Conflicting, conflicted, and incomplete narratives in nutrition and obesity research

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Acknowledgments and Disclosures

Conflicts of interest

- Genetic Fallacy
- Guilt by Association
- Ad hominem
- Appeal to Irrelevant Authority

Funding disclosures impair objectivity

Hypothetical drug studies of varying rigor and disclosed funding.

Disclosure of industry funding vs no disclosure decreased:
- ratings of rigor of trials (OR: 0.63 [0.46,0.87])
- confidence in the results (OR: 0.71 [0.51,0.98])
- willingness to prescribe the hypothetical drugs (OR: 0.68 [0.49,0.94])

Acknowledgments

- Some slides were inspired by, made through collaboration with, or borrowed from others, and I try to give appropriate credit throughout.
- When critiquing others' work, I try to omit names as a professional courtesy.
- References and slides are available upon request.
- However, the content reflects my thoughts, and not necessarily those individuals, anyone else, or any organization.

Disclosures

Dr. Brown has received travel expenses from Academy of Nutrition and Dietetics, Alberta Milk, American Heart Association, DC Metro Academy of Nutrition and Dietetics, Federation of American Societies for Experimental Biology, and International Life Sciences Institute; speaking fees from Academy of Nutrition and Dietetics, Alberta Milk, American Society for Nutrition, Birmingham District Dietetic Association, International Food Information Council, and Rippe Lifestyle Institute, Inc.; monetary awards from Alabama Public Health Association, American Society for Nutrition, and Science Unbound Foundation; and grants from NIH/NIGMS-NIA-NINDS, and UAB NORC. He has been involved in research for which his institution or colleagues have received: unrestricted gifts from National Restaurant Association; and grants from Coca-Cola Foundation, NIH/NIDDK, and PepsiCo.

Outline

- Introduction
- Messy advice: internally and externally inconsistent narratives
- Beliefs, calls-to-action, and scientific conclusions
- Moving forward

Conflicts of interest

Would you believe the results more or less if they were in the opposite direction?

Given the disclosure below, do you believe the results more or less?

The present study was funded by Quaker Oats Center of Excellence, PepsiCo R&D Nutrition. The funder contributed to the study design and editing of the manuscript.

Funding disclosures impair objectivity

The New England Journal of Medicine

A Randomized Study of How Physicians Interpret Research Funding Disclosures


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**Definitions**

*Conflicted narratives* occur when a narrative or source is internally inconsistent

*Conflicting narratives* occur when different compelling narratives disagree, and are therefore externally inconsistent

*Incomplete narratives* occur when there is a large, conceptual void in the logic or analysis used to make a conclusion

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**Conflicted Reports of Research**

**Consumption of takeaway and fast food in a deprived inner London Borough: are they associated with childhood obesity?**

RESUTLS: “Based on our observations, it appears that those who have higher BMIs are less likely to consume fast food as often.”

CONCLUSIONS: “These schoolchildren are exposed to an obesogenic environment, and it is not surprising that in this situation, many of these children are already overweight and will likely become obese as adults.”

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**Conflicted standards from trusted sources**

“Although there is evidence that certain saturated fatty acids (i.e., stearic acid) have fewer cholesterol-raising effects than others, there is no simple means of incorporating this information into dietary guidelines.”


“The addition of added sugars to the Nutrition Facts Panel is a giant step forward,” said … chair of the AHA’s nutrition committee

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**A little conflicted comic relief**

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**Conflicted and Conflicting Recommendations**

**The 30 Best Breakfast Habits to Drop 5 Pounds**

“Swap that coffee for tea, replace the granola with eggs and wake up 10 minutes earlier. Boom: You just lost 10 pounds this week alone.”

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**Conflicted and Conflicting Recommendations**

**The Putative 104 Causes of Obesity Update**

October 22nd, 2015 by Morgan Downey
Myths, Presumptions, and Facts about Obesity

“To assess knowledge scores, correct and incorrect answers were tallied for beneficial and detrimental choices on both pre- and post-tests.”

