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THE **CrossFit** JOURNAL

SWEET AND LOW

Brittney Saline details how exercise and healthy eating might be the best way to combat sugar-fueled depression.

BY BRITTNEY SALINE



Lauren Plumey

Roxanne Melillo formerly used sugar as comfort food. After altering her diet and starting CrossFit, she's lost 10 sizes and said she feels far better.

“Open happiness.” —The Coca-Cola Co.

America has a happiness problem, and Coca-Cola’s got the answer.

On the multi-billion-dollar beverage company’s [website](#), the brand juxtaposes the words of Aristotle, Mahatma Gandhi, Buddha and others with the prose of its marketing team: “Open an ice cold Coca-Cola and choose happiness!”

It didn’t work so well for Roxanne Melillo. A survivor of childhood domestic violence and sexual abuse, the 39-year-old has spent her life sugarcoating her pain.

“I ate to heal myself,” Melillo said. “I would get into a bad mood and the first thing I would turn to is a soda and a candy bar.”

Snickers bars were her feel-good food, a glistening can of Coke her elixir.

“It was a quick fix,” she said. “Pop the can open, drink it.”

It made sense. After all, sugar mediates the [release](#) of [dopamine](#), a neurotransmitter that activates reward signals in the brain. Despite her self-medication, Melillo grew heavier, not happier. By 36, she was pushing 300 lb. at an even 5 feet and had stopped socializing.

“I didn’t care; (sugar) kept me in a cloud of no reality,” she said.

She’s not the only one with a sugar problem. In 2013, the average American consumed approximately [22 teaspoons](#) of caloric sweeteners per day, according to United States Department of Agriculture (USDA) data. Meanwhile, an estimated 350 million people suffer from depression world-wide, according to the [World Health Organization](#), which dubs depression the world’s “leading cause of disability.”

It’s not for lack of drugs. One in 10 Americans 12 and older takes antidepressant medication, according to the [Centers for](#)

[Disease Control and Prevention \(CDC\)](#), spending more than [US\\$11 billion](#) on antidepressants in 2010 alone.

“The rate of antidepressant use has more than tripled in the past 25 years, and yet, if anything, the overall rate of depression is higher now than it was back then,” said Stephen Ilardi, a Kansas University psychology professor who holds a doctorate in clinical neuroscience. “Everything that we’re throwing at this epidemic is really barely making a dent.”

So why are we so unhappy?

Sweet (Dis)Satisfaction

Sugar makes us feel good. Just look to any romcom—full of broken hearts and empty ice-cream tubs—for proof. But research suggests sugar is more sinister than soothing—and not just for our waistlines.

A 2002 [study](#) by researchers from Baylor College of Medicine in Houston, Texas, analyzed major depression prevalence alongside refined-sugar-consumption data across the United States, Korea, France, Germany, Canada and New Zealand. The authors found a “highly significant correlation between sugar consumption ... and the annual rate of depression.”

Researchers from the University of Adelaide in South Australia got a bit more specific, linking soft drinks and sports drinks—including Gatorade and Powerade—to depression and suicidal thoughts in a 2010 [survey](#) of nearly 5,000 people.

One year later, scientists from the Jiangsu Provincial Center for Disease Control and Prevention in Nanjing, China; the Eunice Kennedy Shriver National Institute of Child Health and Human Development in Bethesda, Maryland; and the University of Adelaide conducted a similar [study](#) of almost 24,000 students aged 12-19, examining the association between soft-drink consumption and suicidal thoughts. The researchers reported an 80 percent increased risk for suicidal plans among those who consumed soft drinks three times per day compared to those who imbibed less than once. The risk of an actual suicide attempt nearly quadrupled.

While sugar-sweetened beverages are the [leading source](#) of calories from added sugar in the average American diet, it’s not just drinks that are making us sad. Caloric sweeteners are hidden in 77 percent of calories purchased from consumer-packaged goods in the U.S.

James Gangwisch is a psychotherapist at Columbia University in Manhattan. Remembering his own childhood tendency to feel melancholy after eating sweets, he wondered if he ate sugar because he was sad or if he was sad because he ate sugar.

“We already know that people who are depressed have a tendency to crave carbohydrates and to crave sweets,” he said. “So we wanted different sources of evidence to see if excess sugar intake or excess carbohydrate intake is a risk factor for depression—could it increase your chances of developing depression?”

Using data from the Women’s Health Initiative, Gangwisch and researchers from major universities in California, New York and Minnesota analyzed the food intake and depressive symptoms of nearly 70,000 postmenopausal women for a three-year period, paying attention to total dietary glycemic index (GI) and added sugars. None of the women were depressed at the start of the study, but after three years, the women who reported the most depressive symptoms were also the ones with the highest overall dietary GIs, researchers [reported](#).

Gangwisch theorized that one explanation for the link between a higher dietary GI and depression is repeated spikes and dips in blood-glucose levels, which, over time, can reduce the amount of glucose transported to the brain and result in fatigue, anxiety and mood impairment.

Regular excessive sugar intake can also lead to chronic inflammation, the result of continually overwhelming the liver with fructose.

“Sugar promotes inflammation, and as a pithy way of putting it, the inflamed brain is a depressed brain,” Ilardi said.

On a local level—think bug bites and sprains—inflammation is a good thing, enriching the site with restorative hormones and chemicals in the blood.

“Sugar promotes inflammation, and
as a pithy way of putting it, the
inflamed brain is a depressed brain.”

—Stephen Ilardi



When Hippocrates said, “Let food be thy medicine,” it’s likely he was referring to wholesome, nutritious food rather than brightly colored handfuls of sugar.

“But if we have a systemic inflammatory response then now we have these inflammatory hormones out in the bloodstream at a high level,” Ilardi continued, “and they generally tend to suppress activity in circuits that use serotonin, many circuits that use dopamine, and, in particular, dopamine-based circuits that give us a sense of initiative and drive to pursue our goals and (take) pleasure in reward-based activity.”

But inflammation is just one way sugar damages our brain. The sweet stuff we crave when we’re feeling down can actually scramble our genetic hardwiring for happiness.

Head Games

Blue eyes or brown, male or female—our genes determine how we look and which diseases we’re susceptible to. They also determine production of brain-derived neurotrophic factor (BDNF), a protein that enhances brain health and neuroplasticity by regulating the growth and survival of neurons and synapses.

BDNF plays a vital role in learning and memory, and a lack of it has been [linked](#) to Alzheimer’s disease and major depression. Common antidepressants such as selective serotonin reuptake inhibitors (SSRIs) and norepinephrine selective reuptake inhibitors (NESRIs) have been [shown](#) to upregulate BDNF expression, and BDNF serum infusions to rodent brains have demonstrated antidepressant effects.

Moreover, postmortem analyses of human hippocampi have revealed decreased BDNF expression in suicide patients.

Our natural expression of this protein is determined by the BDNF gene, of which there are multiple variants, some [associated](#) with impaired or reduced BDNF secretion. The good news is that we have the power to affect the expression of our genetics.

“Just because you have one gene variant doesn’t mean that we can’t yet influence the functioning of that particular gene,” said Kirk Erickson, a psychology professor at the University of Pittsburgh. “And so exercise, diet, intellectual engagement—we



“What you’re eating is important independent of the total amount of calories.” —Scott Kanoski

know that all of these things seem to increase the amount of BDNF. Even if you have the ‘bad’ gene for BDNF, there might be something that we can do about it.”

The first thing we can do is to eat less sugar. Studies published in [Neuroscience](#) and [Hippocampus](#) reported that rodents fed diets high in saturated fat and refined sugar exhibited reduced levels of BDNF as well as hippocampal atrophy. Scott Kanoski, an assistant professor at the University of Southern California with a doctorate in behavioral neuroscience, published one such study in [Behavioural Brain Research](#) in 2007, and he was curious to find out whether sugar had an independent effect on BDNF expression.

In February 2015, he published a [study](#) detailing the effects of sucrose and high-fructose-corn-syrup consumption on spatial memory function and hippocampal inflammation in adolescent rats, as compared to control groups fed a standard chow. Both groups weighed the same at the end of the study, but the sugar-stuffed rats demonstrated neuroinflammation and impaired cognitive function.

“If you look at those data, it really speaks to the fact that what you’re eating is important independent of the total amount of calories,” Kanoski said.

Researchers are not entirely sure as to why sugar damages the hippocampus and impairs BDNF expression, but they are certain that it does.

“We know that these diets lead to inflammation in these neurons, so that could be one mechanism that ultimately leads to lower expression of BDNF,” Kanoski said.

The implications for people at risk for or fighting depression are significant.

“BDNF is critical to all new learning,” Ilardi said. “So when a person is stuck in depression, in order to get un-depressed, they need to have a lot of BDNF to learn that ‘OK, I don’t need this runaway stress response, and the world around me isn’t horrible, and people really don’t hate me, and life really is worth living’ ... so if they’re eating a lot of sugar, it can actually get in the way of that healing process.”

Tire-Flip Therapy

Like many eighth-grade boys, Conor Chisholm often faked the stomach flu to get sent home from school early. Only he didn’t do it for the thrill of playing hooky.

“It was because of my anxiety,” said Chisholm, now 18. “I would just feel anxious, and kind of sad, for no reason.”

At 6, Chisholm was diagnosed with depression, ADHD and anxiety. Though he played hockey from third to sixth grade, in seventh grade he often blew off practice, eventually quitting because of his anxiety. In his eighth-grade year, he transferred from public school to a private therapeutic school.

Chisholm tried hobbies such as skateboarding and drawing and took medicine for his conditions, regularly seeing a psychologist. Still, sweets were the only thing that made him feel better.

“Back then if I would eat a bunch of ice cream at night while watching TV, everything would feel so much better,” he said. “Then when I’d wake up in the morning, and that’s when I wouldn’t feel that great.”

Then his father got hooked on CrossFit.

“I remember he would always be on the CrossFit website looking at the workouts and exercise demos,” Conor said. His mother, Caitlin, followed suit, attending a Level 1 Certificate Course a year later.

One day, Caitlin brought Conor to the gym.

“I had such bad anxiety that I didn’t really want to go anywhere ... but my mom just kind of made me go,” Conor said.

But flipping huge, dusty tractor tires and doing heavy farmers carries with old torpedo shells changed his outlook.

“Right after the workout I asked my mom if I could go every day,” Conor said.

We’ve Got the Power

What if we could change our brain chemistry?

“The cells, including neurons, in animals on high-energy diets, their adaptive stress-response pathways are not activated regularly because they have a constant supply of energy,” said Mark Mattson, a senior investigator at the National Institutes of Health. “They’re essentially not challenged.”

When we exercise, however, we give our cells the challenge modern-day life has squelched, activating signaling pathways that lead to the expression of genes encoding proteins designed to protect cells against stress.

