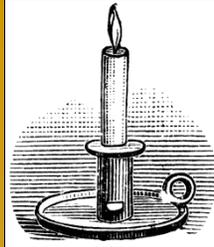




THE UNIVERSITY OF
ALABAMA AT BIRMINGHAM

Office
of
Energetics



David B. Allison, Ph.D.



*Myths, Mistakes and
Mis-information in Obesity*

Disclosure

I have received financial and other benefits from the following entities: the Frontiers Foundation; The Federal Trade Commission; The FDA; The Nutrition Science Initiative (NUSI), and numerous additional government, non-profit and for-profit (including publishing, food, beverage, and pharmaceutical companies) organizations with interests in obesity, nutrition, and health.

Email: Dallison@UAB.edu

Slides Available on Request

Acknowledgments:

Emily Dhurandhar	Andrew Brown
Ed Archer	Kathryn Kaiser
Dwight Lewis	Cynthia Kroeger
Greg Pavela	Patrice Capers
Tonia Schwartz	Rositsa Dimova
J. Michael Oakes	TaShauna Goldsby
Brandon George	Peng Li
Diana Thomas	Kevin Hall
Steve Heymsfield	Nikhil Dhurandhar
Dale Schoeller	Asheley Skinner
John Dawson	Scott Keith
Tapan Mehta	

The above named individuals have contributed to some of the research, slides, or ideas to be presented in this talk. Their inclusion here does not necessarily imply that they endorse the views presented. I apologize to anyone neglected.

Progress

Understanding

- Genetics and Genes
- Physiology
- Neuroscience
- Measurement (e.g., DLW; Body Composition)
- Stigma
- Etc.

Treatment (modest but tangible)

- Pharmaceutical
- Surgical
- Behavioral

Highly Limited to No Progress

- Public Health
- Policy
- Community
- Prevention

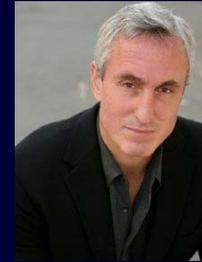
Obesity is Different

Suppose you are at a neighborhood party and someone asks you what you do:

1. “I study energetics and lifespan”
2. “I study statistical methods”
3. “I study obesity”

Thus, questions are being raised about the progress, value, scientific quality, and integrity of our field.

“The New Obesity Campaigns Have It All Wrong” or “Science, Pseudoscience, Nutritional Epidemiology, and Meat”



“...research is important to determine which of these well-intentioned policies and programs are working and for whom. ...What seems reasonable to try is not always effective and may even have unanticipated effects.”



“Implausible results in human nutrition research”



“Three Holes in the Obesity Evidence Base”



Outline

1. Framing the Issue: How Obesity May Be Different
2. Some Myths
3. A Taxonomy of Factors Contributing to Erroneous Beliefs or Impeding Advancement of Knowledge
4. Some Ongoing, Planned, and Proposed Steps in the Right Direction

Myths: Beliefs held true despite substantial refuting evidence.

Large, rapid weight loss is associated with poorer long-term weight outcomes than is slow, gradual weight loss.

Small sustained changes in energy intake or expenditure will produce large long-term weight changes, e.g., increasing daily intake by 2 potato chips will cause 10 kg of weight gain in 10 years.

Setting realistic goals in weight loss therapy is important because otherwise patients will become frustrated and lose less weight.

Assessing “stage of change” or diet “readiness” is important in helping patients seeking weight loss treatment to lose weight.

Physical education classes as currently provided play an important role in preventing or reducing childhood obesity.

Breastfeeding is protective against obesity.

A bout of sexual activity burns 100 to 300 kcal for each person involved.

Casazza, K., ...& Allison, D. B. (2013). Myths, Presumptions, and Facts about Obesity. *New England Journal of Medicine*, Jan 31;368(5):446-54.

Sometimes we do not stop to ask simple questions like: “How would someone know that?” and “Does this make any sense?”

Myth: A bout of sexual activity burns 100 to 300 kcal for each person involved.

Now, how would one figure this out?

Table 3.—Average Vo_2 During Four Sexual Activities*

Activity	Vo_2 , mL/min/kg (% of Maximum)		
	Baseline	Foreplay	Stimulation and Orgasm
Partner stimulation	3.7 ± 0.8 (7 ± 2)	4.5 ± 1.4 (8 ± 3)	6.0 ± 1.8 (11 ± 3)
Self-stimulation	3.9 ± 0.7 (7 ± 2)	4.5 ± 0.7 (9 ± 2)†	6.3 ± 1.6 (12 ± 3)
Woman-on-top coitus	4.5 ± 0.6 (9 ± 2)	5.1 ± 0.8 (10 ± 2)	8.7 ± 3.2 (16 ± 7)
Man-on-top coitus	4.0 ± 0.4 (8 ± 2)	5.0 ± 1.0 (9 ± 2)	11.7 ± 3.8 (22 ± 6)

Table 4.—Duration of Four Sexual Activities*

Activity	Duration, s		
	Stimulation	Orgasm	Resolution†
Partner stimulation	326 ± 179	14 ± 4	38 ± 25
Self-stimulation	186 ± 80	15 ± 5	25 ± 12
Woman-on-top coitus	352 ± 163	16 ± 11	91 ± 116
Man-on-top coitus	332 ± 257	10 ± 4	111 ± 71

(Arch Intern Med
1984;144:1745-1748)

Outline

1. Framing the Issue: How Obesity May Be Different
2. Some Myths
3. A Taxonomy of Factors Contributing to Erroneous Beliefs or Impeding Advancement of Knowledge
4. Some Ongoing, Planned, and Proposed Steps in the Right Direction

A Very Broad Taxonomy of How Science Can Go Wrong

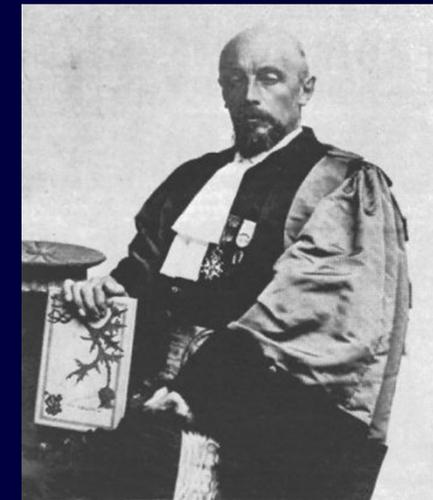
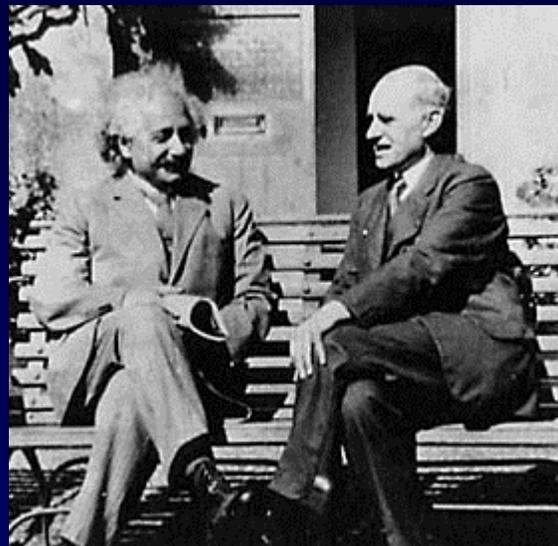
Fraud(?)

Distortion(?)

Gross Error



Gregor Mendel
1822-1884



René Prosper Blondlot
(1849-1930)

AMERICAN
Scientist

Current Issue Past Issues Scientists' Nightstand Multimedia

HOME > SCIENTISTS' NIGHTSTAND > September-October 2008 > Bookshelf Detail

RAISE FONT SIZE A A A VIEW PRINTER-FRIENDLY

BOOK REVIEW

CSI: Mendel
Stephen M. Stigler

ENDING THE MENDEL-FISHER CONTROVERSY. Allan Franklin, A. W. F. Edwards, Daniel J. Fairbanks, Daniel L. Hart and Teddy Soidenfeld. xii + 330 pp. University of Pittsburgh Press, 2008. Cloth, \$70; paper, \$27.95.

“Eddington had needed to make significant corrections to some of the measurements, for various technical reasons, and in the end decided to leave some of the Sobral data out of the calculation entirely.” -

<http://ircamera.as.arizona.edu/NatSci102/NatSci102/text/lightbend.htm>

“The rays were detected by a calcium sulfide thread that glowed slightly in the dark when the rays were refracted through a 60-degree angle prism of aluminum.”

<http://skepdic.com/blondlot.html>

A More Detailed Taxonomy

Errors of Measurement

- Self-reported energy intake
- Self-reported weights
- Weights of unknown origin

Errors of Design

- Gratuitous replication
- Cluster randomized trials with no *df*
- Lack of blinding
- Lack of control for non-specific factors (failure to isolate the independent variable)

Errors of Analysis

- Inappropriate baseline testing in parallel groups RCTs
- Failure to appropriately manage missing data
- Cluster randomized trials without clustering taken into account
- Investigator *df*, data fiddling, and undisclosed multiple testing

Errors of Reporting

- Publication Bias
- Reporting Bias
- Citation Bias

Errors of Interpretation

- Causal language inappropriately used in observational studies
- Extrapolation error
 - 3500 kcal rule
 - Conflating surrogate markers with outcomes of interest
- Not control-correcting in RCTs
- Conflating empirical evidence with tastes and moral values
- Ignoring statistical significance

I use the word 'errors' without implication as to intentionality or lack thereof.

Mea Culpa: I have committed some of these errors too.

