[INTRODUCTION]

What Is Soda Science, and Why Does It Matter?

The age of obesity has arrived; so declared the cover of *Newsweek* on July 3, 2000, over a photo of a big-bellied boy downing a generous helping of ice cream (figure 0.1).[1] "Six million kids are seriously overweight," the text said, warning they could be "fat for life." A year later, the US surgeon general made it official, warning starkly that "overweight and obesity have reached nationwide epidemic proportions." Displaying graphs of excess weight rising rapidly in every age group, in this first-ever Call to Action on obesity, he urged Americans to recognize overweight and obesity as major public health problems and to make the fight against excess body fat part of our daily routines.[2] For those of us who lived through them, few can forget those anxious, fearful years of national alarm about the obesity crisis, roughly 2000–2015, when an excess of pounds, long considered an aesthetic defect of individuals, was now defined by our government as a medical problem—an actual disease that leads to more serious diseases—and a public health emergency that was crippling the country.

The media were obsessed with fatness, and their gripping stories were hard to escape. The problem, we learned in article after article, was rooted in our lifestyle choices. "Our super-sized kids," *Time* wrote, showing a photo of a round-bodied boy, with an ice cream cone, on a skateboard that was bowed down in the middle because of his weight (figure 0.2). "An in-depth look at how our lifestyle is creating a juvenile obesity epidemic," it promised readers. How had we made our kids so heavy that they damaged their skateboards? The answer would become depressingly familiar. Starting in the 1970s, as the price of junk food and sugary drinks dropped, supersizing became the norm, and our intake of junk food soared, and as the lure of our televisions, video games, cell phones, and other toys kept us away from the gym, Americans of all ages began packing on the pounds.[3]

Our bulging bodies were harming the country and undermining its place in the world. Over a cover image of a jowly Statue of Liberty so big around she filled nearly the entire cover, the highbrow monthly *Atlantic* stamped

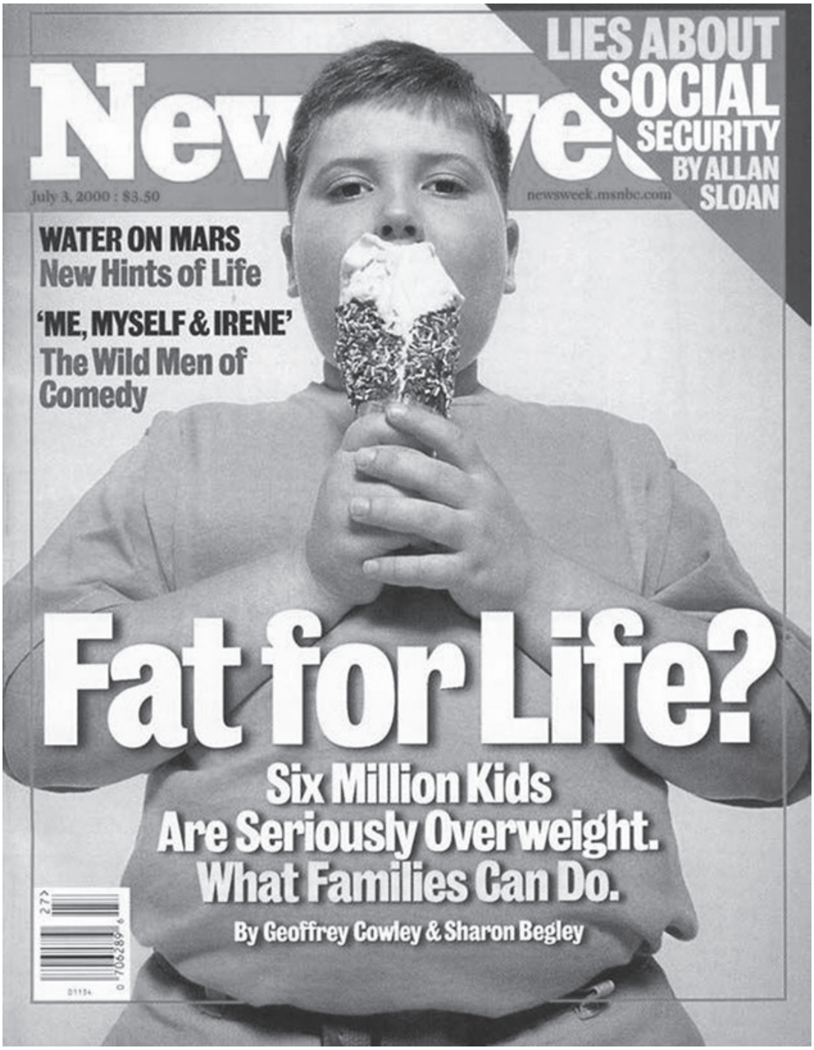

FIGURE 0.1. "Fat for Life?" (*Newsweek* cover)

this message: "Fat Nation: It's Worse Than You Think" (figure 0.3). With body sizes exaggerated to ridiculous effect and heads often left off in dehumanizing fashion, such images contained a grammar of morality that took no time to grasp. Lacking in willpower, unable to control their appetites, and too lazy to get to the gym, such images told us, fat people were morally flawed.[4] The message to everyone was unmistakable. If we wanted to avoid social shame, no matter how we did it, we had to avoid being fat.

Many of us needed to diet and exercise, that much was clear, but exactly *how* we didn't know. The media messages were confusing. Was dietary fat the enemy, as we had been told for years, or was it now our friend? Were carbs weight neutral, were they bad, or were they good? Every year, it seemed, the answers shifted. On June 5, 2017, after the intense anxiety and fear about weight had dulled a bit, the cover of *Time* read: "The Weight Loss Trap. Low Carb. Low Fat. Paleo. Vegan. Flexitarian. Why Your Diet Isn't Working." That was one message that rang true. The advice on exercise was

FIGURE 0.2. "Our Super-Sized Kids" (*Time* cover)

FIGURE 0.3. "Fat Nation" (*Atlantic* cover)

equally perplexing. In early 2010, First Lady Michelle Obama launched her celebrated "Let's Move" program to fight childhood obesity by encouraging kids to play more sports and get more exercise. That program seemed promising, but a few months earlier (on August 17, 2009), *Time* had unspooled "the myth about exercise." "Of course it's good for you," the magazine's cover lectured, "but it won't make you lose weight." So which is it? Does exercise take off the pounds, or is that just a myth? Even without clear and consistent messages, many Americans, worried about their health and feeling bad about themselves, did everything they could to lose unwanted pounds, putting all the weight-loss strategies available to the test.

