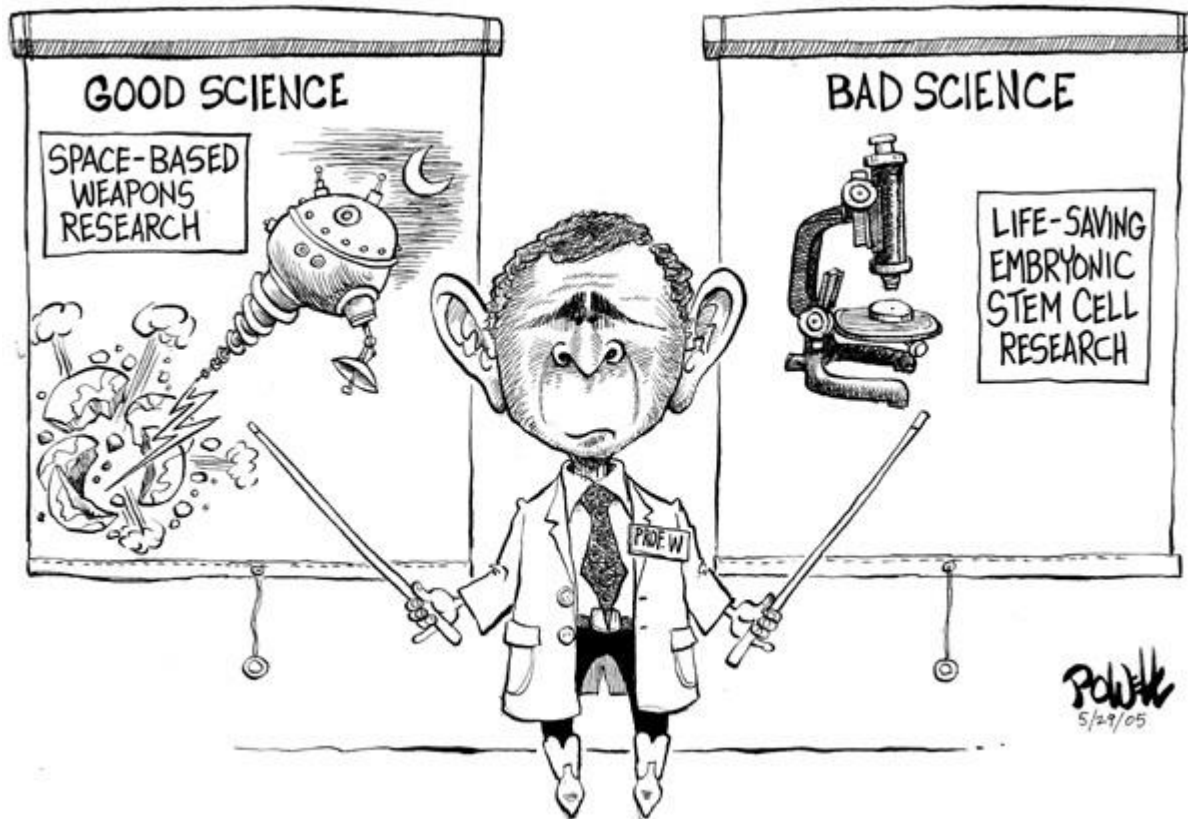


What To Believe: How to tell good science from bad.





8obeats

« Poisonous Seeds Can Be Turned Into Jet Fuel

Eating Cheese and Meat May Boost

By Eliza Strickland | June 6, 2008 10:30 am



Here's one ea
strife in your
you eat your
skimp on the

News > Science

Internet pornography 'ca memory'

German scientists have analysed how th

Bananas a drugs for HIV, say s

BBC

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26 March 2012 Last updated at 21:02 ET

Chocolate 'may help keep people slim'

COMMENTS (251)

By Michelle Roberts

Health reporter, BBC News

Mail Online



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US military now say they believe



Four people feared dead after



Jailed wife who helped Mick



'Princess Diana leaked Buckingham

And now it's global COOLING! Return of Arctic ice cap as it grows by 29% in a year

• 533,000 more square miles of ocean covered with ice than in 2012

Fracking could lead to an 'earthquake domino effect' as it weakens fault lines deep in the earth's crust, scientists claim

- **Scientists from Columbia University have claimed that earthquakes could be caused by pressure on fault lines created by hydraulic fracturing**
- **Danger occurs when the activity is agitated by distant earthquakes that can trigger tremors near waste water injection wells, they said**
- **Seismologists from the university have identified three quakes that were triggered at injection well sites by a major earthquake a long distance away**

By SARAH GRIFFITHS

PUBLISHED: 09:22 EST, 12 July 2013 | UPDATED: 04:57 EST, 13 July 2013

Fracking causes as much seismic activity as 'jumping off a ladder': Controversial method for extracting gas is 'extremely unlikely to trigger an earthquake we would feel'

- **Fracking is blasting underground rock deposits with water and chemicals**
- **It releases trapped gas pockets and was blamed for starting earthquakes**
- **But study says it's very unlikely we'll feel earthquakes caused by fracking**

By [NICK MCDERMOTT](#)

PUBLISHED: 19:39 EST, 9 April 2013 | **UPDATED:** 01:48 EST, 10 April 2013

COCOA KRISPIES



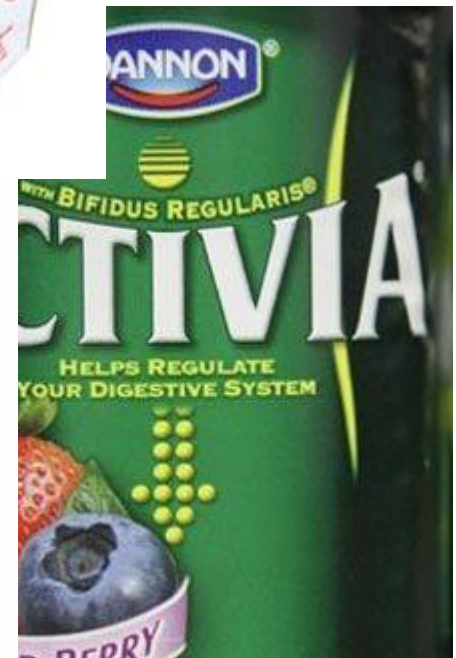
NOW HELPS SUPPORT YOUR CHILD'S
IMMUNITY

25
DAILY VALU
ANTIOXIDA
& NUTRIE
VITAMIN
A,B,C &

NET WT. 16.5 OZ. (1 LB. 0.5 OZ.)

