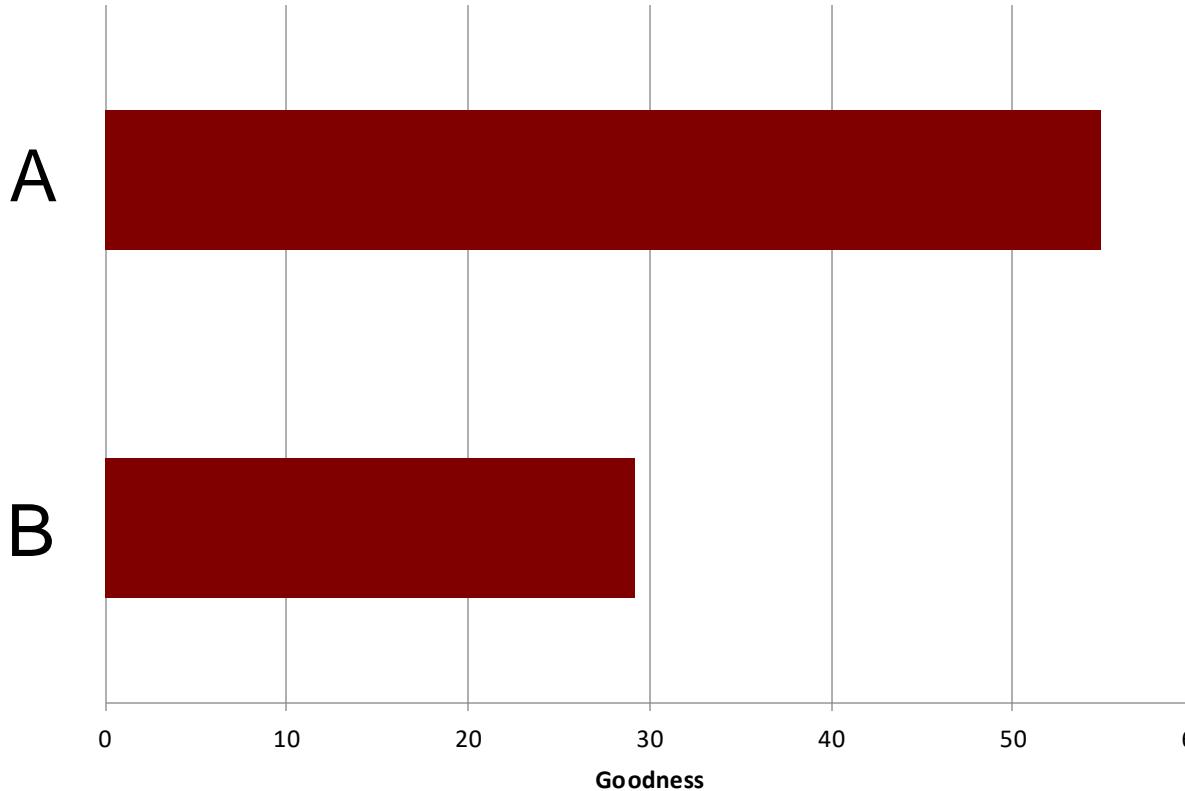
Difference in means  
(effect size)

Sampling error  
(measurement precision)