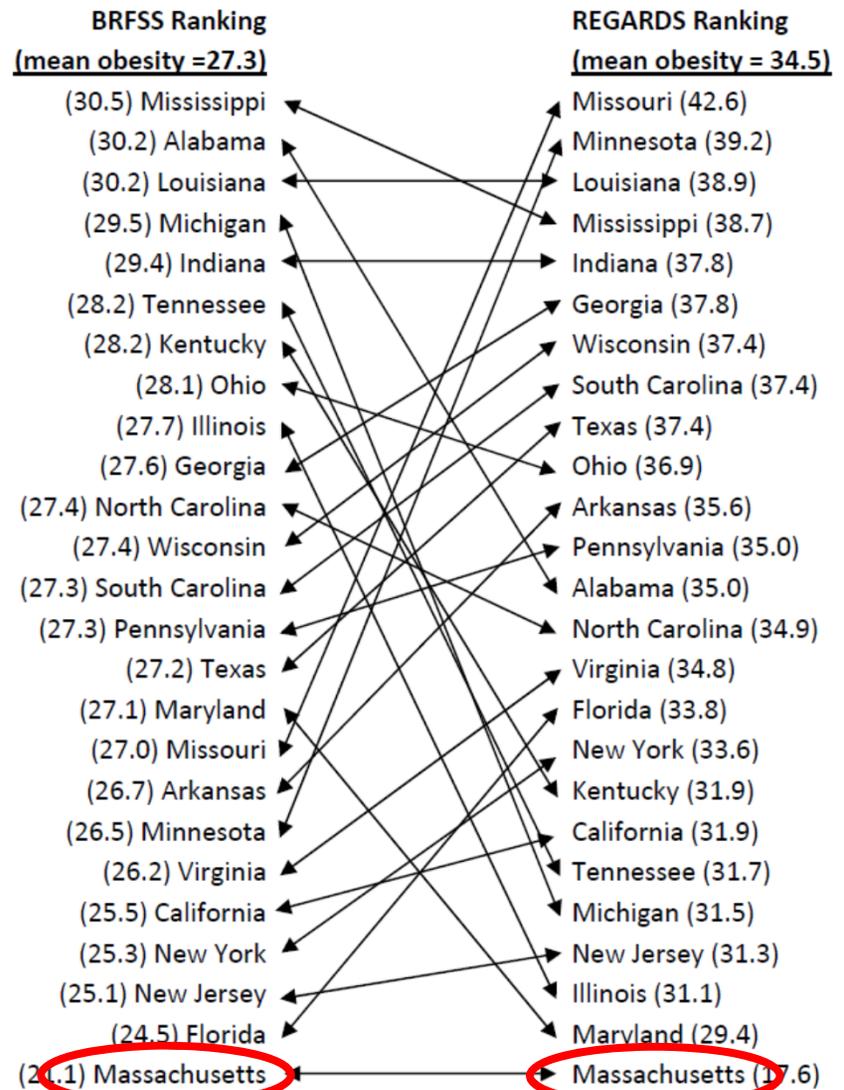
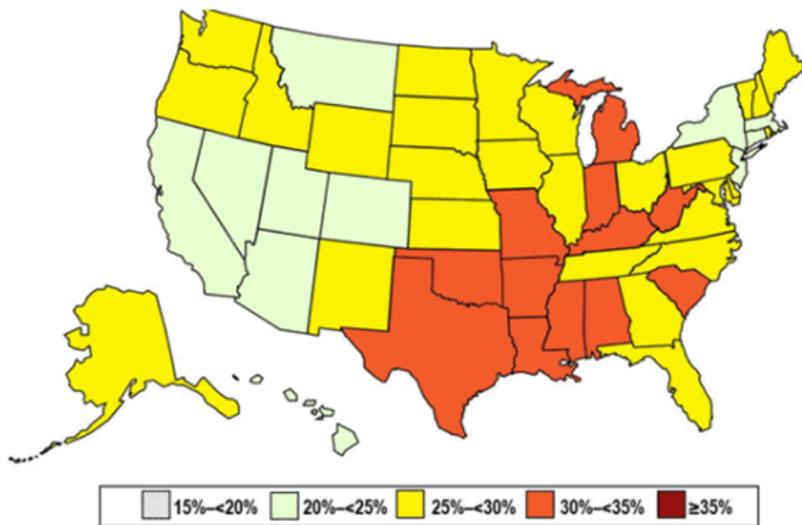
For detailed references to examples and explanations, see:

Allison et al. Goals in Nutrition Science 2015-2020. *Frontiers in Nutrition*. (Submitted).

Errors of Measurement

Failure to take measurement as seriously as we do in other domains.

Prevalence of Self-Reported Obesity Among U.S. Adults
BRFSS, 2011



Le, A., Judd, S. E., Allison, D. B., Oza-Frank, R., Affuso, O., Safford, M. M., Howard, V. G., & Howard, G. (2014). The Geographic Distribution of Obesity in the US and the Potential Regional Differences in Misreporting of Obesity. *Obesity*, 22,(1), 300–306.

The Measurement Problem

Self-report-based estimates of energy intake offer an inadequate basis for scientific conclusions

Dale A Schoeller

Diana Thomas

Edward Archer

Steven B Heymsfield

Steven N Blair

Michael I Goran

James O Hill

Richard L Atkinson

Barbara E Corkey

John Foreyt

Nikhil V Dhurandhar

John G Kral

Kevin D Hall

Barbara C Hansen

Berit Lilienthal Heitmann

Eric Ravussin

David B Allison

Schoeller, Dale A (06/2013). "Self-report-based estimates of energy intake offer an inadequate basis for scientific conclusions". *The American journal of clinical nutrition* (0002-9165), 97 (6), p. 1413.

OPEN ACCESS Freely available online

PLOS ONE

Validity of U.S. Nutritional Surveillance: National Health and Nutrition Examination Survey Caloric Energy Intake Data, 1971–2010

Edward Archer^{1*}, Gregory A. Hand¹, Steven N. Blair^{1,2}

International Journal of Obesity (13 November 2014) | doi:10.1038/ijo.2014.199

Energy balance measurement: when something is not better than nothing

N V Dhurandhar, D Schoeller, A W Brown, S B Heymsfield, D Thomas, T I A Sørensen, J R Speakman, M Jeansonne, D B Allison and the Energy Balance Measurement Working Group

ARTICLE TOOLS

SEARCH PUBME

- N V Dhurandhar
- D Schoeller
- A W Brown

Just because the measurement method one has is the best available, does not make it adequate.

Errors of Design & Resource Allocation

Wise Resource Allocation?

- “Children who wore large CS [clothing size] were more likely to be overweight/obese compared to those in the normal CS group.” ISRN Obesity, Volume 2013 (2013), Article ID 582967, <http://dx.doi.org/10.1155/2013/582967>
- “...food restricted...participants display a significant conditioned place preference for the ...room previously paired with food ...they display a significant explicit preference for the M&M-paired room in a forced-choice of “Which room do you like best?”. <http://www.ncbi.nlm.nih.gov/pubmed/24657735>
- “Increasing the bra-size of the female-hitchhiker was significantly associated with an increase in number of male drivers, but not female drivers, who stopped to offer a ride.” NICOLAS GUÉGUEN (2007) BUST SIZE AND HITCHHIKING: A FIELD STUDY. Perceptual and Motor Skills: Volume 105, Issue , pp. 1294-1298.

The Benefit of Breakfast in Preventing and Reducing Obesity has been Widely Espoused

“Eating a healthy breakfast is a good way to start the day and may be important in achieving and maintaining a healthy weight.”

U.S. Surgeon General <http://www.surgeongeneral.gov/library/calls/obesity/index.html>

“...there's ample evidence that the simple act of eating breakfast -- every day -- is a big part of losing weight, lots of weight.”

Jeanie Davis, WebMD

“If we always eat breakfast every day, we can impact long-term weight loss.”

Schaffner 2007 Gastroenterology Nursing

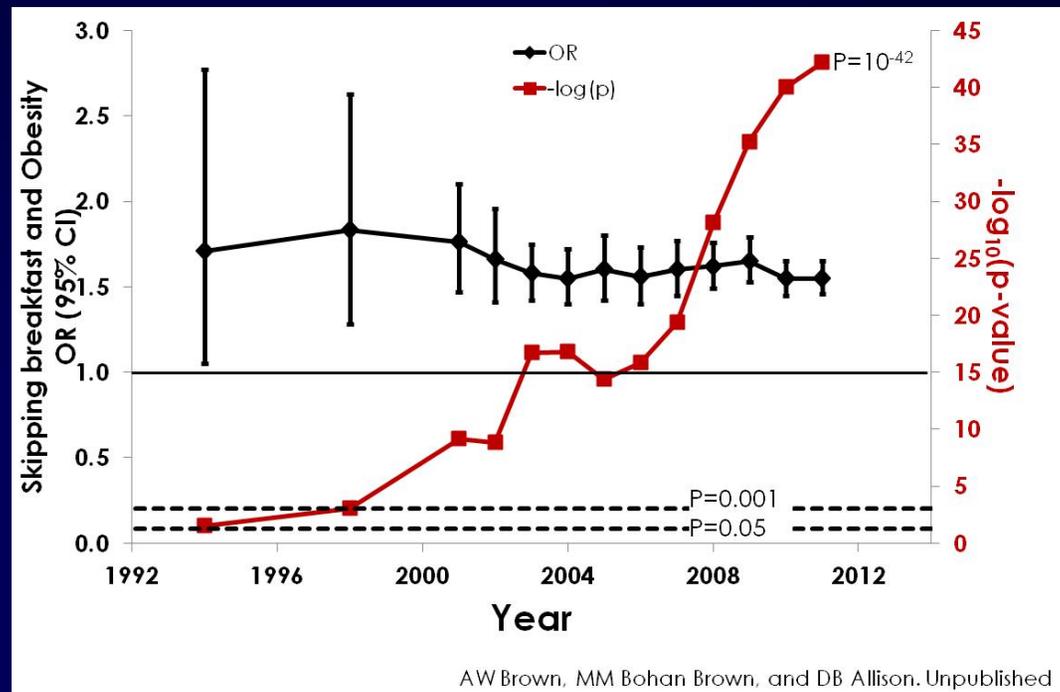
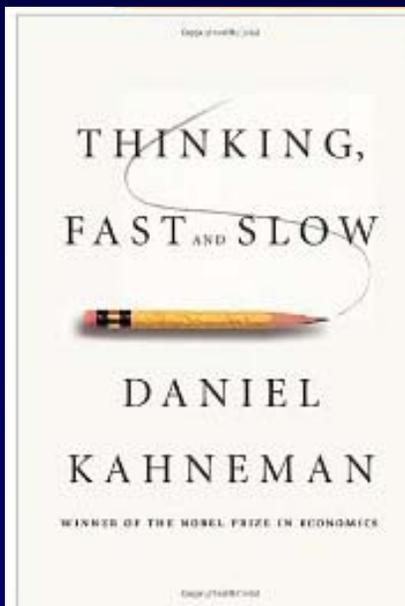
“The fact is, when you're trying to lose body fat, you can't skip breakfast “

Dr. Oz. <http://www.doctoroz.com/blog/lisa-lynn/breakfast-shakes-drink-yourself-skinny>

Not Knowing When to Stop: The Mere Exposure Effect



'A reliable way to make people believe in falsehoods is frequent repetition, because familiarity is not easily distinguished from truth. Authoritarian institutions and marketers have always known this fact. ...you do not have to repeat the entire statement of a fact or idea to make it appear true. People who were repeatedly exposed to the phrase "the body temperature of a chicken" were more likely to accept as true the statement that "the body temperature of a chicken is 144°" (or any other arbitrary number).'



So, we often devote our journal pages, time, and resources to research that increases belief, instead of to research that increases knowledge.

Brown, A. W., Bohan Brown, M. M., & Allison, D. B. (2013). AJCN.

Does Eating Breakfast Promote Weight Loss?

Five out of 5 RCTs say No.