“And one of those proteins is BDNF in the brain,” Mattson said.

Other environmental factors such as [sunlight](#), [calorie restriction](#), and learning and memory tasks, Mattson said, can positively contribute to BDNF expression. But, he added, “Of all the environmental stimuli that increase BDNF, exercise is the most potent.”

In a 2002 [study](#), researchers from the University of California, Los Angeles and the Brain Research Institute in Los Angeles tested levels of BDNF protein and its receptors in rats after three days of voluntary wheel running. Compared to a sedentary control group, BDNF-receptor levels in the soleus muscle increased 391 percent after three days of exercise, and BDNF-protein levels increased 204 percent. Levels of each were also increased in the spinal cord.

In a test of opposites, the researchers paralyzed the soleus muscles of a separate group of sedentary rats caged in conditions “analogous to the sedentary life of many humans.” Paralyzed for approximately eight days, the rats showed a 77 percent reduction in BDNF receptor levels in the soleus muscle and an 86 percent reduction in the spinal cord. After the rats were given seven days to exercise, those numbers increased 175 and 142 percent, respectively.

In 2011, Erickson tested the theory on older adults. In a yearlong controlled trial with 120 adults aged 55-80, participants walked for 40 minutes weekly. Erickson and his team [reported](#) that the year of training led to a 2 percent increase in hippocampal volume, writing that, “We also demonstrate that increased hippocampal volume is associated with greater serum levels of BDNF.”

“We actually don’t have a good understanding of exactly why exercise has this promoting effect, but it certainly seems that when we exercise, it increases the expression of a whole variety of genes ... and within that bundle of genes, BDNF seems to be one of them,” Erickson said.

Though most studies have examined the relationship between BDNF and strictly aerobic activities, a 2010 [study](#) by researchers from the universities of Florida and Georgia demonstrated that “short-duration resistance exercise augments serum BDNF concentrations and that regular participation in progressive resistance training elevates the circulating BDNF response to exercise.”

After an experiment wherein 20 healthy, previously untrained males trained the squat and bench press with increasing loading over a five-week period, the change in BDNF levels from rest to immediately post-exercise increased 98 percent from baseline levels.

“Overall, our results indicate that resistance training increases circulating BDNF, similar to the effects of endurance exercise,” the researchers wrote.

The Way We Live

Today, Chisholm is in his senior year of high school. After more than three years of attending CrossFit classes at CrossFit Magnitude in Pembroke, Massachusetts, and CrossFit Marshfield in Marshfield, Massachusetts—along with [eliminating](#) most of the sugar from his diet—Chisholm



Courtesy of Caitlin Chisholm



Abby Ilardi

Stephen Ilardi is a professor of psychology at Kansas University and holds a doctorate in clinical neuroscience.

said anxiety and mood swings are significantly reduced. He has returned to public high school and works part time at a grocery store.

“I feel so much better compared to how I felt before,” he said. “I feel more balanced ... like in the same mood the whole day.”

In August 2014, he met with his doctor.

“I told the doctor, ‘I don’t think I need to be on meds anymore because all I need to do to feel good at school is have a good routine with clean eating and going to a CrossFit class every day,’” he said. “And I haven’t taken any medicine since.”

Melillo started CrossFit in August 2014 at the insistence of her cousin, Lauren Plumey, who owns Shoreline CrossFit in Branford, Connecticut. One month later, Melillo joined the affiliate’s Paleo challenge, eliminating all sugar from her diet. In addition to dropping from a size 24 to 14 in six months, the combination of CrossFit and the Paleo Diet “changed my life,” she said.

She added: “I was very clear headed, very focused. My kids were happier. I was happier.”

Though she suffered a short relapse following the death of her grandfather later that year, a combination of therapy, a low dose of antidepressants, CrossFit and a clean diet have her back on track today.

“Exercise changes the brain and diet changes the brain.”

—Stephen Ilardi

“I don’t have the anxiety I was having initially,” she said. “I don’t have depressive mood swings or anything.”

According to Ilardi, that combination is what we need to see more of in the fight against depression.

“We can’t keep simply throwing medication at the depression epidemic and expect to help it,” he said. “Just like we wouldn’t take a patient who just had a heart attack and just throw medication at them, and say ‘OK, you can continue living exactly the way you’ve always been living.’”

He continued:

“I think with depression, the first point of emphasis should not be the medication. It should be, ‘We need to radically change the way you’re living.’ Why? Because exercise changes the brain and diet changes the brain Affirming that depression is characterized by a chemical imbalance tells us nothing about the most effective way of treating it.

“And it turns out that there are literally dozens of ways of changing neurochemistry. And most of them have nothing to do with medication and everything to do with the way we live.” ■

ABOUT THE AUTHOR

Brittney Saline contributes to the CrossFit Journal and the CrossFit Games website. She trains at [CrossFit St. Paul](#).



Wendy Nielsen

A Better Beautiful

The first year of the CrossFit Games was 2007. Sure, we started in Dave Castro's mom's backyard, but it felt like Woodstock and looked like a prison yard—just a tougher workout, a tougher crowd, and coed. Wonderfully coed.

This is not just the first major sport spawned from a peanut roaster, but a moment in physical culture, a rather audacious crowning by CrossFit Inc. of the Fittest Man and Woman on Earth from, of all things, a list of friends competing over a weekend. Our beloved Games had an auspicious beginning even if only a score of us recognized the import of what was unfolding.

It's as easy as this: if fitness can be defined and measured, then it can be tested, and we can, in turn, find the fittest. There's an inevitability to the Games that arises directly from our intellectual DNA.

Roll the clock forward a few years and we're driven from Monterey County (by its now-regretful fathers), in a stadium, and on TV, and Reebok has traded the NFL for the Games. The CrossFit Games quickly became a global put-up-or-shut-up challenge that leaves our critics and competitors gloriously silent during Games season lest they find themselves "honorary invitees" and thrust into the arena. The Games make bragging on the Net dangerous. Each athlete is showcasing an approach—a successful one at that. Internet trash talk is now off center stage.

In this, our seventh year, I call your attention to the bodies. Yes, the flesh—the men, the women, the spectators and the competitors. It's not our usual intellectual focus, but I can no longer pretend not to notice. Everyone is an athlete, but many, maybe even most, are simply beautiful. This menagerie of "Frankenfitters," stadia quite literally full of them, embodies a functional aesthetic that is uniquely ours. Their bodies and our appreciation of them are a direct challenge to a host of pathological aesthetics, whether it's the 16-year-old heroin-chic anorexia of the fashion world or the grotesqueness of bodybuilding and drug-induced hypertrophy.

These athletes and spectators wear the look of enormous work capacity across broad time and modal domains. Theirs is the look of true performance. This is what happens when form, as it should and will, follows function.

What we've made, what you'll see all around you this weekend, is a better beautiful.



Greg Glassman
Founder and CEO
CrossFit Inc.



COACH'S ORDERS

BY ANDRÉA MARIA CECIL

Affiliate owners and trainers weigh in on how and when they have their athletes do workouts as prescribed.

There's the guy who went out on his third 800-m run never to return, another who insisted on doing 135-lb. push presses only to walk out forever, and, of course, the one who considered himself an elite-level athlete but took an hour to finish a workout on which his peers spent less than 15 minutes.

The three athletes were at different affiliates, but they all ignored coaching advice, determined to do the workout as prescribed even though their skills were not up to par.

"I don't really feel like going Rx should be encouraged regardless of how long it's going to take the athlete," said James McDermott, head coach at Albany CrossFit in New York.

The 8-year-old affiliate often imposes a time cap on workouts.

"We're looking to preserve the stimulus of the workout."

Take Fran, for example, McDermott said. If an athlete is "fully capable" of performing the CrossFit benchmark workout's 21, 15 and 9 thrusters unbroken but the same number of pull-ups in sets of only 2 or 3, he or she won't experience the same intensity as those who finish in 5 minutes or less.

"We don't really encourage it at all," he said. "We don't like the get-it-done approach."

Instead, McDermott advises athletes to "work to achieve the intended stimulus of the workout. Don't do the work just for the sake of doing work."

The focus on Rx is sometimes distorted, said Josh Corley, owner of CrossFit 719 in Colorado.

"I pride myself more on movement than Rx capabilities. ... There's no use in moving a 135-lb. overhead squat if you're going to move it in a way that you're going to injure yourself, eventually."

Rx, said affiliate owners and coaches, is a starting point from which to modify for the individual. The road to reach it—and beyond—has no shortcuts.



At U Turn CrossFit in Texas, owner JB McDougall and his coaches emphasize mechanics and consistency before intensity.



Wesley Sun Chee Fore (in black), owner of CrossFit Lafayette in Louisiana, will ask an athlete to perform multiple reps with good technique before the workout begins.

The Rx Conversation

At some affiliates, coaches begin the as-prescribed conversation at the whiteboard.

Inspired by the [CrossFit Training Department's Instagram profile](#), which publishes “Beginner” and “Intermediate” scaling options for [CrossFit.com](#) workouts, Albany CrossFit followed suit. It offers its members the workout of the day as Rx, as well as “Scale 1” and “Scale 2.”

“It’s been very positive. We find that our athletes want that direction,” McDermott said.

Meanwhile, at CrossFit Lafayette in Louisiana, coaches communicate non-Rx options via differently colored markers: Red is Rx, blue is scaled down, and black is scaled up.

“We don’t always have the black option,” noted owner Wesley Sun Chee Fore.

At both affiliates, the dialogue between coach and athlete continues during the warm-up. As members set up their equipment for the

workout, trainers must observe multiple reps with good technique to give athletes the green light for a weight or movement.

“I will meet with every athlete,” McDermott said.

Technique must be spot on for CrossFit Lafayette members to go Rx, Sun Chee Fore said.

“If they can’t do it comfortably, it’s not fun,” he explained.

“If we really want to help people develop into better CrossFitters, we can’t be pushing for this prescription all the time.”

—Andrew McDonald

The same goes at other affiliates.

“We really focus on making sure that you have the confidence in the movement,” Corley said. “Show me that you can do that, and then we’ll add that weight and intensity.”

And it’s rare for members to argue.

“Part of that is having a relationship with the athlete,” he said. “I think we’ve done a really good job of showing them ... respect.”

Corley continued: “We don’t want to be confrontational in any way, so we do that through positive reinforcement.”

Shane Venezia takes a similar approach, explaining to athletes why he is scaling their weight or movement.

“They’re pretty receptive,” said the owner of CrossFit No Surrender in Louisiana. “Ultimately it’s the coach’s decision because it’s a safety issue, and at the end of the workout they’re (usually) like, ‘You were right. That workout still kicked my tail.’”

Venezia added: “If they’re safe, I let them do it.”

Still, he has his limits.