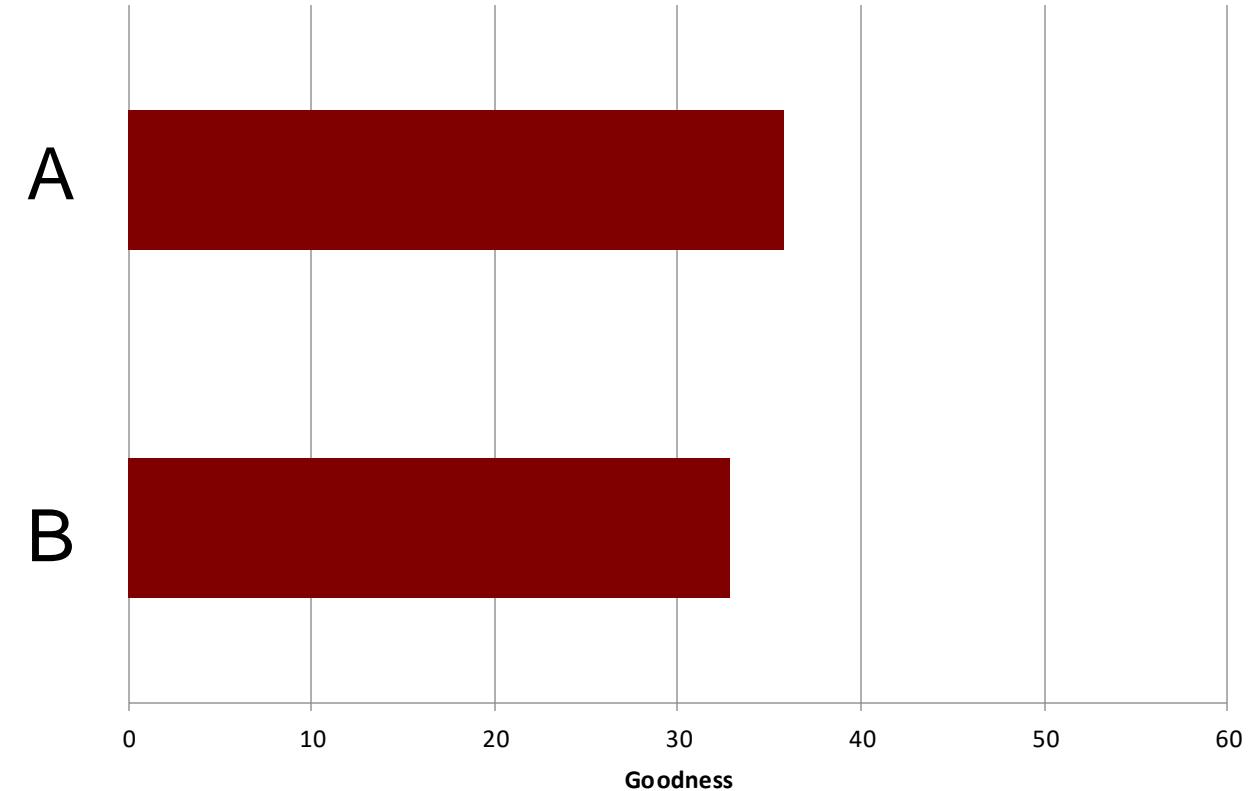
t-test example

# These experiments could have the same p-value...

A/B Test 1



A/B Test2



# **Statistical Significance**

**IS NOT**

# **Scientific Significance**

## Examples of ES Measures

Sample ES	Description	Example
Mean, $M$	Original units	Mean response time, $M = 462$ ms.
Difference between two means	Original units	The average price of milk increased last year by \$0.12/L, from \$1.14/L to \$1.26/L.
Median, $Mdn$	Original units	Median response time, $Mdn = 385$ ms.
Percentage	Units-free	35.5% of respondents were in favor. 0.7% of responses were errors.
Frequency	Units-free	39 states ran a deficit.
Correlation, $r$	Units-free	Income correlated with age ( $r = .28$ ).
Cohen's $d$	Standardized	The average effect of psychotherapy was $d = 0.68$ (see Chapters 7 and 11).
Regression weight, $b$	Original units	The slope of the regression line for income against age was $b = \$1,350/\text{year}$ .
Regression weight, $\beta$	Standardized	The $\beta$ -weight for age in the regression was .23.
Proportion of variance, $R^2$	Units-free	Three variables of age, education, and family status in the multiple regression together gave $R^2 = .48$ .
Risk	Units-free	The risk that a child has a bicycle accident in the next year is 1/45.
Relative risk	Units-free	A boy is 1.4 times as likely as a girl to have a bicycle accident in the next year.
Proportion of variance, $\omega^2$ (Greek omega-squared)	Units-free	In the analysis of variance, the independent variable age accounted for $\omega^2 = 21.5\%$ of total variance.

# Possible Effect Sizes

From *Understanding The New Statistics: Effect Sizes, Confidence Intervals, and Meta-Analysis*, Geoff Cumming, 2011

# Experiments typically report p, but should also report effect size.

American Psychological Association suggests reporting effect sizes in both the units from the experiment (original units) and a standardized measure.

Original units are easier to understand for the experiment at hand.

Standardized units help for future meta-analyses.

Effect size should also be reported as a confidence interval.

# Standardized Effect Size: Cohen's d

Cohen's d standardizes difference of the means versus the standard deviation.

