

Wie lügt man mit Statistik — Die besten Tricks

Prof. Dr. Michael Dreher

Lange Nacht der Wissenschaften 2018

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Komplett erfundene Daten

Grober Unfug

SCOTCEN POLL OF POLLS

SHOULD
SCOTLAND BE
INDEPENDENT?



NO
52%

YES
58%

LIVE

CNN

NAS ▲ 28.30

HAS KILLED MORE THAN 2,600 IN WEST AFRICA, WORLD HEALTH ORG. [F](#) @BROOKEBCNN

talks should happen soon.

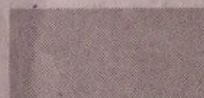
Question Of The Day

**What should cost less: a
gallon of gas or a gallon of milk?**

**YES
43%**



**NO
57%**



To record your answer to the Question
of the Day and other polls about today's
news, visit www.post-journal.com.

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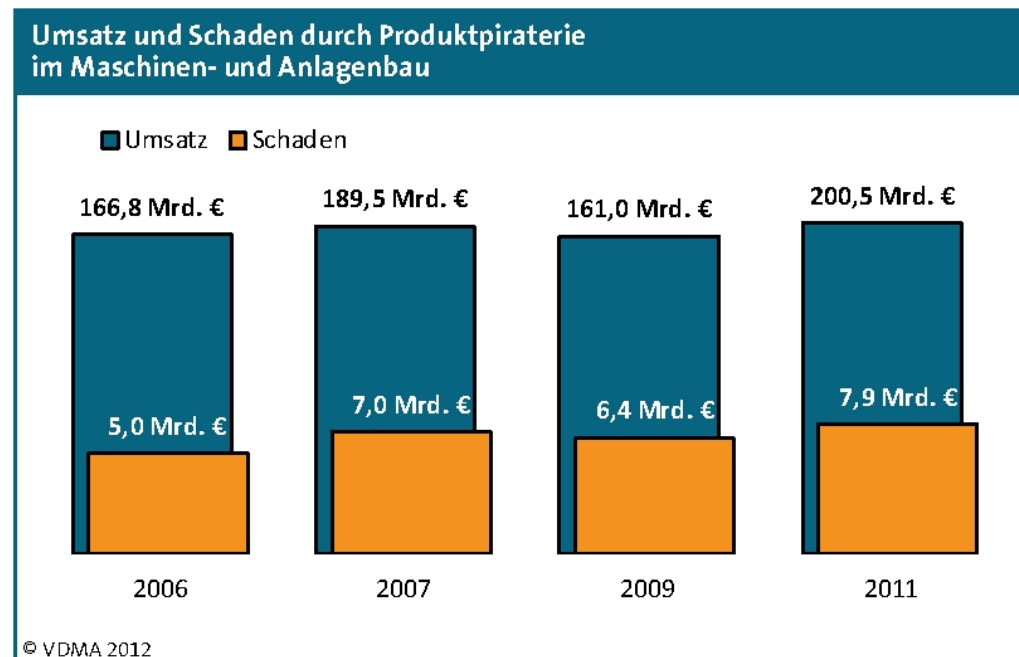
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4 Unternehmensschaden

Der geschätzte Umsatzschaden, der deutschen Maschinen- und Anlagenbauern in 2011 entstand, beträgt 7,9 Milliarden Euro². Damit stieg der Schaden gegenüber 2009 um 24 Prozent an und hat einen neuen Rekord erreicht. Ein Umsatzanteil in dieser Höhe entspricht ca. 37.000 Arbeitsplätzen im Maschinen- und Anlagenbau.

Der höhere Schaden entsteht in erster Linie durch den seit der Wirtschafts- und Finanzkrise 2009 gestiegenen Gesamtumsatz der Branche. Der Anteil am Unternehmensumsatz entspricht mit vier Prozent in etwa dem gleichen Niveau wie 2009.