Even as we tried this lifestyle tactic and that one, rarely with lasting success, the epidemic continued to worsen. By 2017–20, 73.5 percent of American adults were classified as overweight or obese. That hard-to-wrap-your-mind-around number was about 9 percentage points higher than the number in 1999–2000, when the US surgeon general had called us to action, and 17 percentage points higher than in the years 1988 to 1994, when the rise in excess weight was just coming into view.[5] Far from winning the battle, we as a country had lost significant ground.

Though the stinging stories about the obesity epidemic faded away after 2015, Americans continue to be obsessed with slimming down.[6] In any given year, half of American adults attempt to lose weight, largely because of worries about their health.[7] Over four-fifths of Americans see weight loss as their individual responsibility; not surprisingly, lifestyle modification is the primary approach. But which lifestyle behaviors should be modified? Confused as ever about what works, in a recent survey 63 percent of Americans tried exercising to shed pounds, while the same proportion tried eating less food. (Most used two or more methods.) Neither proved very helpful over the long run. Even the most extreme lifestyle interventions produced little lasting success. Contestants on the TV program *The Biggest Loser*, who ate a meager thirteen hundred kilocalories and engaged in 3.1 hours of vigorous exercise a day, lost substantial weight. Within six years, though, the majority had regained on average two-thirds of the pounds they had shed. The intense interventions needed to produce a large weight loss proved unsustainable.[8]

Over the last few decades, the US government has poured huge sums into building up a field of obesity research in hopes of finding ways to slow and then stop the rise in unhealthy weights. Despite the investment, a safe, effective, and affordable long-term solution that works for most people remains beyond reach, and obesity continues to climb.[9] What has gone wrong?

Big Food: Engineering Food Products and Obesity Science

While the media were publicizing the dangers of obesity, and many ordinary Americans were struggling to sort out changing messages about how to rid ourselves of unwanted pounds, the giant food companies were quietly enriching themselves selling us the addictive sugary, salty, and fat-laden junk foods and drinks that were making us fat. (From here on, I'll call all these just junk food.) The public health scholar Nicholas Freudenberg has described a dynamic—global in scope—in which the huge food and beverage companies have been actively promoting hyperconsumption by aggressively marketing these sickening foods and by making unhealthy food ubiquitous and inexpensive.[10] This unhealthy dynamic is part and parcel of the larger, corporate-dominated political and economic order that took shape in the 1970s and 1980s and prevailed until the late 2010s, when it began fracturing.[11] In this corporate order of things, generally called neoliberalism, large companies are among the most powerful forces in the world, markets are considered the best shapers of public policy, governments are expected to get out of the way of business by dismantling consumer-friendly regulations (among other things), and individuals—you and I and the kids on the covers of *Time* and *Newsweek*—are made responsible for our own health through our (or our parents') lifestyle choices and consumer practices, which we should optimize by becoming entrepreneurs of the self.[12] This is the larger context in which the modern obesity epidemic and humankind's failure to fix it became possible. These three figures—the all-powerful company, the weakened government, and the responsibilized consumer—will be with us throughout this book.

The latest thinking on why obesity rates have been steadily rising in the United States and globally points a finger directly at the world's largest food and beverage companies: Big Food. The high-level Lancet Commission on Obesity attributes soaring levels of obesity principally to an increased intake of energy-dense (high-fat, high-sugar), nutrient-poor foods and drinks marketed by the transnational ultra-processed food and beverage companies that dominate the global food system.[13] In his 2013 book *Salt, Sugar, Fat: How the Food Giants Hooked Us*, the investigative reporter Michael Moss documented how the food giants have been engaging in taste engineering, strategically manipulating the sugar, salt, and fat content of their processed foods and sugary drinks to create products so irresistible (the industry term is "alluring") that it's hard to stop consuming them.[14] *Hooked: How We Became Addicted to Processed Food*, his 2021 book, digs deeper, revealing how the industry is exploiting our biology and emotions to addict us to the processed foods that are slowly undermining our health.[15] What's become clear is that, in their relentless pursuit of shareholder profit, the giant food companies have been literally making us sick. The landmark clinical trials of Kevin Hall and his colleagues at the National Institutes of Health show that people who ate solely ultraprocessed foods consumed more than 508 extra calories per day, ate more carbohydrates and fats but not proteins, and rapidly gained weight.[16] Such foods and drinks make up more than half the total dietary energy consumed in high-income countries like the United States. (By ultraprocessed foods I mean "formulations of food substances often modified by chemical processes and then assembled into ready-to-consume hyper-palatable food and drink products using flavors, colors, emulsifiers, and a myriad of other cosmetic additives. Most are made and promoted by . . . giant corporations. Their ultra-processing makes them highly profitable, intensely appealing, and intrinsically unhealthy."[17] The term was introduced in 2009, but I use it for earlier years as well. I use *ultraprocessed foods*, *highly processed foods*, and *junk foods* interchangeably.)

As the US surgeon general and many other authorities have warned, obesity poses serious threats to our health. A complex metabolic condition, obesity (understood as the excessive accumulation of body fat that may impair health) is not just an often-stigmatizing disease; it increases the risk of developing other serious chronic diseases such as cardiovascular disease, type 2 diabetes, musculoskeletal disorders, and some cancers.[18] It also increases the chances of getting severe COVID-19 and dying from it. While infectious disease outbreaks, and especially COVID-19, have produced unimaginable numbers of excess deaths in recent years, what the World Health Organization (WHO) calls the "invisible epidemic of chronic diseases" remains the leading cause of death and disability, responsible for seven in ten American deaths. The proportion is even higher on a global level.[19]

But corporate malfeasance does not end with the manufacturing and mass marketing of unhealthy foods. Beginning in the late 1990s, behind the scenes, far from the public's view, those same companies were at work building up a body of scientific knowledge that minimized the role of junk food and magnified the role of exercise in solving the obesity problem. For the companies, science was not a truth above interests and politics; it was a commodity like, say, caffeine or high-fructose corn syrup, to be mixed and manufactured in ways that maximize profits and minimize government regulation. No sooner was obesity recognized as an enormous public health problem than the companies, working with their nonprofit organization tasked with creating industry-friendly science, and their allies in the academy and government, began systematically building a body of corporate knowledge on obesity, turning it into a set of practical weight-loss tools, and promoting it as the basis for individual and public health understandings of the condition. At the same time that everyday Americans were struggling to parse the media messages on diet versus exercise, the companies were secretly massaging those very messages by sponsoring media-training workshops that taught science journalists that exercise was best and junk food was not a big problem because junk calories could be easily burned off.[20] This invisibly distorted science, which found its way to us through multiple mass media and social media channels, added to the confusion about what we should do to stay healthy. And because that science did not support measures that would hurt the soda industry (taxes, marketing restrictions), it had the potential to undermine efforts at community, state, and national levels to stop the obesity epidemic.

