

The Possible Irritating Effects of Nutritional Facts

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Abstract

Nutrition science and its application in diet has long been the focus of exegesis. We outline a series of seven creative experiments previously carried out that establish diets with rigorous conditions, starting without form or void and progressing through the fundamental nutrients to support an experimental and theoretical framework for life. While this background is well known, less thoroughly examined is the consequence of undertaking such research for those playing smaller roles in the creation, both biologically and bio-ethically. We track the sequelae and find a significant negative impact of experimental nutrition science not only for its individual practitioners but also for the maintenance of nutritional science laboratories and the scientific media communicators who describe such research ($p < 0.05$). This study sets the stage for the next generation of researchers and their many progeny.

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Introduction

We are on the set of a daytime talk show, DocTalk hosted by Dr. Todd Bodd, a hot young doctor in scrubs. The camera flies in over an applauding audience of women, landing on Todd and - a very excited audience member - standing behind a table covered in fruits, vegetables, and bottles of vitamins on the stage.

Hi, I'm Dr. Todd Bodd and welcome to DocTalk. Today we're talking about vitamins. This is our audience volunteer, Debbie. Now, Debbie - do you take your vitamins? I do. Good girl. Debbie giggles uncontrollably, and accidentally-on-purpose touches his chest. Ok. She keeps laughing. You're very handsome! You can go back to your seat. Let's get her back to her seat. Vitamins are the key to health, and perhaps the cure for the common cold [1]. How many of you have heard of megadoses? The audience members raise their hands. Oh! Oh!

The camera pans to find the source of this voice and we see Adam Conover sitting in the audience raising his hand excitedly. I've also heard of the Loch Ness Monster! And fairies! None of them will cure your cold either [7]. What? Adam is awkwardly crawling over audience members and onto Dr. Todd's set. Vitamin supplements are not only not useful in prolonging your life - in some cases they are actually harmful.

Excuse me, who are you? I'm Adam Conover, and this is Adam Ruins Everything! We're doing kind of a show within a show thing today. Very Shakespearean. See? We switch from a view from Todd's camera watermarked "DocTalk" - close up on Dr. Todd as he throws the camera a winning smile - to one from Adam's camera which includes the crew and edges of set. Sorry, I've never heard of your show - I'm a little busy with my own here. Back to the DocTalk shot. The audience applauds. Ok, well which would you rather see - his show about how you should take your vitamins, or mine about a mad scientist that fooled a nation? He smiles at the audience expecting a big response. They are silent. And, um, if you pick my show he'll take his shirt off. The crowd goes wild. We switch to the shot from Adam's show. Yay! My show wins! He dumps a glass of water on Todd's shirt (Table 1).

Table 1: TV shows

	Show	
Time	Wholesomeness	Humorosity
day	high	low
night	low	high

Dr. Todd is shirtless, wringing out his wet shirt, and an audience woman with the vapors is being carted out in a gurney. Adam is in the audience with a microphone, speaking to audience members. So what are vitamins? Easy - they're huge pills that smell like old olives. No. Candy, shaped like cartoon characters? Wrong again.

You're both thinking of vitamin supplements. Vitamins are nutrients that are essential for normal cell function [3].

Back on the set, Dr. Todd is annoyed. Yeah, so our bodies do need vitamins. They make us healthy. Adam joins him. Right, but by definition, vitamins are something you only need a little bit of - that's really the only thing they all have in common. A little goes a long way and we generally get plenty of vitamins from the food we eat. But getting more is even better! No. Vitamins are sort of like cats. If you have no cats you'll be lonely, if you have one cat you'll feel better, but if you start loading up on cats every day it could eventually ruin your life. A woman in the audience, covered in cats, nods thoughtfully. You don't need to take a daily cat, or a daily vitamin. And if you take too much of some vitamins - like A, D, or E - you can become really sick. A pirate cameraman pipes up from behind his camera. Arrrrr - but what if ye get scurvy! First of all, that is very unlikely - you only get that if you're living off of hardtack biscuits for months. But yeah, if your doctor tells you that you need supplements- Because of scurvy! Sure, or some other deficiency - go head. Otherwise, skip it. The pirate nods. starts folding a piece of paper into an airplane. Ok fine, daily vitamins are unnecessary - but megadoses of vitamin C will cure-- Nothing! He flies the paper airplane and we push in on it, through a line-drawn window, and into the interior of an airliner full of animated stick figures. Stick and stick are seated next to each other.

