REAL FOOD, REAL FACTS

PROCESSED FOOD AND THE POLITICS OF KNOWLEDGE

CHARLOTTE BILTEKOFF

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Charlotte Biltekoff

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Introduction

Seeing Food Scientism

In February 2014 I was invited to be a lunchtime speaker at the California League of Food Processors annual Food Processing Expo at the Sacramento Convention Center. The email flyer promoting my talk also advertised a breakfast talk by David Schmidt, president of the International Food Information Council (IFIC), about consumer opinions of processed food and what the industry could do to improve them. Intrigued, I attended the talk. Schmidt began by addressing the tough times food processors in California were facing because of the ongoing drought. He wished it was the only problem facing the processed food industry, but there was another major concern that he wanted to address: misinformation and falsehoods about the processed food industry. He explained that IFIC, which describes itself as "a nonprofit educational organization with a mission to effectively communicate science-based information about health, nutrition, food safety and agriculture," had been conducting research on consumer perceptions of processed food since 2008 and had found "a pretty negative environment." The research suggested that across all demographics

there were high levels of negative association with processed food; 43 percent of consumers reported an unfavorable opinion of processed food, and only about 18 percent were willing to say they were positive. Furthermore, negative perceptions weren't just being driven by the media; they seemed to be coming from all information sources. Schmidt also noted that there seemed to be no one talking about the benefits of processed foods. Many IFIC members were even promoting their processed products as "natural."[1]

The rest of Schmidt's talk discussed IFIC's efforts to do something about this negative environment for processed food. The organization started by publishing a white paper reviewing the scientific basis for food processing and processed food with the Institute of Food Technologists (IFT), a professional society representing food science and technology. Building on this, IFIC developed "consumer friendly messaging platforms" and put together an "Understanding Our Food Communications Tool Kit" for communicators and opinion leaders in agriculture, food, and nutrition. Because agricultural biotechnology had become such a "heated issue," IFIC also put together a "Food Biotechnology" communicator's guide that included a chapter titled "Words to Use and Words to Lose." The last initiative Schmidt talked about was the Alliance to Feed the Future, a new organization established by IFIC to "provide a balanced public dialogue about how modern agricultural technology innovation and food production benefits society." The Alliance already had 118 members, including the Northern California League of Food Processors, and Schmidt talked about the success of its first initiative. Responding to "very misleading perceptions of food and agriculture" in the movie *Food, Inc.* and a "multi-million-dollar curriculum being shared in schools right now to further communicate this information,"

the Alliance put together its own educational curriculum for grades K–8, which had already reached 750,000 teachers and 4.5 million students.[2]

Captivated by what I heard that morning, I started to wonder what was really going on with processed food. I didn't need IFIC's research to tell me that perceptions of processed food had become very negative. That was obvious. The question of whether processed food was good or bad seemed an impossibly fraught one, not least because it wasn't even clear what "processed food" was. On one extreme, critics suggested that all processed food was bad and should be avoided, advice that was impossible to follow since it was never clear where the line was between processed and unprocessed food. On the other extreme, advocates argued that all food was processed, so attacking processed food was nonsense; even organic spinach had been washed, and many staples beloved by real food proponents (e.g., canned tomatoes, olive oil, coffee) were processed foods. But Schmidt's talk suggested that the friction over processed food was about more than whether it was good or bad to eat and that it had something to do with the status of scientific knowledge and expertise.