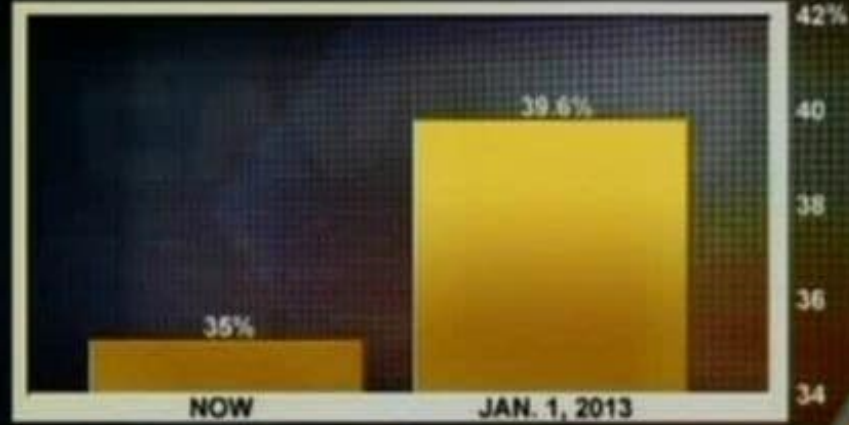


Branchenumsatz und Schaden durch Produktpiraterie in Deutschland im Vergleich

N=405

IF BUSH TAX CUTS EXPIRE

TOP TAX RATE



8:01p ET

FOX
BUSINESS

TOP STORIES

TECHNOLOGY

CONSUMER

WITH THE JUSTICE DEPARTMENT AND ACQUIRES FULL T

DOW 13008.68 ∇ 64.33

S&P 1379.32 ∇ 5.98

NASDAQ 2939.52 ∇ 6.32

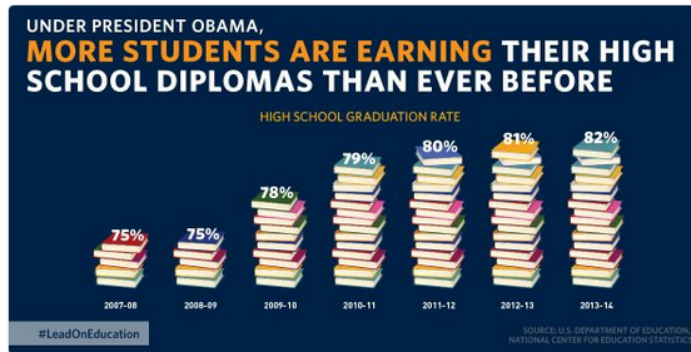


White House Archived

@ObamaWhiteHouse

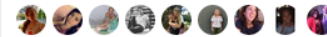
Folgen

Good news: America's high school graduation rate has increased to an all-time high. 🎓 wapo.st/1m40Mei



10:11 - 16. Dez. 2015

359 Retweets 479 „Gefällt mir“-Angaben



51 359 479



Jim M @VMsyspro · 16. Dez. 2015

Antwort an @ObamaWhiteHouse

@WhiteHouse @potus @PressSec So, maybe "No Child Left Behind" wasn't so bad after all.

51 359 479



David Salcido @Vote4I · 16. Dez. 2015

Antwort an @ObamaWhiteHouse

@WhiteHouse "Yeah right, more HI-School Diplomas Issued under 'CAN'T FAIL policies?!" WHOOPEE!!!"

1 2

White House

@ObamaWhiteH

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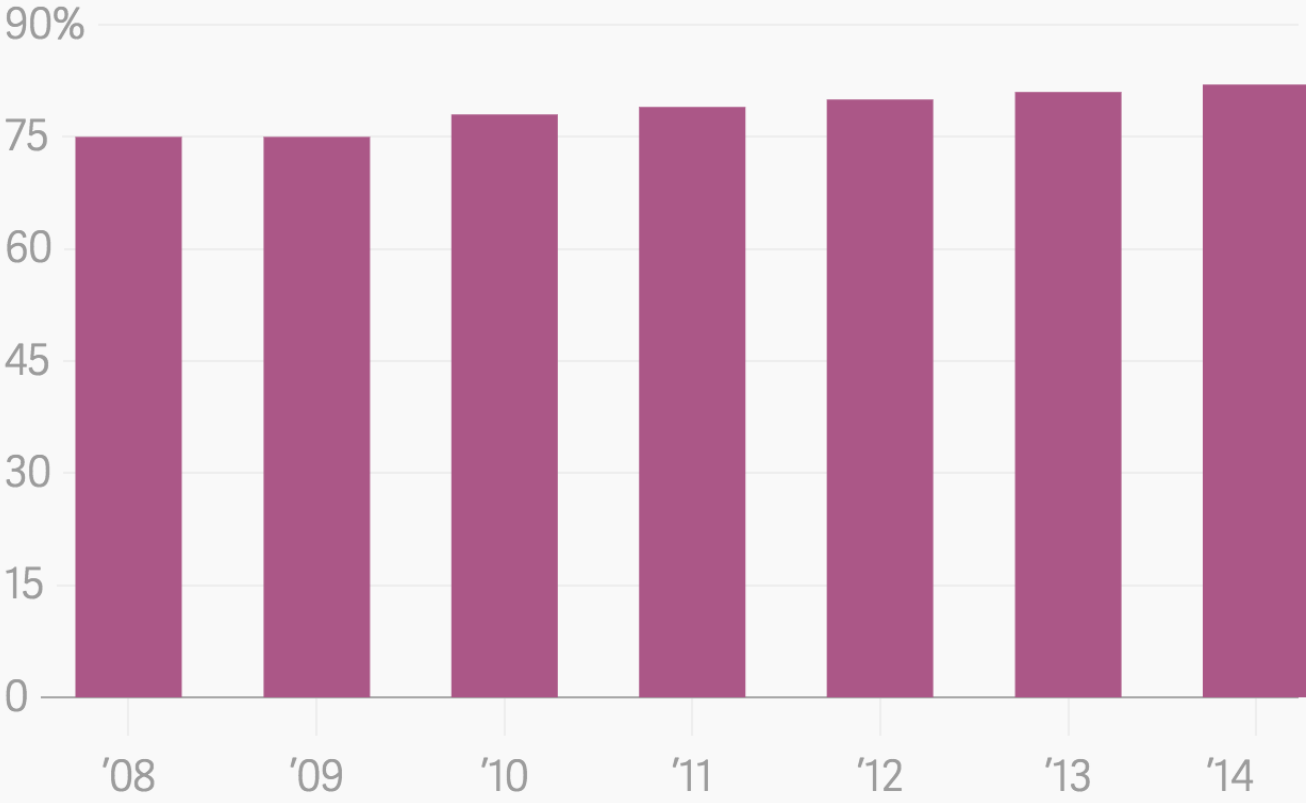
Melde dich jetzt a