Cheat death.

The antioxidant power of pomegranate juice:



MMR vaccine and the media

The Telegraph

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US scientists back autism link to MMR

By [Beezy Marsh](#) and [Sally Beck](#)

12:01AM BST 29 May 2006

 [Comment](#)

The measles virus has been found in the guts of children with a form of autism, renewing fears over the safety of the MMR jab.

American researchers have revealed that 85 per cent of samples taken from autistic children with bowel disorders contain the virus. The strain is

[Health](#)
[Health](#)

[In Hea](#)





100 measles cases reported in Fraser Valley outbreak

Fraser Health warns cases of measles now entering general population in Chilliwack and Agassiz

CBC News Posted: Mar 14, 2014 7:04 AM PT | Last Updated: Mar 14, 2014 11:18 AM PT



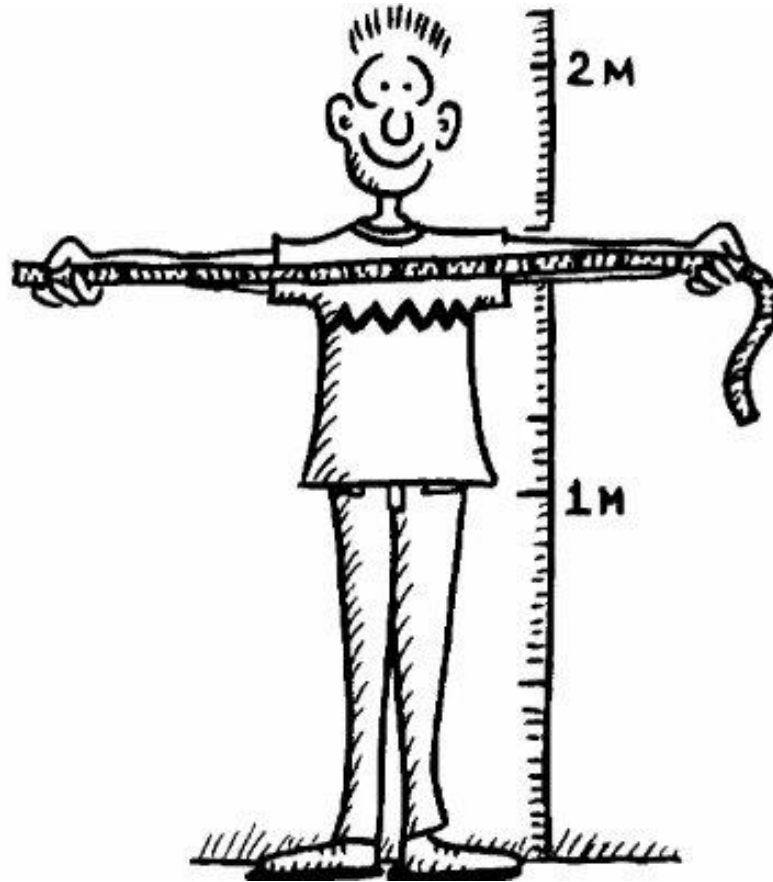
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Data 101



**Step 1: Is it important?
Do you care?**

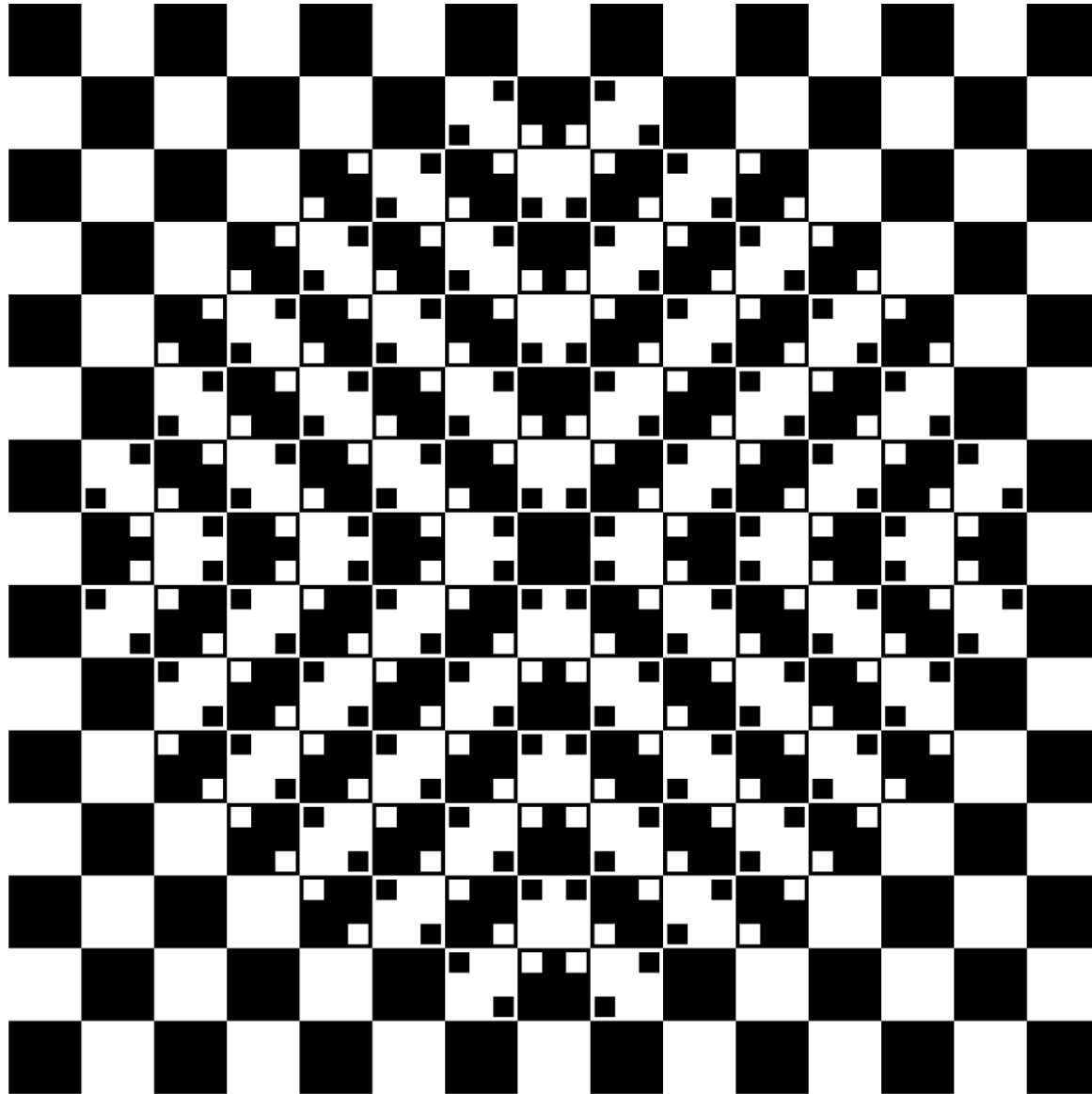
Study: Watching Fox News Makes You Less Informed Than Watching No News