A prime mover in these twin efforts to grow the market for junk food while promoting a science to hide its ill effects was the Coca-Cola Company. Since that day in May 1886 when John S. Pemberton sold the first glass of fizzy Coke at Jacob's Pharmacy in Atlanta, Georgia, Coca-Cola has grown into the world's largest nonalcoholic beverage company, and the producer of the most recognizable symbol of American modernity on earth. (It is said that 94 percent of people around the world can identify the Coke logo.) Coke is far from the only junk food that packs on pounds, but in its classic form, a can of zingy Coca-Cola can create real havoc in our bodies, captured most memorably by the internet meme "What Happens in One Hour after Drinking a Can of Coke!" (shown in figure 0.4).[21]

Coke was not only the *market* leader, it was the *science* leader as well, the prime mover in the global effort to create a body of knowledge that

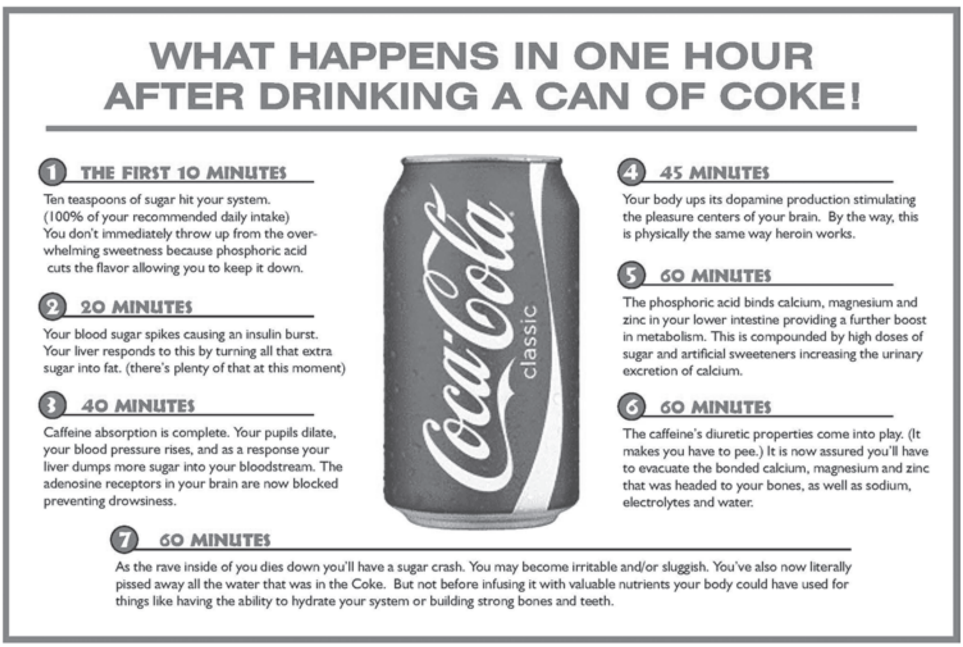

FIGURE 0.4. "What Happens in One Hour after Drinking a Can of Coke!" Created by Gary L. Sohl based on an infographic prepared by Niraj Naik from research by the health writer Wade Meredith.

takes the blame off soda for the rise of the obesity epidemic. Most of us knew nothing about this until 2015. On August 9, 2015, the *New York Times* published a front-page exposé revealing how Coca-Cola was secretly paying leading exercise scientists to establish a Global Energy Balance Network (GEBN) to promote the notion that what matters most for obesity is physical activity, not dietary restraint—a claim few experts accept.[22] What was disturbing was not just the brazenness of the company's attempt to buy science favorable to its commercial interests, but also the scale of the investment (some $20 million) and the enormous secrecy surrounding the operation. Facing widespread criticism from experts and the public alike, Coke moved quickly to contain the damage, dissolving the GEBN, retiring its chief science and health officer, and abandoning its support for exercise science. That exposé in the *Times* brought Coca-Cola, one of Americas' most admired companies, to its knees and spelled the death knell of its project to sway obesity science. Of that two-decades-long hidden history of making and spreading science, only the very end—the scrapping of the network and Coke's very public efforts to restore its reputation—has come to light. As a result, the full story of this covert science urging exercise to counter obesity—who made it and how, what it was, how it lasted so long, what difference it made—remains unknown. Indeed, the science does not even have a name.

While the history of Big Tobacco's and Big Pharma's decades of scientific deception is now part of our cultural common sense, recent work in public health discloses that the production of distorted science is exceptionally widespread. In his eye-opening 2020 book *The Triumph of Doubt: Dark Money and the Science of Deception*, David Michaels draws on more than seven years as head of the US Occupational Safety and Health Administration, and decades of research in epidemiology and environmental health, to document a corporate strategy of manufacturing doubt used by virtually *every industry* that produces products that endanger the environment or human health. While the strategy began with the corporate-driven scientific defense of tobacco in the 1950s, Michaels shows how, since the 1990s, the production of industry-friendly science has grown into an institutionalized sector of the US knowledge economy. In this uncharted arena, a small number of very large "product-defense firms" (the industry's own term) employing scientists, engineers, lawyers, and public relations experts have been creating and advancing "bad science" (Michaels's term) to defend a host of disreputable products from scientific and legal claims that they are harmful. The products protected run the gamut from diesel engines to opioids to silica dust in construction worksites, many familiar from negative press attention. Michaels's primary interest in *Triumph* lies with these highly visible, multi-industry profit-making firms, like the Silicon Valley–based Exponent or the Boston-headquartered Gradient, that openly create science for sale. Yet he briefly mentions another, less visible class of corporate-affiliated scientific organizations: the nonprofits that serve the interests of single industries. In Michaels's account, these nonprofits are minor producers of "junk science," mere "front groups" that, like the large firms, are in the business of sowing doubt about injurious products, and thus unworthy of analytic attention.[23]

Following Michaels, we can call this kind of corporate science sponsored by companies to protect their harmful goods *product-defense science*. Historians of science have written magisterial histories of the sciences created to defend a handful of notorious industries; the tobacco, drug, and energy industries are prime examples.[24] Yet as Michaels's work suggests, there are many other deliberately distorted sciences begging for attention. As noted above, today the chronic diseases of modern life—heart disease, cancers, respiratory disease, diabetes—are the major killers in the United States and globally. Obesity is a risk factor for all these, as well as a chronic disease in itself. Despite their potentially large impact on the rise of these diseases, we know almost nothing about the sciences created to protect the food industry. One kind of product-defense science—what I call soda-defense science, or more simply, soda science—lay at the heart of Coke's project to clandestinely shape the science of obesity in the United States and around the world. That science, and the organizations and people who made it, are the subject of this book.