“I don’t believe Elizabeth should take 25 to 30 minutes to do,” he said of the CrossFit benchmark workout.

Elizabeth calls for 21-15-9 reps of 135-lb. cleans and ring dips. Elite athletes have finished the workout in less than 5 minutes.

“I’m not a firm believer of ‘Rx or die.’ I don’t believe that just because you can lift the weight, you should,” Venezia said.

Neither does JB McDougall. He, however, prefers skiing analogies.

“Just because you got to the bottom of the slope doesn’t mean you were skiing,” he said with a hearty laugh.

U Turn CrossFit members wanting to go Rx on workouts became such an issue that the Texas affiliate added an edict at its entrance: “Leave Your Ego at the Door.”

These days, athletes are more willing to follow the coach’s advice.

“They’re all pretty good because we spend so much time working with them,” McDougall said. “By the time we tell them, it’s not a surprise.”

But for Andrew McDonald, a CrossFit 719 coach who programs all the affiliate’s workouts, there is a time and place to let athletes go Rx no matter how long it takes: benchmark workouts and CrossFit Games Open workouts.

The reason: Athletes will repeat those workouts.

“We want them to be able to come back to that,” McDonald explained. “Now they can see the progress that they’ve made.”

Those are his only exceptions, though.

“If we really want to help people develop into better CrossFitters, we can’t be pushing for this prescription all the time. When you prescribe workouts, you prescribe them to the best of the best. ... On a regular training day, who cares who has the fastest time? We want to change people, not test people all the time.” ■

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THE
CrossFit JOURNAL

STUDENTS STOP SODA

SF State groups beat back pouring-rights contract worth millions. BY BRITTNEY SALINE





Sevan Matossian/CrossFit Journal

Shortly before the Nov. 19 town hall at SF State, groups opposing pouring rights received word that university President Leslie Wong had terminated the contract process with beverage manufacturers.

On Nov. 19, a group of about 20 college students in San Francisco, California, managed to do what countless community leaders and health advocates have failed to do: beat back Big Soda.

After a five-month campaign protesting San Francisco State University’s pursuit of a 10-year pouring-rights contract with The Coca-Cola Co. or PepsiCo Inc., the student-run SF State chapter of **Real Food Challenge (RFC)** convinced SF State President Leslie Wong to stop the contract process. Sixteen other student organizations, two grassroots community-health collaborations, several SF State faculty members, the San Francisco Board of Supervisors and more than 10 percent of the student body assisted the RFC.

“We are one of the schools that sets the stage for the West Coast, so it’s a big victory for us to show that it is very possible,” RFC member Jennifer Rangel said of the group’s triumph over Big Soda.

Pour Health?

Commonplace since the 1990s, pouring-rights contracts grant corporations exclusive sales and marketing opportunities on school campuses in exchange for funds, the use of which is often restricted to purposes designed to funnel money back to the provider. The SF State deal was poised to bring in a one-time minimum contribution of US\$2 million and annual contributions of at least \$125,000, according to a May SF State request for proposals obtained by the CrossFit Journal.

Though Big Soda dollars promise relief in the face of budget deficits and a lack of government funding for higher education, critics argue that ubiquitous on-campus marketing of sugar-sweetened beverages—the **leading** source of added sugar in the American diet—does more harm than good. Added sugar has been shown to increase risk for diabetes, tooth decay, obesity and a host of other health problems.

“The most questionable aspect of these contracts is that they link returns to the companies and to the schools to amounts that students drink,” Marion Nestle wrote in “Food Politics: How the Food Industry Influences Nutrition and Health.” Nestle is professor of nutrition, food studies and public health at New York University.

The SF State pouring-rights request for proposals named its athletic program as a primary beneficiary of the funds. The deal, for which both Coca-Cola and PepsiCo were vying, would have granted the provider exclusive pouring rights and marketing privileges on campus, 80 percent of beverage retail shelf space, scholarships in the company’s name, the chance to name the university’s athletic complex for 10 years, and a corporate-named endowed chair in the college of its choice.

SF State students were less than thrilled.

“We’re trying to get healthier food on campus,” Rangel said. “We’re trying to create a better environment and a more ethical environment for SF State, and that just goes against our entire culture.”

Promoting sugary beverages on campus, she continued, would conflict with the university’s **mission** to confront environmental sustainability, as well as the California State University (CSU) system’s **initiative** to provide 20 percent “real food” on campus by 2020. The CSU, Rangel said, defers to the RFC’s **definition** of real food: local/community based, ecologically sound, fair or humane.

The possibility of a corporate-endowed chair was also a “big problem,” according to Rangel, who worried about how corporate funding might affect academic integrity at SF State, a public institution.

“The acceptance of corporate funding would take away government responsibility to the students to provide a quality and affordable education,” the RFC wrote on its **website**. The RFC also suggested a corporate-endowed chair would “make a mockery of our educational values.”

Fighting the Fizz

The RFC SF State chapter spent the summer researching how pouring-rights contracts work and training with national RFC leaders to learn how to campaign. In fall, the RFC partnered with 16 other student organizations in addition to **The Bigger**

Picture and **Open Truth Now**—campaigns working to fight obesity and Type 2 diabetes—to give class presentations and generate campus awareness of the request for proposals.

In October, the RFC and its allies successfully passed a resolution against pouring rights with Associated Students Inc., the governing student body of SF State.

“Having that resolution written and passed was a big game changer for us because (Wong) could no longer say it was just a small group of students that are fighting this,” Rangel said.

Faculty followed suit with its own resolution “strongly” opposing promotion of Coke or Pepsi products on campus, pointing to measures taken in surrounding areas to limit consumption of sugary beverages, such as the University of California-San Francisco’s recent **initiative** to phase out sales of all sugar-sweetened beverages and the San Francisco Board of Supervisors’ June **vote** to require health-warning labels on soda advertisements.

When RFC members sought to present their objections directly to Wong, SF State administrators granted them a town hall in October—with representatives from Coca-Cola and Pepsi.

“We hadn’t even spoken with President Wong and students hadn’t been publicly educated on the issue, and yet they’re bringing Coke and Pepsi on campus,” said An Bui, RFC SF State chapter president.

Implementing their training, RFC members “occupied the space” during the town hall, Bui said, blocking the soda representatives’ table and demanding an audience with Wong. Their efforts paid off with the promise of a second town hall with Wong himself, slated for Nov. 19.

In preparation, the RFC continued its campaign, amassing nearly 3,000 signatures on its petition opposing a pouring-rights contract. The group was invited to attend the Berkeley, California, premiere of the documentary **“Sugar Coated,”** and after members spoke at a recent meeting of the San Francisco Board of Supervisors, the group earned the board’s unanimous support.

On the afternoon of Nov. 19, RFC members marched toward Seven Hills Conference Center on the campus of SF State, where more than 50 students, faculty and other supporters—including CrossFit Inc. Founder and CEO Greg Glassman—waited. As they marched with signs bearing slogans such as “student rights, not pouring rights,” choruses of “President Wong, you are wrong!”

wafted through the air. A monstrous inflatable soda can labeled “Type 2 diabetes” in Coca-Cola-styled scrawl tugged at its tether near the entrance.

But as Bui reviewed his talking points in the moments before the discussion, he received word from SF State administration that Wong had done an about-face, retracting his decision to pursue a pouring-rights contract.

Though Wong was not available for an interview with the CrossFit Journal, SF State spokesman Jonathan Morales provided an email statement Wong sent to the SF State community after the town hall.

“After listening carefully to the concerns and information I received from our students, faculty and staff, I have decided not to move forward with the process of establishing a partnership with a beverage company,” Wong wrote.

“It really came as kind of a surprise,” Rangel said. “We were really preparing for backlash.”

San Francisco Supervisor Scott Wiener credited the student campaign leaders with the victory.

“The amazing student organizing was the key factor in the university’s reversal,” he wrote in an email. “The students deserve all the credit in the world, and we were happy to provide support at the Board. The movement to reduce consumption of sugary drinks is growing and getting more powerful by the day. We are going to win this fight.”

It’s a fight SF State students are committed to seeing through.

“Because we rejected the pouring-rights contract, San Francisco State is in a unique position to build new health initiatives for the campus community,” Bui said. “We have taken increased responsibility and a new leadership role to find alternative funding for athletics and also to continue San Francisco’s current initiatives against sugar and soda.”

He continued:

“It was a victory in the sense that we got our foot in the door. It was a fight, but the war is not over. Now the real work starts.” ■

ABOUT THE AUTHOR

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Pouring-rights contracts are under increasing scrutiny as people begin to realize Big Soda’s money can come with negative effects on health.



THE
CrossFit JOURNAL

FOOD FOR THOUGHT



Regulation of nutrition practitioners is intended to protect the public, but critics suggest it reduces the innovative thought needed to fight obesity.

BY EMILY BEERS



Disillusioned by her experiences while studying to be a registered dietitian, Amanda Petroccione decided to pursue a holistic-nutritionist credential.

Courtesy of Amanda Petroccione

Amanda Petroccione thought she wanted to be a registered dietitian.

In some states, only registered dietitians (RDs) can provide individualized nutrition plans, and RDs generally have more rights than any other nutrition practitioner in the United States. But Petroccione was disheartened when her studies highlighted flaws in a program designed to produce food-and-nutrition experts who lead the industry.

Petroccione enrolled in college to complete a bachelor's degree in community health and nutrition at the State University of New York (SUNY) at Potsdam. During her time at Potsdam, she had the opportunity to work with an RD in a hospital and was surprised by the lack of individual patient care.

"I would see a lot of patients in one day, and I think there were six different generic diets we would prescribe to them. A cardiac patient would get the prescribed low-salt diet. And someone else might be put on the generic high-calorie diet," Petroccione said of her five-month internship at Canton-Potsdam Hospital in 2004.

"We just had to follow the rigid procedure and didn't actually talk to the patients."

Instead of spending time with patients and drafting nutrition plans according to individual needs, Petroccione gave them simplified handouts that explained the details of their diet.

The clinical environment was largely based on what Petroccione described as a blanket approach to nutrition, meaning it followed broad public-nutrition guidelines, such as the [United States Department of Agriculture \(USDA\) MyPlate program](#), formerly the Food Guide Pyramid. MyPlate essentially promotes a high-carbohydrate, low-fat diet and is criticized by many as being [outdated and ineffective for optimal health](#).

Blanket prescriptions aside, Petroccione said she also thought the food served to patients was inadequate.

"I remember feeding everyone Ensure, and I remember thinking, 'This is garbage.' Straight-up garbage," she said.

Although Ensure is marketed as a nutrition drink with essential vitamins and minerals, an 8-oz. serving contains between 18 and 23 g of added sugar, depending on the flavor, meaning patients were consuming more than 5 tsp. of sugar with each serving. In contrast, the American Heart Association recommends a daily limit of 9 tsp. of added sugar for men and 6 tsp. for women.