Study	Sample	Results
Schlundt et al. AJCN 1992	52 Adult Women	No significant main effect for breakfast skipping (marginally significant interaction between treatment assignment and habitual pre-study breakfast habits).
Dhurandhar et al. AJCN 2014	309 Adults	No significant effect of breakfast skipping vs eating treatment assignment (numerically more weight loss in skipping group)
Betts et al. AJCN 2014	33 Adults	No significant effect of breakfast skipping vs eating treatment assignment (numerically more weight loss in skipping group)
Geliebter et al., J Nutritional Science, 2014	36 Adults	Assignment to breakfast skipping led to significantly more weight loss.
St-Onge et al. International J Nutrition, 2015	20 Children	No significant effect of breakfast skipping vs eating treatment assignment (numerically more weight loss in breakfast eating group)

Choice of Studies: Over-reliance on Observational Studies

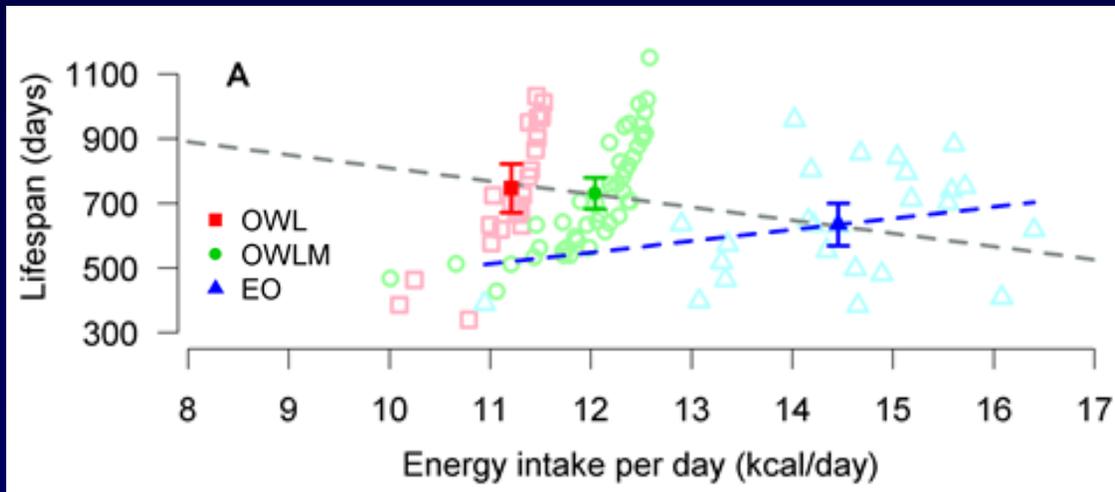
<i>ID no.</i>	<i>Pos.</i>	<i>Neg.</i>	<i>No. of claims</i>	<i>Treatment(s)</i>	<i>Reference</i>
1	0	1	3	Vit E, beta-carotene	<i>NEJM</i> 1994; 330 : 1029–1035
2	0	3	4	Hormone Replacement Ther.	<i>JAMA</i> 2003; 289 : 2651–2662, 2663–2672, 2673–2684
3	0	1	2	Vit E, beta-carotene	<i>JNCI</i> 2005; 97 : 481–488
4	0	0	3	Vit E	<i>JAMA</i> 2005; 293 : 1338–1347
5	0	0	3	Low Fat	<i>JAMA</i> . 2006; 295 : 655–666
6	0	0	3	Vit D, Calcium	<i>NEJM</i> 2006; 354 : 669–683
7	0	0	2	Folic acid, Vit B6, B12	<i>NEJM</i> 2006; 354 : 2764–2772
8	0	0	2	Low Fat	<i>JAMA</i> 2007; 298 : 289–298
9	0	0	12	Vit C, Vit E, beta-carotene	<i>Arch Intern Med</i> 2007; 167 : 1610–1618
10	0	0	12	Vit C, Vit E	<i>JAMA</i> 2008; 300 : 2123–2133
11	0	0	3	Vit E, Selenium	<i>JAMA</i> 2009; 301 : 39–51
12	0	0	3	HRT + Vitamins	<i>JAMA</i> 2002; 288 : 2431–2440
Totals	0	5	52		

“The 12 clinical trials tested 52 observational claims. They all confirmed no claims in the direction of the observational claims... To put it another way, 100% of the observational claims failed to replicate. In fact, five claims (9.6%) are statistically significant in the clinical trials in *the opposite direction* to the observational claim.” – Young & Karr. 2011, *Significance*; 8: 116-120.

Suppose we could effectively eliminate measurement error, genetic variation, smoking, socioeconomic status, and other 'usual' suspects as confounders?

Can Even A Meticulously Controlled Observational Study Accurately Estimate Causal Effects? Two Test Cases

(Ejima, Li, Smith, Nagy, Kadish, van Groen, Dawson, Yang, Patki, Allison (submitted))



Errors of Analysis

Meta-Analysts Often Err in Effect Size Calculation

Distributions of standardized effect sizes arising in meta-analyses show that in domains of substantive research interest, it is unusual for this magnitude measure to be as big as 1.0, quite rare for it to be as big as 1.4, and extraordinary² for it to be as big as 2.0. These statements of

[J Consult Clin Psychol](#). 1996 Jun;64(3):513-6.

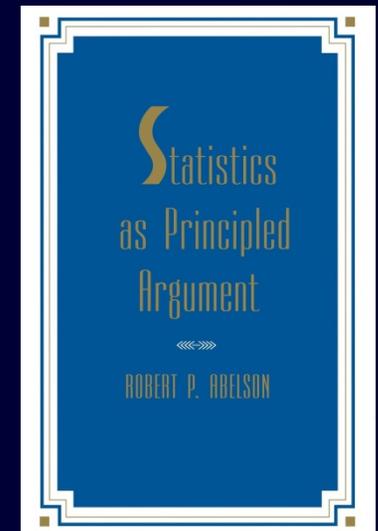
Hypnosis as an adjunct to cognitive-behavioral psychotherapy for obesity: a meta-analytic reappraisal.

Allison DB¹, Faith MS.

⊕ Author information

Abstract

I. Kirsch, G. Montgomery, and G. Sapirstein (1995) meta-analyzed 6 weight-loss studies comparing the efficacy of cognitive-behavior therapy (CBT) alone to CBT plus hypnotherapy and concluded that "the addition of hypnosis substantially enhanced treatment outcome" (p.214). Kirsch reported a mean effect size (expressed as d) of 1.96. After correcting several transcription and computational inaccuracies in the original meta-analysis, these 6 studies yield a smaller mean effect size (.26). Moreover, if 1 questionable study is removed from the analysis, the effect sizes become more homogeneous and the mean (.21) is no longer statistically significant. It is concluded that the addition of hypnosis to CBT for weight loss results in, at most, a small enhancement of treatment outcome.



Effect Size Calculations



Meta Confusion about Glucomannan

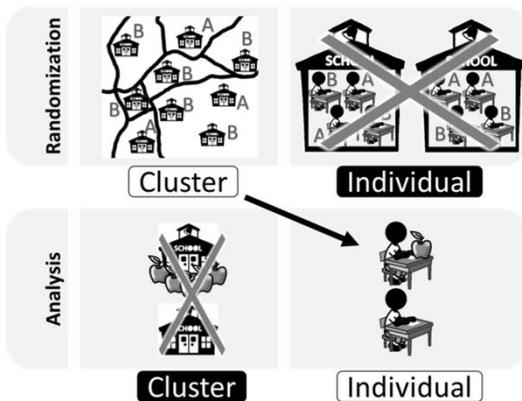
Maybe you've heard of glucomannan — a so-called "super fiber" that Dr. Oz hypes as "nature's skinny sponge." Maybe you read a systematic review and meta-analysis in *Nutrition* of the effect of glucomannan on body weight that concluded it "may help reduce body weight." As it turns out, that analysis was wrong.

<http://conscienhealth.org/2015/03/meta-confusion-about-glucomannan/>

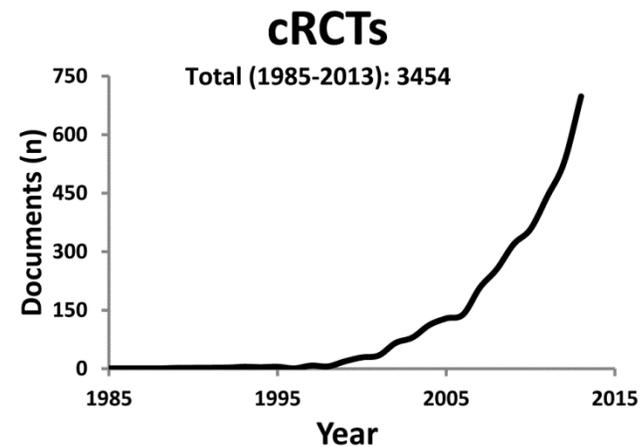
Cluster Randomized Controlled Trials: An Opportunity for Improvement

What They Are

- Randomize at group level
- Measure and analyze at individual level



Increasingly Used



Special Design and Analysis Issues

- Intraclass correlation (ICC)
- Power calculations
- Cluster size versus number of clusters
- Defining clusters
- Statistical analysis
- Reporting guidelines

Often Badly Botched

- Zero degrees of freedom
- Advising against baseline covariates
- Ignoring clustering in analysis
- Misunderstanding cluster levels
- Mistaking observational unit for experimental unit

See: Brown et al. AJCN 2015 doi: 10.394/ajcn.114.105072

cRCT references at end of slide set

Analysis of Cluster Randomized Trials – A Major Source of Confusion

Retraction Watch

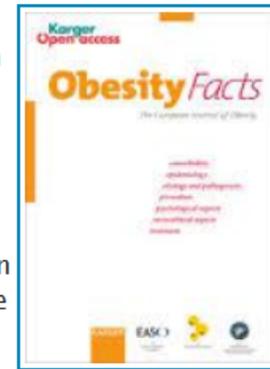
Tracking retractions as a

When should a paper be retracted? A tale from the obesity literature

with one comment

In our line of work, we see it all — [mega-corrections](#) that don't quite rise to the level of retraction, letters to the editor that point out seemingly fatal flaws in papers that remain untouched, and studies retracted for what seem like minor reasons. It can make you wonder what makes a paper worthy of a retraction. A recent case in an obesity journal may not provide a definitive answer, but it gives us a lot to chew on.

Here's the story: In September 2013, [Rosely Sichieri](#) and a colleague from the State University of Rio de Janeiro submitted an article to [Obesity Facts](#), "Unbalanced Baseline in School-Based Interventions to Prevent Obesity: Adjustment Can Lead to Bias?" The article examined statistical issues in randomized controlled trials of school-based weight loss programs. Peer reviewers said the paper needed major revisions before it could be accepted; the authors revised the paper enough in a second draft, submitted in November 2013, that the original reviewers accepted it. The paper was [published in June 2014](#).



Then, in September 2014, a group of authors including [David Allison](#) of the University of Alabama, Birmingham, and colleagues from Clemson, Thomas Jefferson, and the University of Minnesota, wrote a critical [letter that was published in the journal in April](#). The letter, according to a [just-published editorial](#):

“ expressed fundamental and severe criticism with regard to the above mentioned article that culminated in the conclusion that the article should be retracted.