Folgen

17





High school graduation rates in the US

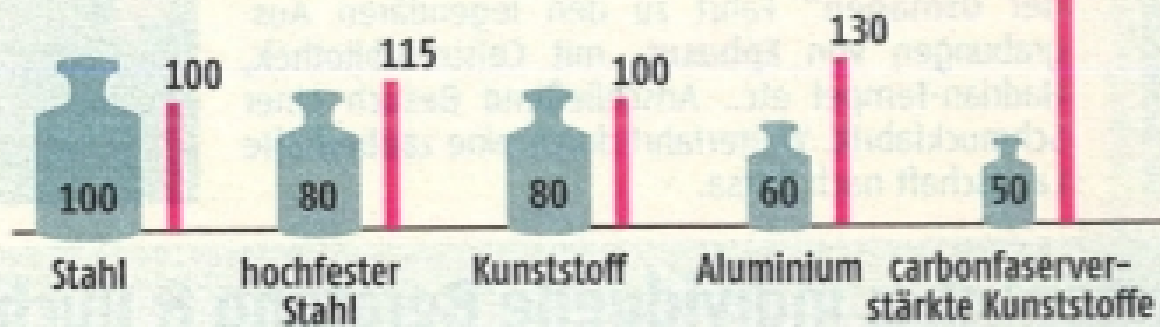


So teuer ist Leichtbau

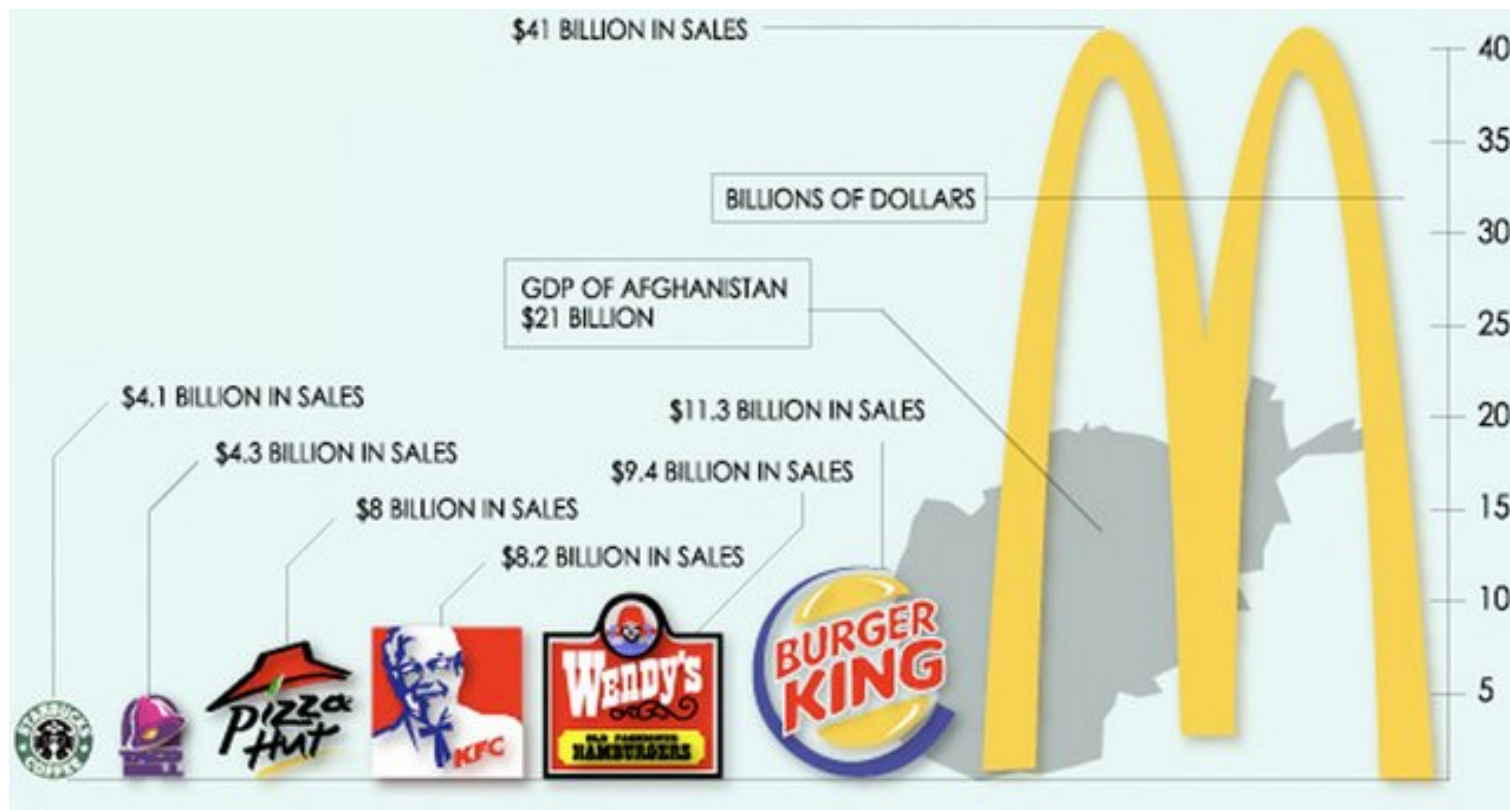
Carbon wiegt die Hälfte von Stahl, kostet aber 5,7 Mal mehr im Automobilbau.