Some fields have adopted interpretations of this standardized value to meaning like “small” (0.2) or “large” (0.8).

# **Lack of Statistical Significance**

**IS NOT**

# **Lack of Scientific Significance**

# Exploratory studies inform future studies

- May help determine what should be studied in more depth
- May help design the bounds of an experiment

Example:

the painkiller Vioxx was tested in a clinical trial against Naproxen, a general already-on-the-market painkiller. During the trial one person died that was taking Naproxen. For Vioxx however, five people died. The difference *was not statistically significant*,  $p > 0.05$ , and thus written off as unimportant. The lawsuits against Vioxx in 2005 proved the researchers wrong: The real-life, and regrettably more powerful test, showed that Vioxx severely—although initially not significantly—raised risks of cardiovascular side effects.

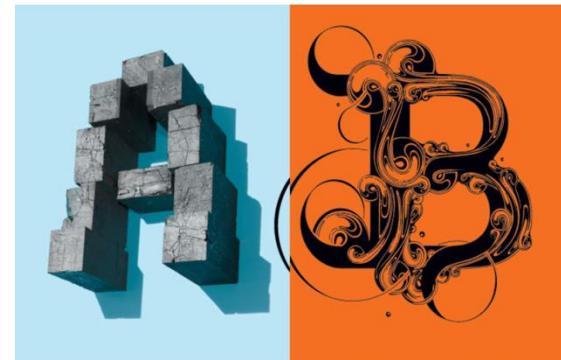
# Recall: A/B Testing

Let's say I'm running an A/B Test on two website designs.

I think A is better than B, but my result is not statistically significant.

I wait for more data and run the test again. This time  $p < 0.05$ .

What can I say?



# Running multiple experiments is common and leads to problems...

Common multiple experiments:

- Comparing more than two conditions
- Recording multiple dependent variables

If you're running multiple tests, then having a probability of 0.05 of finding a statistic more extreme than your own becomes quite large – random sampling error producing something extreme becomes likely.

# Corrections for Multiple Testing

The **Bonferroni** correction can account for this by dividing your desired significance by the number of tests.

Several other corrections are available and may be applicable depending on your assumptions.

**But there are more ways to run multiple tests...**

**1 CHOOSE A POLITICAL PARTY**

**Republicans**      **Democrats**

---

**2 DEFINE TERMS**

Which politicians do you want to include?

Presidents  
 Governors  
 Senators  
 Representatives

---

How do you want to measure economic performance?

Employment  
 Inflation  
 GDP  
 Stock prices

---

Other options

Factor in power  
 Weight more powerful positions more heavily  
 Exclude recessions  
 Don't include economic recessions

**3 IS THERE A RELATIONSHIP?**

Given how you've defined your terms, does the economy do better, worse or about the same when more Democrats are in power? Each dot below represents one month of data.

**4 IS YOUR RESULT SIGNIFICANT?**

If there were no connection between the economy and politics, what is the probability that you'd get results at least as strong as yours? That probability is your p-value, and by convention, you need a p-value of 0.05 or less to get published.

**Result: Publishable**

You achieved a p-value of **less than 0.01** and showed that **Democrats** have a **positive effect** on the economy. Get ready to be published!

---

If you're interested in reading real (and more rigorous) studies on the connection between politics and the economy, see the work of Larry Bartels and Alan Blinder and Mark Watson.

Data from The @unitedstates Project, National Governors Association, Bureau of Labor Statistics, Federal Reserve Bank of St. Louis and Yahoo Finance.

# p-hacking

It's easy to toy around with the variables and slice and dice to find a significant result while ignoring your multiple tests along the way.

**1 CHOOSE A POLITICAL PARTY**

---

**2 DEFINE TERMS**

Which politicians do you want to include?

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A BETTER ECONOMY

MORE DEMOCRATIC POWER →

Result: Publishable  
 You're in the 99th percentile of less than 0.01% of results. Democrats have a positive effect on the economy. Probability to be published: 99.99%  
 Tests about the way.

# p-hacking

It's easy to toy around with the variables and space and time to find a significant result while ignoring your multiple tests about the way.