From my perspective, grounded in food studies, negative perceptions of processed food expressed and encompassed a whole range of concerns about the industrial food system, having to do with health, safety, sustainability, and more. But IFIC seemed to think that public concerns about processed food stemmed from scientific ignorance and could be addressed with the facts about food production and processing. The introduction to IFIC's "Understanding Our Food Communications Tool Kit," for example, explained that while many people are concerned about food processing, "some views result from lack of awareness about these processes and foods." The goals of the tool kit were

to "communicate facts about modern food production," "clear up misinformation about processed food," and "guide consumers and clients to make the best food choices for health and lifestyle."[3] The "Food Biotechnology" communicator's guide described consumer opinions as "based on emotion" and began with a large graphic advising readers to "communicate the facts clearly and concisely."[4] In 2014 IFIC launched the FACTS (Food Advocates Communicating through Science) Network to "combat the growing tide of deceptive advice, misleading statistics, and alarmist tactics that define much of today's food and nutrition dialogue."[5] The next year, the FACTS Network published a three-part series in the spirit of *National Geographic*'s "War on Science" series called the "War on 'Food' Science," each piece featuring experts sharing the science on "commonly miscommunicated topics" such as weight loss, BPA (bisphenol-A), and artificial sweeteners.[6]

Because I have a joint faculty appointment in my home field of American Studies and in the Department of Food Science and Technology at UC Davis, I frequently encountered the idea that public perceptions of processed food were based in irrational fears and lack of scientific understanding. I saw it in the pages of the food industry magazines that arrived in my campus mailbox, the emails I received about educational programing from IFT, the sessions I attended at IFT's annual meetings, and at conferences and talks I attended on my own campus. Eventually I decided to try to make sense of all this. This book, which is the result of that effort, focuses on the knowledge politics that are at the heart of the friction between the food industry and the public when it comes to processed food. I push back against the food industry's framing of consumer aversion to processed food as based in lack of scientific literacy and its framing of the processed food controversy as a conflict between science on one side and

antiscience on the other. Instead, I ask what the processed food controversy can tell us about the role of scientific authority in the relationship between the food industry and the public.

My real concerns have to do with how the food industry's deployment of scientific authority limits the potential for meaningful contestation over the trajectory of the food system, and I make two central claims about this. I argue that in responding to growing concerns about processed food among both activists and the public in the early decades of the twenty-first century, the food industry leveraged scientific authority to claim and maintain the power to define the questions that mattered and the conversations that were reasonable to have about the food system. I also argue that the food industry imagined and projected the public as lacking the skills and capacities to engage with science and technology or its governance. Doing so has helped justify not taking public concerns about the food system seriously.

During the early years of the twenty-first century, ideas about good food were transformed by growing awareness of health, environmental, social, economic, animal welfare, and other effects of industrial food production, giving rise to changes in individual behavior and a range of well-documented consumer and social movements related to food.[7] I move questions about science and technology to the center of our understanding of the politics of food at this time not only because the food industry marshaled scientific authority in its own defense but also because concerns about science and technology and its governance cut across these movements. Movements promoting organics and farmers' markets, combating obesity, reforming animal agriculture, resisting biotechnology, fighting for food safety, and more took up questions about the uses of technology in food production as well as the role of scientific authority in the food system. At the

same time, these movements were shaped by doubts about the capacity of experts to understand and respond to public concerns about these uses of technology and science and scientific authority.[8] Scholarship addressing the role of science in the friction between the food industry and the public has largely focused on how organizations representing the food industry, such as IFIC, have thwarted effective science communication, emphasizing the potential public health consequences of its manipulation of information about food and health.[9] While this work is important, it focuses on knowledge, or what people know about food and the potential health impacts of particular foods. I contend that it is crucial to also understand the role of knowledge politics, or how scientific authority has been both contested by the public and leveraged by the food industry.

PROCESSED FOOD FRAMES

My analysis revolves around how different actors in the food system understood and addressed the problem with processed food differently. For food industry representatives, the problem with processed food was that the public had negative attitudes about it because of misinformation and misperceptions. They were concerned that such attitudes were affecting purchasing behavior, leading to the "deselection" of processed products, in addition to overall negative perceptions of the food industry. But for many others, the problem was with processed food itself. Among those concerned with public health, processed food was a problem because its poor nutritional composition (too much salt, sugar, and fat) combined with its ubiquity seemed to be causing population-wide health problems such as obesity, diabetes, and cardiovascular disease.[10] Another set of activists and activated

consumers considered processed food the troubling product of a troubled food system—detrimental not only because of population- or individual-level health effects but also because of its central place in an industrial food system that was responsible for a litany of environmental, social, economic, and other ills.[11] Among consumers and activists concerned about regulatory laxity and risks related to food production technologies, such as synthetic additives, processed food was considered dangerous because some ingredients were a threat to the short- and long-term health of individuals.[12]