 **Gewicht: Stahl = 100**

 **Preis: Stahl = 100**



Quellen: Zeitschrift Capital, SGL Group



Begriffliche Unschärfen

Begriffliche Unschärfe: Risiko

Oktober 1995, U.K. Committee on Safety of Medicine:

„die Pille der dritten Generation erhöht das Thromboserisiko um 100 % “

Begriffliche Unschärfe: Risiko

Oktober 1995, U.K. Committee on Safety of Medicine:

„die Pille der dritten Generation erhöht das Thromboserisiko um 100 % “

Gemeint war:

7000 Frauen nehmen Pille der zweiten Generation: 1 Thrombosefall

7000 Frauen nehmen Pille der dritten Generation: 2 Thrombosefälle

Begriffliche Unschärfe: Durchschnitt

Kleinunternehmen

Chef:	300.000 EUR / Jahr
10 Mitarbeiter:	je 30.000 EUR / Jahr
Durchschnitt:	$600.000 / 11$ $\approx 54.500 \text{ EUR / Jahr}$

Inhaltlich angemessener: Median anstatt arithmetischem Mittel

Korrelationen und Kausalzusammenhänge

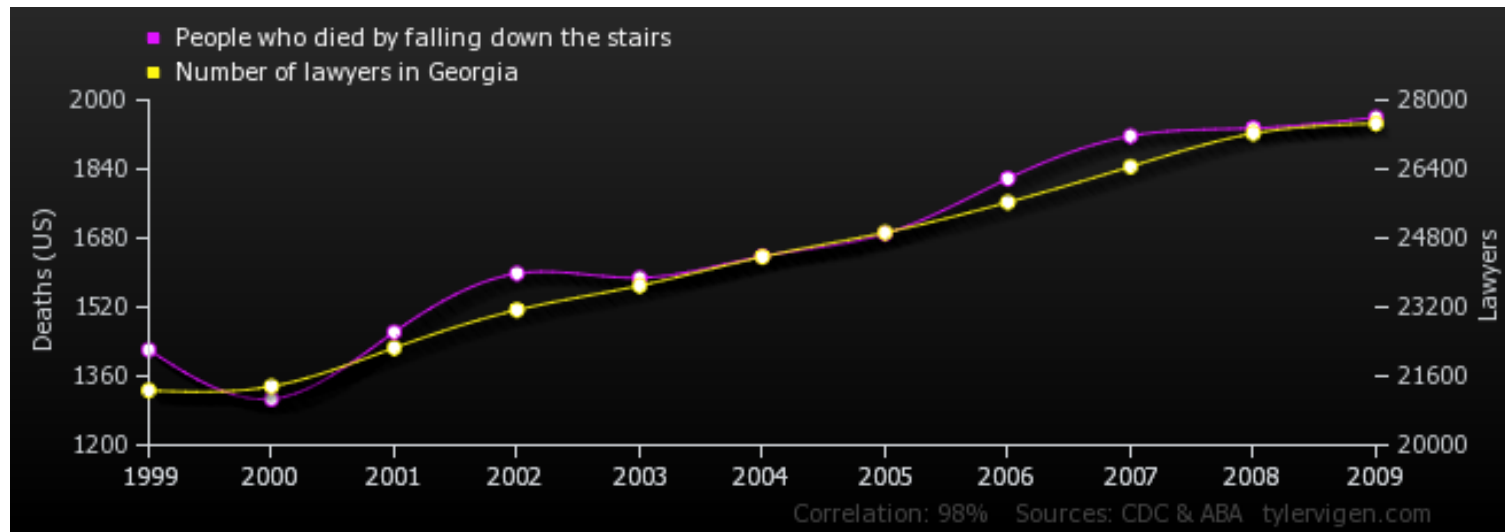
Korrelation bedeutet nicht immer Kausalzusammenhang

Der Korrelationskoeffizient zwischen zwei Zahlenreihen ist eine reelle Zahl zwischen -1 und $+1$, die „den Gleichklang zwischen den Zahlenreihen beschreibt“.