Taking the Science in Soda Science Seriously

Since the mid-2010s, a small but growing number of critics within the public health field have been working to expose food-industry efforts to distort science for corporate benefit. The giant in this emerging field of research is the well-known nutritionist and longtime food-industry critic Marion Nestle. Her *Soda Politics: Taking On Big Soda (and Winning)* (2015) sketches the outlines of an "astonishingly comprehensive" campaign on the part of the soda industry to maintain sales of sugary soda in face of the obesity threat.[25] Nestle's *Unsavory Truth: How Food Companies Skew the Science of What We Eat* (2018) tackles the influence of the industry on nutrition professionals and associations, unraveling the often-hidden conflicts of interest involved. In another hard-hitting book, a decade earlier, in *Appetite for Profit: How the Food Industry Undermines Our Health and How to Fight Back* (2006), public health lawyer Michele Simon exposed the "shameless publicity stunts" used by the food industry to obscure its massive public relations campaign to protect corporate images and bottom lines.[26] As their subtitles suggest, these books are driven most fundamentally by political agendas. By demonstrating the food industry's culpability in biasing the science and obfuscating the truth, they aim to hold it to account and get the public to join the fight. Written in a populist style, Simon's text serves as a kind of consumer's guide to spotting and challenging corporate malfeasance in the food industry. Since around 2018, there has also emerged a small but growing journal literature by critical public health scholars, based largely outside the United States. Less overtly political (or perhaps political in a more academic way), the authors have mined company emails and internal documents acquired through public-records requests and, in a few cases conducted key informant interviews, to illuminate the motives and strategies of key food-industry actors involved in manipulating the science.[27]

Through their efforts to expose wrongdoing, these writings have contributed to a shared public narrative about the food industry and its project to bend the science of obesity to industry ends. We can call this the "PR (public relations) disguised as science" story, and it is told using a standard set of terms. Not every commentator uses all these terms, but they crop up frequently enough to provide a useful point of departure for us. In this story, the Big Food companies and their industry front groups (e.g., product-defense firms, single-industry nonprofits, and academic-industry partnerships like the GEBN) have been "co-opting" academic researchers to become "mercenary scientists" who create "junk science" (or PR-as-science) that "manufactures doubt" about mainstream accounts of the product's harmfulness, in order to protect profits and escape government regulation. The ethics are clear-cut: these actions are self-evidently wrong and deserve condemnation.

These are not just academic terms. In an era of widespread skepticism about expertise and the ascendancy of the internet as a source of information, this language has spread widely among publics around the world. A November 2023 Google search for "front group" produced 8.7 billion hits, and "co-optation of scientists" yielded 1.6 billion, while "[to] manufacture doubt" produced 228 million. What these numbers tell us is that this black-and-white, PR-as-science story, and the language in which it is told, have been reproduced again and again, becoming the dominant narrative through which many of us think and talk about the corporate distortion of science. Yet these terms are problematic.

The problems start with the outright rejection of the science. The public health critics deplore the science created for corporate ends. They've dismissed it as "corporate PR," "mercenary science," "bought and paid for conclusions," "marketing in the name of science," "so-called science," and "junk science," all signaling that the knowledge is unworthy of the name "science" and undeserving of further attention. In these accounts, the interest in the science is largely confined to discovering the myriad ways it has been twisted to achieve industry ends. Figuring out how mainstream science has been perverted is an important task, and partly as a result of this work, we now have incontrovertible evidence that the obesity science funded by Coke and created by its scientific nonprofit was biased in industry's favor. Yet we can take the story further.

Historical and broadly sociological understandings of science suggest what we might gain by taking the claims of the Coke scientists—that they *are* doing science (of some sort)—seriously. Why should we do that? For one thing, soda science is recognizably science. Moreover it represents an unusual but only too common kind of science about which very little is known. Acknowledging the "scienceness" of this industry-funded knowledge is also useful because it allows us to see the advantages that the label "science" bestows on the experts who make and promote it. Even on the political front, we cannot hold the food companies accountable for distorting the science of chronic disease unless we know exactly what they've been doing in the name of "science." In short, the scienceness of soda science is the key to its (mostly hidden) power in the world.

In this book I will argue that corporate science *is distorted* and at the same time *is (a kind of) science*. Seeing it this way opens up a host of new questions about corporate science in general and soda science in particular. Instead of asking simply how the knowledge was twisted to serve industry ends, we can ask more open-ended questions about the who, how, when, why, and so-what of soda science. Approaching the science in this way will open up a secret world of transnational science making, science spreading, and effects that no one (beyond those involved) knew existed. And by uncovering hidden pathways of power and influence, it will show that soda science's effects are especially harmful in good part because they are invisible.

A second problem with existing writing on corporate interference with nutrition science is its US focus. (Since 2020, Chile, Colombia, and other Latin American countries have attracted growing attention.) That makes sense, given that many of the key companies and their main scientific nonprofit are headquartered in the United States. But the companies funding soda science—Coca-Cola, PepsiCo, Kraft, and dozens of other peer firms—included some of the world's largest food companies, with global brands and markets that needed protecting from the critics in public health. If the companies operated within global spheres, so too did the scientists, who belonged to transnational networks of public health researchers and institutions working to find answers to the rapidly worsening crisis of obesity.

The food giants and their scientific agents were thinking globally from the beginning; to understand them and their project of science slanting, we need to do the same.

In this book we will see that, from conception to execution, soda science was a fully global enterprise designed to protect soda by making industry-friendly science about obesity in the United States, spreading it to large, rapidly growing markets, especially in the Global South, and translating it into industry-favorable policies to protect those markets from government regulation. Taking a global approach to soda science allows us to see both the full scope of the soda-science project and its most insidious effects.