More specifically, the letter argued that by criticizing some of the statistical tools used in these types of studies, the authors dissuade scientists from employing “legitimate power-enhancing analytic methods.” Here's [more from the letter itself](#):

Confusion Resulting From Testing Against Baseline Differences

Bland and Altman *Trials* 2011, **12**:264
<http://www.trialsjournal.com/content/12/1/264>



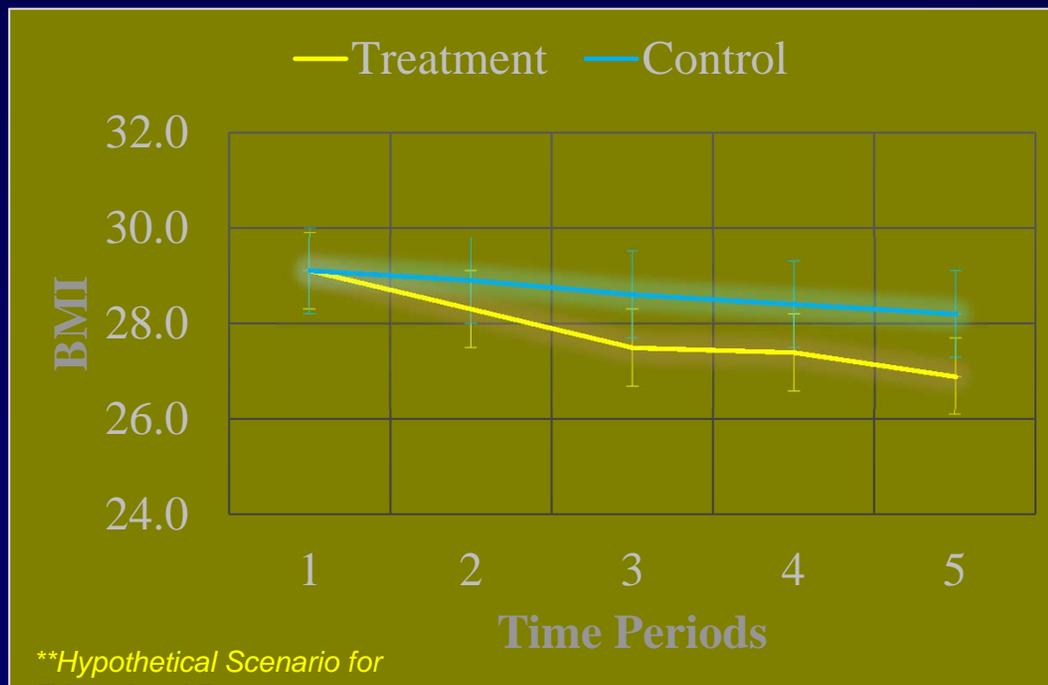
METHODOLOGY

Open Access

Comparisons against baseline within randomised groups are often used and can be highly misleading

J Martin Bland^{1*} and Douglas G Altman²

- “Randomised groups should be compared directly by two-sample methods and separate tests against baseline are highly misleading.”
- Pre-Post
 - Treatment $p < .05$
 - Control $p > .05$
- Between Groups
 - $p > .05$
- Misleading? Yes!
- With two groups, the false positive rate for declaring a difference between groups can be as high as 50%
 - Far higher than 5%!
- Equivalent to flipping two coins and declaring them different if they land on different sides



**Hypothetical Scenario for Educational Purposes

Inappropriate Testing Against Baseline Levels in Parallel RCT

Disability and Rehabilitation

Home All Issues Current Issue Early Online Aims & Scope Editorial Board Instructions for Authors

Issue TOC | Previous Article | Next Article [SHARE](#)

With your contact details, **David Muller** of expertise!

 Sign up for eAlerts

 Request a call back

 Publish with us

Letter to the Editor

Conclusion of “Nordic walking for geriatric rehabilitation: a randomized pilot trial” is based on faulty statistical analysis and is inaccurate

Posted online on January 19, 2015. (doi:10.3109/09638288.2014.1002580)

[David B. Allison](#), [Michelle S. Williams](#), [Gregory A. Hand](#), [John M. Jakicic](#), and [Kevin R. Fontaine](#)

¹Department of Biostatistics, University of Alabama at Birmingham, Birmingham, AL, USA,

²Nutrition Obesity Research Center, University of Alabama at Birmingham, Birmingham, AL, USA,

³Office of Energetics, University of Alabama at Birmingham, Birmingham, AL, USA,

⁴Division of Preventive Medicine, University of Alabama at Birmingham, Birmingham, AL, USA,

⁵School of Public Health, West Virginia University, Morgantown, WV, USA,

[HTML](#)

[PDF \(100 KB\)](#)

[PDF Plus \(106 KB\)](#)

[Reprints](#)

[Permissions](#)

<http://informahealthcare.com/doi/abs/10.3109/09638288.2014.1002580>

Errors of Reporting

Conclusion Spinning: Effect of the Healthy Schools Program on Prevalence of Overweight and Obesity in California Schools, 2006–2012

Headline



“Now, as the Alliance celebrates its 10-year anniversary, a new peer-reviewed study confirms we are delivering on our mission of reducing the prevalence of childhood obesity.”
“an important means of supporting schools in reducing obesity.”

Study

- Analyses showed no difference between Healthy School Program schools and control schools in overweight and obesity prevalence
- Healthy School Program appears to be an important means of supporting schools in reducing obesity...

<http://www.wassermanfoundation.org/news/new-study-shows-that-combating-childhood-obesity-in-schools-works/>
http://www.cdc.gov/pcd/issues/2015/15_0020.htm

Distortions In The Mass Media

Headline: Skipping breakfast to lose weight makes you fatter - and far more likely to raid the vending machine.

Study: Presentation at proceedings; MRI results and observations of how much subjects ate at lunch after skipping breakfast. No body weight, no vending machines.

Headline: How Calico cats could help cure obesity.

Study: Conference abstract involving X-inactivation in mouse cells – no cats or obesity involved

Headline: Diet Soda Leaves Your Gut Unsatisfied, Contributes To Obesity.

Study: Assessment of metabolic responses to different carbohydrates loads of bacteria in vitro. Humans, diet soda, and obesity were not studied.

Headline: US Farm Subsidy Policies Contribute To Worsening Obesity Trends, Study Finds.

Paper: There is no study – paper is an author's commentary/review on farm subsidies.

Headline: Drinking 5 cups of coffee everyday may lead to obesity: study.

Headline: Wrong amount of coffee could kill you.

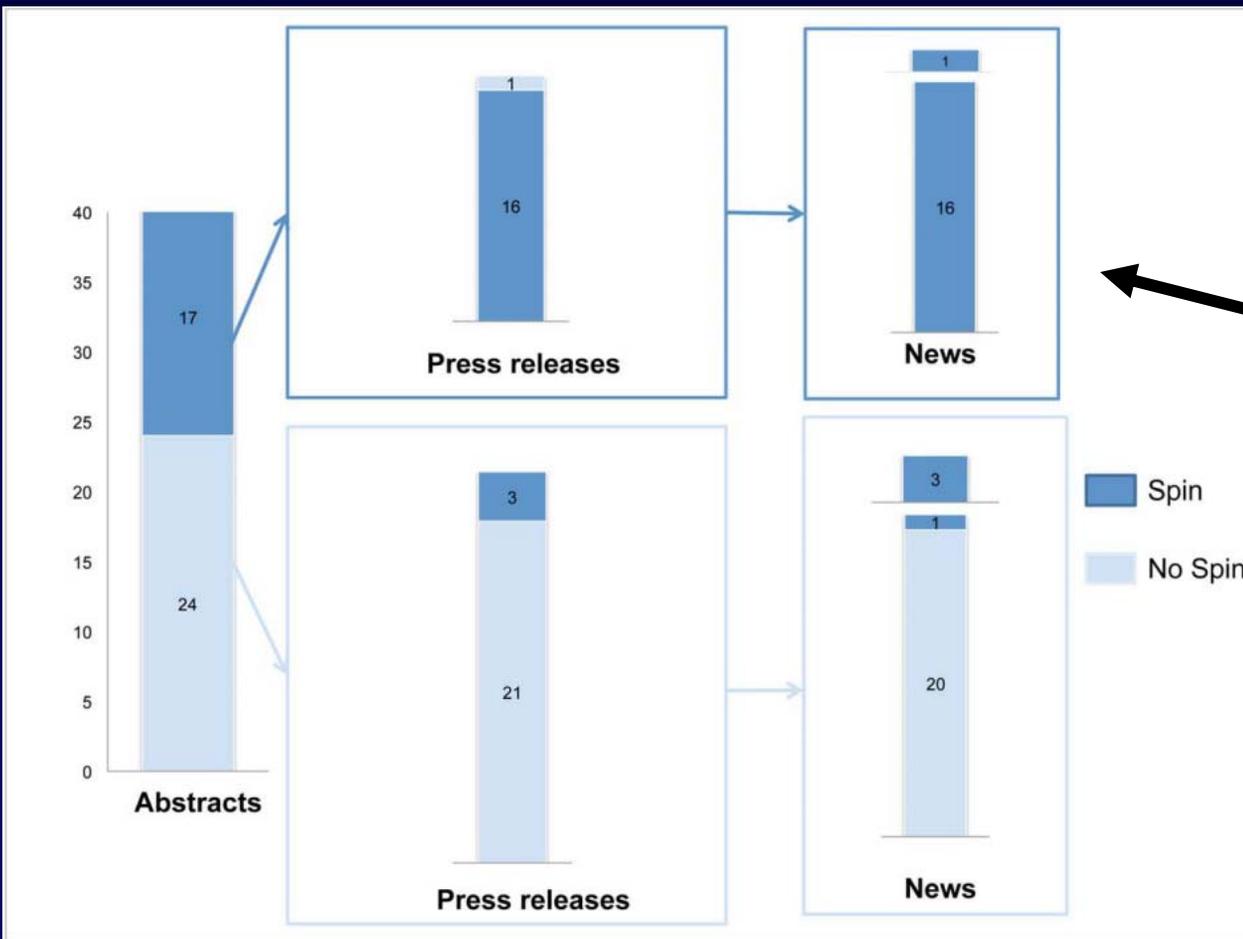
Study: A study of mice, involving a substance found in coffee, but no coffee, showed no significant weight gain, and reported no deaths.

For references, see: ObesityandEnergetics.org.