Vitamin C does not prevent or cure colds. And products that claim it does are nonsense. Remember Airborne? Sure - the cold medicine created by a school teacher. It keeps you from getting colds from the magazines on airplanes. That is not true. Who gave you a medical license? Airborne was sold as a "cold buster" - with claims that it was a cure for the common cold. But in 2008 they were hit with a class- action lawsuit for false advertising, and ending up paying out \$23.3 million [4]. Because it's basically fizzy kool-aid. But when I take vitamin C it makes me feel better. The audience "awwwww"s - they are so in love with him. That's confirmation bias - when you're looking for a result, you'll find it. So enjoy your placebo, but in reality, at least fifteen different studies have concluded that Vitamin C does not treat the common cold. The audience "boooo"s. They don't like Adam. Hey, it's not my fault everyone thinks vitamins are magic. It's Linus Pauling's. A corner of the DocTalk set has been dressed up like a groovy 70s science lab. An actor portrays the late Linus

Pauling, working in the lab. Pauling was a genius chemist and one of America's true scientific celebrities. He is the only person to ever be awarded two Nobel Prizes on his own. We see flashbulbs go off around him as women shriek with delight and panties are thrown at him. I love your chemistry!! Your science is amazing.

In the early 70s though, Pauling became fixated on the idea of eternal life, and started believing that vitamins were the path to it. Basically, he went nuts about vitamins. Hundreds of bottles of vitamins fall from the sky, bonking Pauling on the head, and burying him in a pile of bottles. He emerges from the pile looking wonky and crazed. He began claiming that massive doses of vitamin C could cure the common cold, cancer, and increase longevity by decades. We see Pauling walking from the lab onto a TV set, and getting mic'd as he sits down next to a Dick Cavett-type and an ashtray full of cigarettes. Everyone is in plaid pants. So I take these vitapills and I'll live forever? Uh, vitaMINS, and no, you won't live forever - you'll just never get sick or die. It was like if Stephen Hawking suddenly started saying pop rocks and coke will kill you. Sounds pretty far out, but it must be true! Up next we've got Wayland Flowers and puppet superstar Madame!

Dr. Todd is throwing out the origami as Adam yammers. Pauling was repeatedly proven totally incorrect in multiple studies - there's no medical basis for his claims - but he continued to publicize them. In fact, in 1994 he died of the very cancer he claimed vitamins would cure. You're telling me vitamin supplements are a lie and we only believe in them because one guy went crazy? Pretty much [5]. The effects of his media frenzy are still persisting today. Basically, Pauling was the Michael Jackson of nutrition - he totally changed the game, we didn't know how crazy he was, and 40 years later we're still humming the tunes. Wow. That's Bad. It's bad. You know it. A woman in the audience raises her hand and asks a question. So what are you saying? We shouldn't believe scientists? No, definitely not saying that. But you should still continue to critically examine ideas, even when they come from a certifiable genius, or a very handsome TV show host. Why, thank you. Sure, you too. And don't waste your money on unnecessary supplements. Boy these lights make you sweat, huh? What are you wearing, dress shields? Alright, enough! You told your vitamin story - wow, neat, now get out of here and go ruin Kathy Lee and Hoda. That would be virtually impossible. They are way too likeable. Go! Sorry. Ok. Adam scurries away and

Dr. Todd is framed alone, throwing to commercial. Sorry about that... whatever! But when we come back we'll be back on track, talking about the most important meal of the day - breakfast!

He rises into Dr. Todd's shot. Most important, and completely misunderstood! Did you know cereal is supposed to keep you from masturbating?

Do we not have security? How does this keep happening?

Materials and Methods

The camera flies in again. Sorry for all the unexpected interruptions earlier, but now I'm going to tell you about the most remarkable, life-changing new diet tip available. The audience "wooooo"s. Are you sure about that? Uh, yeah - there was a scientific study on it, so I'm pretty sure I know what I'm talking about. Plus I have a TV show. Just because you have a TV show doesn't mean you can't be wrong, or lie. Watch: bologna is made from the best parts of the cow, these Transformers movies keep getting better, I go on lots of dates - see? Maybe I hold myself to a higher standard than you.

Adam walks over to an off-set monitor Well you've certainly been wrong before. Can we roll the clips? The monitor plays old clips of Dr. Todd. In each clip he has a different dumb hair/beard style. This next diet is the ultimate way to optimize your health - it's called the Slow Carb Diet. It's called Atkins, and there is scientific proof that this is the most effective way to keep your body healthy by eating based on your body type. Based on your blood type. Based on your cavemen ancestors! Adam joins Dr. Todd on the set. There is no way all these different diets could all be the most effective. Yeah, ok, well - they are all advancements. There is nothing wrong with improving the knowledge you have.