84	49	61	55	60	47	41	42	38	29	40	34	38	30	32	26	24	31
22	35	41	41	44	47	40	48	35	35	40	38	47	40	49	51	48	60

Für diese Tabelle: Korrelationskoeffizient ist -0.574 .

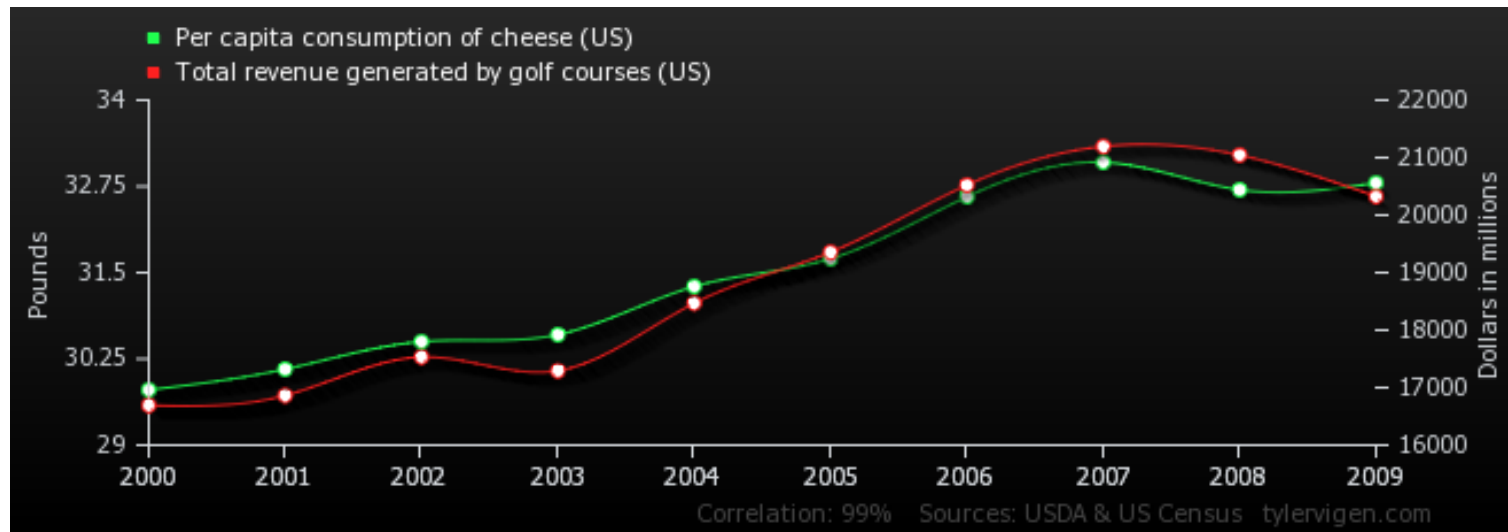
Todesfälle durch Treppensturz und Rechtsanwälte in Georgia



Korrelationskoeffizient ist $+0.984153$

Quelle: tylervigen.com

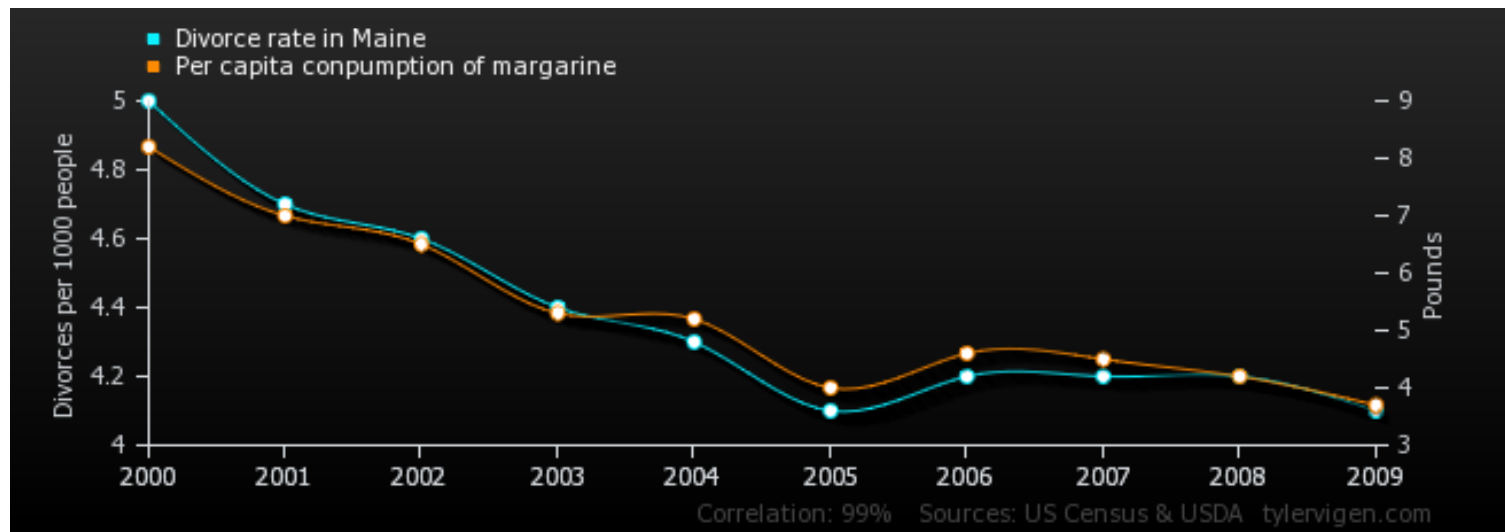
Pro-Kopf-Verbrauch an Käse und Gesamtumsatz von Golfplätzen