Perpetuation of Spin

Misrepresentation of Randomized Controlled Trials in Press Releases and News Coverage: A Cohort Study

Amélie Yavchitz^{1,2,3}, Isabelle Boutron^{1,2,3*}, Aida Bafeta^{1,2,3}, Ibrahim Marroun⁴, Pierre Charles⁴, Jean Mantz⁵, Philippe Ravaud^{1,2,3}

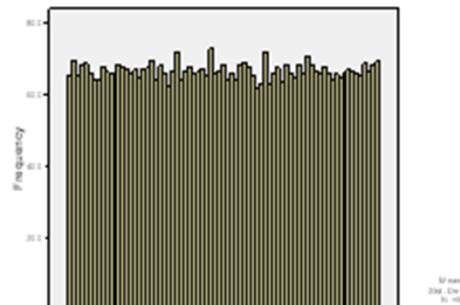


Spin: reporting strategies emphasizing the beneficial effect of the experimental treatment

Spin perpetuates throughout the reporting

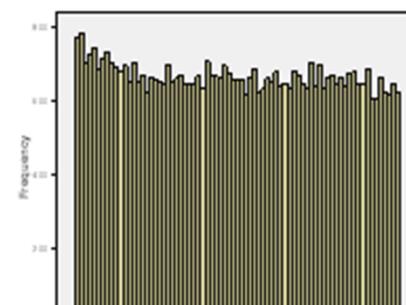
Distortions via Statistical Fiddling ('p-hacking')? Example in Obesity Trials

Simulated Distribution of p-values all nulls true.



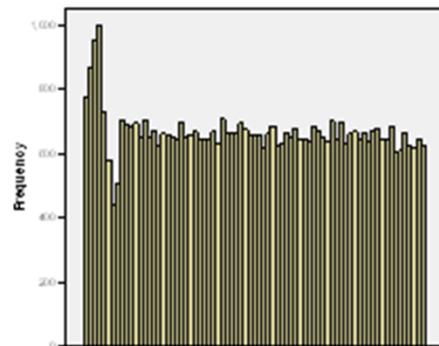
p-value

Simulated Distribution of p-values some nulls false.



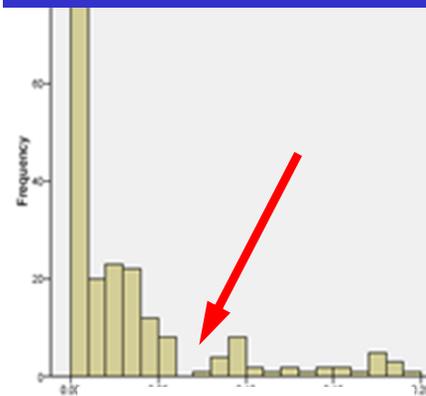
p-value

Simulated p-values all nulls true + 'Fiddling'.



p-value

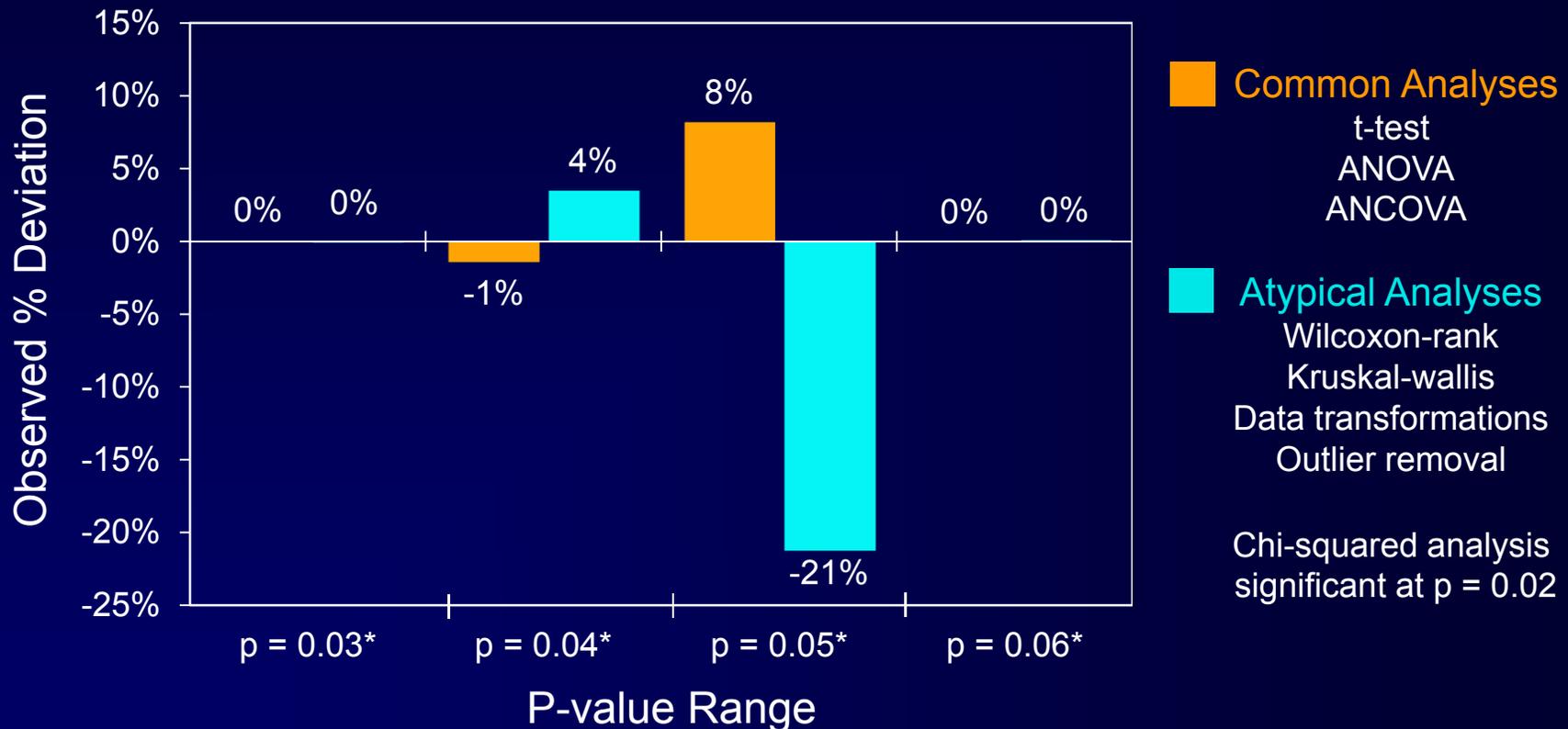
Real data (N=347 obesity RCTs; p for dip = .052)



p-value

Evidence of P-value Fiddling

Deviation of Observed P-value Distributions from Expected Distributions
within PubMed Abstracts
for Common vs. Atypical Statistical Analyses

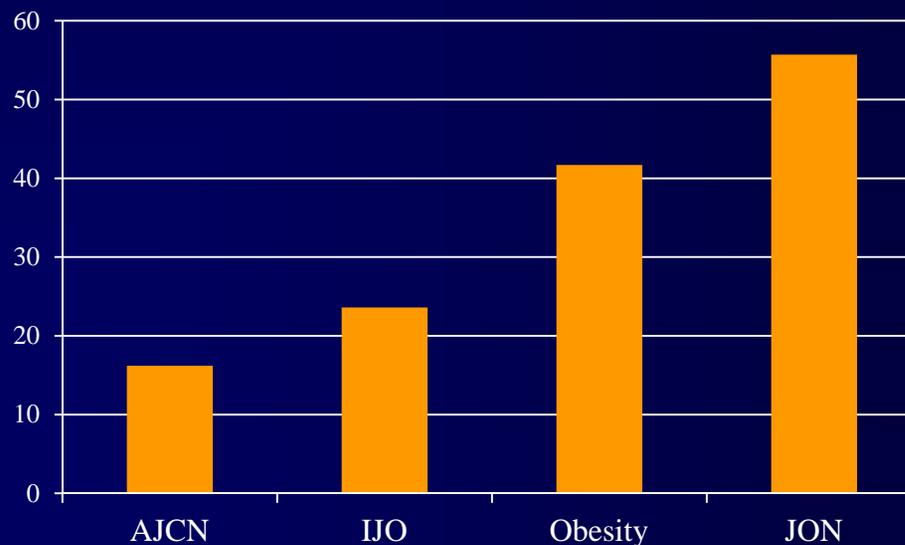


Kroeger CM, Brown AW, Allison DB. Evidence of p-value fiddling using a rapid, high-volume, systematic method. American Society for Nutrition Advances and Controversies in Clinical Nutrition Annual Meeting. National Harbor, Maryland, USA, 2014. Poster presentation.

Use of Causal Language in Observational Studies of Obesity and Nutrition

Stacey S. Cofield^a Rachel V. Corona^b David B. Allison^{a,c}

Percent of articles
using unjustified
causal language.



Curious Errors & the Power of Simple Mathematics

• 66 •

World Journal of Acupuncture-Moxibustion (WJAM)
Vol. 25, No.1, 30th Mar. 2015



Letters

Letter to the Editor: Exceptional Data in Paper on “The effect of meridian massage on BM, BMI, WC and HC in simple obesity patients: a randomized controlled trial”

14, November, 2014

Dear Editor:

Given the tremendous need for effective weight loss treatments, we read with interest the paper by Yan et al.^[1] and were intrigued by the reported finding that a form of massage produced weight loss in a randomized controlled trial.

Upon closer inspection, we were struck by the magnitude of the results. Specifically, in an 8-week period, the treatment (massage) group lost over 7 kg, more than 9% of their baseline body weight, and 3.7 kg more than the control group lost. Such results rival those of all available obesity treatment procedures except surgery and very

Errors of Interpretation

Math Problems

Modeling Potential Effects of Reduced Calories in Kids' Meals with Toy Giveaways

Maysoun Y. Freij, PhD, MPH,¹ Randall L. Sell, ScD,² Anne K. Bozack, MPH,¹
Linda J. Weiss, PhD,¹ and Ana C. Garcia, MPA³

calculation is based on the fact that a pound of body fat equals approximately 3500 calories. Therefore, a child who eats a kids' meal with a toy twice per week would avoid approximately 132 calories per week if he or she consumed an NPLAN-like regulated kids' meal in place of an unregulated kids' meal. This equals approximately 6864 calories per year (132 calories \times 52 weeks) or approximately two pounds per year averted. A lower calorie limit

nance). Calculations in the model include children who are estimated to eat fast food four or more times per day. Though rare, such children could theoretically expect to avert weight gain of 27 pounds per year if an NPLAN-like toy ordinance were fully implemented.

<http://www.ncbi.nlm.nih.gov/pubmed/25496036> (original article retracted).

From Kevin Hall:
"I used the 'rule of thumb' equations relating excess body weight to excess energy intake ... [from PMID: 24349967]. I came up with about 0.5 kg of excess weight ... by increasing daily intake by 19 kcal/d from 7 to 12 years."

So, the original investigators were off by a factor of about 9.