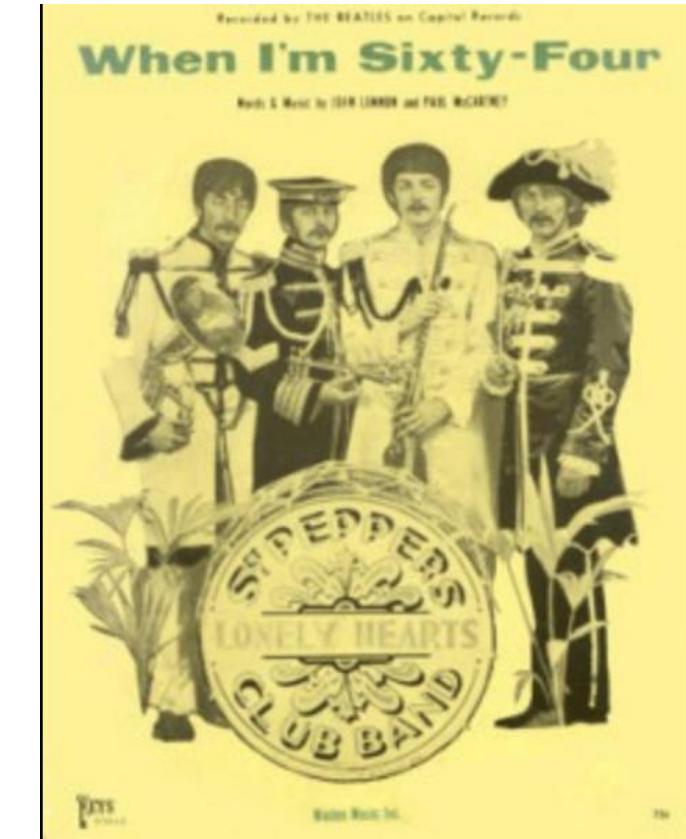
<https://projects.fivethirtyeight.com/p-hacking/>

# Example: Listening to “When I’m Sixty-Four” Decreases Chronological Age

## ***Study 2: musical contrast and chronological rejuvenation***

Using the same method as in Study 1, we asked 20 University of Pennsylvania undergraduates to listen to either “When I’m Sixty-Four” by The Beatles or “Kalimba.” Then, in an ostensibly unrelated task, they indicated their birth date (mm/dd/yyyy) and their father’s age. We used father’s age to control for variation in baseline age across participants.

An ANCOVA revealed the predicted effect: According to their birth dates, people were nearly a year-and-a-half younger after listening to “When I’m Sixty-Four” (adjusted  $M = 20.1$  years) rather than to “Kalimba” (adjusted  $M = 21.5$  years),  $F(1, 17) = 4.92, p = .040$ .



From *False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant*, Simmons et al., 2011 & Image from [https://en.wikipedia.org/wiki/File:When\\_I%27m\\_sixty\\_four.jpg](https://en.wikipedia.org/wiki/File:When_I%27m_sixty_four.jpg)

# But the reality....

**Table 3.** Study 2: Original Report (in Bolded Text) and the Requirement-Compliant Report (With Addition of Gray Text)

**Using the same method as in Study 1, we asked 20 34 University of Pennsylvania undergraduates to listen only to either “When I’m Sixty-Four” by The Beatles or “Kalimba” or “Hot Potato” by the Wiggles.** We conducted our analyses after every session of approximately 10 participants; we did not decide in advance when to terminate data collection. **Then, in an ostensibly unrelated task, they indicated only their birth date (mm/dd/yyyy) and** how old they felt, how much they would enjoy eating at a diner, the square root of 100, their agreement with “computers are complicated machines,” **their father’s age**, their mother’s age, whether they would take advantage of an early-bird special, their political orientation, which of four Canadian quarterbacks they believed won an award, how often they refer to the past as “the good old days,” and their gender. **We used father’s age to control for variation in baseline age across participants.**

An ANCOVA revealed the predicted effect: According to their birth dates, people were nearly a year-and-a-half younger after listening to “When I’m Sixty-Four” (adjusted  $M = 20.1$  years) rather than to “Kalimba” (adjusted  $M = 21.5$  years),  $F(1, 17) = 4.92, p = .040$ . Without controlling for father’s age, the age difference was smaller and did not reach significance ( $M_s = 20.3$  and 21.2, respectively),  $F(1, 18) = 1.01, p = .33$ .