By Michael Kelley



Step 2: Know our biases

Why our biases matter!!



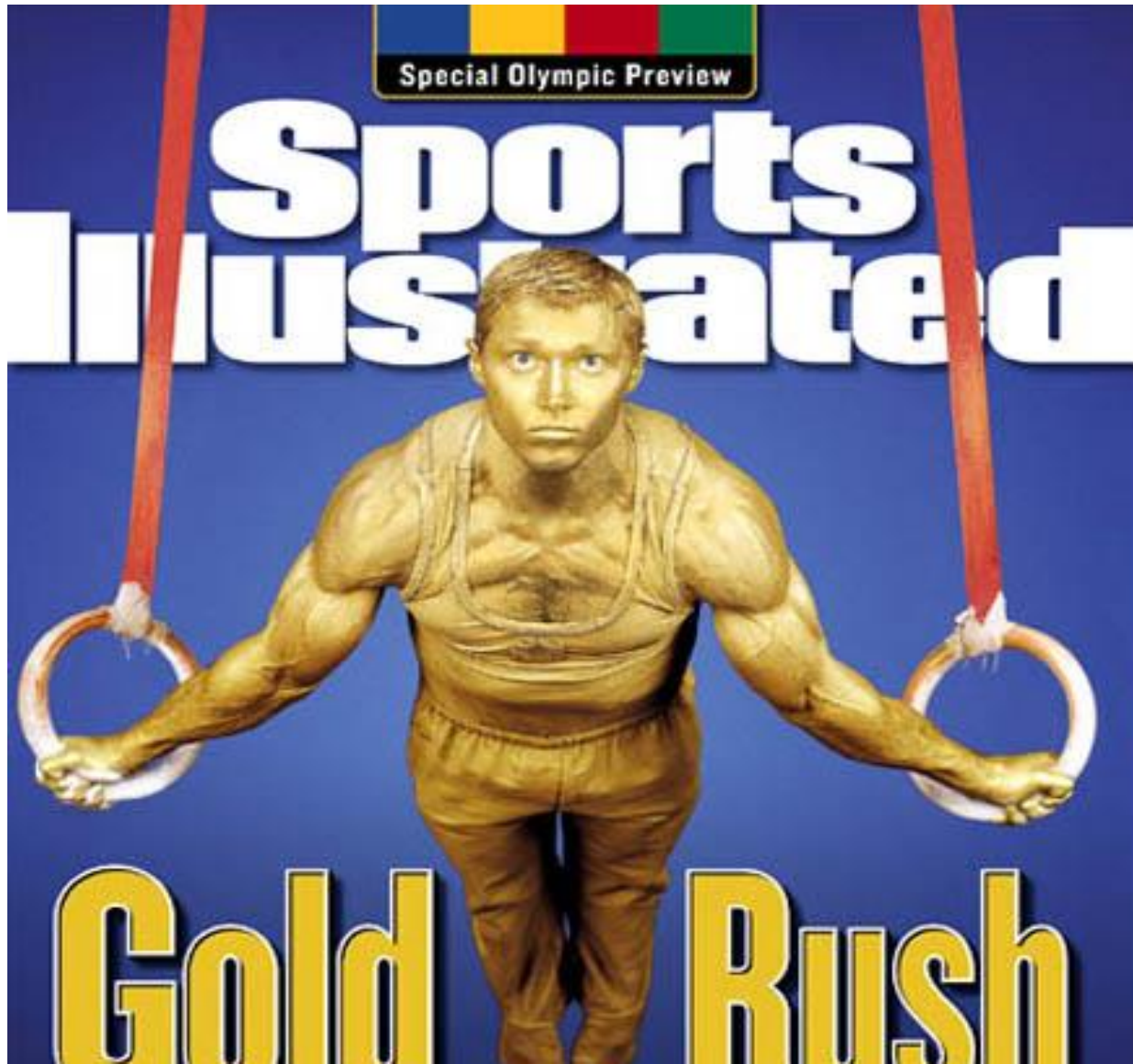
Randomness



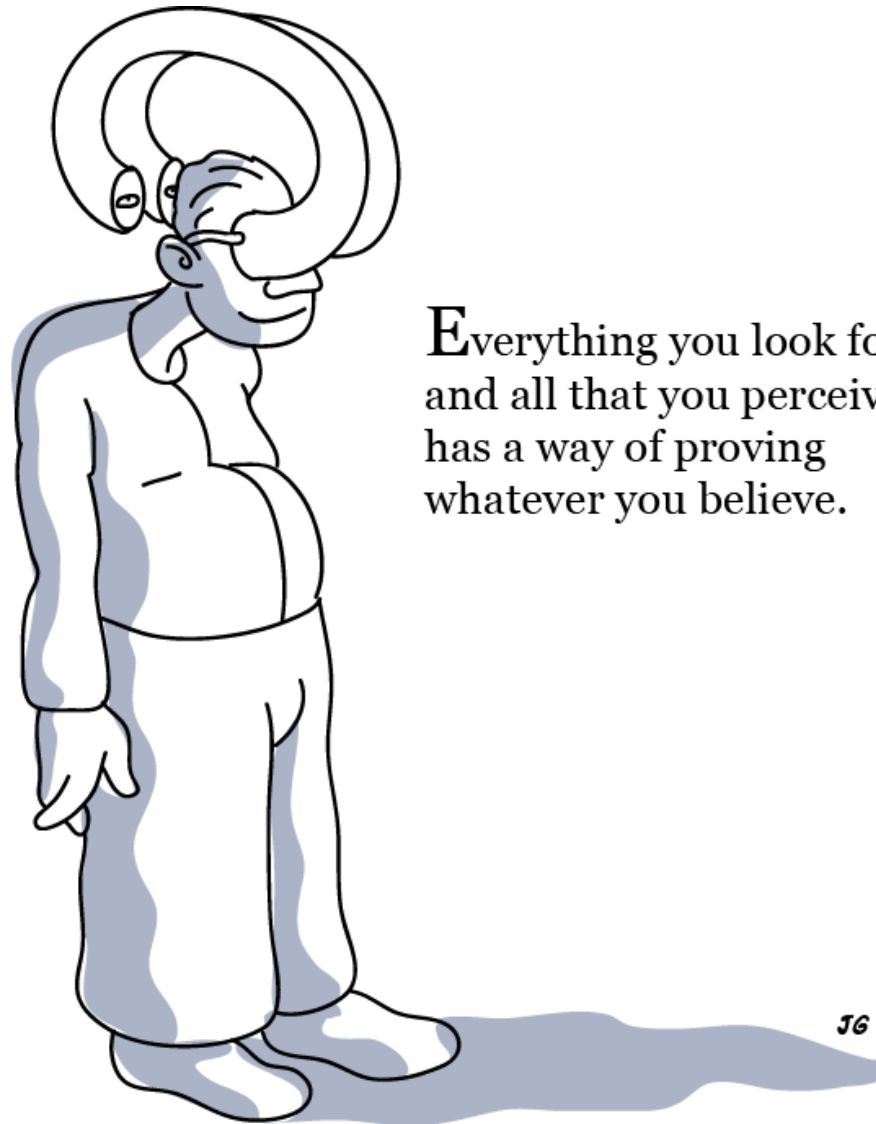
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Regression to the mean