The third problem with the standard story lies in the political nature of its key terms. These terms—*industry front group*, *co-optation of academic scientists*, *mercenary science*, and so forth—serve as powerful battle cries in the larger war being waged over the excessive power and greed of huge corporations in our society. What ties them together is their negative character: they are all derogatory labels for individuals and institutions doing things many of us find troubling. This approach expresses our collective discomfort and dismay at the deliberate distortion of modern science, a crowning achievement of modern society. These pejorative terms, though, stop our thinking at a fairly superficial level: we label something bad and put it out of mind. If our aim is not just to condemn, but *to understand* the how's, why's, and so-what's of corporate science, we need a very different vocabulary. In this book I draw on a new set of concepts and methods, ones that draw readers much deeper into the hidden recesses of corporate science to see who inhabits that world and what drives them. The result is a story about soda science that is both bigger (more global) and smaller (more human) than the story that now dominates public understanding.

Drawing on the methods and analytic perspectives of two allied fields—social studies of science and the anthropology of global health—I take that science created for industry ends as my object of investigation. I show how—by taking the science seriously, studying the scientists and their organizations in action, seeing them as parts of a global project, and asking big, open-ended questions of the actors themselves—we can tell a bigger story about the corporate science of obesity that has been making us as a society and people elsewhere on the planet sick. In pursuing this agenda, I will be building on the important work of the public health scholars who, as insiders in this world, are superb guides to the science and the culture of the field. I also rely on the writings of science and health journalists who have been closely following this story, submitting open-records requests, and documenting critical developments as they unfold. My findings generally support their conclusions but add to them in surprising new ways. I draw most heavily, however, on my own on-the-ground, documentary, and online research to tell a human story of soda science, and so it is to that I now turn.

Unearthing the Secrets of Soda Science

In 2013, two years before Coke's ill-fated foray into science making became public, I began pursuing the hunch that the giant food companies that are skewing our diets toward salt, sugar, and fat might also be working behind the scenes to sway the scientific and governmental responses to the obesity epidemic. Although our story in this book will start in Atlanta, Georgia, and Washington, DC, my research was launched in China's capital city, Beijing. Why China? In the late twentieth century, China was the single most important target market for the food and soda industries. Mao was long dead, and the country was on an economic roll developing a market economy and looking to the West, especially the United States, for ways to create the good life. If Coke was anywhere selling sugary soda and quietly pushing the science of obesity in its direction, I figured, it would be here in Beijing. Also, China was my area of expertise. After two decades investigating the science behind the one-child policy, I had an intimate understanding of how science and politics/policy were knotted together at the apex of the country's political system.

My plan was to look for corporate influence on the science and policy of obesity in China, and then trace those influences back to their roots in the United States, where many of the biggest food companies are based. At that time, some longtime industry critics no doubt suspected Coke was trying to manipulate science to its advantage, but no one had any idea of the phenomenal scale of the effort. To discover how corporate actors might be clandestinely tampering with the science, I combined the fine-grained ethnographic methods of anthropology (seeking the actor's or participant's point of view, and placing that in wider political-economic and cultural context) with the painstaking "deconstructionist" methods of science studies (taking apart the facts, arguments, and so forth, to see how they were created), innovating additional methods where needed.

Because corporate science turned out to be exceptionally complex and the soda industry and its agents had sophisticated strategies for keeping their secrets hidden, it would take almost ten years, four involving sustained data collection, to get to the bottom of things. By that time, I had accumulated a very substantial body of empirical material on the corporate science and policy of obesity, and the organizations, individuals, and political dynamics involved in making them in the United States and China over twenty to twenty-five years. Using that information, I then created a set of data archives and histories that made the information more readily available for teasing out larger patterns and crafting stories. The list below provides a capsule account of the methods used, the materials gathered, and the archives and histories I assembled prior to writing this book. This broad overview can serve as a guide to the kinds and depth of empirical support that lies behind my claims, some of which are rather strong.

THE UNITED STATES

1. Coca-Cola, history of obesity work: constructed from books on the firm, company annual reports, Securities and Exchange Commission (SEC) reports, sustainability reports, articles on the website Coca-Cola Journey, and other sources
2. Email archive: emails between Coca-Cola executives and cooperating academic and government scientists (2009–15)
3. ILSI history: history of ILSI-Global, ILSI Center for Health Promotion, and ILSI North America, created from materials on the ILSI website, annual reports of ILSI-Global and branches, and conference programs and papers
4. US Internal Revenue Service (IRS) tax forms: 990 forms for all ILSI entities in the United States (1997–2020)

BOTH THE UNITED STATES AND CHINA

5. Interview file: numbered transcripts from interviews I conducted with twenty-five Chinese (2013) and twelve internationally prominent obesity specialists in the United States and Europe (2015–16); includes interview with the executive director of ILSI-Global
6. Scientist profiles: professional biographies of the main soda scientists, American and Chinese, constructed from their curricula vitae and other online sources
7. Article archive: set of relevant scientific articles on obesity and its management

CHINA

8. Newsletter file: news items on obesity from ILSI-China's semiannual newsletters (1990s–2015), used to construct history of ILSI-China and its work on obesity

9. Policy archive: collection of Chinese policy documents on obesity and chronic disease, articles on Ministry of Health website, photos of Chinese public health campaigns, and so forth (late 1980s to 2020)
10. Fieldnotes: Observations from ethnographic research carried out at conferences and in restaurants, drugstores, bookstores, and other sites in Beijing (2013)

This neat, orderly list implies a straightforward process of data collection, from step 1 to step 10. The research itself was anything but linear. I began with clear questions and a detailed plan, but as I learned more about how things were done on the ground, new questions kept arising, and the project kept expanding in scope. The work took me from China to the United States, and then to Switzerland, England, and Scotland. Serendipity played a big role. It was my good fortune, for example, to meet the key figures in the GEBN project at an obesity conference in Beijing in late 2013, two years before their names were linked to the science-for-sale scandal that enveloped Coke. Though I had no inkling of what they were planning behind the scenes, I was astonished to hear one of them tell the audience of more than two hundred top Chinese obesity specialists that the real public health problem was not obesity but physical inactivity, and to hear all three claim that exercise was what mattered for obesity, a finding, they added, firmly rooted in the science of energy balance. My fieldnotes record my reaction: "OMG, ** Coke is funding research that says obesity is not the issue **." I did not know it at the time, but what I had encountered was a full-blown, Coke-funded product-defense science of obesity. The labyrinthine process by which I uncovered many of the secrets of soda science is a story in itself, and I tell it in the second appendix. In the chapters that follow, where the findings are especially striking or unexpected, I include little methodological notes in the text to fill readers in on the data or methods that produced the discovery.