Outline

1. Framing the Issue: How Obesity May Be Different
2. Some Myths
3. A Taxonomy of Factors Contributing to Erroneous Beliefs or Impeding Advancement of Knowledge
4. Some Ongoing, Planned, and Proposed Steps in the Right Direction

clinicalobesity

Perspective

Stagnation in the clinical, community and public health domain of obesity: the need for probative research

K. Casazza¹ and D. B. Allison²

Article first published online: 1 NOV 2012

DOI: 10.1111/j.1758-8111.2012.00052.x

© 2012 The Authors. Clinical Obesity © 2012
International Association for the Study of Obesity

Issue

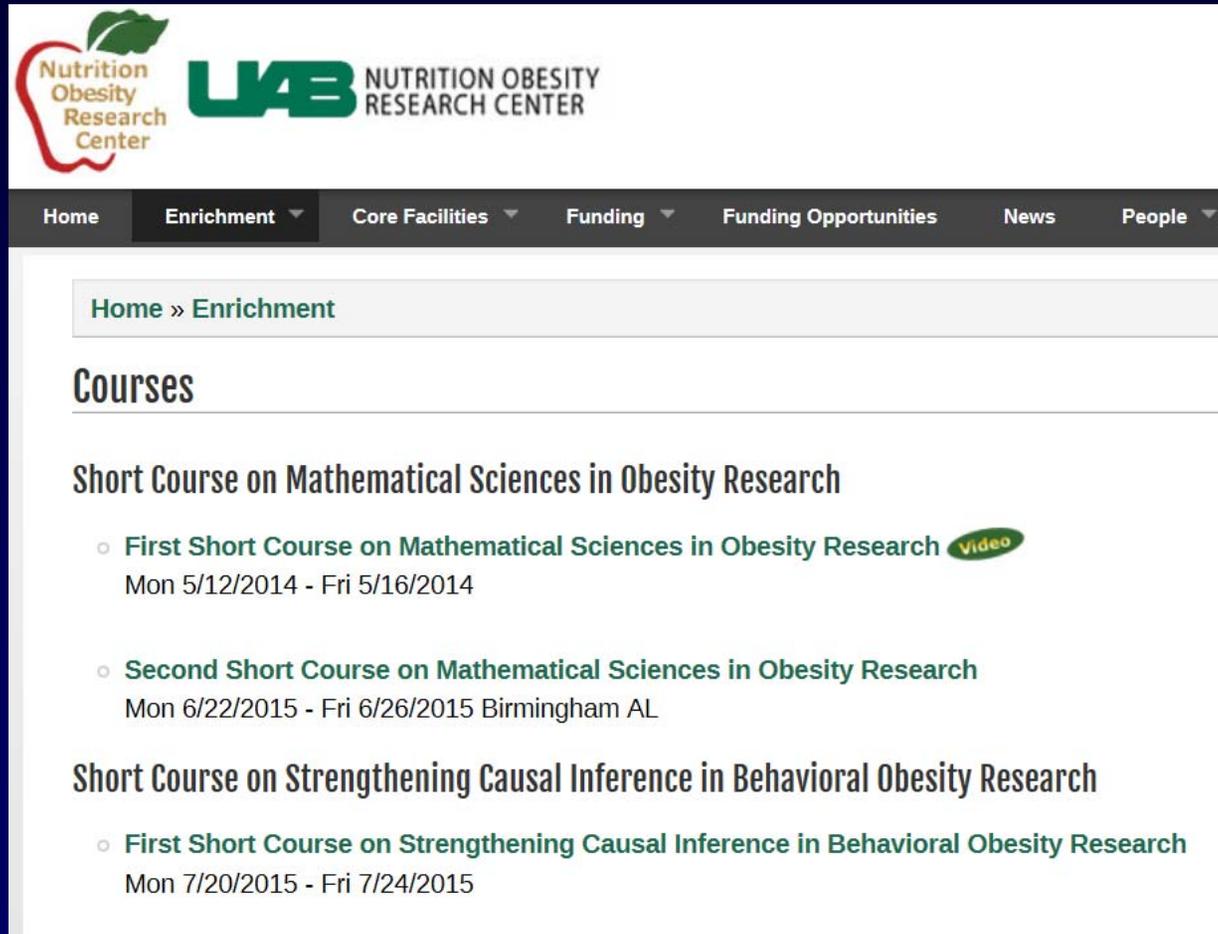


Clinical Obesity

Volume 2, Issue 3-4, pages 83
–85, June-August 2012

NIH seems interested: “Pragmatic Research in Healthcare Settings to Improve Diabetes and Obesity Prevention and Care (R18).” <http://grants.nih.gov/grants/guide/pa-files/PAR-15-157.html#sthash.HtuU1cpk.dpuf>

UAB NORC Courses



The screenshot shows the UAB Nutrition Obesity Research Center website. At the top left is the logo for the Nutrition Obesity Research Center, featuring a red apple outline and green leaves. To its right is the UAB logo and the text "NUTRITION OBESITY RESEARCH CENTER". Below the logo is a dark navigation bar with white text for "Home", "Enrichment", "Core Facilities", "Funding", "Funding Opportunities", "News", and "People". Underneath the navigation bar is a breadcrumb trail: "Home » Enrichment". The main content area is titled "Courses" and lists three short courses. The first course is "First Short Course on Mathematical Sciences in Obesity Research" with a "Video" icon, dated Mon 5/12/2014 - Fri 5/16/2014. The second course is "Second Short Course on Mathematical Sciences in Obesity Research" dated Mon 6/22/2015 - Fri 6/26/2015 in Birmingham AL. The third course is "First Short Course on Strengthening Causal Inference in Behavioral Obesity Research" dated Mon 7/20/2015 - Fri 7/24/2015.

Nutrition Obesity Research Center **UAB** NUTRITION OBESITY RESEARCH CENTER

Home Enrichment Core Facilities Funding Funding Opportunities News People

Home » Enrichment

Courses

Short Course on Mathematical Sciences in Obesity Research

- **First Short Course on Mathematical Sciences in Obesity Research** 
Mon 5/12/2014 - Fri 5/16/2014
- **Second Short Course on Mathematical Sciences in Obesity Research**
Mon 6/22/2015 - Fri 6/26/2015 Birmingham AL

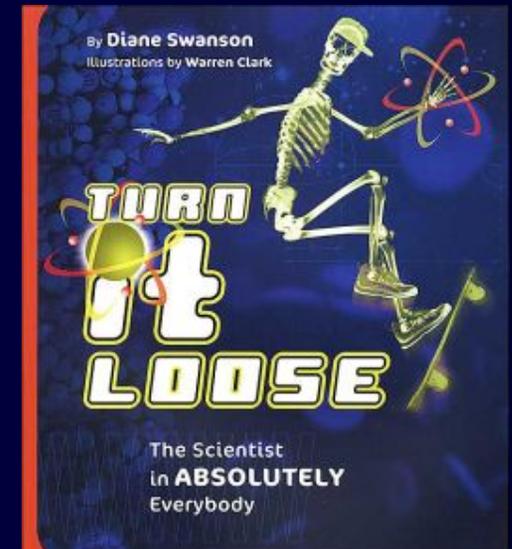
Short Course on Strengthening Causal Inference in Behavioral Obesity Research

- **First Short Course on Strengthening Causal Inference in Behavioral Obesity Research**
Mon 7/20/2015 - Fri 7/24/2015

<http://www.norc.uab.edu/courses/shortcourse>

Going Forward

- Treat obesity as a science as meriting the same rigor as any other science.
- Don't believe everything you read. Go back to the original source and read yourself.
- Recognize that short-term studies, studies of intermediary endpoints, and observational studies all have their place, but should not be our stopping points or bases for overreaching conclusions.
- Develop and fund a set of 'meta-methods' (e.g. clinical trials registries, CONSORT statements, public data sharing) which will collectively buttress/ensure the implementation of the fundamental scientific methods that already exist.
- Teach our students and ourselves that unfailingly pursuing truth through science is not a job, but a discipline, a vocation, and a privilege.



Come visit us in Alabama and we can talk some more
on the trail.



謝謝您

Cheaha Mountain
Photo courtesy Rohan Dhurandhar.

Some References

Widespread Prevalence of Misleading Pre/Post Analysis

- Cooking oil replacement
 - <http://online.liebertpub.com/doi/abs/10.1089/dia.2013.0178>
- Exercise regimens in children
 - http://www.kjp.or.kr/upload/JustAccepted_KJP-13-254.pdf
 - <http://www.sciencedirect.com/science/article/pii/S0190740913003903>
- Mobile device intervention in minority girls
 - <http://www.sciencedirect.com/science/article/pii/S0749379713006946>
- Liquid vs solid intake
 - <http://www.ncbi.nlm.nih.gov/pubmed/10878689>
 - <http://www.ncbi.nlm.nih.gov/pubmed/21720441>
- Yoga as weight management
 - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4278132/?report=printable>
- Enteral nutrition in Crohn's disease patients
 - <http://www.ncbi.nlm.nih.gov/pubmed/25632205>
- Nordic walking for physical therapy
 - <http://informahealthcare.com/doi/abs/10.3109/09638288.2012.717580>
- Meal size vs frequency
 - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265261/>
- Flaxseed diets
 - <http://www.nutritionj.com/content/14/1/5>
- Vegetable juice diets
 - <http://www.lipidworld.com/content/13/1/102>

cRCT references

Title	Link	Type
Best (but often forgotten) practices: designing, analyzing, and reporting cluster randomized controlled trials	http://ajcn.nutrition.org/content/early/2015/05/27/ajcn.114.105072.abstract	Tutorial
The Assertion that Controlling for Baseline (Pre-Randomization) Covariates in Randomized Controlled Trials Leads to Bias Is False	http://www.karger.com/Article/FullText/381434	Correcting Letter
Comment on “School-Based Obesity Prevention Intervention in Chilean Children: Effective in Controlling, but not Reducing Obesity”	http://www.hindawi.com/journals/job/2015/183528/	Correcting Letter
Comment on “Intervention Effects of a School-Based Health Promotion Programme on Obesity Related Behavioural Outcomes”	http://www.hindawi.com/journals/job/2015/708181/	Correcting Letter

Some Extra Slides That May Be
of Interest

Presumptions: Unproven Yet Commonly Espoused Propositions

Regularly eating (versus skipping) breakfast is protective against obesity.
[Now a myth?]

Early childhood is the period where we learn important exercise and eating habits that influence our weight throughout life.

Eating more fruits and vegetables will produce weight loss or less weight gain, regardless of whether one intentionally makes any other behavioral or environmental changes.

Weight cycling (i.e. “yo-yo dieting”) increases mortality rate.

Snacking contributes to weight gain and obesity.