"I thought, 'This is what we're feeding a sick, elderly patient? There must be something better than this,'" Petroccione said. "It was so disappointing—disappointing that this was the direction our country was going in in the field of nutrition."

Becoming an RD

Becoming an RD is only one way into the nutrition field.

RDs—also called registered dietitian nutritionists (RDNs)—are regulated by the [Academy of Nutrition and Dietetics \(AND\)](#), formerly the American Dietetic Association (ADA). Individuals who hold the credential can choose to call themselves an RD, the traditional name, or an RDN, the newer title.

[Becoming an RD](#) involves completing a bachelor's degree at a college that offers AND-approved course work and a 900-1,200-hour unpaid internship at AND-approved facilities. The next step is passing the AND's national exam, which costs applicants US\$200.

The [national exam](#) is broken into four domains:

1. Principles of dietetics (includes topics such as food science and nutrient composition of foods).
2. Nutrition care for individuals and groups (clinical nutrition).
3. Management of food and nutrition programs and services.
4. Food-service systems.

RDs also pay an annual \$60 renewal fee to the AND, as well as yearly membership dues, which vary depending on whether the member is a student, an RD or part of the military. The average rate for these membership dues is \$175 a year, explained Sarah Krieger, an RD and spokeswoman with the AND, which has more than 75,000 members today.

When the [ADA was founded in 1917](#), its aim was to help the government feed the population during a time when World War I was affecting many of the country's resources. Since inception, the AND has been focused on a broad, public approach to nutrition. In a [2013 position paper](#), the AND explained how it promotes what it calls a "total diet approach to healthy eating."

"All foods can fit within this pattern if consumed in moderation with appropriate portion size and combined with physical activity," the paper stated.

The paper listed MyPlate as well as the “[2010 Dietary Guidelines for Americans](#)” as two of several approaches that support the total-diet approach. Like MyPlate, “Dietary Guidelines for Americans” is a public-nutrition guide that promotes a low-fat, high-carb diet. It is updated every five years by the USDA in conjunction with the [U.S. Department of Health and Human Services](#).

“The dietary guidelines are very general ... and may not apply to everyone. But for normal, healthy individuals, these are our recommendations,” Krieger said.

During Petroccione’s time at SUNY Potsdam, the nutrition courses she took—ranging from nutrition science to food-service-systems management to culinary arts—were taught by RDs. The curriculum was largely based on AND recommendations, Petroccione explained.

Krieger said the RD education reflected in AND-approved coursework is “the gold standard” in nutrition education.

“It’s the level of education RDs obtain to gain credibility (that makes it the gold standard),” she explained.

The AND’s prescriptions are evidence based and updated every five years, she added.

“We put out position papers that are extensively researched on all aspects of nutrition,” Krieger said.

Petroccione, though, said she didn’t feel she was receiving a gold-standard education, so she chose to abandon her RD studies. Instead, she did a master’s degree in business at Clarkson University in Potsdam and went on to acquire a holistic-nutritionist credential in 2011 via a one-year program offered by the [Institute for Integrative Nutrition](#).

“The RD’s generalized, public approach to nutrition was outdated and only looks at one way of doing things,” Petroccione said. “RD education is based on one perspective, based on crunching numbers of macronutrients, based on broad guidelines.”

The holistic-nutrition credential provided her with a much more diverse education, she said.

“I learned more than 100 different theories about nutrition,” she said. This was refreshing after spending her university days challenging many of the prescriptions her professors preached, Petroccione said.

“(There were) things I disagreed with, like the standard 2,000-calorie diet and that we should be eating 60 percent carbohydrates,” she said. “And (my professors) were just like, ‘This is just the way it is. These are the prescriptions.’”

When it comes to accepting newer diet beliefs—such as Zone, Paleo, gluten-free or low-carb prescriptions—the AND is often reluctant. A [2015 article](#) published by the AND criticized the Paleo Diet, suggesting it falls short on traditional beliefs about appropriate carbohydrate recommendations.

Krieger said the AND doesn’t support diets such as the Zone or Paleo plans because they’re “temporary diets.” The AND looks to provide lifelong dietary advice to the public, she added.

But Petroccione said she suspects one of the reasons the AND promotes what she considers ineffective nutrition guidelines is to protect the companies who fund the AND. Some of the [AND’s sponsors](#) over the years have included the National Dairy Council, beverage companies such as Coca-Cola and PepsiCo, and food companies such as Kellogg’s, Hershey’s, General Mills and Kraft. Petroccione’s suspicions are shared by others, including [Marion Nestle](#), professor of nutrition, food studies and public health at New York University. Nestle is author of “Food Politics: How the Food Industry Influences Nutrition and Health” and many other books.

While Krieger and the AND [deny sponsorship](#) influences the AND’s position on health and nutrition, an [July 2013 International Business Times article](#) by Christopher Zara argued that “anyone with a digestive system” has the right to be suspicious.

“The nation’s nutrition industry has been hijacked by the very companies whose products most contribute to our obesity and health problems,” Zara wrote.

Petroccione said the fact that Coca-Cola funds the AND made her wary of some of the concepts she was learning, such as the total-diet approach in which all foods can be good foods with [moderation](#).

“That tells the public it’s OK to drink Coke. And Ensure,” she said. “I just don’t trust the AND.”

A Longstanding Monopoly

Michael Stroka is the executive director of the [Board for Certification of Nutrition Specialists \(BCNS\)](#), the body that



Shocking obesity rates are causing more and more people to reconsider traditional nutrition guidelines and take a closer look at their diets.

governs [certified nutrition specialists](#). Stroka called the BCNS credential the RD’s “primary competitor,” though its approach to nutrition is much different.

“(The AND’s) focus has traditionally been around food-service management ... making sure the population gets good nutrition according to U.S. dietary guidelines,” Stroka said. “The certified nutrition specialist (CNS) is based on managing and reversing (an individual’s) ailments through targeted nutrition therapy.”

The CNS credential—accredited through the [National Commission for Certifying Agencies](#)—requires candidates to complete a master’s degree or doctorate, 1,000 hours of practical experience and a rigorous certifying exam. Continuing education is required for maintenance of the credential.

Despite the presence of the CNS and other credentials—including the holistic-nutritionist credential—the AND has essentially had a monopoly on nutrition practitioners in the U.S. for more than 30 years, Stroka explained.

During the 1980s and 1990s, states began introducing nutrition regulation. Today, 46 states regulate nutrition practitioners. The type and severity of regulation varies from [state to state](#), but essentially RDs have more rights than any other nutrition practitioner across the country, Stroka said.

The term “dietitian” is [regulated and protected in the United States and other countries](#), meaning only RDs can refer to themselves as dietitians, while other nutrition practitioners must refer to themselves as “nutritionists.”

In the more tightly regulated states, RDs are the only nutrition practitioners who are legally allowed to provide individual nutrition advice or counseling, and they’re the only practitioners allowed to use nutrition to treat and prevent disease, a practice referred to as “medical nutrition therapy (MNT),” Krieger explained.

Unlike “dietitian,” “nutritionist” is not a regulated term in the United States. A nutritionist without an RD credential falls under the freedom-of-speech aspects of the First Amendment, Krieger said.



Kim Bellavance

In many states, only registered dietitians can perform nutrition counseling, which limits the options for consumers who are looking to improve their health.

“This means (nutritionists) can give general advice to the masses but no individual meal plans, especially if there is a medical condition,” she said. Nutritionists are not allowed to diagnose or treat any diet-related medical conditions, she added.

Further, some states require nutrition practitioners to be licensed.

In 16 states, including North Carolina and Georgia, only RDs are [eligible for licensure](#). In these states, it is a criminal offense for anyone other than an RD to perform nutrition counseling. Other states, such as Minnesota and Illinois, are also regulated through licensure; however, credentials such as the CNS are also accepted. In the most unregulated states, such as California, Pennsylvania, New York and Michigan, licensure is not required and it is legal to provide nutrition care without an RD credential. However, even in these states, some insurance providers choose to cover RDs only.

In short, those without an RD credential in much of the U.S. need to proceed with caution or they could end up in court facing penalties from fines to jail time. This was the case for Steve Cooksey from North Carolina, who found himself embroiled in a legal battle in 2012 when the North Carolina Board of Dietetics/Nutrition told him he could not offer diet advice. Cooksey, who had blogged about how the Paleo Diet helped his diabetes and advised others on the benefits of eating

this way, filed a free-speech lawsuit in federal court, but it was ultimately [dismissed](#).

Protection or Policy Disaster?

The AND’s publicly stated reason for promoting nutrition regulation is to protect the public from working with unqualified individuals.

“Someone can take a six-week class about nutrition online and get a certificate in the mail and call themselves a nutritionist,” Krieger explained. Regulation protects the public because it assures the consumer the RD is well trained, she added.

“Licensing dietitians and nutritionists assures the public that individuals disseminating nutrition advice have the appropriate education and experience,” the [AND website](#) states.

The type of education that’s “appropriate” is very much up for debate.

“The (AND) has convinced RDs they’re the experts in nutrition, but nobody else is convinced,” Stroka said. “They don’t have the expertise to do serious one-on-one individualized work to optimize your body.”



Kim Bellavance

Many people who have no success with high-carb, low-fat diets find success with Zone or Paleo prescriptions, yet agencies such as the AND stick to the traditional plan.

Stroka said he believes there are many other high-quality certifications available, and the very concept of regulating the nutrition practitioner is flawed.

“It’s terrible public policy,” he said. “It artificially constrains the supply of nutrition information and artificially restricts who can legally do the work.”

Stroka said by limiting consumer choice and restricting qualified individuals from working in the field in certain states, current regulation provides zero benefit to anyone—except the AND.

“It’s extremely beneficial to the academy (AND). People need to go through their certification and pay for their certification,” Stroka said. “It’s all about power and money.”

Stroka is working to get this point across to the public through [The Center for Nutrition Advocacy \(CNA\)](#). Stroka explained the CNA is nonprofit initiated by the BCNS that strives to put a [stop to the AND’s monopoly](#) for the sake of consumer choice and practitioner freedom.

The CNA’s philosophy is to give various nutrition practitioners—who hold diverse views on nutrition and nutrition therapy—the freedom to legally provide individual nutrition advice to their clients, Stroka added.

“We believe all nutrition practitioners should be able to practice according to the level of their training,” he said.

This means RDs, CNSs, holistic nutritionists, athletic therapists, health coaches, personal trainers and those with doctoral degrees in dietetics, among others, should be able to use nutrition to help their clients, he added.

“Each of them has an important role in combating the chronic diseases associated with poor nutrition today,” Stroka said.