Understanding Product-Defense Science

To make sense of soda science, I turn to the ideas of science and technology studies (or simply "science studies"). Science studies holds that science does not simply reflect the natural world. Rather, science is social, a product of the specific individuals, communities, and wider contexts in which it is made, and it comes to bear the marks of the circumstances in which it is produced. Science is also active; the actors are constantly working to create and advance scientific knowledge.[28] A central question in the field is how scientific knowledge is actively constructed by participants who attempt to form stable knowledge structures and networks. That is our interest here as well: how specific facts and analytic frameworks on obesity were created.

This project on soda science was inspired by science studies work on commercialized science funded by the pharmaceutical industry. The drug industry plays a huge role in contemporary biomedicine (that is, scientific or mainstream medicine) because of the centrality of drugs in treatments for modern diseases. Work by Jeremy A. Greene, Adriana Petryna, Sergio Sismondo, and Joseph Dumit, among others, has shown that Big Pharma has come to control or shape virtually every phase of the scientific process surrounding chronic disease, from the clinical trials and other research to the analysis, writing, publication, and dissemination of the results.[29] This extraordinary control of the science has given the industry a critical role not just in marketing its drug treatments, but also in defining the diseases that are treated. Further maximizing sales and profits, the industry has also been spreading new notions of the self as inherently ill and in chronic need of those drugs. Indeed, Sismondo contends that this commercialized science that is being molded by Big Pharma represents a new model of science that is distinct from academic science. He calls it simply corporate science.

This project also drew inspiration from anthropological work on global health. As giant corporations have become the predominant force shaping the health of people around the world, anthropologists, ever attuned to questions of power, have been exploring the influence of corporate power in the field of global health. Seeking to capture these ongoing shifts, Vincanne Adams has characterized global health as "a platform that binds the public and private sector interests in novel form, inheriting the common sense of neoliberalism and increasingly mobilizing the private sector and its market-based, profit-driven solutions for all health problems."[30] Anthropologists have also urged a rethinking of the notion of "health." If Susan L. Erikson is right, then today "global health" is no longer simply about eliminating disease but "has become a thing en route to, amid, and alongside making money."[31] Thinking about health promotion as fundamentally about the pursuit of money, anthropologists have been asking open-ended questions to learn what cluster of actors, institutions, ethics, and so forth are coming together to wrest money from "health," how these vary from society to society, and with what effects. This is the approach I take here.

If the pharmaceutical industry has had a pervasive impact on the medical management of the chronic diseases of modern life, what about Big Food? Very few researchers working within science studies (or anthropological) perspectives have tackled this question. Nutrition science presents special challenges for science studies work on corporate science. The science is unusually complex; in addition, the influence of food companies on health is much more difficult to measure than the impact of drug companies.[32] In this book, I build on core concepts in science studies to trace the practices by which Big Food and its agents created and advanced a science of obesity and translated it into policies on chronic disease over twenty years (1995–2015), with a look ahead to 2020. Reflecting the anthropological concern with the *effects* of corporate power and corporate science, I also track the impact the food industry has had on our ideas, practices, and public policies regarding health. Pharma products may be widely used to treat our ills, but food products are consumed every day. Moreover, agents of Big Food have been creating and spreading corporate science for decades. We will see that the industry's imprint is much deeper than anyone has suspected.

CORPORATE SCIENCE: KEY TERMS

If our current terms are too limited, what terms should we use? Let us begin at the beginning: what is corporate science? By *corporate science* I mean simply science that is funded by industry and created to serve industry ends. It often looks like academic science but differs in that its primary aim is not to increase the stock of knowledge but to advance the marketing goals of industry. Following Michaels, *product-defense science* is a distinctive kind of corporate science produced with corporate support for the express aim of defending harmful products of all kinds.[33] Soda-defense science is a product-defense science created to defend sugary soda from the cascading threats to corporate profits and reputations brought about by the public health critiques of soda. The *soda* in soda-defense science refers primarily to carbonated soft drinks, but it also stands for other sugary drinks and, further afield, junk foods that harm health, all of which gain some protection from the science created to defend sugary drinks. Coca-Cola was the dominant corporate force in this science enterprise, but other companies making highly processed food worked with it and benefited from the science.

Despite the casual use of epithets like "junk science" by some observers, soda science can by no means be considered junk science. A prime example of junk science is the set of pattern-matching techniques that are widely used in forensics but have been shown by subsequent DNA analysis to be deeply flawed and the basis of countless wrongful convictions. These problematic matching techniques include analyses of bite marks, shoe prints, tire tracks, and handwriting. As M. Chris Fabricant shows in *Junk Science and the American Criminal Justice System* (2022), these techniques have no empirical or scientific grounding and—despite the hype surrounding them, on TV shows like *Forensic Files* and in real courtroom cases—amount to mere expert opinion based on training and experience. Soda science is nothing like this; soda science is a real science that has been manipulated in certain ways.

Like all sciences, soda science is a body of knowledge that is humanly created and shaped by its institutional and wider political and cultural contexts. We will ask not whether the science developed for the soda industry is good or bad (the core concern of the public health critics). Instead we'll ask how it is made (by whom, with what practices, in what historical circumstances), how it differs from mainstream science, what effects it has on public health programs and policies, and how it is ethically rationalized. (Because it was heavily shaped by corporate interests, by definition the science was "bad" in certain ways, some of which I point out as we move along. Its "badness" is not my primary concern, however.)

Fact Making: Scientific Elements of Interest

In telling the story of soda science, I take up a classic topic in science studies: how scientific facts are made, made stable or solid, and produce effects. A common way to study science is to examine a finished product (an article, a report). If instead we study *science in action*—as a messy process of actors making facts, crafting arguments, advancing claims, and so forth over a period of time—we get a much livelier and more robust picture of who is making it, how, and in response to what institutional and political-economic conditions. By following soda science over two decades, we are able to trace it over its full lifespan, from its birth through many years of development to its sudden demise in the wake of the *New York Times* exposé.

To see the imprint of industry on the science, it's not necessary to delve into the technical details (data sets, equations, computations, and so forth). Instead, we can focus on a cluster of more general elements of the knowledge. Soda science produced one weighty fact: physical activity is the primary answer to obesity.[34] That fact was buttressed by a larger "energy balance" analytic framework, the concepts making up the framework, supporting arguments, and rhetorical (or persuasional) devices designed to convince audiences of the soundness of the claim. Facts, frameworks, concepts, arguments, and rhetorical patterns: these are the main elements of the science I will be tracking in the pages that follow. When I talk about "the science," I will be referring to these five elements.

Phases of Science and Policy Making

In the pages that follow I trace the process by which scientists associated with Coke first created and then advanced these elements of soda science.