Korrelationskoeffizient ist $+0.9897$

Quelle: tylervigen.com

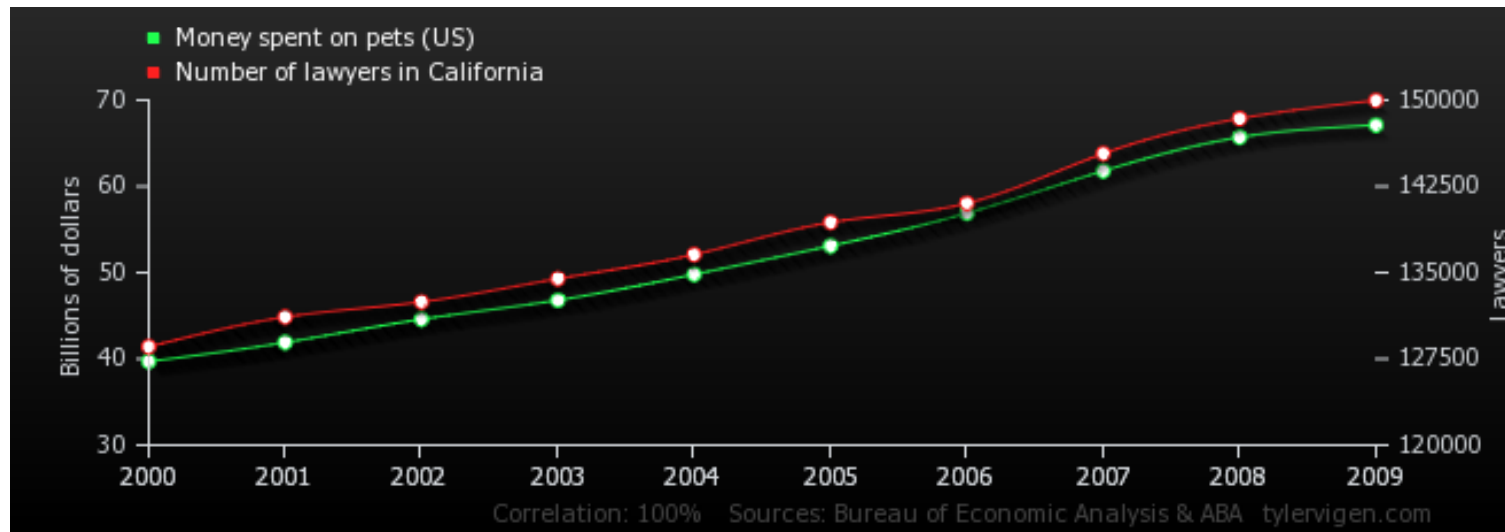
Scheidungsrate in Maine (USA) und Pro-Kopf-Verbrauch an Margarine



Korrelationskoeffizient ist $+0.992558$

Quelle: tylervigen.com

Ausgaben für Haustiere und Anzahl der Rechtsanwälte in Kalifornien



Korrelationskoeffizient ist $+0.998386$

Quelle: tylervigen.com

Genetically engineered crops, glyphosate and the deterioration of health in the United States of America

Nancy L. Swanson¹, Andre Leu^{2*}, Jon Abrahamson³ and Bradley Wallet⁴

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² *International Federation of Organic Agricultural Movements, Bonn, Germany*

³ *Abacus Enterprises, Lummi Island, WA, USA*

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Abstract

A huge increase in the incidence and prevalence of chronic diseases has been reported in the United States (US) over the last 20 years. Similar increases have been seen globally. The herbicide glyphosate was introduced in 1974 and its use is accelerating with the advent of herbicide-tolerant genetically engineered (GE) crops. Evidence is mounting that glyphosate interferes with many metabolic processes in plants and animals and glyphosate residues have been detected in both. Glyphosate disrupts the endocrine system and the balance of gut bacteria, it damages DNA and is a driver of mutations that lead to cancer.

In the present study, US government databases were searched for GE crop data, glyphosate application data and disease epidemiological data. Correlation analyses were then performed on a total of 22 diseases in these time-series data sets. The Pearson correlation coefficients are highly significant ($< 10^{-5}$) between glyphosate applications and hypertension (R = 0.923), stroke (R = 0.925), diabetes prevalence (R = 0.971), diabetes incidence (R = 0.935), obesity (R = 0.962), lipoprotein metabolism disorder (R = 0.973), Alzheimer's (R = 0.917), senile dementia (R = 0.994), Parkinson's (R = 0.875), multiple sclerosis (R = 0.828), autism (R = 0.989), inflammatory bowel disease (R = 0.938), intestinal infections (R = 0.974), end stage renal disease (R = 0.975), acute kidney failure (R = 0.978), cancers of the thyroid (R = 0.988), liver (R = 0.960), bladder (R = 0.981), pancreas (R = 0.918), kidney (R = 0.973) and myeloid leukaemia (R = 0.878).