The processed food controversy was, in other words, a framing contest, a competition over credibility, authority, and influence between different frames or different ways of seeing the same thing, leading to different courses of action.[13] The frame I call "Real Food" led to calls to avoid processed food and reform the food system. The frame I call "Real Facts" responded with education and communication designed to address a lack of scientific literacy among the public. But these frames represent more than just ways of thinking about processed food, and though they may appear to compete over correct or incorrect knowledge, my interest lies in looking beyond this.

The Real Food and Real Facts frames resemble the "contending lifeworlds" that Rachel Schurman and William Munro, authors of *Fighting for the Future of Food*, identified among agribusinesses and activists fighting over biotechnology at the turn of the twenty-first century. They describe contending lifeworlds as comprising shared social circles and intellectual communities as well as shared mental worlds, or taken for granted beliefs, judgments, and assumptions. As they point out, shared lifeworlds generate and naturalize "certain broad visions of the world, as well as interpretations of specific phenomena."[14] Different understandings

of science and its role were important components of these contending lifeworlds. Those promoting biotechnology believed in "the fundamentally positive nature of science," and they were invested in the idea that "a scientific perspective, which relied on 'hard facts,' and empirical evidence rather than on religion, value judgements or emotion, was quintessentially rational." They also assumed that the public was unable to meaningfully participate in the debate about genetic engineering because it lacked basic scientific knowledge.[15] In contrast, the lifeworld shared by activists centered a shared grievance against agricultural biotechnology that was shaped by concerns about health and environmental impacts as well as power and inequality in the global food system, including the privatization of "the 'basic building blocks of life'" and "the use of science for private gain rather than public good."[16] It was bound by shared moral outrage and a commitment to doing something about the new technologies.[17]

Competing processed food frames also resonate with the competing paradigms Tim Lang and Michael Heasman discuss in their "food wars thesis." They describe a paradigm as "a way of thinking, a set of assumptions from which new knowledge is generated, a way of seeing the world which shapes intellectual beliefs and actions." Food paradigms are "a set of shared understandings, common rules and ways of conceiving problems and solutions about food."[18] Lang and Heasman explain that a productionist paradigm oriented toward producing more food dominated food policy throughout much of the twentieth century and that as it wanes two paradigms compete to replace it. The "life-science integrated paradigm" and the "ecologically integrated paradigm" not only rely on different sciences (biotechnology in the former and agroecology in the latter) but also are driven by different understandings of the role of food in the relationship between humans

and the environment (mechanistic vs. holistic) and the role of knowledge in food policy (top down and expert led vs. knowledge as empowerment).[19] Though I use the term "frames" to highlight that Real Food and Real Facts are different ways of seeing the same thing, I am interested in the fullness of values, culture, and knowledge politics informing competing approaches to the food system that are captured in these complementary discussions of "lifeworlds" and "paradigms."[20]

In identifying and analyzing the processed food controversy as a framing contest between Real Food and Real Facts, my intention is to highlight how these different ways of thinking about and acting in relation to processed food are linked to struggles over authority—not just right or wrong knowledge, but the kinds of questions and expertise that matter when it comes to food, health, and the food system. Decades ago, in her President's Address to the Society for Nutrition Education, the celebrated nutritionist, educator, author, and gardener Joan Dye Gussow made a compelling case for paying attention to how certain questions about food came to matter. Gussow argued that while conflicts over processed food and the industrial food system may appear to be about data, or what is true, they are actually about what the facts mean and what should be done with them. She went on to explain that these are questions that research cannot answer: "Only when we keep the whole system in mind and decide which arrangements of the relevant facts make the most sense, only then can we decide which facts about any isolated piece of the system are relevant, and in that sense 'true.'"[21]