Like this new study - my next guest discovered that adding chocolate to your diet can improve your health by helping you lose weight. A chubby cameraman eating a chocolate bar nods his head and wipes his chocolatey hand on his too-small T-shirt. I knew it. Please welcome John Bohannon! John Bohannon walks out and joins Adam and Todd at their table. This person is a fraud. Adam! No he's not, he's my guest! Sorry John. Oh, no - he's right.

In spring of 2015 he purposefully conducted a fraudulent study to find the health benefits of chocolate, and ended up convincing people that eating chocolate makes you lose weight [2]. God, I love your work. Likewise. They perform a complex handshake. Why would you do that? (Table 2)

Table 2: Trees by type and lethality

Tree		
Type	Bearing	Lethality
Normal	Fruit	0.001
Good/Evil	Knowledge	0.999

I wanted to demonstrate how easy it is to get the media to report on bad food studies. And? Turns out it's super easy. What is going on? I'm adding a segment. Now it's time for Cooking Up A Fraudulent Study with Chef Adam. Adam puts on a chef's hat as he and John walk over to a kitchen area of the set - basically a table laid out with food, bowls, etc. First we started off with random samples instead of balanced samples. That means that instead of making sure he had balanced numbers of different types of people, he just threw together a bunch of folks. Random might sound better, but it makes it much more likely for data to be skewed by unknown variables. Adam demonstrates this dumping a bunch of different types of berries in a bowl. Then we cherry-picked data.

If you look at enough details, you're sure to get some type of results, and you can just select those and leave out the rest. He picks some cherries out of a bowl and adds them to his mix - then the rest of the cherries into the garbage. Then we got it published in journals with no peer review, but real sciencey - sounding names. Like "The Journal of Medicine and Clinical Sciences" or "Medical Science Journal". These journals will take any junk you send them - as long as you pay their fees. Adam starts pulling banana peels and yogurt cups out of the garbage and tossing them into the bowl.

John sprinkles sugar on top. Then I sprinkled in exciting language to tantalize journalists. Voila! You got yourself a piping hot bowl of garbage. They slop it on to plates and hand it to a guy and gal in T-shirts that read "Cool Media Guy" and "Cool Media Gal". They gobble it up. I love it! Mmmmm, so sharable! Dr. Todd has joined them, and is peering over their shoulders and into the bowl.

That's disgusting. I know. The media is so hungry for interesting content, they are more than willing to take faulty science and run with it. No one would fall for that. You did. Dr. Todd's eyes widen as he realizes how many flawed ideas he has fallen for over the years. Acai berries, ancient melon, balanced water - they couldn't all

be... Just food. Yup, they're all just food. Not medicine. Members of the audience stand up. You don't know what you're talking about Dr. Todd! You told us to try oil pulling! Yeah, I ate green coffee beans for a year because of you!! Are you abs for real? Wait wait - come on, Adam - tell them the surprising fact about how it isn't really my fault.

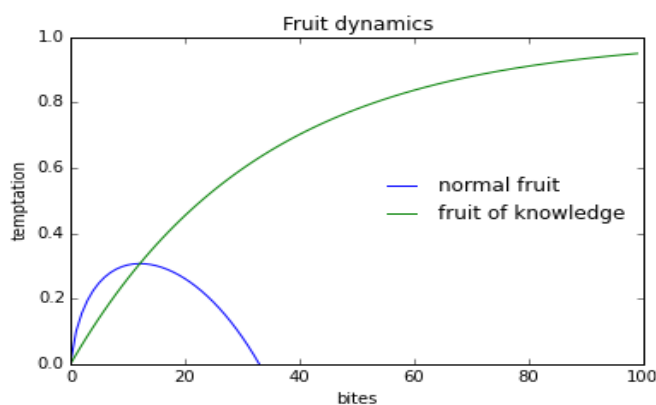
But it is. I mean, not you - you're just an imaginary straw man. But it is the fault of all the shows, magazines, websites, and documentaries that use faulty science to generate clicks and ad sales. You terrorize people with scary headlines and then convince them of junky pseudoscience, all to sell ads. That's not just being a bad reporter, it's being a bad person. Debbie stands in the audience, holding a torch. Burn the witch! The crowd roars and mayhem breaks out. Whoops - too impassioned. Sometimes I don't know my own strength. Help me! Wait! There is a simple solution to all of this! I'll tell you in just a-- uh-oh.

Women rush the stage angrily and the picture suddenly cuts out to a cartoon graphic of Adam that says "Technical difficulties - we'll be right back after this!"