The Pearson correlation coefficients are highly significant ($< 10^{-4}$) between the percentage of GE corn and soy planted in the US and hypertension (R = 0.961), stroke (R = 0.983), diabetes prevalence (R = 0.983), diabetes incidence (R = 0.955), obesity (R = 0.962), lipoprotein metabolism disorder (R = 0.955), Alzheimer's (R = 0.937), Parkinson's (R = 0.952), multiple sclerosis (R = 0.876), hepatitis C (R = 0.946), end stage renal disease (R = 0.958), acute kidney failure (R = 0.967), cancers of the thyroid (R = 0.938), liver (R = 0.911), bladder (R = 0.945), pancreas (R = 0.841), kidney (R = 0.940) and myeloid leukaemia (R = 0.889). The significance and strength of the correlations show that the effects of glyphosate and GE crops on human health should be further investigated.

Age Adjusted Kidney and Renal Pelvis Cancer Incidence

Plotted against glyphosate applied to corn & soy ($R = 0.9734$, $p \leq 1.98e-08$)
along with %GE corn and soy planted in U.S. ($R = 0.94$, $p \leq 1.978e-05$)
sources: USDA:NASS; SEER

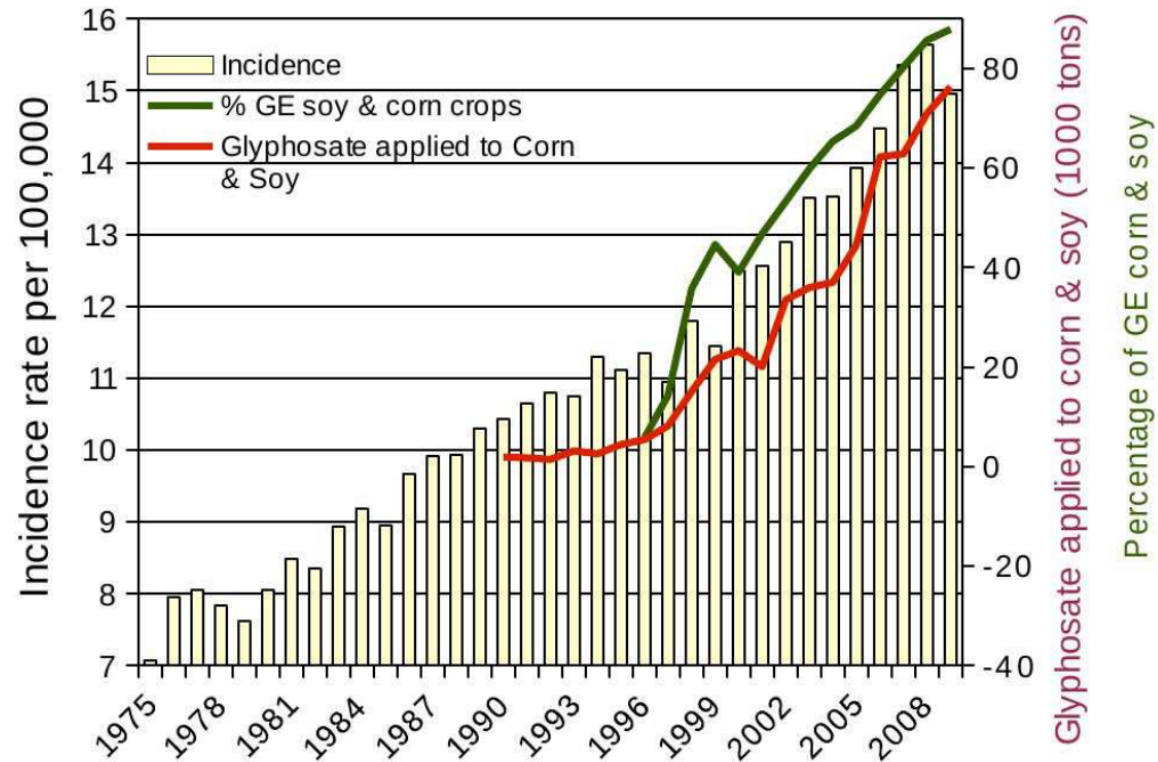
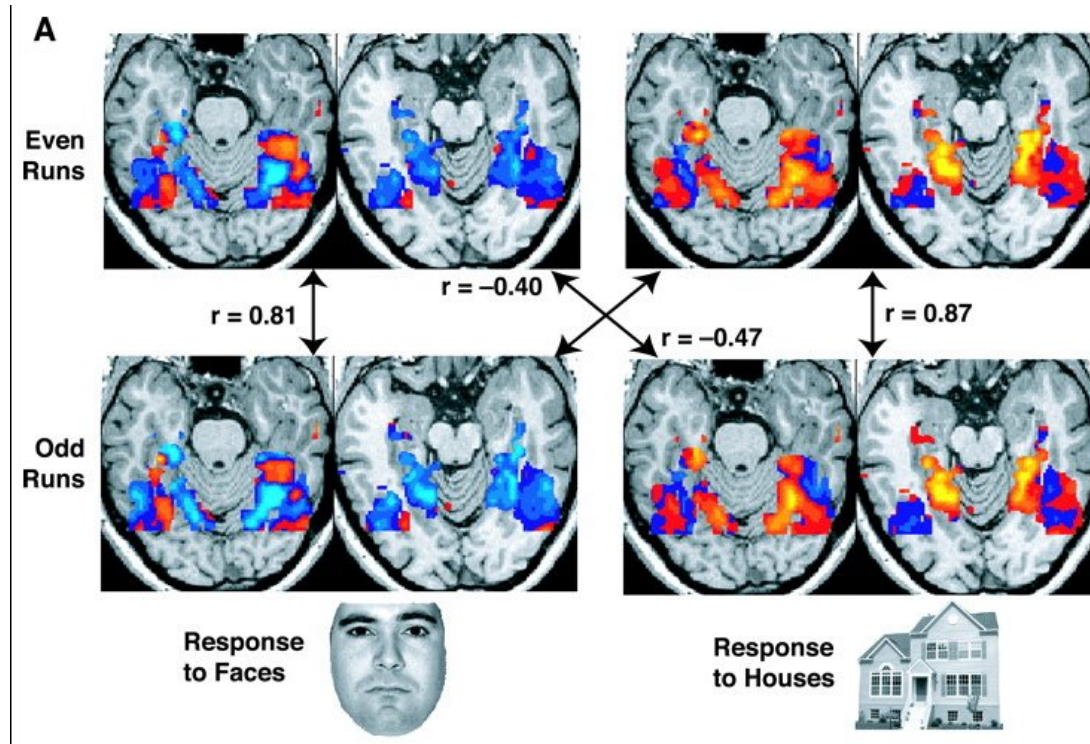


