

Statistical Follies and Epidemiology

William M. Briggs
Statistician to the Stars!
matt@wmbriggs.com

28 July 2012



“A new study claims a single exposure to the American flag – even among Democratic participants – shifts support toward Republican beliefs, attitudes and voting behavior.”

Quoted from Fox News Grapevine segment “Stars, Stripes and Republican Votes?” 20 July 2011

“We report that a brief exposure to the American flag led to a shift toward Republican beliefs, attitudes, and voting behavior among both Republican and Democratic participants, despite their overwhelming belief that exposure to the flag would not influence their behavior.”

Abstract of “A Single Exposure to the American Flag Shifts Support Toward Republicanism up to 8 Months Later.” Carter, T., M.J. Ferguson, and R.R. Hassin, 2011. *Psychological Science*. doi: 10.1177/0956797611414726

HOW IT WAS DONE: 396 people recruited for four sessions, from before the election to eight months after. 197 made it through Session 2; just 71 made it to the end. 8 more excluded, leaving 63 out of the original 396 from which to draw conclusions.

These 63 were *pre-selected to have polarized views*: folks “who planned to vote...where polling indicated...significant margin separated Obama and McCain.” Some got survey with flag, some not.

Created “composite measures” of voting intentions; then regressed the “centered” intentions on earlier intentions and used the *residuals* as main measure of voting intentions.

Result: flag-seers’ residuals tended to disapprove of Obama’s 8-month-old presidency slightly more.

The Publish Or Perish Fallacy

When you need a paper, do a survey, call the questionnaire an “instrument” then finagle, interpret like mad; but be sure “finding” accords with received “wisdom.”



“Democratic political candidates can skip this weekend’s July 4th parades. A new Harvard University study finds that July 4th parades energize only Republicans, turn kids into Republicans, and help to boost the GOP turnout of adults on Election Day.”

Quoted from US News & World Report “Harvard: July 4th Parades Are Right-Wing” 30 June 2011

“Survey evidence [says] Republicans consider themselves more patriotic than Democrats...a political congruence between the patriotism promoted on Fourth of July and the values associated with the Republican party. Fourth of July celebrations in Republican dominated counties may thus be more politically biased events that socialize children into Republicans.”

From “Shaping the Nation: The Effect of Fourth of July on Political Preferences and Behavior in the United States.” Madestam, A., D. Yanagizawa-Drott, 2011. *Harvard Site*

HOW IT WAS DONE: “Our method uses daily precipitation data from 1920-1990 to proxy for exogenous variation in participation on Fourth of July as a child. The estimates imply that days without rain on Fourth of July in childhood increase the likelihood of identifying with the Republicans as an adult, voting for the Republican but not the Democratic candidate, and voter turnout.”

Result: “[O]ne Fourth of July without rain before age 18 increases the likelihood of identifying as a Republican at age 40 by 2 percent the share of people voting for the Republican candidate at age 40 by 4 percent, and the share of people turning out to vote at age 40 by 0.9 percent.”

The Over-confident Academic Expert Fallacy:

I can't think of another explanation for the observed correlation, therefore there isn't one: whatever I say is the cause is *the* cause.

Causation *is* correlation

But beware *post hoc ergo propter hoc*:
X happened, then Y happened, there-
fore X *caused* Y, $p < 0.05$.



“Three new studies released today by [CARB] reveal that exposure to airborne fine-particulate matter significantly elevates the risk for premature deaths from heart disease in older adults and elevates incidence of strokes among post-menopausal women. Heart disease is the number one killer in California and is responsible for approximately 35% of annual deaths.”

CARB press release #:11-53 8 December 2011

“All-cause mortality is significantly associated with PM2.5 exposure, but the results are sensitive to statistical model specification and to the exposure model used to generate the estimates. When we applied control for residence in the largest urban conurbations, and we employed the land use regression (LUR) model, we found significantly elevated effects on all cause mortality.”

From “Spatiotemporal Analysis of Air Pollution and Mortality in California Based on the American Cancer Society Cohort” Michael Jerrett *et al.*, 2011. CARB contract #06-332.

HOW IT WAS DONE: Nine models, each with several subjective “knobs” and dials to twist. Only one showed a “statistically significant” relationship. Authors only reported on this model.