Since soda science, like all public health sciences, was an *applied science* meant to inform concrete programs and policies, I follow the process outward to include the *translation* of the science into practical health interventions and policies.[35] We thus track the corporate science of obesity over three phases: science making, science promoting (or spreading), and science translating. Although these overlap in practice, it is useful to analyze them as separate phases, as each one involved somewhat different actors, dynamics, and effects on the overall project of spreading soda science around the world.

Much of the writing on soda science describes the work it does as "sowing doubt" on mainstream scientific views of obesity. Soda science did indeed spread doubt, but its goal was much more ambitious than that. The overarching goal of Coke and other corporate sponsors of soda science was to create an alternative scientific story about obesity, one that downplayed the role of sugary soda, and then to advance that science, spread it to major markets, and get it embedded in local policies meant to control chronic disease. Since the global dissemination and policy translation of soda science was an active aspiration of the soda industry and its scientific agents, we can talk about an intentional *project* to make soda science the dominant approach to understanding and managing obesity around the world, or at least in the parts of the world that formed important markets for sugary soda. Indeed, we can talk about a global vision, an *imagined empire of soda science* endorsed and built into public policy by countries around the world.[36] Recognizing the global ambitions of the soda-science project allows us to see international effects of the science that we would not otherwise have noticed.

Science-Making Organizations: A Dedicated Product-Defense Nonprofit

To understand the making and effects of corporate science, we need to move beyond the one-dimensional notion of a front group to specify the kinds of organizations that are making the science, how they work, and what work they do. Corporations provide vital funding for corporate science, but the successful creation of such a science lies in the hands of a set of poorly understood, dark-money organizations whose mission is to create and circulate corporate science while rendering the corporate in the science invisible. Unlike the huge multi-industry product-defense firms mentioned by Michaels, in the making of soda science, the food industry would rely heavily on a small, shadowy, secretive, and yet sophisticated *single-industry nonprofit*, the International Life Sciences Institute (ILSI). Because its overriding objective was to create science to protect the interests of the food industry, we can call it a *product-defense nonprofit*. In the absence of research on the organization and inner workings of ILSI or any other product-defense nonprofit, I draw on my own research to identify six key features of the organization's structure and operations. Ranging from organizational dimensions to personnel practices to rules on ethics and participation, these six attributes will help us understand what made ILSI such an effective scientific agent for the soda industry in both the United States and China, where ILSI had a branch.

ILSI was the most important, but it was far from the only organization that made soda science. The academic scientists working with ILSI were highly entrepreneurial and, in the fifteen years of soda science's existence, created a variety of ad hoc academic-industry partnerships to move the project forward in different ways. In tracking how these were built, how they worked, and what work they did, we will uncover an entire sociology of recruitment, cultivation, and retention of academic scientists that provides vital keys to the long life and worrying effects of soda science.

A GLOBAL PROJECT; SCIENCE IN DEMOCRATIC AND AUTHORITARIAN CONTEXTS

The story told here unfolds primarily in two parts of the world: the United States, where soda science was created and initially promoted, and China, a major destination for its spread, endorsement, and translation into official policy. China under market reform (1978–present) was a top destination for the soda industry and its scientific agents. With its enormous population hungry for the products of modern life and its government preaching the marketization of everything, China offered an irresistible destination for giant soda companies seeking to market both soda *and* soda science. Coca-Cola had long had eyes on the China market and was rewarded for its patience by being tapped to be the very first foreign company allowed to do business in China after it opened to the global economy. Less well publicized is that the very same year, Coke's scientific nonprofit (ILSI) also established a foothold in the country. China was also a pet country of ILSI's president—who was concurrently a Coke executive—and he cultivated it with exceptional care. As a result of his efforts, and the way ILSI was inserted into China's political system, the global project of soda science may have been more successful in China than anywhere else in the world.

Science is shaped by its wider context, and the vast political and cultural differences between the United States and China—one, an open democratic society in which science is largely free from direct state control, the other, an authoritarian society in which science is subordinate to the party-state and subject to its political hierarchies—offer a truly rare opportunity to observe the same science as it is made and circulated in radically different political contexts. Soda science was also molded by the very different cultures of the two nations. By following soda science as it traveled from the United States to China, we will be able to glimpse two very different ways of making science, doing ethics, and turning science into practical programs and policies. Following the science across national borders also underscores how the success of soda science depends vitally on the larger context in which it is introduced. In both societies, soda science developed rapidly, but its secrets were exposed, and it was felled, in only one of them, the United States. In the other, China, soda science, with all its industry-friendly biases, continues to shape official thinking and public policy on chronic disease to this day. At least in this case, one of world's leading authoritarian systems was much friendlier to corporate science than the world's leading democratic one.

CORRUPTION: DOING ETHICS, HIDING SECRETS

As sciences deliberately distorted to serve industry interests, soda-defense and other product-defense sciences are fundamentally tainted, or contaminated. The science studies scholar Sergio Sismondo calls this *epistemic corruption* (corruption of the knowledge, or simply "corruption"). Corruption exists, he writes, "when a knowledge system importantly loses integrity, ceasing to provide the kinds of trusted knowledge expected of it. . . . Often [it] occurs because the system has been coopted for interests at odds with some of the central goals thought to be behind it."[37]

If corruption is the central feature of product-defense science, ethics—the moral reflection on and management of that corruption—is a central practice of those making and using corporate science. For the analyst of a case of corrupted science, the issue of ethics arises on two levels: the analyst's ethical stance toward the project as a whole, and the ethics of the actors involved in creating the science. My position on the ethics of the soda-science project is clear: it is wrong and needs to be exposed and those responsible held to account. The ethics of the actors is a different question. Rather than prejudging the scientists who created soda science, I adopt an agnostic stance and seek to understand their ethical decisions and actions in the context in which they were made. In this book, I develop the notion of (epistemic) corruption further by proposing a set of knowledge practices by which the scientists who make product-defense science try to manage the ethics of corporate science to their advantage.

For corporate science to be credible and durable, the corruption at its core must be concealed. And indeed, the secretive nature of corporate science making has been abundantly documented. In the product-defense sciences, Michaels writes, "dark money rules. . . . Secrets abound."[38] In his study of corporate science in the pharmaceutical industry, Sismondo describes a "shadowy knowledge economy," a "ghost-managed medical science" in which industry presence is a ghostly apparition, everywhere busy in the background shaping the science and its consumption and yet nowhere clearly seen.[39] I discovered the ubiquity of such covert domains and furtive actions early in my research, as those involved in making obesity science in China skirted questions about funding, left gaps in the conversation, and gave answers that did not quite compute. As I peeled back layers of obfuscation surrounding ILSI's operations, I came to realize that it was devoting as much effort to protecting its soda-defense agenda from detection as to pursuing the agenda itself.