Stroka said he believes the best way to ensure various practitioners are able to practice to the level of their training is through title protection. This would mean the state would regulate the titles of the various credentials. For example, you can’t call yourself an RD unless you have an RD credential, nor can you call yourself a CNS unless you’ve acquired a CNS credential, Stroka explained. He said it would then be up to the various practitioners to accurately inform the public as to their training and qualifications, and the free market would essentially decide which practitioners are best.

Apart from consumer choice and practitioner freedom, another factor to consider when looking at regulation is quality of care. Stroka said current regulation has not helped increase quality. He’s not alone.



“I have learned most by taking initiative and staying up to date with the latest research available.” —Luke Corey, registered dietitian

A [2007 policy study](#) published by The Reason Foundation—a public-policy think tank—looked at various academic studies and presented a similar viewpoint.

“Oftentimes, licensing laws actually reduce service quality and public safety,” wrote author Adam B. Summers. One of the reasons for this is because regulation reduces quality competition, he argued.

“The real motivation behind most occupational licensing regulations is one of special interests, not the public interest,” Summers wrote.

A 2011 policy paper published by the [W.E. Upjohn Institute](#) noted that several studies showed increased licensure doesn’t lead to quality improvements but results in a decrease in employment opportunities.

Government-mandated licensure has hurt various professions, [including hair braiders, interior designers and florists](#). Practitioners in each field have suggested there’s simply no need for regulation.



Registered dietitian Amanda Montalvo has abandoned blanket guidelines in favor of a more individualized approach to nutrition.

“It doesn’t make sense to regulate (nutrition) like dentistry. Everyone agrees on one standard in dentistry, and nobody but a dentist would be able to practice dentistry,” Stroka said.

“Nutrition isn’t like that. It’s a tool that is used by a wide variety of individuals and professionals in different settings, so to regulate it ... like dentistry just doesn’t work.”

Not on MyPlate

Beth Miller is an RD with the University of California Los Angeles (UCLA), where she works with various varsity athletic teams.

Without her RD credential, she likely wouldn’t have been hired by UCLA. However, Miller explained much of what she learned while becoming an RD isn’t information she uses with her clients today. This includes the MyPlate guidelines, which she said formed the basis of many of her nutrition textbooks in school.

“For athletes, we typically make our nutrition prescriptions using grams per kilogram of body weight for each macronutrient, depending on the sport and athlete’s needs,” she said. “It’s tough to be so general with nutrition because it’s very individual, and (MyPlate) tries to reach a large scale of people.”

In many public environments, however, such as nursing homes and hospitals, patients tend to receive more general information from RDs, Miller added.

Amanda Montalvo, an RD from Farmington, Connecticut, explained the AND doesn’t monitor or restrict what types of nutrition guidelines she promotes to her clients. Because of this, Montalvo has abandoned all things MyPlate, both in her private practice, Naturally Evolving Wellness, and with her nursing-home patients.

“There are things I don’t like about (MyPlate). For one, there’s no movement or exercise component,” she said. “And it’s just so basic. Everyone is so different. I like to work with people and try to find specific things that work for them.”

She has also abandoned what the AND taught her about a low-fat diet.

“There are tons of studies and data that talk about healthy fats these days, but the AND still promotes a low-fat diet,” Montalvo said.

Luke Corey, an RD at EXOS, an athletic-performance training company run out of the Mayo Clinic Sports Medicine Center in Rochester, Minnesota, said most RDs he knows stay away from many of the AND’s prescriptions.

“The majority of dietitians know that (MyPlate) recommendations aren’t appropriate and they don’t use it,” he said.

Corey said he believes regulation throughout the United States might play a role in preventing the AND—and the college curriculum that leads directly to the RD credential—from quickly adopting new science.

“Textbooks are written based on large, long-term sample sizes. (When science evolves) there’s a lot of hesitation toward embracing new research, so they fall back on what they feel comfortable with, and what the long-term studies say,” Corey said.

Instead, Corey said much of the nutrition information he uses today he learned not through textbooks but through internships, through working with athletes and through self-education.

“I have learned most by taking initiative and staying up to date with the latest research available,” he said.

Letting the Free Market Decide

Considering the diet-related health crisis in the United States today—evidenced by the rise in diabetes, heart disease and obesity-related illnesses—skilled nutrition practitioners are needed. The AND is the most powerful gatekeeper in the industry, but comments from Stroka, Petroccione, Miller, Montalvo and Corey suggest it’s far from the most forward thinking.

“Effectively, (the AND’s) stance is ‘if you’re not an RD, it’s not possible to provide any effective nutrition advice,’” Stroka said. “A lot of people are practicing nutrition in different ways, so saying only a narrow subset of people can do nutrition doesn’t make sense.”

Instead, Stroka wants the public—and nutrition practitioners—to have a chance to learn diverse ways of thinking about nutrition.

“Then the public, not the AND, can decide which title and which practitioners they think are best,” he said. ■

About the Author

Emily Beers is a CrossFit Journal contributor and coach at [CrossFit Vancouver](#). She finished 37th at the 2014 Reebok CrossFit Games.

THE CrossFit JOURNAL

Carbo-Load of Crap

T.J. Murphy explains how he ditched his traditional running diet, lost weight, didn't bonk and felt better.

By T.J. Murphy

December 2015



On Aug. 9 The New York Times published “Coca-Cola Funds Scientists Who Shift Blame for Obesity Away From Bad Diets.” The report focused on Coca-Cola’s financial support of a group of scientists pledging to fight the obesity crisis by calling for more exercise rather than intake of fewer calories.

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"Coke has provided financial and logistical support to a new nonprofit organization called the Global Energy Balance Network, which promotes the argument that weight-conscious Americans are overly fixated on how much they eat and drink while not paying enough attention to exercise," according to the Times.

The article created a backlash that set Coca-Cola in full retreat, and chairman and CEO Muhtar Kent wrote a [Wall Street Journal op-ed piece](#) that stated the company would be more transparent about its funding of research. Kent's piece created an [additional wave of criticism](#).

Although PepsiCo, McDonald's, Kraft Foods and Hershey's were also mentioned in the original New York Times piece as companies who sponsor food-industry research, Gatorade—owned by PepsiCo—did not appear in the article. Interestingly, Gatorade has offered financial support to exercise scientists conducting studies on hydration and carbohydrate intake [for decades](#).

Dr. Tim Noakes, best known in some circles for his research on hydration, is one of those who has in recent years publicly reversed his position and openly attacked soft-drink companies for their support of high-carbohydrate diets. In a January 2015 [Primal Blueprint podcast](#), Noakes blamed high-carb diets for race fields crowded with "fat runners" at recent marathons.

"We have a half-marathon in Cape Town, and we did a study on the field. We found that 30 percent of the runners in the field were insulin resistant and obese," Noakes said.

Also alarming for Noakes was that the runners weren't doing themselves any favors in the race.

"They were literally eating tons of sugar during the race," he said in the podcast.

In a November 2014 [Australian Broadcast Corporation interview](#), Noakes talked about his role in the over-consumption of sugar.

"I spent 33 years of my life telling athletes that they must carbohydrate load, which meant that for the last three days before a marathon, you should eat 700 or 800g of carbohydrate (per day). And I was the first in the world to produce these GUs that people lived their races on. So if



Dr. Tim Noakes said he regrets his role in developing early versions of the high-carb supplements that now fuel the endurance community.

you go to the Ironman, you'll see people taking GUs every half hour or so. So myself and Bruce Fordyce, who's the great South African ultramarathon runner, developed that product and I apologize because that was completely wrong," he said.

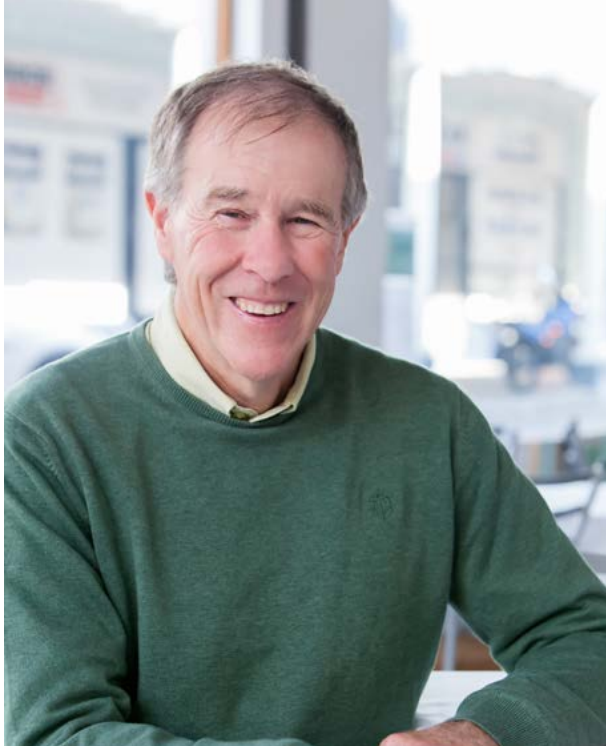
"GUs" are small packages of semi-solid energy paste, some with caffeine, that an endurance athlete can consume for an approximately 100-calorie infusion of carbohydrate. Noakes was referring specifically to Leppin FRN Squeezies, which he helped develop in the early 1980s. "FRN" was an initialism representing the inventors: F for Fordyce, and R for Bernard Rose, a South African 2:10 marathoner.

The N stood for Noakes.

Running in the Wrong Direction

"For 30 years I was part of the problem," Noakes told me in a Skype call from his office in Cape Town, South Africa, in April 2015.

Courtesy of Dr. Tim Noakes



"We did research on carbs because that's what we could afford to do." —Dr. Tim Noakes

Noakes was talking about the overall trend of sports-science research directed at endurance athletes and carbohydrate. The trend started in the 1960s with the invention of Gatorade and continues today: At an American College of Sports Medicine conference in San Diego, California, this past spring, I sat through several hours of lectures stating a high rate of carbohydrate intake is crucial to athletic performance.

***"For 30 years I was part of the problem."
—Dr. Tim Noakes***

In 1969, Noakes, who had a passion for distance running, graduated from the University of Cape Town medical school and set out to be a sports scientist. Coincidentally, the first Gatorade-funded study at an independent

laboratory—Ball State University—was conducted in 1970, with resulting article *"Fluid Ingestion During Distance Running"* published in *Archives of Environmental Health: An International Journal*. The study's lead author, David Costill, had asked Gatorade for US\$800. The company gave him \$8,000, and a symbiotic relationship between sports science and the beverage industry was born.

"We did research on carbs because that's what we could afford to do," Noakes told me.

He was earnest about his overall conclusion that a high-carbohydrate diet was essential to running well. Throughout the 1980s and into the 1990s, Noakes either led or contributed to studies on sugar for endurance athletes, such as *"Carbohydrate Ingestion and Muscle Glycogen Depletion During Marathon and Ultramarathon Racing,"* published in the *European Journal of Applied Physiology* in 1988.