Authors claimed to have shown a relationship between PM2.5 and inhalation. Yet authors never, *not even in one case*, measured the PM2.5 inhalation of any person. Measured how far from highway residents might have, at one time, lived. Yet *sub-urban folks had higher risks than urban*.

Result: “The results from this investigation indicate consistent and robust effects of PM2.5.”

The Friend of a Friend of a Friend Fallacy:

I can't measure what I think is the real cause, nor can I measure the direct effects of this cause, but I can measure things that possibly maybe are sort of related and call them the cause and effect.

RADON IS



AN ODORLESS TASTELESS INVISIBLE

RADIOACTIVE GAS



THAT CAUSES LUNG CANCER

“‘Radon is one of the most serious environmental health risks that we face,’ said University of Minnesota professor Bill Angell...He explains the colorless, odorless radioactive gas forms naturally in the ground. But when radon it enters your home, it is a serious problem.

‘The risk of dying of lung cancer because of radon in your home is one out of 50,’ said Angell, ‘So it’s an incredibly big risk.’”

Channel 3 WSIL TV report “Experts Work to Raise Radon Awareness”, 26 June 2012.

“We find a positive association between radon and lung cancer risk consistent with previous studies...[T]he results of the present prospective cohort study are fully compatible with an association between residential radon and risk for lung cancer as detected in three previous meta analyses and provide important evidence at the low end of the low end of the residential dose curve.”

Residential radon and lung cancer incidence in a Danish cohort, Brauner *et al.*, 2012. *Environmental Research*.

HOW IT WAS DONE: Measured *actual* exposure and outcomes of 57 thousand Danes and found “adjusted IRR for lung cancer was 1.04 (95% CI: 0.69–1.56) in association with a 100 Bq/m³ higher radon concentration and 1.67 (95% CI: 0.69–4.04) among non-smokers.”

“In the present study, a number of risk factors for lung cancer were less prevalent among participants living at the higher radon concentrations, including...low fruit intake, risk occupation and traffic-related air pollution. This would result in an underestimation of the association between radon and lung cancer risk in our study.”

The Everybody Else Said It Was True Fallacy:

Even though your results are the exact opposite of your belief, explain them away, and state your belief.

Bad news for chocoholics: Dark chocolate isn't so healthy for you after all

By ANGELA DOWDEN
UPDATED: 09:56 EST, 24 January 2012

[Comments \(32\)](#) | [Share](#)  +1 < 5 | [Tweet](#) < 0 | [Like](#) < 85

Chocoholics pounce on studies showing dark chocolate is good for your heart and contains procyanidins, which help to lower blood pressure.

But while dark chocolate is better than milk and white chocolate due to the antioxidants it contains, it's also higher in calories and saturated fat.



Eating dark chocolate really is good for your heart

By DAILY MAIL REPORTER

PUBLISHED: 17:27 EST, 24 April 2012 | UPDATED: 17:28 EST, 24 April 2012

[Comments \(18\)](#) | [Share](#)  +1 < 2 | [Tweet](#) < 0 | [Like](#) < 579

It has long been suggested that dark chocolate is good for your heart.

Now a study has confirmed that eating it in moderate quantities does indeed lower blood sugar and cholesterol levels.

The research team set out to test the direct effect of eating chocolate which is a source of several substances that scientists think might impart important health benefits.



Ignore all that hype about antioxidant supplements: Why daily vitamin pills can **INCREASE** your risk of disease

By LOUISE ATKINSON

PUBLISHED: 17:46 EST, 21 May 2012 | **UPDATED:** 19:21 EST, 21 May 2012

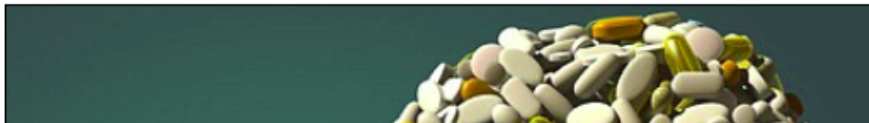
[Comments \(140\)](#) | [Share](#)  +1 9 [Tweet](#) 0 [Like](#) 1.2k

Did you take your vitamins today?

Many of us have been so seduced by the idea that supplements help protect us against ill health that we happily pop one, two or even more a day — and feel guilty if we forget.