Clearly, the appearance of sound ethics was vital to the believability and durability of the science and to the reputation of its makers as upstanding scientists. But instead of labeling the scientists who made soda science *unethical*, in the pages that follow I ask what they were doing to make their (corrupt) work *appear ethical*.[40] I discovered that, in both the United States and China, achieving neutrality for their (nonneutral) science of obesity was one of the central challenges facing those engaged in making soda science. It involved two sets of practices. The first was *hiding secrets*. As the research progressed, I came to understand that the making and burying of secrets—especially regarding corporate funding—was a fundamental and structured part of making, spreading, and translating corporate science. The second practice was what we might call *doing ethics*: demonstrating scientific integrity to put one's conscience to rest, while not in fact resolving the ethical contradictions. The twin practices of ethics (performing integrity) and secrecy (camouflaging what could not be demonstrated to be ethical) became a central focus of my research, and they will be a big part of the story told below.

What Lies Ahead

Hoping to reach general readers as well as professional colleagues, in this book I keep academic discussion to a minimum, highlighting instead the human story of soda science. That is a story of how—once the soda industry came under attack for the obesity epidemic—the giant soda companies mobilized a sprawling, largely invisible apparatus of scientific nonprofits, academic scientists, and public-private partnerships to create a corporate science of obesity whose primary aim was to defend industry interests, not combat obesity, and how they then succeeded in getting it endorsed and translated into official policy in one of the world's largest countries. I argue that soda science was a real if unconventional kind of science that deserves attention because it had distorting—and largely invisible—effects on popular ideas about health as well as on the health policies (and no doubt also the health) of the United States and other nations targeted by the soda industry. Beyond the science's problematic claims—exercise is the most important answer to the obesity epidemic, soda taxes are unworthy of consideration—it had a number of unusual characteristics that make little sense until one recognizes that this is no ordinary science, but a product-defense science corrupted to the core. In telling a comprehensive story of the life, death, and afterlife of soda science, my larger aims are both analytical or conceptual and political: first, to contribute to the broader understanding of corporate science, its nature, dynamics, and significance; and second, to hold industry and its agents to account.

The book has two parts, each with four chapters. Part 1 traces the birth and advance of soda science in the United States in the wake of the mid-1990s emergence of the obesity epidemic. We follow the elaboration of the science step by step over some fifteen to twenty years, as different parties—the food industry's scientific nonprofit ILSI, ad hoc academic-industry partnerships, and the soda industry itself, especially the industry giant Coca-Cola—succeeded in quietly building a credible science of obesity that put industry interests first. Suddenly, in late 2015, just as the science was poised to go global in a big way, its corporate funding came to light, and soda science as an active project abruptly ended. A brief coda to part 1 documents the sudden death of this project and traces the aftershocks for Coke, ILSI, and the soda scientists. In this coda we learn why, despite its untimely demise, the soda-science project was still a big win for Coca-Cola.

Part 2 charts the spread of soda science to China in the years 1999–2015, uncovering how Coca-Cola, working through ILSI and its American advisers, took advantage of the peculiarities of China's political system and its admiration for Western science to get soda science accepted as authoritative. Here we follow China's top obesity scientist-officials, as they laid the groundwork, got soda science endorsed as the best science for China, and built it into China's policies on diet-related chronic disease. We see too how they reworked the discourse to make their industry-friendly science of obesity appear ethical in Chinese cultural terms. In the coda to this part, we discover that, despite its demise in the United States, soda science with its industry-friendly provisions has lived on in China. It has continued to form the basis for official policy on chronic disease, including Healthy China 2030, at least through 2020, with worrying consequences for the health of China's people.

At the center of all these stories is a remarkable cast of well-educated, highly motivated, and enterprising characters—industry executives, academic-turned-corporate scientists and, in China, state scientist-officials—all deeply committed to making the dream of soda science come true. Four Americans and two Chinese remained at the center of the action for some fifteen years, allowing me to tell much of the story through their words, writings, and actions. The interpretations, of course, are my own.

In the conclusion, I highlight the crucial role of soda science in the formation of America's step-counting, weight-obsessed fitness culture. While soda science is no longer an active project, Big Food is now aggressively defending its ultraprocessed foods and manipulating science and policy in markets around the world. The conclusion sketches out these latest developments to make clear that the work of exposing the industry's tactics and holding it to account has just begun.

Finally, the conclusion returns us to the central political question surrounding corporate science, that of accountability. As an anthropologist, I take it as part of my craft and my ethics to be responsible for what I write. In this book I have strived for accountability by basing every part of my story and every argument on empirical evidence and laying out my methods and data to show how I came to these conclusions. In presenting extensive evidence that the food industry and affiliated scientists distorted the science of obesity and transported it to other countries, my intention is to hold these parties to account. Have they taken responsibility for the science they created? We're able to answer that question because I published some initial results in medical journals between 2019 and 2021. In the conclusion we will see how Coke and ILSI responded to the publication of research documenting their complicity in the soda-science project.

A first appendix lays out the set of concepts I developed to study soda science. I hope they might be useful to readers interested in investigating other product-defense sciences. A second, methodological, appendix tells the story of the research behind the book. It includes brief profiles of the scientists I talked to as well as an assessment of the limitations of the research.

My citation practices are unusual and important to understand at the outset. In order to reduce the number of endnote markings (note numbers) in the text, I have used numbered endnotes only for essential information (such as where the material discussed can be found, usually via short citations keying to entries in the bibliography, where full information will be found) or clarification. In addition to the numbered endnotes, I've created three sets of citations that are not marked in the text (thus "unmarked citations") but appear in the notes section of the book just after the numbered notes for the relevant chapter. These cite material from three types of sources: my interviews, my fieldnotes, and emails located in the Food Industry Documents collection maintained by the University of California San Francisco Library (UCSFL). For each of these three kinds of citations, I've created a list arranged by order of location in the text (section heading and the paragraph number within the section). For example, when I use a quotation from an interview, in the text I make clear that that material is from an interview. Readers who wish to know the source will need to note the heading and the paragraph number in the section where the quote appears, go to the notes for that chapter, find the relevant section heading and paragraph number, and the source will be listed there. For material taken from interviews, I provide a reference to the numbered transcript of my Interview File (IF), as well as the date and location of the interview. For material taken from my fieldnotes, I give a brief summary of the circumstances where the note was taken. For those three types of material, there will be no marking in the text indicating that the source can be found in the notes at the end of the book.