As in the lifeworlds, paradigms, and frames discussed above, Gussow argued that the really important issues have to do with which questions about the food system are deemed worth asking. What questions people consider worth asking, she argued, tends

to be shaped by the views they start out with. To use her example, when faced with the same information about fiber, health, and the effects of processing on food (i.e., fiber is important to health, and processing removes fiber), whether someone deems it important to ask, "In what form should we be fortifying food with fiber?," or "In what ways should we be modifying our processing methods so as to retain more fiber in food?," has everything to do with assumptions they already have about the aims and trajectory of the food system. Those asking the first question assume the food system will continue to pursue greater efficiencies through processing, while those asking the second assume that this trajectory cannot continue because of growing pressures on food production and the wastefulness of taking things out of food only to then put them back in. In other words, whether particular questions about food are deemed worth asking is shaped not by data—or questions research can answer—but by frames, worldviews, and paradigms.[22]

THE PUBLIC UNDERSTANDING OF SCIENCE FLIP

While this book explores the dynamics of the contest between the Real Food and Real Facts frames, the analysis is not symmetrical. This is not a comparative analysis of competing frames but an exploration of how Real Facts emerged in response to Real Food, how it framed the issues, what kinds of knowledge as well as social and political values and commitments these framings embodied, and their effects.[23] The Real Facts frame was centrally shaped by the deficit model of the public understanding of science, reflecting a dominant cultural narrative in which public skepticism about science and technology was believed to be caused by a lack, or deficit, of scientific knowledge or understanding. Despite research arguing that public concerns about technology are not

caused by ignorance and showing that more information does not necessarily lead to greater acceptance, the assumption has persisted that if the public understood science better, it would accept and celebrate the role technology plays in food production rather than question it.[24] The questions I ask go against the grain of these assumptions and the questions that are normally asked about science and publics.

Rather than look at the public's understanding of science, I explore how food industry actors understood the public, especially vis-à-vis their relationship to science. I think of this move as the "public understanding of science flip," and it builds on the work of scholars in Science and Technology Studies (STS) who have made the case for the importance of understanding "scientific" representations of the public. As the sociologist of science Brian Wynne has famously argued, such representations are themselves often based on misunderstandings that cause more, not less, alienation among the public.[25] Importantly, the public understanding of science flip reframes the problem of public mistrust in science as a problem of how the public is imagined by science. In this case, that means reframing the problem Real Facts proponents are facing in the midst of the processed food controversy from an ill-informed and even "antiscience" public to how they themselves imagine and interact with the public.[26] Taking inspiration from Claire Marris's work on synthetic biology, through this flip I hope to open the taken for granted expectations and "tacit normative commitments" embedded in the Real Facts frame to both understanding and appraisal.[27]

A central insight of the book is that food industry actors expanded and entrenched "food scientism," evoking and deploying scientific authority to assert and justify their own normative commitments, including commercial interests in the processed products of the industrial food system. Scientism describes

claims and assumptions about the primacy of scientific ways of knowing. It includes the assumption that the only questions that matter are those that can be understood through science as well as the use of references to science or scientific authority to frame assertions of values as beyond reproach, debate, or even dialogue.[28] Another form of scientism has to do with "using science as a source of authority in ways that extend beyond scientific and technical domains."[29] Wynne describes a shift in the role of science, especially since the 1950s, from informing to defining policy issues.[30] Writing with Ian Welsh, Wynne notes that this type of scientism "generates contestation and confusion as the normative commitments built into references to science are presented as if they involve no normative choices, only the findings and declarative authority of science. When others question the normative commitments authorized by science in this way, they are then deemed to be anti-science."[31] As this description suggests, scientism goes hand in hand with the deficit model of the public understanding of science. In the case of the processed food controversy, the Real Facts frame's assumption of scientized authority goes hand in hand with its imagined and projected perception of the public as lacking knowledge and understanding of the science and technology involved in food production.