Regression to the mean



Conformation bias

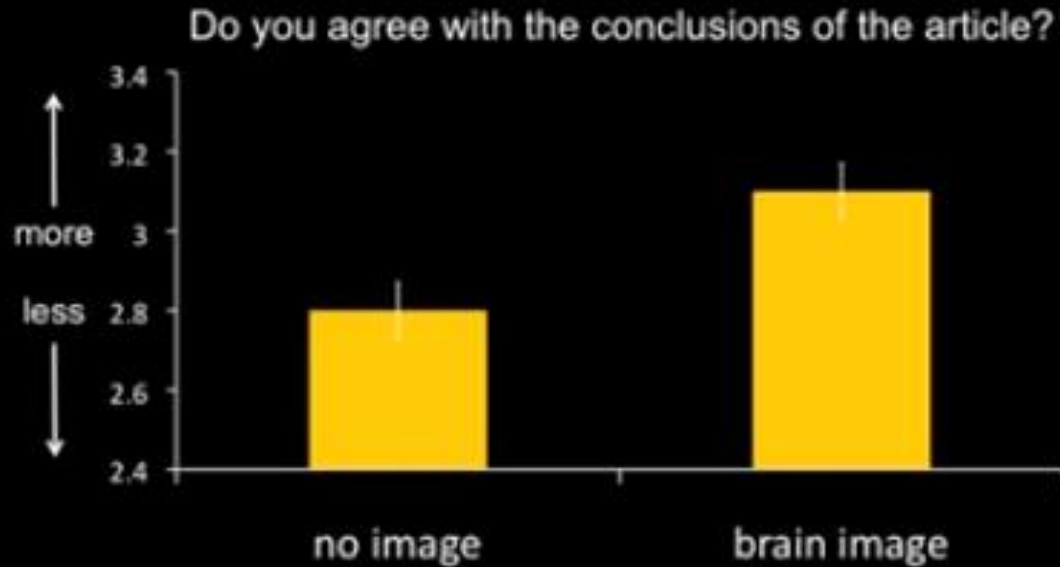


Pictures of brains



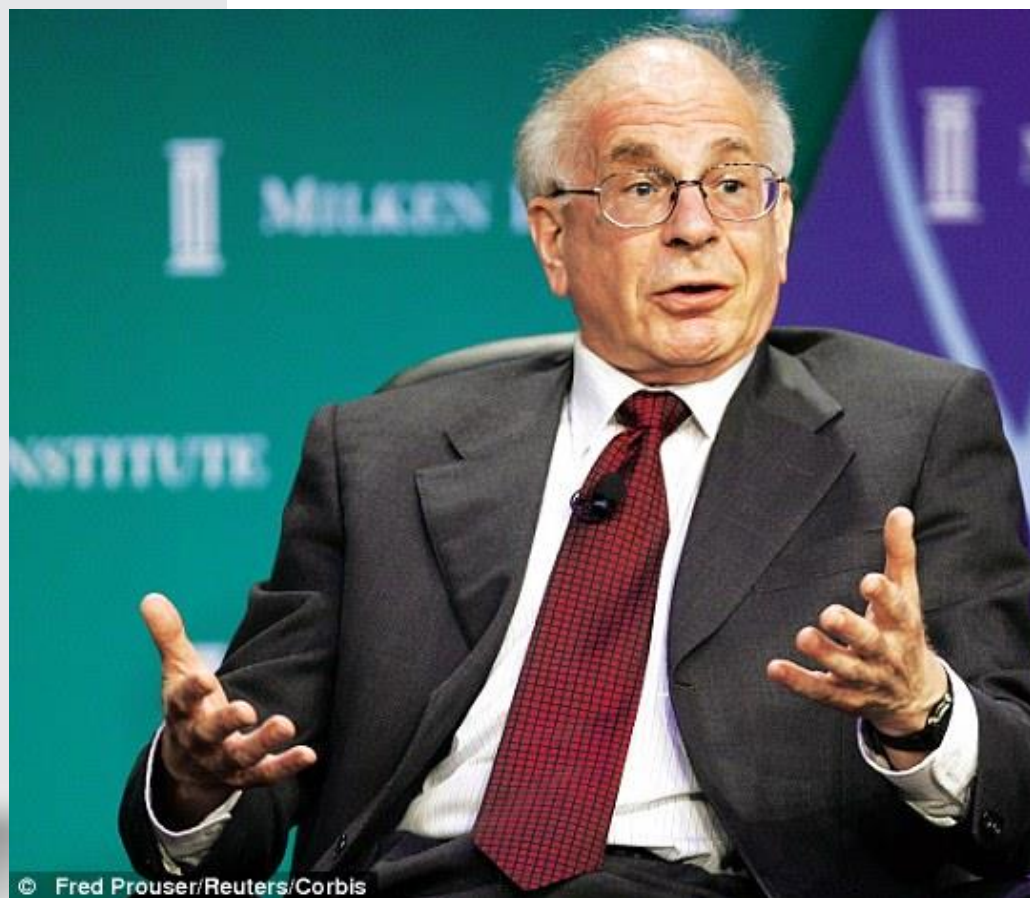
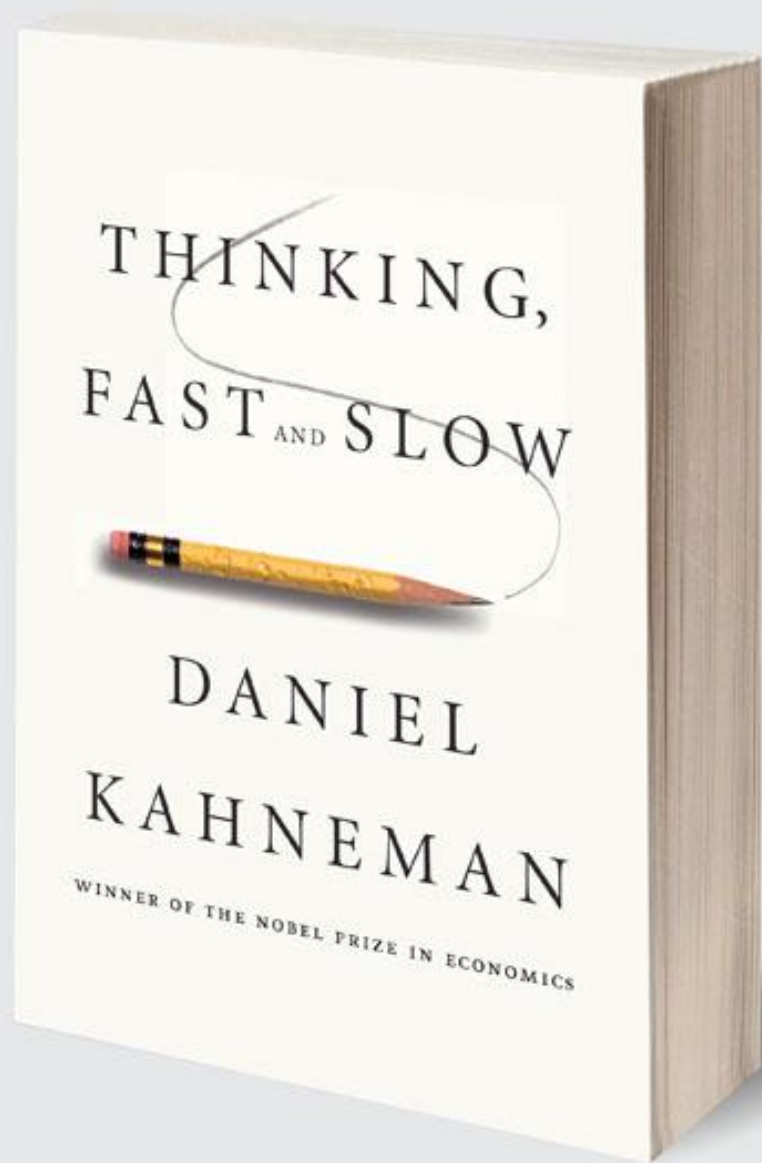
Pictures of brains

brains sell.



UCI

McCabe & Castel, 2008



© Fred Prouser/Reuters/Corbis

**Step 3: What does the
number actually
mean?**

Is it a big number?

theguardian

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Two glasses of wine a day 'triples mouth cancer risk'

Government campaign to warn that drinking just over recommended limit increases risk of serious health problems

Press Association
The Guardian, Sunday 5 February 2012 10.15 GMT



Article history

Society
[Alcohol](#) · [Cancer](#) · [Health](#)
· [NHS](#)

Politics
[Health policy](#) · [Diane Abbott](#) · [Andrew Lansley](#)

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Is it a big number?

theguardian

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Two glasses of wine a day 'triples mouth cancer risk'

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Press Association
The Guardian, Sunday 5 February 2012 10.15 GMT



Article history

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AWARDS

CODE

information

NONPROFIT

The Oral Cancer Foundation

The Oral Cancer Foundation is a national public service, non-profit entity designed to reduce suffering through education, research, advocacy, and patient support activities. Oral cancer is the largest group of head and neck cancer category. Common names for it include such things as mouth cancer, tongue cancer