# I Fooled Millions Into Thinking Chocolate Helps Weight Loss. Here's How.



John Bohannon

5/27/15 4:23PM • Filed to

ars TECHNICA

SCIENCE —

## “Mindless Eating,” or how to turn a life of research into question

Now questioning: 3,700 citations in 25 different journals over 20+ years.

CATHLEEN O'GRADY - 4/24/2017, 4:30 AM



“Slim by Chocolate” found that people who ate a chocolate bar every day lost weight, according to a newspaper, just

## Everyone Is Missing the Point About Brian Wansink and P-Hacking

There are more crucial lessons to learn from the replication crisis.

By ANDREW GELMAN

OCT 08, 2018 • 11:00 AM



Brian Wansink during the 2013 Discovery Vitality Summit in Johannesburg, South Africa.

Lefty Shivambu/Gallo Images/Getty Images

*This post originally appeared on [the author's website](#).*

Last month, Brian Wansink, the Cornell University researcher and retraction

# “Researcher Degrees of Freedom”

In addition to independent and dependent variables, the researcher chooses:

- How many participants

• How often to run the analyses versus collecting data

- Whether to do the analyses in collaboration with others
  - Whether to report on all conditions
  - Whether to report on all experiments
- It is all too easy to torture the data  
to say what one wants it to say**

- How to handle missing data
- How to handle outliers
- The definition of an outlier

From *False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant*,  
Simmons et al., 2011

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**How do we correct  
for all of this?**

From *False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant*,  
Simmons et al., 2011<sup>84</sup>

## **Table 2.** Simple Solution to the Problem of False-Positive Publications

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### Requirements for authors

1. Authors must decide the rule for terminating data collection before data collection begins and report this rule in the article.
2. Authors must collect at least 20 observations per cell or else provide a compelling cost-of-data-collection justification.
3. Authors must list all variables collected in a study.
4. Authors must report all experimental conditions, including failed manipulations.
5. If observations are eliminated, authors must also report what the statistical results are if those observations are included.
6. If an analysis includes a covariate, authors must report the statistical results of the analysis without the covariate.

Better Reporting allows us to assess better

From *False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant*, Simmons et al., 2011



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Future-proof your research.  
Preregister your next study.

## What is Preregistration?

When you preregister your research, you're simply specifying your research plan in advance of your study and submitting it to a registry.

Preregistration separates *hypothesis-generating* (exploratory) from *hypothesis-testing* (confirmatory) research. Both are important. But the same data cannot be used to generate *and* test a hypothesis, which can happen unintentionally and reduce the credibility of your



# Pre-registration

State ahead of time:

- What will be studied
- What are the hypotheses
- What data will be collected
- What is the analysis procedure

From

<https://wscinemag.org/news/2018/09/more-and-more-scientists-are-preregistering-their-studies-should-you>, Image from: <https://www.cos.io/our-services/prereg>,

In a survey of 41 papers in 2005-2006, found major issues:

- Not enough information reported:
  - Missing p-values (only “ $p<0.05$ ” reported)
  - Missing means (!!)
  - Missing standard deviations (can’t check test)
  - Missing the test used
- Failure to check assumptions
  - Tests are particular to study design & data character!
- Over-testing (multiple-tests)
- Picking the wrong test

Better  
Reporting  
allows us to  
assess better

# **Strong methods and better reporting provides rigor in both quantitative and qualitative data studies.**

- Leverage methodologies
  - These have been refined and improved over years and people
- Be Transparent
  - The community should be able to examine what you did. Be clear in reporting your methodologies and implementation. Make your data and analysis available for inspection.
- Abundant data strengthens claims, but be cognizant of what your data is truly sampling
- Inspect research carefully, your own and that of others

**There may be times when you're the only  
one who realizes the ethical problems.**

**Be prepared for what you're going to do.**



# The code I'm still ashamed of

Bill Sourour

November 13, 2016

If you write code for a living, there's a chance that at some point in your career, someone will ask you to code something a little deceitful – if not outright unethical.

This happened to me back in the year 2000. And it's something I'll never be able to forget.

I wrote my first line of code at 6 years old. I'm no prodigy though. I had a lot

# The code I'm still ashamed of

Bill Sourour

November 13, 2016

One of the projects I was assigned to involved a drug that was targeted at women. The graphics and general style of the website made it clear that the client wanted to specifically target teenage girls.

One of the features of this website was a quiz that asked girls a series of questions and recommended a type of drug based on their answers.