In the UK alone, we spend more than £300 million on supplements every year.

But while this might be keeping the manufacturers in a healthy state, are vitamin pills really so good for us?



The vitamin pills that actually work! How some supplements can work wonders for certain ailments

By DR MAX PEMBERTON

PUBLISHED: 16:07 EST, 26 May 2012 | **UPDATED:** 03:54 EST, 27 May 2012

[Comments \(168\)](#) | [Share](#)  +1 1 [Tweet](#) 0 [Like](#) 444

When my grandmother suffered a fall and broke her pelvis, her GP advised her to take supplements to help speed healing.


Initially I was sceptical — these things are not part of medical training and I assumed the herbal remedies and vitamin pills in health food shops were little more than placebos. But I was wrong.

With some research I discovered many supplements have a good



Women who drink four cups of coffee a day 'face higher risk of incontinence'

By DAILY MAIL REPORTER
UPDATED: 02:51 EST, 11 April 2011

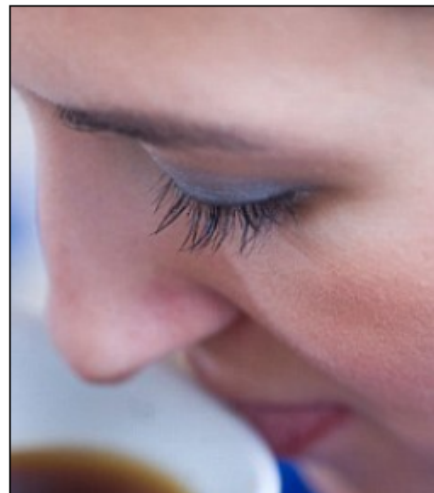
Comments (18) | Share  +1 0 | Tweet  0 | Like  32

Women who drink at least four caffeine drinks a day are more likely to develop frequent problems with bladder control.

A new study of 65,000 American women found that those with the highest caffeine intake - equivalent to four or more cups of coffee or ten cans of soda a day - were more likely to develop urinary incontinence over four years.

The study found no increased risk among women consuming about three cups of coffee or less per day.

In the most highly caffeine group, caffeine was particularly related to urge incontinence, a type where leakage happens after a sudden, strong urge to urinate.



Caffeine not tied to worsening urinary incontinence

REUTERS By Andrew M. Seaman | Reuters - Fri, Apr 27, 2012

Recommend  Tweet 16 |  Share 2 |  +1 0 |  Email  Print

RELATED CONTENT



A barista makes a cup of coffee ...

NEW YORK (Reuters Health) - Women with [urinary incontinence](#) who also enjoy their regular cup of coffee or tea don't have to worry about the extra caffeine making their condition worse, suggests a new study.

The new research stands in contrast to the common recommendation that women with leaky bladders stay away from caffeinated foods and beverages.

"If a woman feels she wants to abstain from caffeine that's completely fine, but based on our results, women with moderate incontinence shouldn't be concerned," said [Mary Townsend](#), the study's lead author from Brigham and Women's Hospital and Harvard Medical School in Boston.

Still, the findings cannot say whether caffeine might have a shorter-term impact by making women need to urinate soon after eating or drinking something caffeinated.

Newsheadlines

POMEGRANATES SHOWN TO BE EFFECTIVE FOR MENOPAUSAL SYMPTOMS

General

Acronym Expander

Associations and Societies

Bibliography

Conference Calendar

Conference Coverage

Contribute to OBGYN.net

Discussion Forums

Educational Tutorials

Health News Headlines

Medline

Meet our Doctors & Practitioners

Register

Menopause

July 19, 2004

2004 JUL 19 - ([NewsRx.com](#) & [NewsRx.net](#)) -- Ah! The pomegranate – th too, because researchers say pomegranate relieves adverse effects of m

According to a study from Japan, "Pomegranate is known to contain estr in mice. In this study, we investigated whether pomegranate extract is ef mice.

"Prolongation of the immobility time in forced swimming test, an index of mineral density (BMD) of the tibia was measured by X-ray absorptiometr bone histomorphometry," explained J. Moriokamoto and colleagues Saita

"Administration of pomegranate extract (juice and seed extract) for 2 we shortened the immobility time compared with 5% glucose-dosed mice (c

"In addition," the scientists said, "ovariectomy-induced decrease of BMD bone volume and the trabecular number were significantly increased and group compared with the control group."