Figure 8. Correlation between age-adjusted kidney cancer incidence and glyphosate applications and percentage of US corn and soy crops that are GE.

Funktionale Magnetresonanztomographie



Quelle: National Institute of Mental Health. US Department of Health and Human Services

Alternatives Experiment zur Funktionalen MRT

- Proband befindet sich im MRT
- Proband bekommt mehrere Fotos mit Menschen in unterschiedlichen gesellschaftlichen Situationen zu sehen
- Proband soll mitteilen, wie eine bestimmte abgebildete Person sich vermutlich gefühlt hat
- Sauerstoffverbrauch für jede Teilregion des Gehirns wird gemessen

Quelle: C.M.Bennett et al., *Neural Correlates of Interspecies Taking in the Post-Mortem Atlantic Salmon: An Argument for Proper Multiple Comparisons Correction*, Journal of Serendipitous and Unexpected Results 2010

Das Ergebnis

Bennett et al.

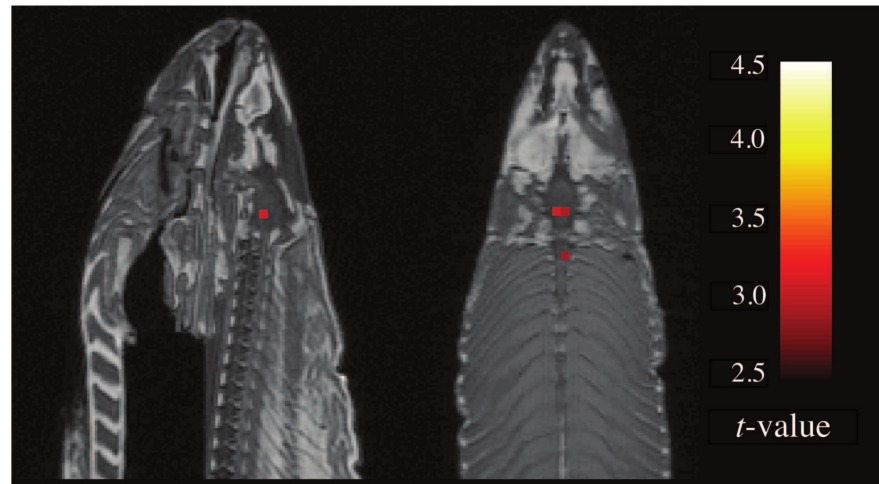


Fig. 1. Sagittal and axial images of significant brain voxels in the task > rest contrast. The parameters for this comparison were $t(131) > 3.15$, $p(\text{uncorrected}) < 0.001$, 3 voxel extent threshold. Two clusters were observed in the salmon central nervous system. One cluster was observed in the medial brain cavity and another was observed in the upper spinal column.

Quelle: C.M.Bennett et al., *Neural Correlates of Interspecies Taking in the Post-Mortem Atlantic Salmon: An Argument for Proper Multiple Comparisons Correction*, Journal of Serendipitous and Unexpected Results 2010