As Wynne argues, a deficit model of the public understanding of science is "almost preordained" as a function of scientistic assumptions about the nature of the issues at hand. Critics of the deficit model take for granted that deficits of information and understanding exist but reject the assumption that deficits explain public skepticism about or opposition to projects that, they point out, are justified in the name of science but based on unacknowledged value commitments.[32] While his and others' critiques of the deficit model of the public understanding of science have become widely accepted, Wynne observes that deficit thinking refuses

to die. He describes the deficit model as constantly "buried with great self-congratulatory ceremony, then almost in the same breath reincarnated in some new form."[33] He lists a repertoire of ten public deficit models for the mistrust of science that have been "abandoned, but reinvented" since the 1990s. These include "public 'deficit' of understanding of scientific knowledge," which presumes that the public mistrusts science because it doesn't know the facts; "public 'deficit' of trust in science," which is presumed to be correctable by more transparency and explanation; and "public 'deficit' of knowledge of the benefits of 'science,'" for example, genetically modified crops will "help feed the global starving." All models were accompanied by what Wynne describes as an underlying assumption that public responses are emotional, "epistemologically empty," and susceptible to misinformation.[34] Building on Wynne's observations, I argue that deficit thinking is central to the Real Facts frame and track how the deficit model of the public understanding of science has both evolved and remained resilient within the food industry's imaginary of the public. Chapter 4 looks specifically at how deficit thinking persisted even in the face of the industry's own growing concerns about the limits of a scientized, deficit-driven approach to communicating with the public. I am especially interested in what is accomplished by this ongoing deficit thinking and the educational efforts that stem from it, despite its failure to produce the uncritical public embrace of science and technology in the food system that it presumably seeks.

ANTIPOLITICS

In accounting for how the food industry responded to the Real Food frame, I pay attention to unintended effects of industry efforts to educate the public about processed food, arguing that

among them was antipolitics. My analysis reveals an "antipolitics machine" similar to one that James Ferguson uncovered in his well-known work highlighting the "side effects" of "failed" development projects in South Africa. The "antipolitics machine" he describes was produced in the process of experts "insistently reposing political questions of land, resources, jobs, or wages as technical 'problems' responsive to the technical 'development' intervention." It was the result of plans, conceptions, discursive systems, social institutions, and systems of thought that he describes as "an anonymous set of interrelations that only ends up having a kind of retrospective coherence."[35] My analysis highlights the side effects of campaigns to improve public perceptions of processed food, which were also composed of plans, discursive systems, social institutions, and systems of thought and appear, in retrospect, as the Real Facts frame. The "side effects" I discuss include the entrenchment and expansion of scientific authority over questions about processed food and the uses of science and technology in the food system more broadly, or food scientism, and the depoliticization of the Real Food frame, or antipolitics. The food industry insistently re-posed political questions "of land, resources, jobs, and wages"—and more—as technical "problems" responsive to the application of modern food production technologies.[36] At the same time, it insistently re-posed political concerns about the food system, including its aims and driving purposes, as technical problems of misunderstanding or misinformation amenable to the intervention of the kind of communication efforts this book explores.

I consider the Real Food frame a "practice of politics" in Tania Li's sense: "the expression, in word or deed, of a critical challenge" that often "starts out as refusal of the way things are."[37] In her analysis of development projects in Indonesia, which builds

on Ferguson's work, Li notes that the process of translating "the will to improve" into specific plans and projects entails two inseparable practices. Problematization identifies "deficiencies that need to be rectified" and "rendering technical" poses problems in a way that aligns with the expertise of those positioned to address them. As Li explains, rendering a problem technical also renders it nonpolitical because of what must be excluded for the problem to match the available solutions. In the case of the food industry's response to the Real Food frame, problematization was shaped by the deficit model of the public understanding of science. When food industry actors set out to correct the problem they identified as the public's lack of knowledge and understanding, they excluded the salient questions about the food system raised by the Real Food frame and confirmed their own authority over the problem at hand. "Rendering technical" also creates certain kinds of social relationships, confirming the authority of experts and the boundary between those "with the capacity to diagnose deficiencies in others . . . and those who are subject to expert direction." At the same time, it both generates and responds to the possibility for contestation; this is "a boundary that has to be maintained and that can be challenged."[38] In the case I explore, the boundary between experts and those who were subject to their direction was in constant tension. The Real Food frame presented ongoing challenges to taken for granted ideas about both good food and expert authority, and the food industry responded with the dynamic, evolving efforts I describe.