<table>
<thead>
<tr>
<th>Supports Healthy Weight</th>
<th>Promotes Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating breakfast regularly</td>
<td>Sweetened beverage intake</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>Snacking frequencies on junk food</td>
</tr>
<tr>
<td>Eating frequency</td>
<td>Time spent watching TV</td>
</tr>
<tr>
<td>Dietary variety</td>
<td>Dietary fat intake</td>
</tr>
<tr>
<td>Parental restriction on food</td>
<td>Carbohydrates intake</td>
</tr>
<tr>
<td>Regular physical activity</td>
<td>Frequency of eating away from home</td>
</tr>
<tr>
<td>Protein intake</td>
<td>Fast food consumption</td>
</tr>
<tr>
<td>Reduced fat food products</td>
<td>Total caloric intake</td>
</tr>
<tr>
<td>Increased fruits and vegetables</td>
<td>Portion sizes consumed</td>
</tr>
<tr>
<td>Energy density of the diet</td>
<td></td>
</tr>
</tbody>
</table>

Incomplete Recommendations in the Same Magazine

Incomplete Recommendations in the Same Magazine

Incomplete by Confounding

Incomplete by Confounding

Incomplete Recommendations in the Same Magazine

Incomplete Recommendations in the Same Magazine

Incomplete in Context

Incomplete in Context

Which foods should you eat?

A  Corn  B  Alfalfa sprouts  C  Hot dogs  D  Spinach  E  Peaches  F  Bananas  G  Milk chocolate

Incomplete in Context

Incomplete in Context

Lay American Conceptions of Nutrition: Dose Insensitivity, Categorical Thinking, Contagion, and the Monotonic Mind
Incomplete because of irrelevance

Fruit and Vegetable Consumption and Changes in Anthropometric Variables in Adult Populations: A Systematic Review and Meta-Analysis of Prospective Cohort Studies

<table>
<thead>
<tr>
<th></th>
<th>Fruit</th>
<th>Veg</th>
<th>F &amp; V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Change</td>
<td>S</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>S</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Risk of weight gain or abdominal obesity</td>
<td>S</td>
<td>S</td>
<td>NS</td>
</tr>
<tr>
<td>Mean weight change (high v low)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

- Higher intake of fruits was associated with decreased weight: -13.68 g BW/y per 100 g/d in fruit intake.

2.67 tonnes of fruit per 1 kg weight loss per year

"Nevertheless, when combined with evolutionary nutrition and epidemiological modeling studies, these findings have public health relevance and support all initiatives to increase fruit and vegetable intake." (emphasis added)

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Beliefs, Calls-to-action, and Science

Belief: "a feeling of being sure that someone or something exists or that something is true"

Call to action: "an instruction to the audience to provoke an immediate response"

Science: "knowledge about or study of the natural world based on facts learned through experiments and observation"

A call to action involves using a belief and value structure to tell others what to do.

Science isn’t required.

For science, only three things matter:
1. The data
2. The methods used to generate the data
3. The logic connecting the data to conclusions

Biases in scientific articles may reflect beliefs

Meeting abstract presented at Experimental Biology:

Water intake and metabolic syndrome risk. A randomized clinical trial

"Our findings do not lead to conclude that SSB replacement with water does not support reduction of metabolic syndrome risk factors but rather that intervention provided was ineffective in reducing other sugary beverage intake."

Final published paper in the Journal of Nutrition

9 month change in ‘Beverages with Sugar’

Intervention | Control
--- | ---
-252 | -115

Title: Substituting water for sugar-sweetened beverages reduces circulating triglycerides and the prevalence of metabolic syndrome in obese but not overweight Mexican women in a randomized controlled trial.

PMID: 25332472

Biases in scientific articles may reflect beliefs

Misleadingly citing research

- Schnund et al. AJCN 1992
- 52 obese adult women assigned to eat or skip breakfast, stratified according to their baseline breakfast-eating habits in a 12 week weight loss study
- Cited by 91 papers in English; 42 ratable

Breakfast-by-strata interaction: p=0.06. No main effects.