The built environment, in terms of sidewalk and park availability, influences obesity.

im·pli·cate

/ˈɪmpliˌkɑːt/ 

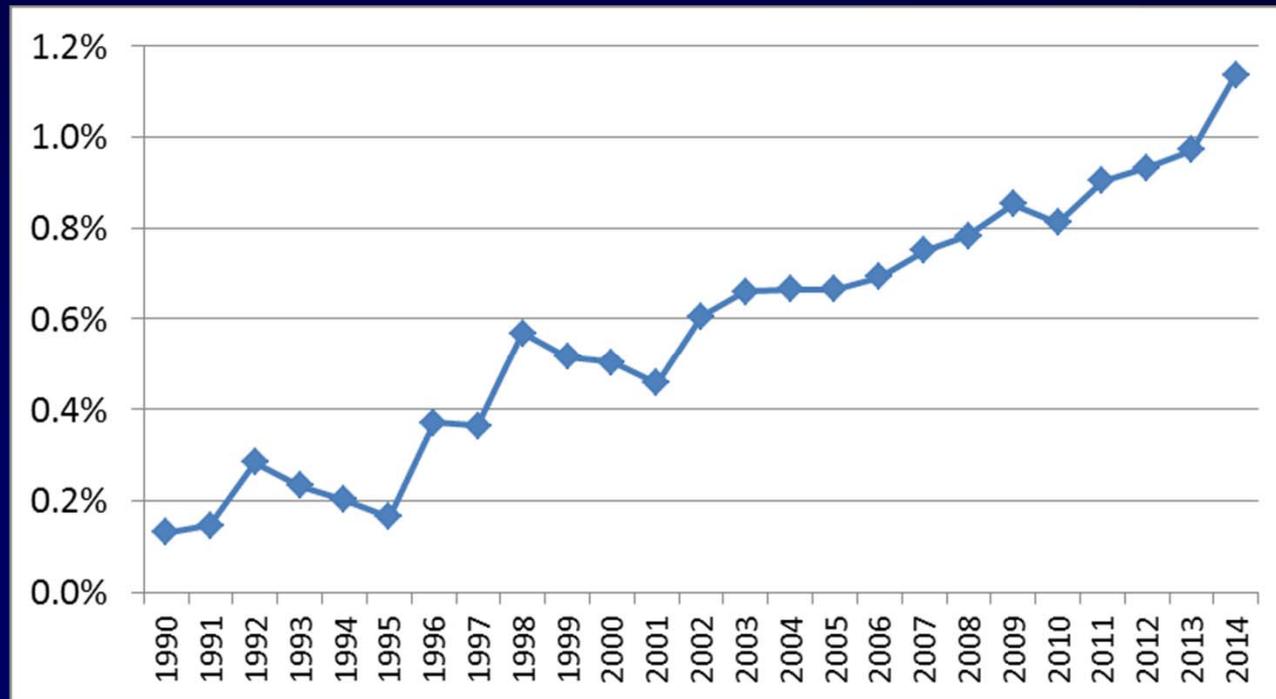
verb

past tense: **implicated**; past participle: **implicated**

1. show (someone) to be involved in a crime.
"police claims implicated him in many more killings"
synonyms: [incriminate](#), [compromise](#); [More](#)
2. convey (a meaning or intention) indirectly through what one says, rather than stating it explicitly; imply.
"by saying that coffee would keep her awake, Mary implicated that she didn't want any"

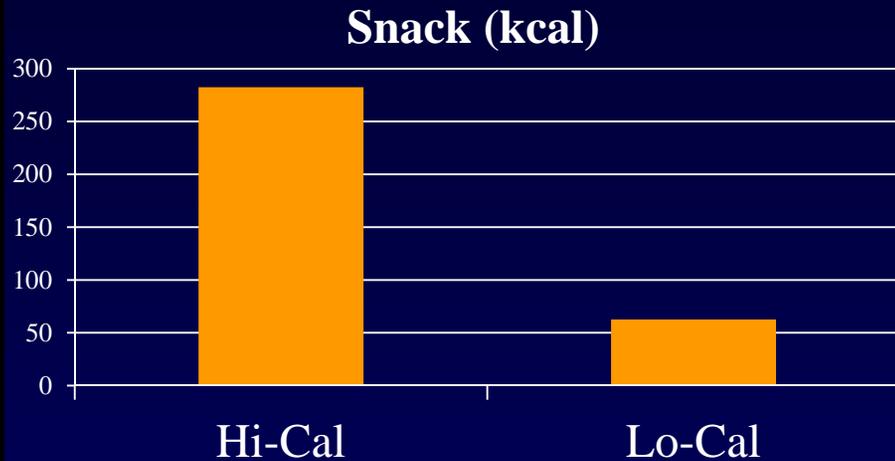
Emotion Raising Language.

Intersection/Union (expressed as percent) of articles with phrases "Implicated In" and ("Obesity" or "Weight Gain").



From Scopus Search 3/30/14.

Short-Term Studies Are Insufficient: Example - *Learned Compensation in Humans*



Appetite, 1989, 12, 95-103

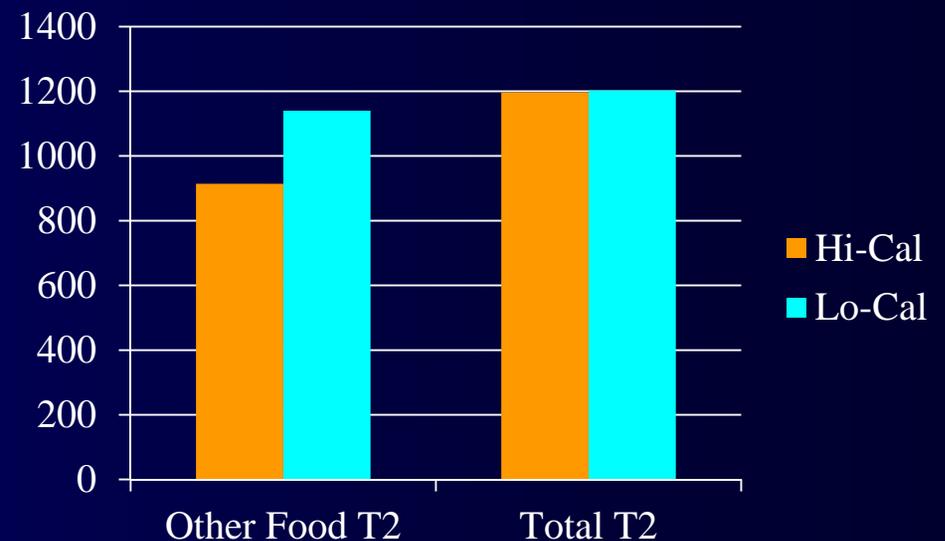
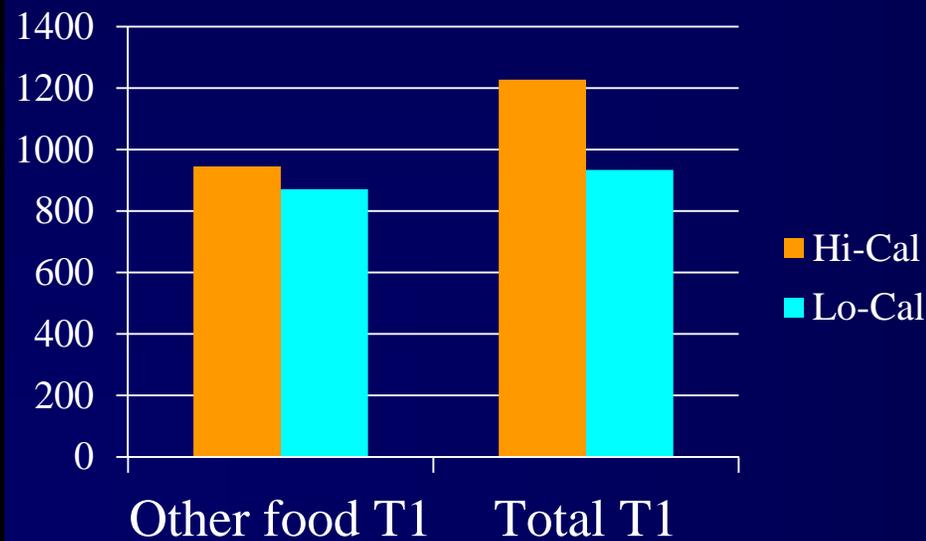
Learned Caloric Adjustment of Human Intake

JEANINE LOUIS-SYLVESTRE, ALAIN TOURNIER,
PHILIPPE VERGER, MICHÈLE CHABERT and
BRIGITTE DELORME

Laboratoire de Neurobiologie de la Nutrition E.P.H.E., Université Paris 6

JOSEPH HOSSENLOPP

Ecole Nationale des Sciences de l'Industrie Alimentaire



Conclusion Spinning

The impact of area-based initiatives on physical activity trends in deprived areas; a quasi-experimental evaluation of the Dutch District Approach

Daniëlle Kramer^{1*}, Mariël Droomers¹, Birthe Jongeneel-Grimen¹, Marleen Wingen², Karien Stronks¹ and Anton E Kunst¹

* Corresponding author: Daniëlle Kramer d.kramer@amc.uva.nl

For all author emails, please [log on](#).

► Author
Affiliations

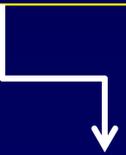
International Journal of Behavioral Nutrition and Physical Activity 2014, **11**:36
doi:10.1186/1479-5868-11-36

Published: 11 March 2014

Wow, that's
a lot of null.



But, wait...



Results

Deprived target districts showed a significantly positive change in walking trend between the pre-intervention and intervention period. The trend change in the deprived target districts was significantly larger compared to the rest of the Netherlands, but not compared to other deprived districts. For cycling and sports, neither deprived districts nor control districts showed a significant trend change. For all leisure-time PA outcomes, trend changes were not related to the intensity of environmental interventions in the deprived target districts.

Conclusion

Some evidence was found to suggest that ABIs like the District Approach have a positive impact on leisure-time PA in deprived districts, regardless of the intensity of environmental interventions.



Int J Obes (Lond). Author manuscript; available in PMC 2010 Jul 1.

PMCID: PMC2815336

Published in final edited form as:

NIHMSID: NIHMS155044

[Int J Obes \(Lond\). 2010 Jan; 34\(1\): 84–83.](#)

Published online 2009 Dec 1. doi: [10.1038/ijo.2009.239](https://doi.org/10.1038/ijo.2009.239)

White Hat Bias: Examples of its Presence in Obesity Research and a Call for Renewed Commitment to Faithfulness in Research Reporting

[Mark B Cope](#), PhD

Department of Pharmacology and Toxicology, School of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA. Email: mbcope@uab.edu

[David B Allison](#), PhD

Department of Biostatistics; School of Public Health; and Clinical Nutrition Research Center, University of Alabama at Birmingham, Birmingham, AL, USA. Email: Dallison@uab.edu

Unreasonable Extrapolation

The Study Abstract

Assessing non-digestible compounds in apple cultivars and their potential as modulators of obese faecal microbiota in vitro. Food Chem. 2014 Oct 15;161:208-15.

“The health benefits of apple bioactive compounds have been extensively reported. However, only few studies have focused on bioactive compounds that are not absorbed and metabolised during gastrointestinal digestion and can induce changes in microbial populations of faeces. We have characterised Braeburn, Fuji, Gala, Golden Delicious, Granny Smith, McIntosh and Red Delicious cultivars and found significant differences for extractable phenolics (1.08-9.2mg/g) non-extractable proanthocyanidins (3.28-5.7mg/g), and dietary fibre (20.6-32.2%) among cultivars with Granny Smith having the highest contents.

Granny Smith was used after in vitro digestion for fermentation of faeces from diet-induced obese mice. Results showed that relative abundances of Firmicutes, Bacteroidetes, Enterococcus, Enterobacteriaceae, Escherichia coli, and Bifidobacterium in apple cultured faeces tended to resemble the abundance in faeces from lean mice with increased trend in the production of butyric acid. These results suggest that apple non-digestible compounds might help to re-establish a disturbed microbiota balance in obesity.”