STS scholars have long expressed concerns about the troubling political foreclosures enacted by the deficit model of the public understanding of science, arguing that how experts imagine and project the public in relation to science shapes whether or to what extent it seems reasonable or necessary to take its concerns

seriously or to include it in decision making.[39] Wynne, for example, describes scientific representations of risk as embodying tacit projections of human subjects, including their "agency and capacities," and elsewhere talks about how the public is "imagined, constructed and projected in reflection of the unspoken needs of the institutionally powerful."[40] Building on the premise that deficit-driven imaginaries of the public have real consequences for the possibility for the public to be included in decision making about technological governance, Marris looks at how public attitudes about synthetic biology have been imagined and projected as a major threat to the field that needs to be overcome so that it can deliver its public benefit.[41] Looking at the field's efforts to address ethical, legal, and social issues (ELSI work), she found persistent "synbiophobia-phobia" among the experts, or fear of the public's fear of the new technology, arguing that supporters of synthetic biology advocated "communication and dialogue, but not debate where people could disagree about what is at stake."[42] Similarly, the Real Facts frame imagined an irrationally fearful public whose misperceptions had to be overcome for the public benefit of the industrial food system to be delivered. While food industry actors were very much focused on communicating with the public about processed food, by imagining and projecting an irrationally fearful public lacking the skills and capacities to understand the science of food production, they closed down rather than opened up the possibility for meaningful debate where people could disagree about the issues or what was at stake.

As Wynne explains, scientism causes public rejection of things done in the name of science to appear as a rejection of science because it "has already so falsely narrowed its moral imagination to the idea that support for the policy stance is determined by scientific fact, that no alternative is left."[43] Ultimately, there

becomes little to no reasonable ground for public refusal. My analysis reveals the ways in which the Real Facts frame produced the public as antiscience, showing that the conflict over processed food appeared to be about science itself because of the ways in which the food industry drew on scientific authority—and scientistic assumptions—to defend its own interests. It's a sleight of hand that played on and played into existing science wars and broader national politics concerning the status of truth, so heightened during the Trump and COVID-19 years. Crucially, in so doing, it obscured or distracted from important questions about the future of the food system and the ends to which science and technology are used within it.

This sleight of hand by the food industry was part of the "antipolitics machine" I explore, as were its scientistic underpinnings. Wynne and others have shown that scientistic assumptions lead to the mistaken belief that public concerns are primarily related to risk, or the impact of technologies, rather than the aims and driving purposes of innovation. As Melissa Leach, Ian Scoones, and Wynne put it in their introduction to *Science and Citizens*, "The assumption is that public concerns are focused on risk and consequences rather than on the unstated and unaccountable human purposes, aspirations, priorities, expectations and aims that drive innovation oriented scientific knowledge."[44] Similarly, in *Seeds, Science and Struggle*, Abby Kinchy describes a "scientization" of public debate about biotechnology in which social conflicts were transformed into debates among scientific experts and risk assessment was elevated over questions about the social desirability of the technology. She argues that while conflicts over genetically engineered crops were "disputes about the social order," scientization narrowed the public debate to questions about evidence of risk,