Moriokamoto's team noted, "Some histological bone formation/resorptior

Pomegranate seed oil 'no better than a placebo' at easing hot flushes

- Study shows menopausal symptoms may be due to psychological as well as hormonal changes

By [CLAIRE BATES](#)

UPDATED: 04:12 EST, 24 January 2012

[Comments \(12\)](#) | [Share](#) [+1](#) 0 [Tweet](#) 0 [Like](#) 15

Pomegranate seed oil is a popular alternative remedy for women seeking relief from menopausal symptoms.

It was thought that because it is rich in plant compounds called phytoestrogens, these would mimic estrogen in the body.

However, the first clinical trial of the treatment has found that women taking the supplement twice a day for 12 weeks got no more relief than women taking a placebo pill containing sunflower oil.



The Statistics Isn't What You Think It Is
Fallacy:

Want: $\Pr(\text{Theory true} \mid \text{Data, Model})$

Get: $\Pr(T(x) > t(x) \mid \text{Data, Model}(\theta), \theta = 0)$

A complete list of things caused by global warming

Apologies for a temporary delay in updating the dead link list

[AIDS](#), [Afghan poppies destroyed](#), [African holocaust](#), [aged deaths](#), [poppies more potent](#), [Africa devastated](#), [Africa in conflict](#), [African aid threatened](#), [aggressive weeds](#), [Air France crash](#), [air pockets](#), [air pressure changes](#), [airport farewells virtual](#), [airport malaria](#), [Agulhas current](#), [Alaskan towns slowly destroyed](#), [Al Qaeda and Taliban Being Helped](#), [allergy increase](#), [allergy season longer](#), [alligators in the Thames](#), [Alps melting](#), [Amazon a desert](#), [American dream end](#), [amphibians breeding earlier \(or not\)](#), [anaphylactic reactions to bee stings](#), [ancient forests dramatically changed](#), [animals head for the hills](#), [animals shrink](#), [Antarctic grass flourishes](#), [Antarctic ice grows](#), [Antarctic ice shrinks](#), [Antarctic sea life at risk](#), [anxiety treatment](#), [algal blooms](#), [archaeological sites threatened](#), [Arctic bogs melt](#), [Arctic in bloom](#), [Arctic ice free](#), [Arctic ice melt faster](#), [Arctic lakes disappear](#), [Arctic tundra lost](#), [Arctic warming \(not\)](#), [a rose by any other name smells of nothing](#), [asteroid strike risk](#), [asthma](#), [Atlantic less salty](#), [Atlantic more salty](#), [atmospheric circulation modified](#), [attack of the killer jellyfish](#), [avalanches reduced](#), [avalanches increased](#), [Baghdad snow](#), [Bahrain under water](#), [bananas grow](#), [barbarisation](#), [bats decline](#), [beer and bread prices to soar](#), [beer better](#), [beer worse](#), [beetle infestation](#), [beef shortage](#), [bet for \\$10,000](#), [big melt faster](#), [billion dollar research projects](#), [billion homeless](#), [billions face risk](#), [billions of deaths](#), [bird loss accelerating](#), [bird populations dying](#), [bird strikes](#), [bird visitors drop](#), [birds confused](#), [birds decline \(Wales\)](#), [birds driven north](#), [birds face longer migrations](#), [birds on long migrations threatened](#), [birds return early](#), [birds shrink\(Aus\)](#), [birds