The screenshot shows the Medical Daily website interface. At the top, the site name "Medical Daily" is displayed in a large blue font. Below it is a navigation bar with links for "HOME", "US / WORLD", "CONSUMER NEWS", "POLICY / BIZ", and "SCIENCE / TE". A prominent advertisement for "ampyra" is featured, with the text "Walk on" and "Ask your doctor about the AMPYRA FREE* TRIAL". Below the ad, the article title "An Apple A Day Keeps The Fat Away; Granny Smith's Fiber And Polyphenol Count Promote Overall Health" is shown in a large black font. The author is listed as "By Samantha Olson | Sep 30, 2014 11:58 AM EDT". Social media sharing icons for Facebook, Twitter, LinkedIn, Google+, and a plus sign are visible, along with a "34" comment count. A small image of various apples is shown at the bottom right of the article preview.



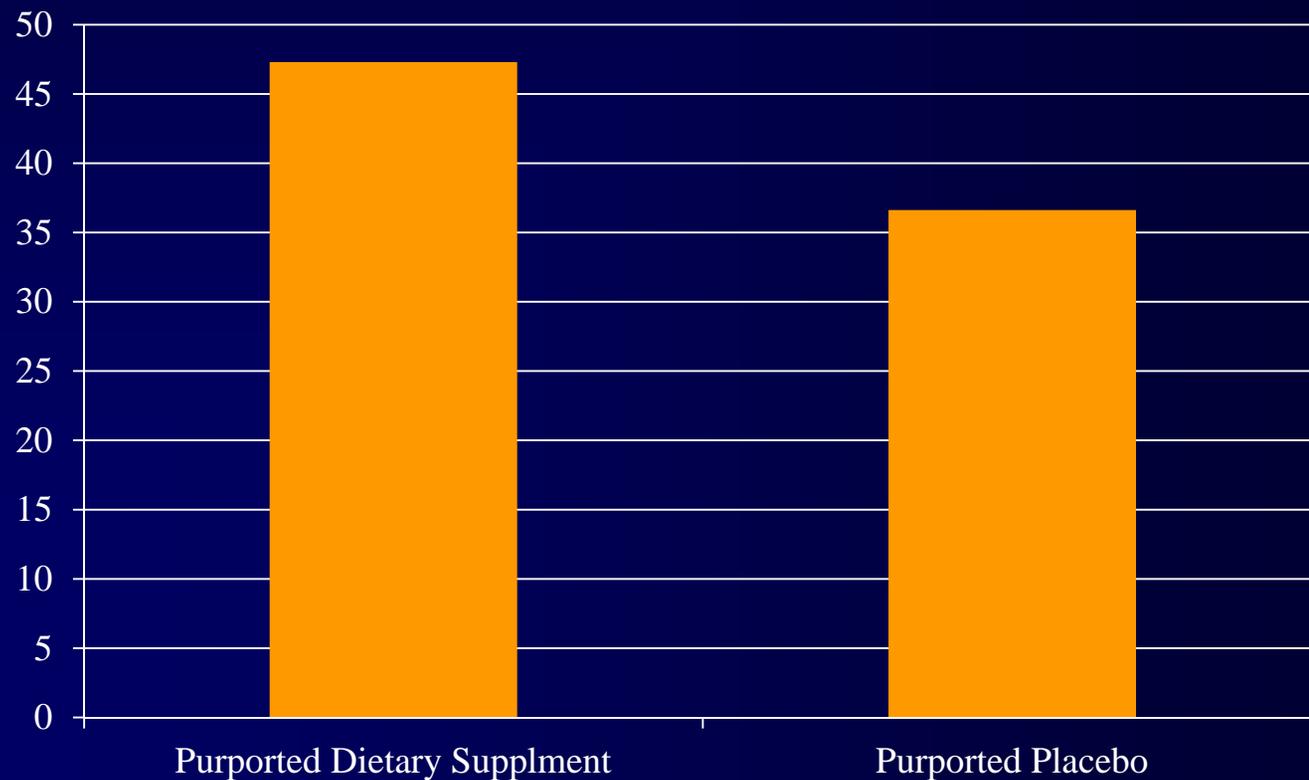
Why should we care if people exaggerate the benefits of some approaches?

Research report

Taking weight-loss supplements may elicit liberation from dietary control. A laboratory experiment [☆]

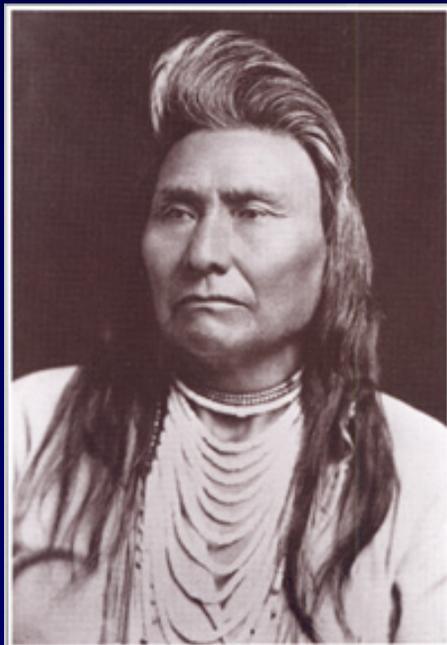
Yevvon Yi-Chi Chang ^a, Wen-Bin Chiou ^{b,*}

Grams of Candy Consumed



“It does not require many words to speak the truth.” ~

Chief Joseph: Nez Perce 1840-1904, Nez Percé Indian chief



<http://www.nps.gov/laro/historyculture/chief-joseph.htm>

Mode of Delivery and Offspring Body Mass Index, Overweight and Obesity in Adult Life: A Systematic Review and Meta-Analysis

Karthik Darmasseelane, Matthew J. Hyde, Shalini Santhakumaran, Chris Gale, Neena Modi

Conclusions

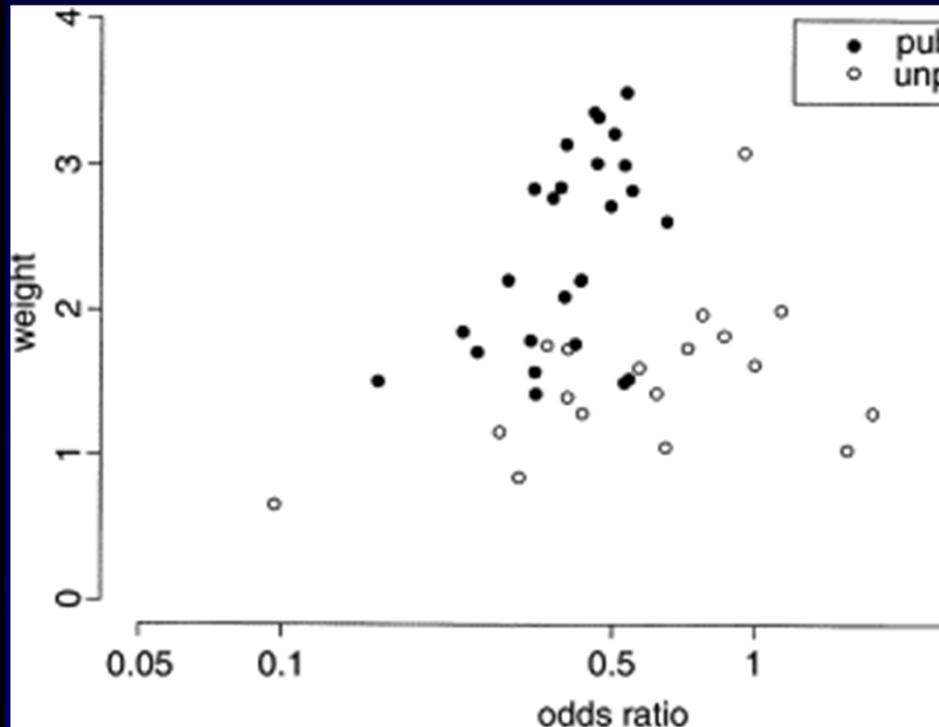
“There is a strong association between CS and increased offspring BMI, overweight and obesity in adulthood. Given the rising CS rate worldwide there is a need to determine whether this is causal, or reflective of confounding influences.”

Nicely and easily done.

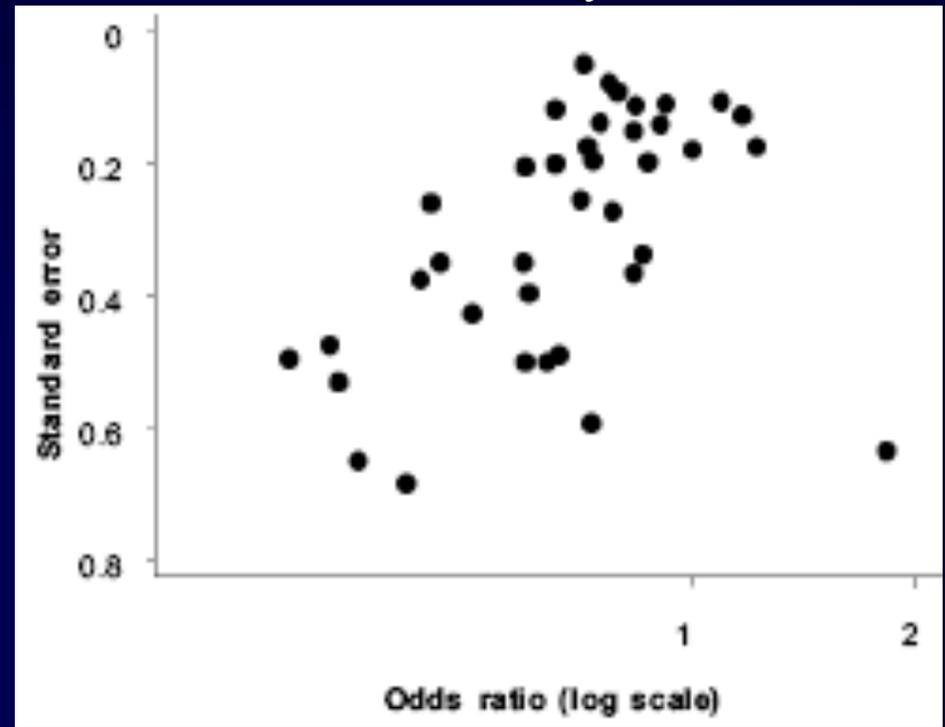
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0087896>

Distortions Via Publication Bias

Simulated Data



WHO Report on Breast-Feeding and Obesity



Norma Terrin, Christopher H. Schmid, Joseph Lau
Journal of Clinical Epidemiology, Volume 58,
Issue 9, September 2005, Pages 894–901
<http://dx.doi.org/10.1016/j.jclinepi.2005.01.006>

WHO report: “Evidence of the Long-Term Effects of Breastfeeding: Systematic Reviews and Meta-Analysis”
(http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/ISBN_92_4_159523_0.pdf)