occluding the bigger question at stake: "What kind of agriculture do we want?"[45] Writing about the policing of food safety concerns in Japan in the wake of the Fukushima nuclear meltdown, the sociologist Aya H. Kimura notes that scientization gave science "the final word on controversies, obfuscating their social and cultural roots and consequences."[46] She argues that "food policing" constrained the ability of citizens to engage in contamination issues by condemning their concerns as antiscience, leaving little space for the expression of views that might "form a basis for figuring out social and political, not necessarily scientific, solutions to the situation."[47] In the context of the processed food controversy, the Real Facts frame narrowly construed the issues at hand as having only to do with risk, or the safety of the processes, ingredients, and technologies that the industry used to produce food. It too focused the public debate on questions about risk and scientific evidence, leaving little room for the expression of views that might lead to social and political solutions to the situation. The Real Facts frame enacted antipolitics by occluding both public concerns about the aims and driving purposes that science and technology serve and the bigger question that was at stake: What kind of food system do we want?

STRUCTURE OF THE BOOK

The book begins with a chapter that explains how good food became "real" at the beginning of the twenty-first century. Each subsequent chapter analyzes an encounter between the food industry and the public, or the imagined public, in which experts responded to "real food" with "real facts." The first encounter, described in chapter 2, takes place in the classroom, where two curricula competed to teach American schoolchildren where their

food comes from. The next encounter, the focus of chapter 3, takes place in the marketplace and the regulatory arena, where trade groups, corporations, and the public wrestled over the meaning of "natural" when it came to food. The third encounter, analyzed in chapter 4, revolves around the question of how communication between the food industry and the public should evolve as it became clear that established methods, described in the previous chapters, were not working. I selected these three encounters from the vast array of possibilities to highlight both the primary domains in which the food industry responded to changing perceptions of processed food and the primary discursive themes that shaped these responses. My early exposure to IFIC discussed at the beginning of the introduction suggested two of the important domains to pay attention to: communication aimed directly at the public, such as the FACTS Network, and efforts within the food industry to develop new communication strategies, such as the "Understanding Our Food" communicators tool kit. But I also came to understand the marketplace as a critically important domain in which the food industry sought to address the public's attitudes about processed food, which is why one of the chapters focuses on the market and its associated regulatory arena. The discursive themes I identified—understanding where your food comes from, naturalness, and transparency—were initially championed by the social and consumer movements resisting the industrial food system and were then taken up in the food industry's response to them. While the time periods the chapters cover overlap, the main events they discuss proceed loosely chronologically.

The work of responding to the public's changing perceptions of processed food has been conducted largely by trade associations representing the food and agriculture industries, so the chapters

focus on the efforts of such groups. Trade groups have historically played an important but overlooked role in the relationship between the food industry and the public. In her history of the canning industry, Anna Zeide notes that food industry trade groups emerged alongside canning in the early twentieth century. Canners established the first trade associations to promote confidence in the new technology and used the language of science to "build consumer trust and taste."[48] Over time these associations came to represent the broader processed food industry and became one of the most powerful but overlooked players in the food system. The power of trade groups representing the food industry has only intensified since the 1980s, as the industry has become increasingly consolidated into fewer, more powerful companies joining forces to amplify and exercise their influence through trade associations.[49]

Sarah Heiss, who has written about the Sugar Association and the Corn Refiners Association, notes that while many scholars have looked at the role of trade associations in framing risks and shaping health policy, few have looked specifically at their role in the context of food risks.[50] According to Heiss, industry is a "stakeholder in risk negotiations," seeking to shape how risks are identified and managed, and many organizations participate in trade associations to "ensure their voice is heard."[51] Heiss explains that such associations aggregate the already significant resources of their members to negate risk, shape the public conversation about issues, influence policy, and burnish the public image of the industry they represent.[52] They lobby and conduct public relations and marketing campaigns, activities that blur the boundaries between research, education, advertising, and advocacy.[53] Thus, she argues, trade associations should be understood as "discursive landscape architects."[54]