Approximately 43,250 people in the US will be newly diagnosed with oral cancer in 2014. This

Is it a big number?

theguardian

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0.00013% get mouth cancer
per year in the USA
Triple this: **0.00041%**

The Oral Cancer Foundation

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Approximately 43,250 people in the US will be newly diagnosed with oral cancer in 2014. This

How does it compare?

AWARDS

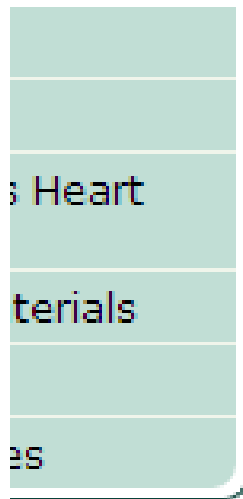
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Information

NONPROFIT

The Oral Cancer Foundation

The Oral Cancer Foundation is a national public service, non-profit entity designed to reduce suffering through education, research, advocacy, and patient support activities. Oral cancer is the largest group of the head and neck cancer category. Common names for it include such things as mouth cancer, tongue cancer, throat cancer, and larynx cancer. **Approximately 43,250 people in the US will be newly diagnosed with oral cancer in 2014.** This includes approximately 10,000 deaths.



- Heart disease is the leading cause of death for both men and women. **More than half** of the deaths due to heart disease in 2009 were in men.¹
- Coronary heart disease is the most common type of heart disease, killing more than **385,000 people** annually.¹
- Every year about **715,000 Americans** have a heart attack. Of these, 525,000 are a first heart attack and 190,000 happen in people who have already had a heart attack.²

How does it compare?