Calls to Action: good intentions with consequences

Untended Consequences of Obesity-Targeted Health Policy

Andrew W. Brown, PhD, and David B. Allison, PhD


<table>
<thead>
<tr>
<th>Action</th>
<th>Good intention</th>
<th>Documented unintended consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label “unhealthy” foods with messages that encourage consuming fruits and vegetables.</td>
<td>Increase “healthy” behaviors and decrease “unhealthy” behaviors.</td>
<td>Increased selection of an “unhealthy” snack.</td>
</tr>
<tr>
<td>Examine certain restaurants and foods as more “healthy” and more “unhealthy”.</td>
<td>Decrease caloric consumption and shift consumption toward “healthy” foods.</td>
<td>Consumers consumed more calories in side dishes and beverages, and underestimated total meal calories when choosing “healthy” restaurants or main dishes.</td>
</tr>
<tr>
<td>Labeling calories and removing value pricing on menu items.</td>
<td>Awareness of calories and eliminating value pricing will decrease energy consumption.</td>
<td>Men ate more calories.</td>
</tr>
<tr>
<td>Discourage chocolate consumption.</td>
<td>Decrease caloric consumption.</td>
<td>Chocolate consumption increased for some women in some circumstances.</td>
</tr>
<tr>
<td>Tax sugar sweetened beverages (50%).</td>
<td>Decrease energy intake to decrease weight.</td>
<td>Increased consumption of beer beyond the decrease in sugar sweetened beverages.</td>
</tr>
</tbody>
</table>

Potential consequences of health halos

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

“Y.Y.-C. Chang, W.-R. Choe/Appetite 72 (2014) B–12

<table>
<thead>
<tr>
<th>Perceived Weight Reduction Progress</th>
<th>Nougat Consumed (g)</th>
<th>Amount of Sugar Chosen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td><em>Active</em></td>
<td>Control</td>
</tr>
<tr>
<td><em>Active</em></td>
<td><em>Active</em></td>
<td>Control</td>
</tr>
</tbody>
</table>

Mediation Analysis:

“These thought-provoking findings can serve as a basis for educating the public about the myth that they are free to feel liberated from the need to regulate their eating when using weight-loss supplements.”

Simple recommendations for complex concepts

“It is important to limit empty calories to the amount that fits your calorie and nutrient needs. You can lower your intake by eating and drinking foods and beverages containing empty calories less often or by decreasing the amount you eat or drink.”

Which has the greatest empty calories?

A 5 ounces of table wine
B 2 x 1 ounce patties of pork sausage
C 3 ounces of roasted chicken thigh with skin (cooked weight)
D 1 cup of frozen yogurt
E 3 ounces of regular, 80% lean ground beef (cooked weight)
F 1 medium, 2 ounce croissant
G 1 cup of fruit flavored, low-fat yogurt
H 1 small, 2 ounce blueberry muffin
I 3 x 1 ounce slices of beef bologna

Snacking: simple or complex concept?

Simple or complex concept?

"Active" Consumption

Calories

~400 ~200 ~100 ~50 0

Positive Neutral Negative

Snack Related Perceptions

How Researchers Define Snacks and Meals

By time: 8-10AM, 12-2PM, and 6-8PM = meals; Other times = snacks

By food composition/type: Based on ‘taxonomy’ of food, or calories in eating occasion

How Individuals Define Snacks and Meals

Meals Related Perceptions

Eating in family vs. Eating alone

Cloth napkin vs. Paper napkin

Sitting while eating vs. Standing while eating

Expensive vs. Inexpensive

Prepared food vs. Packaged food

‘Healthy’ food vs. ‘Unhealthy’ food

Implications for advice about snacks and meals?
Fruits and Vegetables: Language is Important

Increased fruit and vegetable intake has no discernible effect on weight loss: a systematic review and meta-analysis

Kathryn A Kaiser, Andrew W Brown, Michelle H Ikeda-Brown, James W Blumberg, Richard P Horton, and David P Allison

Am J Clin Nutr 2016;104:550A-554A.

Conclusion spinning to inspire action

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

Headline

“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…”

Study

“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.”


http://www.cdc.gov/pcd/issues/2015/15_0020.htm

Bolstering Science and Science Communication

An Economics Analogy: Lemon Markets

A lemon market will be produced by the following:

- Asymmetry of information, in which no [reader] can accurately assess the value of [research] and [communicator] can more accurately assess the value
- An incentive exists for the [communicator] to pass off a low-quality product as a higher-quality one
- [Communicators] have no way to disclose credibility to [readers]
- [Readers] are sufficiently pessimistic about [research] quality
- Deficiency of effective public quality assurances

“The valuable capacity of the human mind to simplify a complex situation becomes dangerous when not controlled in terms of definitely stated criteria.”

—Simon Kuznets, 1934

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Thinking about food

An Economics Analogy: Lemon Markets

Food X is Bad!

Food X is Bad!

Food X is OKAY


 thinking about food
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