Remember, this website was posing as a general information site. It was not clearly an advertisement for any particular drug.

When I received the requirements, they contained the questions for the quiz, along with multiple choice answers for each question.

Missing from the requirements was any indication of what I should do with the answers at the end of the quiz. So what rules determined what treatment the quiz would recommend?

“The quiz doesn’t work,” she said.

“Oh. What’s broken?” I asked.

“Well, it seems that no matter what I do, the quiz recommends the client’s drug as the best possible treatment. The only exception is if I say I’m allergic. Or if I say I am already taking it.”

“Yes. That’s what the requirements say to do. Everything leads to the client’s drug.”

“Oh. Okay. Cool.”

And she was off.

I wish I could tell you that when I first saw those requirements they bothered me. I wish I could tell you that it felt wrong to code something that was basically designed to trick young girls. But the truth is, I didn’t think much of it at the time. I had a job to do, and I did it.

"The quiz doesn't work," she said.

"Oh. What's broken?"

"Well, it seems that client's drug as the I

say I'm allergic. Or if I say I am already taking it."

"Yes. That's what the client's drug."

"Oh. Okay. Cool."

And she was off.

I wish I could tell you that bothered me. I wish I could was basically designed to much of it at the time. I had a job to do, and I did it.

Nothing that we were doing was illegal. As the youngest developer on my team, I was making good money for my age. And in the end, I understood that the real purpose of the site was to push a particular drug. So, I chalked this tactic up to "marketing."

The day of the dinner, shortly before leaving the office, a colleague emailed me a link to a news report online. It was about a young girl who had taken the drug I'd built the website for.

She had killed herself.

It turned out that among the main side effects of that drug were severe depression and suicidal thoughts.



## The code I'm still ashamed of

Bill Sourour

November 13, 2016

There are a million and one ways for me to rationalize my part in later suicides and severe depression. Even today, there is ongoing litigation with former patients.

It's easy to make an argument that I had no part in it at all. Still, I've never felt okay about writing that code.

## Data Ethics Checklist

Developed by David Danks (Carnegie Mellon University) in conjunction with Seattle Children's Hospital, November 2018

If you're not sure and the potential impact is large, consider consulting someone with more expertise.

David Danks' "Data Ethics Checklist" piloted at the Seattle Children's Hospital

### Potential privacy issues

- P1.** Does this process/method/analysis use information that patient/families/employees are probably unaware that Seattle Children's has collected (or could integrate)?  
[Roughly, did they "consent" to have their data used in this way, though think more broadly than "mere" legal consent.]

0: Definitely not

1: In some situations

2: Definitely yes

- P2.** Will this project infer information that the target people would legitimately object to you knowing (even though they agreed to provide the input data)?  
[People's willingness to provide their data depends partly on how they think the data could be used, not how it could possibly be used.]

0: Definitely not

1: In some situations

2: Definitely yes

### Potential bias and equity issues

- B1.** Were the various input data collected, measured, or processed differently between groups?  
[For example, have only some groups provided relevant data? Or were some groups treated differently during data collection?]

0: Definitely not

1: In some situations

2: Definitely yes

- B2.** Will the affected people likely disagree about whether the impacts are a net positive?  
[The same impacts could be good for one group but bad for another, so we should consider the impacted individuals' interests.]

0: Definitely not

1: In some situations

2: Definitely yes

### Potential transparency and measurement issues

- T1.** For any given prediction/recommendation/analysis, would it be difficult to determine what happened, why it happened, or how to improve it?  
[Surprises and errors are inevitable; can we explain (after the fact) why they occurred, and perhaps how to avoid them in the future?]

0: Definitely not

1: In some situations

2: Definitely yes

- T2.** Does the project place disproportionate weight on only a few datapoints (or will you not know if it does)?  
[We should be cautious about deploying technology that is, or might be, fragile (= highly dependent on small features of the data.)]

0: Definitely not

1: In some situations

2: Definitely yes

### Potential overall issues

- O1.** If your dependent (parent, child, etc.) were going to be impacted (in treatment, privacy, etc.), would you want to be involved or guide them about how to respond?

0: Definitely not

1: In some situations

2: Definitely yes

- O2.** Would you be uncomfortable or feel uneasy if you knew this technology would impact you?

0: Definitely not

1: In some situations

2: Definitely yes