AWARDS

CODE

Information

NONPROFIT

The Oral Cancer Foundation

The Oral Cancer Foundation is a national public service, non-profit entity designed to reduce suffering through education, research, advocacy, and patient support activities. Oral cancer is the largest group of head and neck cancers, with about 37,000 new cases and 17,000 deaths in the United States each year. The Oral Cancer Foundation is a national public service, non-profit entity designed to reduce suffering through education, research, advocacy, and patient support activities. Oral cancer is the largest group of head and neck cancers, with about 37,000 new cases and 17,000 deaths in the United States each year.

Over 16 times more people have a heart attack compared to getting mouth

terials

es

- Every year about **775,000 Americans** have a heart attack. Of these, 525,000 are a first heart attack and 190,000 happen in people who have already had a heart attack.²

www.cdc.gov/heartdisease/facts.htm

**Step 4: Who reported
or produced the data?**

People trying to sell you something?

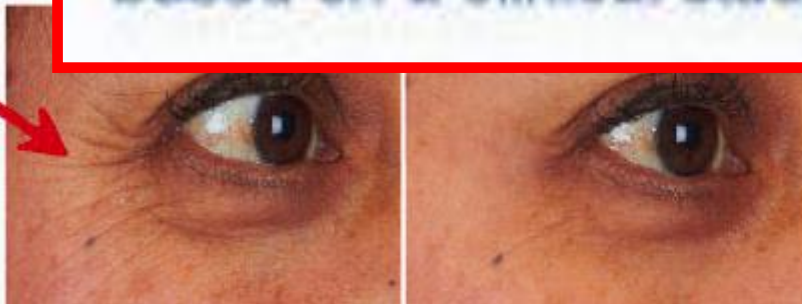


Hydroxatone®  Clinical Proven Results

Scientifically Advanced Hydroxatone® AM/PM is proven to produce **REAL RESULTS**.
Participants in our Hydroxatone® Independent Clinical Study agreed:

✓ 97% say they would recommend Hydroxatone® to a friend

*based on a clinical study of 38 participants after 8 weeks



Combining Hydroxatone® and Instant Effect® results in immediate and long term anti-aging benefits!

People trying to sell you something?



Hydroxatone®  Clinical Proven Results
Rejuvenating beauty through science

Scientifically Advanced Hydroxatone® AM/PM is proven to produce **REAL RESULTS**.
Participants in our Hydroxatone® Independent Clinical Study agreed:

✓ 97% say they would recommend Hydroxatone® to a friend

✓ 90% noticed a visible reduction in wrinkles and fine lines

✓ 84% received compliments on their skin after using Hydroxatone®

*based on a clinical study of 32 participants

All the results are SELF-REPORTED

Campaigning organisations? Charities?

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Oxfam: 85 richest people as wealthy as poorest half of the world

As World Economic Forum starts in Davos, development charity claims growing inequality has been driven by 'power grab'

Graeme Wearden

theguardian.com, Monday 20 January 2014 09.24 GMT

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[Economics](#)

Political Party?



News

Middle class families better off with Harper

February 25, 2014

A new report from Statistics Canada shows middle class families are better off today thanks to the leadership of Prime Minister Stephen Harper.

The Survey of Financial Security found that the average net worth of Canadian families is up 44.5% since 2005 – and the largest increase occurred for families in the middle class.

Our plan is working. We have the best economy in the G7. Canada has added more

Journalist?

Daily Mail  **GOOD HEALTH**
TUESDAY, FEBRUARY 24, 2009 www.dailymail.co.uk DAILY NEWSPAPER OF THE YEAR 50p **STARTS 96c**

As Jade makes a fortune and the University Challenge winner is vilified for being bright...

WHY IS IT CLEVER TO BE DUMB?

PAGES 28-29



Top neuroscientist's warning to parents

SOCIAL WEBSITES 'HARM A CHILD'S BRAIN'

SOCIAL networking websites are causing alarming changes in the brains of young users, an eminent scientist has warned.

After tests on a notebook, Twitter and MySpace are said to

have caused a 10 per cent increase in the thickness of the brain's grey matter, which is the part of the brain that processes information.

The study, published in the journal *NeuroImage*, found that the brains of young people who spent more than 10 hours a week on social networking sites had a thicker layer of grey matter in the brain's prefrontal cortex, which is the part of the brain that is responsible for decision-making and social behaviour.

The study also found that the brains of young people who spent more than 10 hours a week on social networking sites had a thicker layer of grey matter in the brain's amygdala, which is the part of the brain that is responsible for processing emotions.

The study was carried out by a team of researchers from the University of Cambridge, the University of Oxford and the University of Edinburgh.

The researchers used a technique called magnetic resonance imaging (MRI) to scan the brains of young people who had used social networking sites for at least a year.

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The researchers used a technique called magnetic resonance imaging (MRI) to scan the brains of young people who had used social networking sites for at least a year.



She has all the trappings of a star: a red carpet, a crowd of photographers and a host of admirers.

Moment of glory for the girl from a slumdog shack

SEE PAGE THREE

Step 5: Is it a survey?

It is very easy to manipulate surveys



Self reporting



 Print  Close

Eating large amounts of meat, cheese may be as deadly as smoking, study shows

By Amanda Woerner

Published March 04, 2014 | FoxNews.com

Could a diet rich in meat and cheese be just as deadly as smoking cigarettes? New research from the University of Southern California indicates that consuming high levels of animal proteins could be detrimental to a person's health, according to a study published in the journal *Cell Metabolism*.

Eating a hamburger, or other forms of animal protein, elevates levels of the growth hormone IGF-1 in the human body. In children, IGF-1 helps promote growth and development – but in adulthood, high levels of the hormone have been linked to an increased risk for cancer and other age-related disease, according to study author Valter Longo, director of the University of Southern California's Longevity Institute.

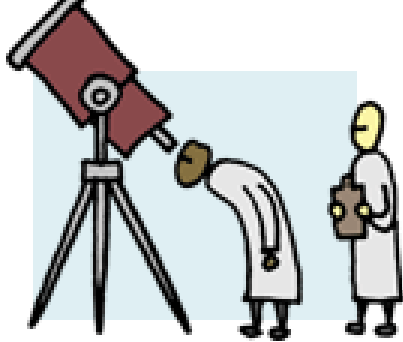
Knowing that IGF-1 was linked to increased mortality, Longo and his fellow researchers began

Make your own biased survey!