shrink \(USA\)](#), [bittern boom ends](#), [blackbirds stop singing](#), [blackbirds threatened](#), [Black Hawk down](#), [blizzards](#), [blood contaminated](#), [blue mussels return](#), [borders redrawn](#), [bluetongue](#), [brains shrink](#), [brewers droop](#), [bridge collapse \(Minneapolis\)](#), [Britain one big city](#), [Britain Siberian](#), [Britain's bananas](#), [British monsoon](#), [brothels struggle](#), [brown Ireland](#), [bubonic plague](#), [Buddhist temple threatened](#), [building collapse](#), [building season extension](#), [bushfires](#), [butterflies move north](#), [butterflies reeling](#), [butterfly saved](#), [carbon crimes](#), [caribou decline](#), [Cambodian sex trade fuelled](#), [camel deaths](#), [cancer](#), [cancer deaths in England](#), [cannibalism](#), [cataracts](#), [cats more amorous](#), [caterpillar biomass shift](#), [cave paintings threatened](#), [chagas disease](#), [childhood insomnia](#), [children's mental health](#), [chocolate shortage](#), [Cholera](#), [circumcision in decline](#), [cirrus disappearance](#), [civil unrest](#), [cloud increase](#), [clownfish get lost](#), [coast beauty spots lost](#), [cockroach migration](#), [cod go south](#), [coffee threatened](#), [coffee berry borer](#), [coffee berry disease](#), [cold climate creatures survive](#), [cold spells](#), [cold spells \(Australia\)](#), [colder waters \(Long Island\)](#), [cold wave \(India\)](#), [cold weather \(world\)](#), [cold winters](#), [computer models](#), [conferences](#), [conflict](#), [conflict with Russia](#), [consumers foot the bill](#), [coral bleaching](#), [coral fish suffer](#), [coral reefs dying](#), [coral reefs grow](#), [coral reefs shrink](#), [coral reefs twilight](#), [cost of trillions](#), [cougar attacks](#), [crabgrass menace](#), [cradle of civilisation threatened](#), [creatures move uphill](#), [crime increase](#), [crocodile sex](#), [crocodiles driven from water](#), [crops devastated](#), [crop failures increase](#), [cross-breeding](#), [crumbling roads](#), [buildings and sewage systems](#), [cryptococcal disease](#), [curriculum change](#), [cyclones \(Australia\)](#), [damselies forced back to UK](#), [danger to kid's health](#), [Darfur](#), [Dartford Warbler plague](#), [daylight increase](#), [deadly virus outbreaks](#), [death rate increase \(US\)](#), [death rate drop](#), [deaths to reach 6 million](#), [decades of progress at risk](#), [Dengue hemorrhagic fever](#), [depression](#), [desert advance](#), [desert retreat](#), [destruction of the environment](#), [dig sites threatened](#), [disasters](#), [diseases move north](#), [diving reefs closed](#), [dog disease](#), [dozen deadly diseases - or not](#), [drought](#), [ducks and geese decline](#), [dust bowl in the corn belt](#), [dust doubles](#), [earlier pollen season](#), [Earth axis tilt](#), [Earth biodiversity crisis](#), [Earth crumbling](#), [Earth dying](#), [Earth even hotter](#), [Earth light dimming](#), [Earth lopsided](#), [Earth melting](#), [Earth morbid fever](#), [Earth on fast track](#), [Earth past point of no return](#), [Earth slowing down](#), [Earth](#)