"Based on the data and evidence we had, it seemed clear that carbohydrates were the key to performance. The evidence was so convincing," Noakes said.

In 1981, due to Noakes' influence, the Comrades Marathon—an "ultramarathon"—posted aid stations after every one of the race's 56 miles. In 1985, Noakes published the first edition of what has long been considered the bible of sports science for distance runners: *"The Lore of Running."* The book contains hundreds of pages detailing the prevailing research on the physiology and biochemistry of running, with a huge emphasis on how "many exercise scientists around the world have become convinced that the ingestion of a high-carbohydrate diet is the secret to optimum performance during prolonged exercise."

Noakes reversed his position on the high-carbohydrate diet in early 2011. Even though he was a runner and didn't drink or smoke, Noakes—in his early 60s at the time—was overweight and diagnosed with Type 2 diabetes. Desperate for an answer, he tried a low-carb diet he had read about in an ad on the Internet. The promise was that he would lose 11 lb. in as few as eight weeks.

"In eight weeks I lost 11 kilograms," he told me. The 11 kg—or 24 lb.—was more than double the promised amount. Noakes said he shed what felt like 20 years in his health as a runner.

As Noakes described it, he used to be the poster boy for the high-carb diet. Now he's more of an avenger against the soft-drink industry's influence on sports science. Usually with hostile reaction, he talks to other scientists about topics such as insulin resistance, chronic inflammation and how "the science has been completely distorted by the drink industry."

Noakes is also the author of "Waterlogged: The Serious Problem of Overhydration in Endurance Sports," which details how misguided hydration science and advertising have caused athletes to drink when they aren't thirsty, exposing them to the risk of **hyponatremia**.

A Personal History of Carb Loading

The first time I ever used any sort of nutritional supplement in sports, it was 1979 during two-a-day football practices in the thick heat and humidity of August in Iowa. Once every hour or so, the coaches made us take a break from drills and had us sprint back and forth to a garden hose that lay near the field. Someone had taken a punch to the hose so it had about 10 holes in it. A light trickle of water flowed from each hole. Of course, by the time we got to the hose the coaches were already yelling at us to run back, so you were lucky if you got a taste of the water.

Surely the hose was installed because hydration had become a sports-science topic after Costill began work in the early '70s conducting experiments on exercise and hydration, measuring rectal temperatures in runners and so on. The notion of drinking water or Gatorade was antithetical to what my coaches had experienced as athletes in their own high-school years. My dad played football in the 1970s for Les Hipple, an Iowa legend who led Marion High School to state championships in football, basketball, track and cross-country running. Drinking fluids during practice or games was strictly forbidden. Dad told me some of his teammates stashed lemon wedges into their helmets and ate them surreptitiously to help stave off thirst.

On Sept. 18, 1983, I did my first triathlon: The All-Iowa Triathlon, held at Lake McBride near Iowa City. It might have been the first triathlon held in Iowa. You had a choice between the half-Ironman (1.2-mile swim, 56-mile bike ride and 13.1-mile run) and the full. I did the half. It was during that race that I saw and used an aid station for the first time. There was just one that I recall, at the halfway



T.J. Murphy

At the Boston Marathon, aid stations abound, and carbs are never far from reach of the runners.

point in the bike ride. It looked like a neighborhood lemonade stand: a small table attended by a den mother and two of her Cub Scouts. They handed out cups of water and slices of banana.

How vastly different things would be in 15 years.

In 1998 I was racing Ironman Australia, and there was a station every 20 km or so during the bike and much more frequently during the run. (In 2015, they had an aid station every 2 km on the run course.) These stations were virtual 7-Elevens with a wide array of drink choices from water to sports drinks to flat cola. And there was food: bananas, orange slices, sports bars and "biscuits." As we biked or ran by tables, countless volunteers would shout out what they had in their hand to offer. I took a biscuit out of curiosity more than anything else—they were actually chocolate-chip cookies.

By this time in my life, I had been training and competing in both running races and the occasional triathlon. I had also worked at a running-shoe store in the years prior to

my becoming editor-in-chief of Triathlete Magazine, which at the time was based in San Francisco, California. Both as an athlete and editor, I had been immersed in learning whatever I could from the prominent sports scientists who concentrated on endurance athletics. The big names to me were Costill; Edmund Burke, an exercise physiologist who had served at the Olympic Training Center in Colorado Springs, Colorado; Ed Coyle, a sports scientist who specialized in carbohydrates and performance at the University of Texas at Austin; and Noakes.

When I was free of injury (which wasn't that often), I routinely tallied anywhere from 60 to 100 miles per week as a runner. Largely because of the studies conducted by Noakes, Burke and Coyle, I and just about every competitive runner I knew became carbohydrate freaks. The message from the research was clear: Endurance athletes who didn't consume enough carbohydrate before, during and after exercise were blowing it. If you weren't effectively carbo-loading in the days before a competition—filling up both muscle and liver glycogen stores by cramming down as much pasta,

potatoes and pancakes as you could—you would come up short on energy during the race. On a day before a marathon, I would glut down a jello-like substance called Exceed High-Carbohydrate.

The message from the research was clear: Endurance athletes who didn't consume enough carbohydrate before, during and after exercise were blowing it.

In 1996, I had gone to Vancouver, Canada, as a journalist to report on the Gatorade Sports Science Institute (GSSI) annual meeting, where exercise scientists flew in



Dave Re/CrossFit Journal

Fuel for elite endurance athletics?



T.J. Murphy

Some athletes are now questioning traditional fueling strategies and looking beyond carbohydrates.

from around the globe to present papers and hold panel discussions. I vividly remember Coyle's talk on carbohydrate for recovery. He talked about how critical it was to eat a high-carb meal before exercise and—depending on the duration and intensity of the workout—how important it was to strive to eat and drink carbs not just immediately after the session or race but also for the next 24 hours.

Run a hard 10 miles, for example, and the prudent runner should take in a steady stream of carbohydrates on the hour every hour. I tried to comply: I ate pasta and oatmeal and drank as many sugary drinks as I could stand. I ate PowerBars and Chips Ahoy cookies.

The injuries I sustained during the 1990s were usually joint related—knees, ankles, hips. I had irritable bowel syndrome as well. Noakes told me he's sure he would have sustained a better level of performance in his earlier years as an ultra-runner if he hadn't been fueling his insulin resistance with high levels of carbohydrates. As a 52-year-old who is in most ways far more fit and healthy than I was as a competitive distance runner and triathlete in the 1990s, I, too, wonder if I would have performed better with different fuel.

In 1997, I made a visit to GSSI headquarters in Barrington, Illinois. I met a number of researchers with doctorates who were busy conducting studies on heat and hydration. It was winter, and I went for a 45-minute run with two of the scientists. It was cold—freezing, in fact—but they insisted I carry a bottle of Gatorade, and they were on me the whole run to sip the fruit-punch-flavored beverage. I didn't want a drop. I wasn't thirsty for one thing, and I had to force it down to drink to the satisfaction of the scientists.

I recently spoke with Mark Sisson of [Mark's Daily Apple](#) on how—to this day—the carbo-loading party is ritualistic at big marathons and races. These days, Sisson is a fierce advocate for eating a Paleolithic, low-carb diet. But back in the late 1970s as a 2:18 marathoner trying to make the 1980 Olympic trials, Sisson—who had studied pre-med at Williams College and read every piece of research he could get his hands on—strived to consume at least 1,000 g of carbohydrates per day in accordance with what he had read. By the age of 27, Sisson was plagued by upper-respiratory-tract inflammation, arthritis in his feet and irritable bowel syndrome. When he started eating a diet more in the range of 100-150 g of carbs per day and avoiding grains and processed sugars entirely, all that went away.

I had an experience similar to those of Noakes and Sisson. In 2010, even though I was running 50-60 miles a week, I couldn't get my weight below 200 lb. My body fat percentage was well over 20, and to my utter shock a blood test showed I was prediabetic. When I ran in a half-marathon that year, I noticed the same thing Noakes said he was seeing in the races in South Africa: a lot of fat runners, as he described it. The first 100 or so were skinny, and most of the rest were not.

If exercise is the key to ending the obesity crisis—as Coke and the Global Energy Balance Network would have you believe—why all the fat runners?

In the October 2010 Los Angeles Rock 'n' Roll Half-Marathon, I saw the same sort of thing. And I was seeing the same thing in the mirror.

After I finished the race, I sat on a curb and tried to stretch out my knees, which were screaming with inflammation. Just about the same time Noakes was having his desperate epiphany, I had mine.

When I talked to Noakes this past spring, he was at a difficult juncture in his life. He was preparing to retire from his position at the University of Cape Town and be put “on trial” by colleagues at the school who were attacking his campaign against processed carbohydrates in the diet.

In talking to Noakes, I recalled how I had met him in person at the Hawaii Ironman in 1999 and was surprised that an ultra-runner could carry so much weight. Noakes is now thin as a rail and training for marathons. But his central passion is the Noakes Foundation, through which he wants to support dietary research that will “reverse the global epidemics of obesity and Type 2 diabetes mellitus,” he said.

He’s set out to bring things back into balance.

As for me, leaving behind the runner’s traditional high-carb diet reversed my being prediabetic. I eat moderate protein, avoid processed carbs and have upped the fat intake. I remember when I first made the change: I dropped 10 lb. of excess fat in about two weeks and my energy levels became consistent. It was a shocker.

In late May 2015, I was offered a free entry to the San Diego Rock ‘n’ Roll Half Marathon the day before the race. I took it even though my running mileage was about what most CrossFitters log—a couple of miles a week max, in the form of intervals. As an experiment, I bypassed every aid station the entire day. Not a single drop of Gatorade Endurance, sports gel or even water.

It was a warm day. During the race, I recalled how I used to comb through aid stations in a panic, freaked out that I would risk “hitting the wall” if I didn’t take in everything I could. Also called “bonking,” hitting the wall is a term used to describe what happens when you run out of glycogen.

I used the half-marathon as a personal experiment. I didn’t carbo-load or take in a single gram of carbohydrate during the race. My previous understanding of the matter suggested I would bonk, blow up and probably have to walk the last third of the race. But that didn’t happen. As I ran through Mile 10, I actually felt stronger, and my energy levels seemed to stay steady throughout the 13 miles.

The question that’s being asked now by researchers such as Noakes is this: What if you prioritize fat burning in your



T.J. Murphy

Carb culture: Athletes sample product at this year's Boston Marathon expo.

training and avoid having to incessantly top off your glycogen tank with carbo-loading?

As Noakes told me, there’s a lot to be learned about how best to balance fat burning and smarter use of carbs during a race for an optimal strategy. But freedom from the up-and-down insulin cycle of high-carb intake was a good thing for me.

I’ll never look back.