- What method (and time?) would you contact people?
- What questions would you ask?
- How would you phrase the question?
- Anything else?

**Step 6: Is it peer
reviewed?**

The peer review process



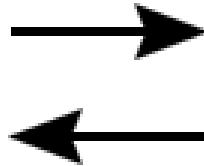
Scientists study something.



Scientists write about their results.



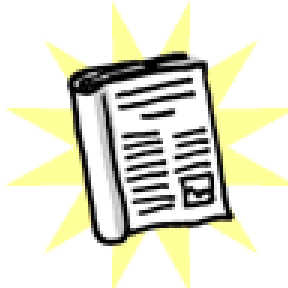
Journal editor receives an article and sends it out for peer review.



Peer reviewers read the article and provide feedback to the editor.



Editor may send reviewer comments to the scientists who may then revise and resubmit the article for further review. If an article does not maintain sufficiently high scientific standards, it may be rejected at this point.



If an article finally meets editorial and peer standards it is published in a journal.

**Step 7: Is it a
randomized,
controlled trial?**

Controls and Randomization



Double blind study



**Step 8: Is it too
simplistic?**

Things are really complicated!!

theguardian

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Two glasses of wine a day 'triples mouth cancer risk'

Government campaign to warn that drinking just over recommended limit increases risk of serious health problems

Press Association
The Guardian, Sunday 5 February 2012 10.15 GMT



Article history

Society

Alcohol - Cancer - Health - NHS

Politics

Health policy - Diane Abbott - Andrew Lansley -

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Red wine and chocolate can boost your brain power

It's the perfect excuse to have that extra glass of red wine and spoonful of chocolate dessert - research has shown that **ingredients in both might make you brainier.**



Food and Drink

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**Step 9: Is it just a
correlation?
(Correlation DOES
NOT mean
causation!!)**

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Wednesday, May 12, 1999 Published at 19:11 GMT 20:11 UK

Health

Night light 'damages children's eyes'



Children should sleep in the dark

Children who sleep with a light on during the night could

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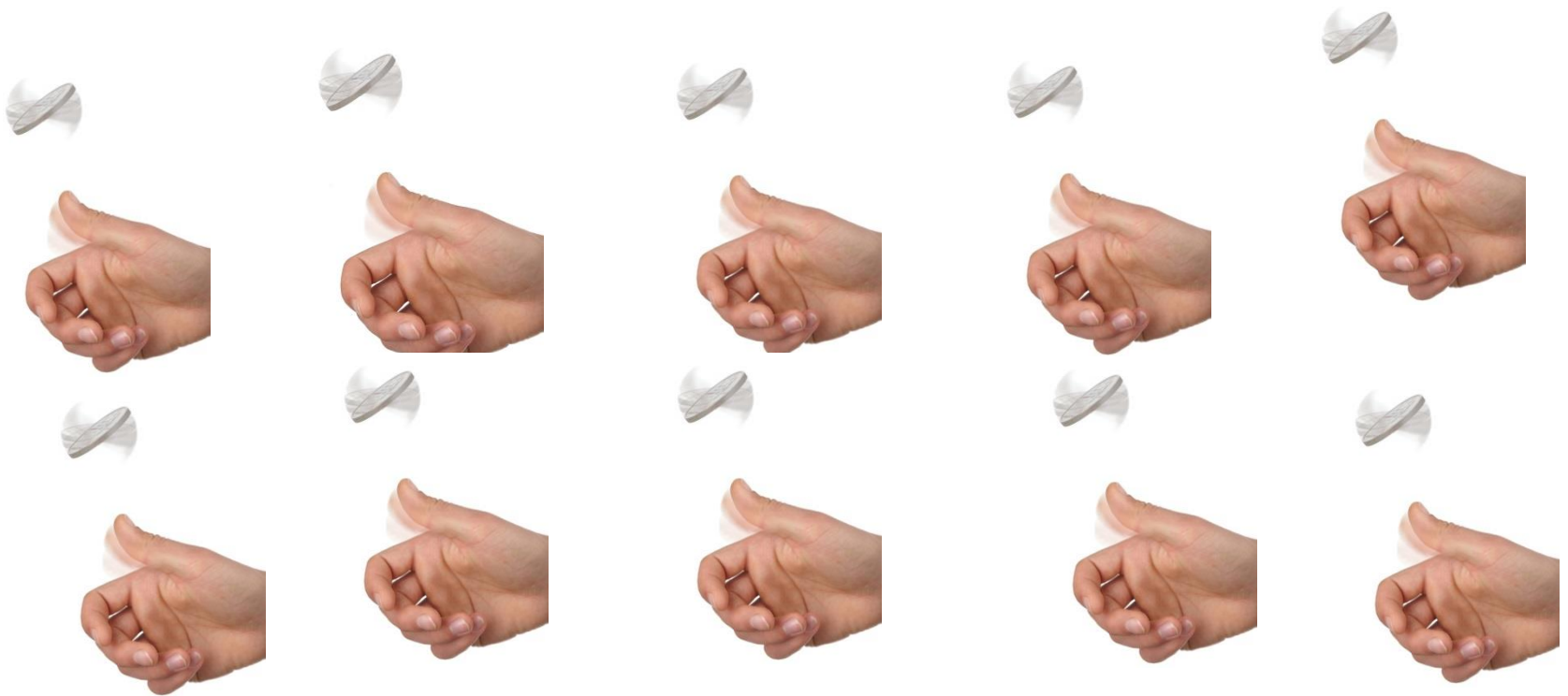
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Spot the covariates?
(Other things that could
affect the results apart from
the thing reported)