Results

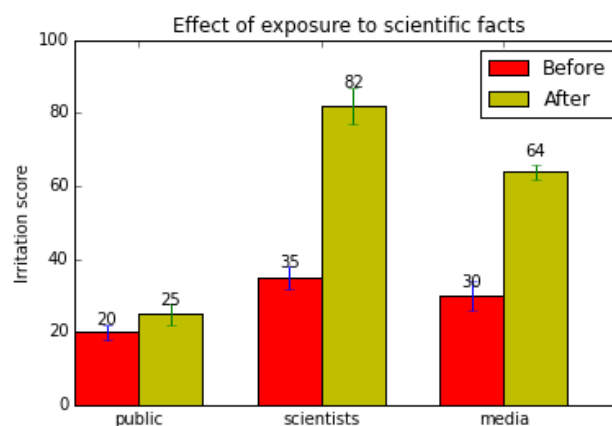
The studio is mayhem. Audience members are tearing down the set and someone has started a trashcan fire. Dr. Todd is standing on his table crying. Oh god, oh god, I'm going to lose my show and have to start stripping again to pay off my student loans. Why did we do pitchfork giveaway? Women run past brandishing pitchforks.

Adam climbs up next to Dr. Todd. Wait! Everybody calm down. Please, go back to your seats. The audience members reluctantly pause. We want the real info!! What am I supposed to eat? You have to tell me what to eat! I don't know! Come on, man - pull it together. You're Dr. Todd Bodd, America's most handsome doctor! Yeah, I know... But if we can't rely on science or magic pills to make us healthy, how can we be sure? We should all be critical of what advertisers and the media tell us because they want to sell us something (Figure 1).



In 2013 Americans spent \$40 billion on diet programs and products - that's about \$200 per person. And it doesn't seem to be working.

Instead of listening to advertising, listen to your doctor - your real doctor. Debbie - it's Debbie, right? Debbie, the woman from the start of the show, is holding a trash can aloft, ready to smash one of the DocTalk set walls. She pauses. Yeah? Didn't you used to have your own doctor, who knew you personally, and could give you informed advice? I guess....oh yeah, Dr. Thompson. He had just a regular face, but I liked him. I miss him (Figure 2).



An average-looking doctor, Dr. Thompson steps out of the shadows. I miss you too, Debbie. I'd like to do some bloodwork, and - if you'd let me - listen to your heart. You had me at bloodwork. They walk off together. I think they're going to be really healthy together. Also each one of us already has the best tool available for tracking health. Fit bit? No. Our bodies. Please welcome our last guest - your body!

Discussion

Todd's headless body comes out, as Adam and Todd climb down off the table. Is this a nightmare? No! It's you! When you eat something bad, you feel bad. And when you exercise and eat well, you feel good. If you want to find out what you need, listen to your body. The body pulls up it's shirt to reveal a huge gross mouth in it's stomach. I like grapes. See? You learned something about yourself! You like grapes. Dr. Todd is horrified. AUGH!!! Make it stop!! Come on, love your body.

The body goes to hug Dr. Todd - he is horrified. Sorry, I guess he's not ready, Body. The body shrugs it's shoulders and exits. How are you doing this? Low budget green screen. In the world of nutrition reporting, if it seems too good to be true, it is. Just eat in moderation, food when possible, and you can.

Great, how am I supposed to make that a new show every day? I don't know - Oprah added a book club. Do that. Oh and remember - the foods that work for you might not work for the person next to you, because their body isn't your body. I guess you're right. Some of the stuff I was saying was crazy! I didn't want to say it, but yeah. I got into this to help people, not just have my own line of teeth whitening strips.

I did it because I love science. I guess I got lost though. You know my name isn't even Todd Bodd? It's Rodney Bodd. Rod Bodd? Yeah, it wasn't catchy enough for TV. I'm gonna do it, Adam. I'm going to do my show based on real science! Really? That's great man, I love a science show. I'm sure it'll be a big hit!

The DocTalk set is deserted, a tumbleweed rolls by, a possum gnaws on a bottle of vitamins. Lonely music plays.

Conclusions

Adam and Todd's headless body are walking home down the a residential sidewalk. Adam points to the body's feet

Are those shape ups? Yeah, I'm toning my butt. You know they don't really do that. In fact Sketchers was faced with a class action lawsuit over it - which they settled for \$40 million dollars [6]. You mean all they do is make me look weird? Yep. Well, you also don't have a head. What are you saying?

Nothing. Never mind.

Conflict of Interest

The authors declare that they have no conflicts of interest.

Acknowledgement

The authors thank the Big Breakfast Research Lab for helpful comments.

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