About the Author

T.J. Murphy is a New York Times best-selling author, a contributing writer to Outside Magazine and the former editor-in-chief of Triathlete Magazine. His books include “Unbreakable Runner,” “Ready to Run” and “Inside the Box.”

THE
CrossFit JOURNAL

SCOPING OUT YOUR PRACTICE

Personal trainers are encouraged to define and take ownership of their profession.

BY LON KILGORE



In the fitness industry, scopes of practice appear to overlap and create identity crises.

How does a personal trainer’s practice differ from that of a fitness trainer, an exercise instructor, a strength-and-conditioning specialist, a fitness instructor, a tactical-fitness instructor, a functional-fitness instructor or any other practitioner in the realm of exercise and fitness?

Does each of group of practitioners have an associated scope of practice describing the duties and limits of the work associated with that group?

The term “scope of practice” describes the procedures, actions and processes that a worker within a particular occupation is normally permitted to undertake. It is also a legal term that largely refers to occupations that require government-issued licenses in order to work within the field; for example, a physician’s scope of practice allows prescription of drugs but a nurse’s scope of practice does not.

As personal training is not a government-regulated occupation, it is up to its certifying organizations, not legislative bodies, to establish and adopt scope-of-practice statements for their credentialed members. If an organization is truly the authority and represents the occupational rank and file, it will have a well-considered, applicable and accessible scope-of-practice statement. Failure to have such a statement invites confusion and lack of occupational identity, and it increases the risk of legal exposure to members, who have no guidelines on the limits of their occupational activities.

The American College of Not Personal Trainers

The American College of Sports Medicine (ACSM) is notable among academic organizations that sell certifications to high-school-educated individuals. One would assume an academic group such as the ACSM would provide its credentialed personal trainers an evidence-based and applicable scope-of-practice statement or document, and “ACSM’s Resources for the Personal Trainer” (1) does have the following statement buried on Page 481 in the Legal Issues and Responsibilities chapter:

A concise, well-considered scope of practice brings an occupation into focus and helps its practitioners succeed.



Mike Warkentin/CrossFit Journal



CrossFit Trainers are presented with a scope of practice that is specific to their work in the CrossFit system.

“According to the American College of Sports Medicine’s Code of Ethics for Certified and Registered Professionals, ‘[Personal Trainers] practice within the scope of their knowledge, skills, and abilities. [Personal Trainers] will not provide services that are limited by state law to provision by another healthcare professional only’.”

The bracketed presentation belongs to the ACSM, and “personal trainer” is a replacement for the original ACSMCP, or ACSM certified professional, a catch-all term that does nothing to add any clarity to the discussion. In addition, the statement lacks any type of description of what a personal trainer should do. As such, this statement cannot be used to describe the duties and limits of clinical and non-clinical occupations. The ACSM provides no authoritative and direct statements of scope of practice for personal trainers.

The National Not-Personal-Training Association

The National Strength and Conditioning Association (NSCA) offers a single-sentence definition of “scope of practice” in the glossary on Page 665 of “NSCA’s Essentials of Personal Training”

(3): “Legal boundaries that determine the extent of a personal trainer’s professional duties.”

“Scope of practice” does not appear in the index, and a direct statement or description of the scope of practice for personal trainers cannot be found within the body of the text.

Personal training is an unregulated occupation, and as the specific “legal boundaries” are not defined in any way, the reader is never presented with information to specifically define the duties and tasks that the personal trainer should or should not perform.

The most cogent statement promulgated by the NSCA is not a defined scope-of-practice statement but rather a description of what a personal trainer is. The text can be found on the NSCA’s [Certified Personal Trainer \(CPT\) page](#): Personal trainers “are health/fitness professionals who, using an individualized approach, assess, motivate, educate and train clients regarding their health and fitness needs. ... (Personal trainers) design safe and effective exercise programs, provide the guidance to help clients achieve their personal health/fitness goals and respond appropriately in emergency situations. Recognizing their own area of expertise, a personal trainer will refer clients to other health care professionals when appropriate.”

Interestingly, with only one complete sentence—“special populations include those with chronic and temporary health conditions”—and a few minor qualifiers added, this text becomes the description for the NSCA’s [Certified Special Populations Specialist \(CSPS\)](#). As Figure 1 on the CSPS page indicates, the credential requires a bachelor’s degree.

So which occupation’s scope of practice is accurately described by this basic wording? That of a non-degreed NSCA CPT who works with apparently healthy populations or that of the degreed NSCA CSPS who works with special populations?

In reality, all NSCA credential descriptions have virtually identical wording and concepts. Essentially only the population served differs—athletes, tactical athletes, special populations or the apparently healthy. The limits of practice are never articulated. This is a woeful circumstance for a body proposing to represent those within the personal-training occupation.

National Academy of Not Personal Training

The National Academy for Sports Medicine (NASM) provides no scope-of-practice statement in its “Essentials of Personal Fitness Training” (2).

A “sports medicine” organization that provides only personal-training credentials but no clinical credentials? How did this misleading nomenclature make it into an organizational title?

This non sequitur might not be all that surprising: The organization’s three executive officers have backgrounds in marketing, business administration and sales, and wholesale electronic sales, with no training or experience in personal training noted in their biographies. Could it be that sales and marketing are at the forefront of operations rather than service to the occupation of personal training?

We cannot really single out the NASM for the lack of relevant executives at the helm. The NSCA is currently searching for a [senior director of certification and education](#). Notable in the job requirements are “knowledge of certification industry,” “three years of experience working in the certification industry,” and academic preparation in “education, measurement, or similar concentration.” Under essential duties and responsibilities: “Lead the development of new certification and certificate programs as directed.”

The job description does not mention experience, or even a familiarity, with strength and conditioning, personal training, tactical training or special populations (the four training tracks offered by the organization).

The continuing identity crisis of personal trainers and the large interest in regulation are in part due to the lack of accurate, appropriate and agreed-upon scope-of-practice positions and statements.

Microscope of Practice

Having no scope-of-practice statement or a generic scope-of-practice statement creates confusion with regard to occupational boundaries. But it can be just as bad to have a defined scope-of-practice statement that, if implemented, prohibits normal training services.

The Canadian Society for Exercise Physiology (CSEP) publishes a [scope-of-practice statement](#) for personal trainers credentialed through the organization’s testing service. However, the CSEP statement is restrictive to the point of ensuring that clients can make no progress in fitness. In CSEP’s world view, the personal trainer cannot do any maximal testing—any testing that assesses maximal endurance or strength. The personal trainer also cannot program training that includes any maximal exertion (strength or endurance); only submaximal exercise can be programmed and delivered.

Also per CSEP, the personal trainer cannot work with anyone under 15 years of age or over 69. So personal trainers cannot work with healthy youth to combat the pandemic of obesity and low fitness. And they cannot work with healthy older adults to maintain function, improve quality of life and reduce the risk of mortality.

For any trainer to use these unwarranted and narrow guidelines is a recipe for business failure as clients will almost certainly be unable to achieve their goals with these restrictions.

A Perspective

The bottom line is that the continuing identity crisis of personal trainers and the large interest in regulation are in part due to the lack of accurate, appropriate and agreed-upon scope-of-practice positions and statements from credentialing and educational bodies related to personal training.

While personal fitness training is not a licensed profession, it does require a scope of practice for its workers. But little guidance exists. Further, the guidance available is not uniformly adopted or agreed upon.

It is obvious that there is a significant need for the development of a scope-of-practice statement—a practical and specific statement—for all exercise-related occupations. This need should have been satisfied long ago.

Within the industry there are bright spots. For example, CrossFit Inc. includes a scope-of-practice statement within its Certified CrossFit Trainer (CCFT) Candidate Handbook. It states that a CCFT:

- Designs and leads CrossFit workouts for both groups and individuals, from beginner to advanced, that are safe, effective, and appropriate for individuals who are apparently healthy or have medical clearance to exercise. The trainer recognizes the limitations of his or her own knowledge and skill set and refers clients to other healthcare professionals when appropriate.
- Assesses, monitors, and develops exercise programming based on the athlete's current and ongoing fitness and performance goals, fitness level, readiness for training, performance (relative to goals, level, and readiness for training), lifestyle patterns, diet, and nutritional needs.
- Teaches functional movements.
- Minimizes risk and facilitates sound movement patterns.
- Educates and motivates athletes towards exercise-program success and sound nutritional and lifestyle strategies.
- Runs an ethical practice operating with professionalism and integrity.
- Minimizes and manages risk for the athlete in the training facility, is prepared for emergency situations, and responds appropriately when they occur.

One interesting observation regarding the CrossFit scope-of-practice statement is that trainees are referred to as athletes. The rationale is that every person has the capacity to be an athlete, every person who wishes to become fit competes with himself or herself to achieve progressively higher levels of fitness, and every CrossFit athlete/trainee can measure himself or herself against measurable standards of performance. While all CrossFitters might not participate in official competitions, they train and progress just like competitive athletes—but they do it in a much more scaled and supportive environment.