“[GW’s] indirect social and political impact in poor countries may be even more far-reaching, including upheavals and civil wars – and even more witches hacked to death with machetes.” Edward Miguel, Professor of Economics, Berkeley.

“Oyster Herpes: Latest Symptom of Global Warming?” *National Geographic*

“Global warming ‘helps coral reefs grow’” *New Scientist*

“Global Warming Has Devastating Effect on Coral Reefs, Study Shows” *National Geographic*

“We don’t usually think of the Taliban and global warming in the same sentence...” Charlie Gibson, ABC News.

“[GW will cause] plankton called a coccolithophore to bloom in huge numbers” Sharon Smith, Professor U. Miami

“Warmer Seas Will Wipe Out Plankton, Source of Ocean Life”
Jef Huisman, Professor U. Amsterdam

“Climate wars threaten billions” *A Climate of Conflict*, International Alert

“Criminologists and police officers are now beginning to speculate that one of the hidden consequences of global warming will be an increase in street crime” Ken Pease, Professor University College London

“Study Says Polar Bears Could Face Extinction” Arctic Climate Impact Assessment

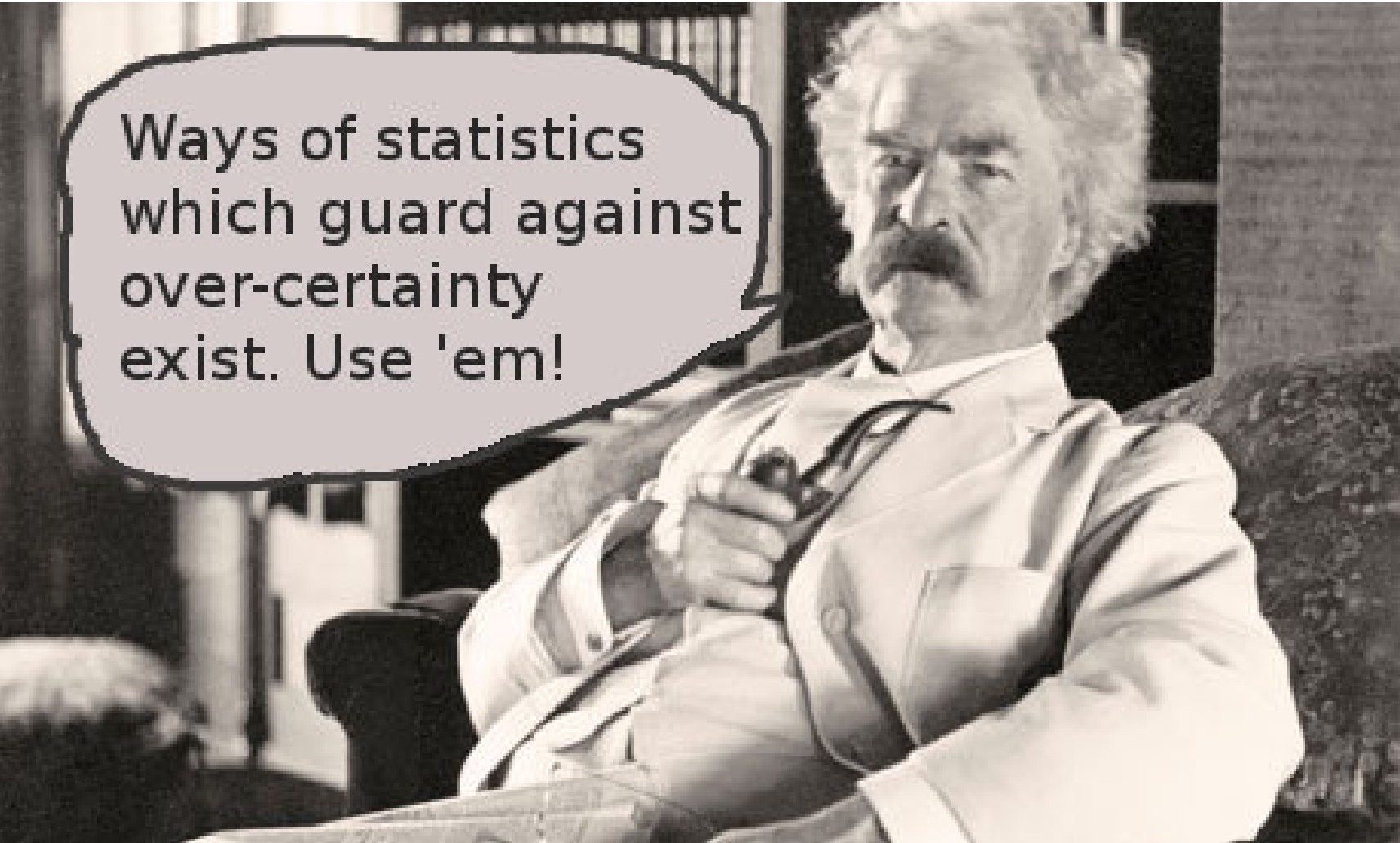
“Spiders Getting Bigger – Global Warming to Blame?” *National Geographic*

“The panda bear could disappear in the wild unless the pace of global warming slows.” WWF Global

“Surge in fatal shark attacks blamed on global warming” *The Guardian*

Extinction risk: warm, fuzzy, cuddly photogenic species. To thrive: biting, sticking, pestering, plaguing species.

The Come On In The Water's Fine Fallacy,
a.k.a. The Bandwagon Fallacy, a.k.a. The
Grants Are Flowing Fallacy, a.k.a. A Good
Chance I'll Get Quoted In The Press Fallacy

A black and white photograph of Mark Twain sitting in a chair, holding a pipe. A speech bubble is overlaid on the image, containing text. The background shows a window with a view of a building.

Ways of statistics
which guard against
over-certainty
exist. Use 'em!