**Step 10: Is it a meta-
analysis?
(Study of studies)**

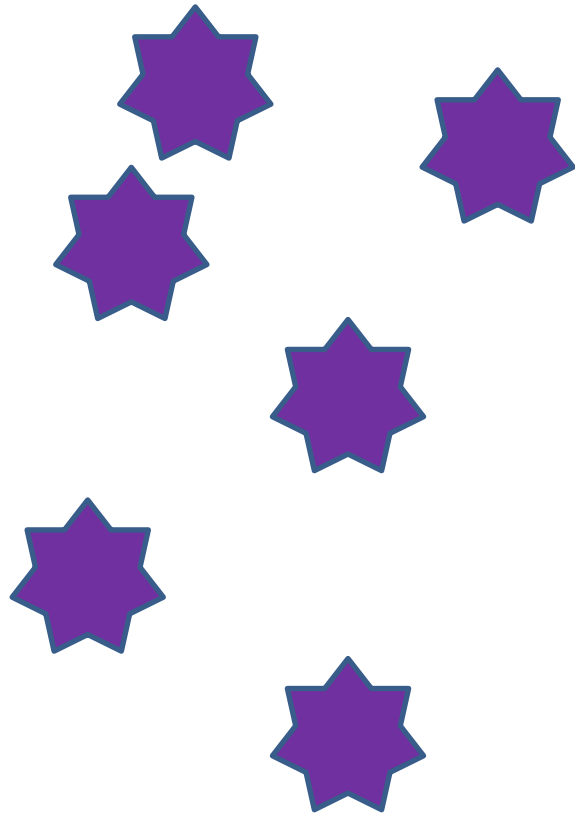


To get all heads only 16 goes

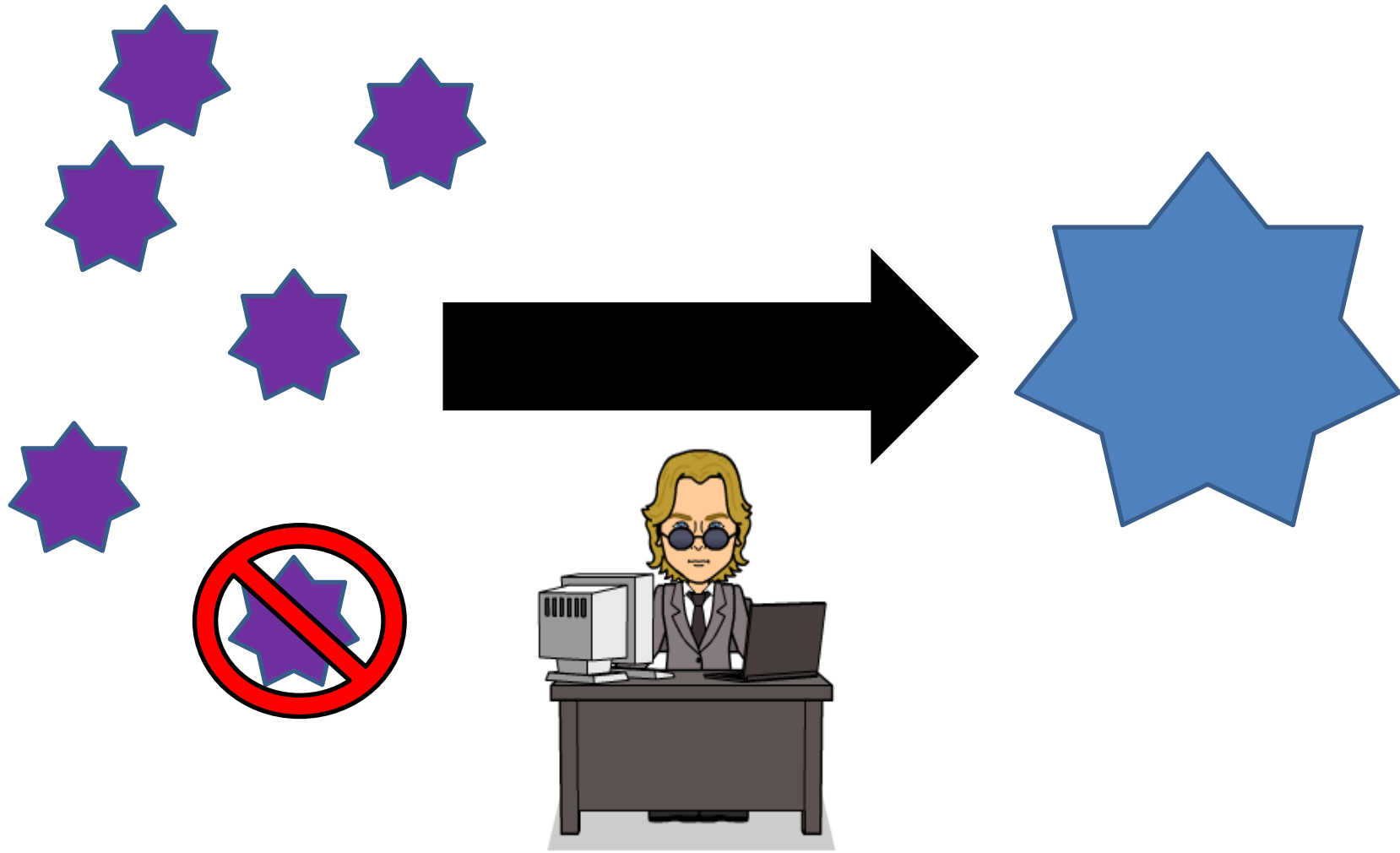


To get all heads 1024 goes

What is a meta-analysis?



What is a meta-analysis?



23 January 2014 Last updated at 21:50 ET

<http://www.bbc.com/news/health-25861078>

Vitamin D not needed for healthy people, study finds



Many healthy people take vitamin D supplements

There is little reason to prescribe vitamin D supplements to healthy adults to reduce the risk of diseases or fractures, say researchers writing in the Lancet.

They found no significant reduction in risk in any area after analysing more than 100 trials.

Related Stories

[Vitamin D 'no effect' on the healthy](#)

[Vitamin D's disease role queried](#)

Some reasons things may go wrong

- Selling a product
 - Homeopathy
 - Big Pharma
 - Newspapers
 - Cosmetics
 - Food
- Research Funding
- Graduate students and profs wanting to publish ⇒ “publish or perish”

Recap: The 10-Step Guide

Step 1: Is it important? Do you care?

Step 2: Know our biases

Step 3: What does the number actually mean?

Step 4: Who reported or produced the data?

Step 5: Is it a survey?

Step 6: Is it peer reviewed?

Step 7: Is it a randomized, controlled trial?

Step 8: Is it too simplistic?

Step 9: Is it just a correlation?

Step 10: Is it a meta-analysis (a study of studies)?