Creating a Scope-of-Practice Statement for the Personal Trainer

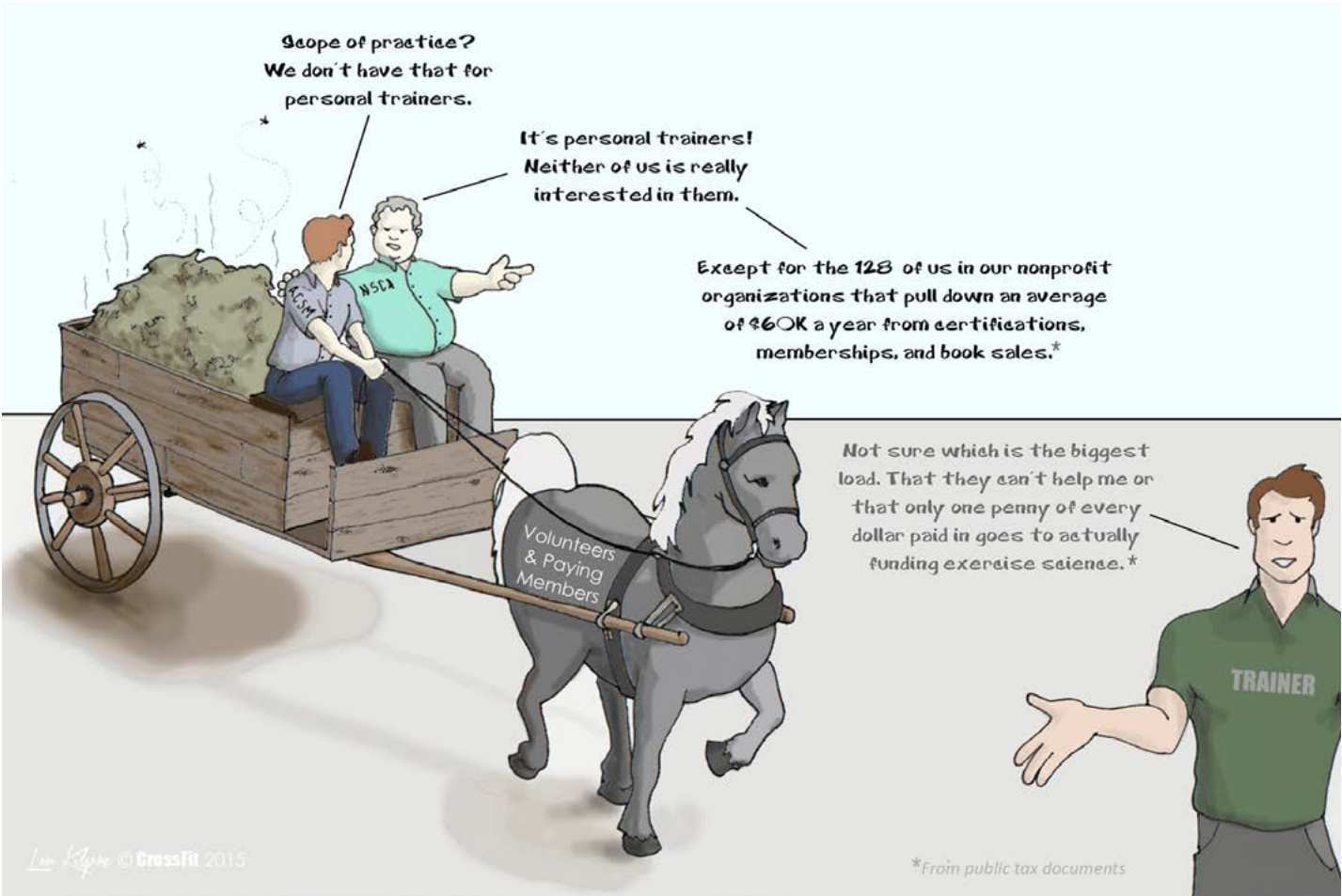
If we consider the CrossFit statement and apply it across the breadth of work done by personal trainers, we can divide the activities within their scope of practice into primary, secondary and tertiary activities.

Primary activities within a trainer's scope of practice are those that directly relate to delivering fitness training to an apparently healthy client:

- Screen for risks, contraindications and limitations to exercise prior to client participation.
- Work with clients to reach their fitness and fitness-associated health goals.
- Design and deliver exercise programs for apparently healthy populations.
- Document client progress.

Secondary activities are activities that are contributory to support of fitness gain or are referent to working with diseased or injured populations.

- Motivate clients to support exercise adherence and healthy behaviour change. A personal trainer should not provide any counseling intended to treat or modify a psychosocial disease or condition.
- Provide general information on healthy eating. A personal trainer should not provide any nutritional advice or guidance intended to treat or modify a disease or condition.



- Follow physician or therapist exercise advice or exercise prescriptions provided to the trainer in respect to a diseased or injured client until the client has been cleared for medically unsupervised exercise. A personal trainer should not independently prescribe any exercise as a therapy or curative for a disease or condition.

- Refer a client to a relevant specialist if the needed service lies outside the personal trainer's scope of practice and training.

A tertiary item within the trainer's scope of practice lies in the business of personal training.

- Conduct business according to common principles and applicable law.

In this context, the Certified CrossFit Trainer scope of practice can inform the wider body of trainers and exercise organizations on the issue of scope of practice.

Intentionally out of Focus?

It has become too common a practice to use the argument that the exercise occupations are so broad and many that a scope-of-practice statement from an organization must necessarily be general to accommodate them all. As the examples here demonstrate, this approach is nonsense and results in failure to describe a scope of practice for any of the occupations to be served, and it leads to confusion as to what a trainer can or cannot do. Organizations whose mission statement refers only to exercise science, clinical practice or strength-and-conditioning coaching cannot effectively represent anyone other than those specifically named in their missions. So who actually represents you?

It should be apparent that any organization claiming to represent an occupation and its members should have true expertise in the occupation it claims to represent. Organizations should provide occupational guidance that is specific, relevant and accessible to their members, and organizations should also be honest and steadfast in their representation of those working within the occupation.



Jeff Rhode



Josh Samra



Kathryn Rowan

The scope of practice frames trainers' work by determining how they motivate and support clients and how they conduct business.

Organizations whose mission statement refers only to exercise science, clinical practice or strength-and-conditioning coaching cannot effectively represent anyone other than those specifically named in their missions.

The failure of the ACSM and NSCA to deliver anything more than a general, nondescript statement that's irrelevant to personal trainers clearly identifies two organizations that have not systematically considered the realities of the personal-training occupation in terms of theory or practice. This may seem a harsh statement given these organizations have produced text-

books on the subject, but if they will not or cannot describe what a trainer can and cannot do in order to develop a relevant scope-of-practice statement, how can they publish anything authoritative on the topic?

Do personal trainers need quasi-relevant guidance from disinvested parties? No. They need qualified and experienced leadership invested in the occupation they propose to serve. Is it appropriate for organizations to dabble in occupations outside their intended and stated missions? No.

Trainers need to take active ownership in, contribute to direction of and be able to trust any organization that promises them representation and the betterment of their and their client's conditions. ■

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THE
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DRUNK ON SUGAR?

BY LON KILGORE

Study results suggest guzzling a beer after a workout might actually be more productive than chugging a sugar-laced sports drink.





A cold one after a tough one: Probably not ideal, but no sillier than downing a sports drink loaded with added sugar.

I just finished a barely sub-four-minute Grace. It's not a great time, but it's what I can do, and I'm spent from the effort. It's Texas hot, and on this piece of pavement at 9 p.m., it's 103 F. I'm old, tired, sweaty and thirsty.

What should I drink when I separate myself from this sweat angel?

The media and academic exercise organizations favor Gatorade or some other sports drink to help people rehydrate and recover after exercise, and we are led to believe a body of sports science says high-fructose-laden drinks with some salt are optimal for those purposes. But are sports drinks really optimal or is the belief based on exceptional marketing?

Well, we know water is best for rehydration—adding carbohydrate and salts can reduce water uptake in the gut—and there is your answer (5,10). But is there something that rehydrates as well as water but tastes good and doesn't contain sugar and salt?

Well, there might be good news: A recent study by David Jiménez-Pavón and company indicates beer can be an effective rehydration fluid (7). But beer is a mild diuretic and central-nervous-system depressant. It can't be a recovery drink.

Or perhaps it's actually more effective than sports drinks loaded with sugar.

The Breakdown

When compared to sports beverages, stout beer has approximately 33 percent less sugar, regular beer has 60 percent less sugar, and low-alcohol beer has over 70 percent less sugar. Low-alcohol and regular (4.5 percent) beer actually have more water per volume than sports drinks.

All beers contain a relatively larger—but still small—spectrum of dissolved electrolytes, vitamins and minerals than sports drinks.

If we're worried about sugar consumption, it seems beer provides all the water and less of the sugar, plus it provides more electrolytes and other nutrients than sports drinks.

	Sweat	Beer	Sport Drink
Component ¹			
Carbohydrate	0.048	0.9	2
Protein (amino)	0.021	0.1	0
Component ²			
Calcium	4.5	1.2	0.3
Iron	0.3	0.0003	0
Magnesium	0.39	2.1	0
Phosphorus	9	3.9	3
Potassium	12	9.8	4.6
Sodium	270	0.9	11.9
Zinc	0.12	1.32	0

1. in g per 30 g

2. in mg per 30 g

Table 1: Comparison of the constituents of sweat, beer and sports drink (adapted from 2,3,4,7,8,9,11,12,13).

But what about the diuretic effect of alcohol? What about the effect of increased dissolved contents slowing the uptake of fluid across the gut? Surely that will make beer a worse recovery drink.

It seems beer provides all the water
and less of the sugar, plus it provides
more electrolytes and other nutrients
than sports drinks.

In the experiment, after one hour of running in heat at up to 95 percent of maximum heart rate, the subjects lost 2.4 and 2.3 percent of body mass (dehydration) in two separate trials. Subjects rehydrated in one trial with 660 ml of beer followed by ad lib water; in a second trial they consumed water alone. The volume of total fluid intake was constant between the trials. The rehydration period was two hours. Of note, 660 ml of beer is equivalent to 1.86 12-oz. bottles of beer or 1.4 pint glasses, so we know the researchers didn't send the 165-lb. subjects home hammered.

Beer isn't considered a sports drink for obvious reasons, but at least it has 60 percent less sugar than the beverages commonly seen in gym bags.



Both the water and the beer-followed-by-water treatments increased post-dehydration body mass to the same extent. In fact, beer and water also resulted in virtually the exact same recovery improvements in blood tests across the board. The researchers concluded that beer seems to be as effective as water in rehydrating individuals who have lost more than 2 percent of their body mass via exercise exertion in the heat (35 C/95 F).

The diuretic effect of alcohol was not present in these dehydrated subjects—a finding similar to an experiment conducted by Hobson and Maughan (6). If you are fully hydrated, alcohol is a diuretic, but if you are dehydrated it doesn’t seem to have the same effect.

Beer as a recommended and beneficial adjunct to sport performance isn’t actually new. In 1979, the American Medical Joggers Association recommended that 1 L of beer be consumed during a 40-km race to prevent runner’s haematuria, a condition in which running causes breakage of the blood vessels in the bladder and discolored urine (1).

Let’s actually compare the biochemicals lost in sweat with the contents of sports drinks and beer. Marketing tells us sports drinks replace what is lost—but do they really?

On Page 3, we see a lot of zeroes in the sports-drinks column but none in the beer column. It appears as though beer contains much of what is lost in sweat, so if we use the same logic as sports-drink manufacturers—well, you see the relationship.

By detailing the superiority of a real but likely untenable alternative, it should be obvious that sports drinks are not the high-tech answer for rehydration and performance.

Beer ticks off more replenishment boxes than sport drinks, and the data from the Jiménez-Pavón paper indicates it would be effective to add beer to a rehydration strategy.

So am I recommending everyone start keeping a six in their gym bag for easy access post-workout? No. But by detailing the

superiority of a real but likely untenable alternative, it should be obvious that sports drinks are not the high-tech answer for rehydration and performance.

Adding sugar and salt to water makes for a palatable and extremely cheap high-margin product. That’s it. Corporate beverage companies shouldn’t fund the creation of some mythology of optimal hydration simply to drive sales. But we, as customers, are also to blame for the current circumstances because we have unquestioningly bought into the hype for decades.

Beer probably is not the answer to optimal rehydration; then again, neither is a sports drink.

In the end, I tend to agree with Ellen Kushner, who wrote, “Across the troubled maelstrom of time, people always need a beer.” ■

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