While trade associations inherently blur the boundary between research, education, advertising, and advocacy, some of the food industry organizations whose work I analyze operate closer to the murky boundary between trade groups and what critics refer to as front groups. While trade groups tend to be up-front about who they represent, front groups are easier to mistake as having other purposes, such as educating the public to help them make sound consumption choices or helping clear up confusion about the benefits of modern food processing. They operate more in the public relations domain rather than through lobbying and tend to have names that don't directly indicate who their funders are.[55] It's clear who the Corn Refiners Association represents, for example, but "International Food Information Council" is not a name that readily reveals the fact that the organization is funded by corporate members that control much of the global food system. Like trade groups, a main goal of industry front groups is to control the public discourse.[56] The Center for Food Safety, an organization describing itself as "at the forefront of organizing a powerful food movement that is fighting the food industry model and promoting organic, ecological and sustainable alternatives," published a critical guide to food industry front groups in 2013. It argued that instead of working to fix problems in the food system, the industry uses front groups to "change the way these problems are talked about, to downplay them, to discredit critics, and otherwise make the problems disappear from the public's eye."[57] I look at three examples of how trade groups representing the food industry sought to shape the discourse around processed food by framing the problem as the public and its misunderstandings.

The chapters are not organized around specific food system issues, nor do they address empirical questions about the food system issues that are raised. One of the defining characteristics

of the Real Food frame is that it emerged from several distinct concerns that converged around the idea that processed food should be avoided. The Real Food frame is itself an abstraction and an amalgamation of concerns about food, the food industry, the food system, and the role of scientific authority. In each of the encounters I explore, distinct issues such as obesity, biotechnology, chemical additives, pesticides, and animal welfare are conflated as they are contested by advocates of both Real Food and Real Facts. Each of the issues that converged to redefine good food as "real" are pressing and the subject of some level of scientific controversy and debate. The question of whether processed food is good or bad can only be answered by disentangling these issues, exploring the scientific evidence, and putting this in relation to social, cultural, political, and economic contexts and impacts. But that is not a task I take on here. It is not a goal of this book to take a stand on the many empirical question that are raised within the encounters I explore. Rather than evaluate empirical claims and counterclaims, I focus on how knowledge and expertise are contested through these claims, as well as their political stakes. This book is also not about the role of science in food production, the manipulation of scientific research by the food industry, or how science has also been deployed by food industry critics and advocates of alternative agriculture, all important topics that have been addressed by others.[58]

CHAPTERS AND METHODS

To draw out the political stakes of efforts to educate the public about processed food, this book describes a coherence that emerged, in retrospect, from my observations of a messy landscape of discourses and actions. The idea that this landscape could be understood as a framing contest between "Real Food" and "Real

Facts" occurred to me early in the process as I immersed myself in what was going on with processed food, casting a wide net that transcended the contents of the chapters in the book. I thought with the frames as I wrote up some preliminary findings, but the framing contest concept was not an analytic that I deployed throughout the research and analysis. Each data set I collected called for a different methodological approach, described in more detail below, all of which involved some form of inductive coding that led me to distinct analytical themes. I approached the data with questions about how actors in the food industry thought about, represented, and interacted with the public, and my analytical process involved looking for patterns that would help me understand that. Only in retrospect did the frames become coherent in my understanding of what I was seeing across the data sets and central to how I presented them for readers.

Chapter 1 has two central aims. The first is to contest the food industry's framing of negative perceptions of processed food as the result of irrational fears, lack of knowledge, or misunderstandings by tracing the historical changes through which processed food became "bad" and good food became "real" at the turn of the twenty-first century. The second is to show that in redefining good and bad food, the Real Food frame also challenged established forms of scientific authority over food as well as the food industry's relationship to it. To resist the Real Facts frame's deficit-driven imaginary of the public and reframe Real Food as a practice of politics, I focus on what people understood, desired, and were anxious *for* rather than what they were anxious about or afraid *of*.[59] The chapter begins by looking at how it became more socially important than ever before for people to eat right, just as dietary advice turned to avoiding potentially harmful foods and nutrients for the first time. Then I explain how the Real Food frame emerged from a confluence of overlapping

concerns about the industrial food system that also challenged its scientific underpinnings, imposing new ways of thinking about "good food" that necessarily encompassed more than science could account for.

The following chapters explore the three encounters between the food industry and the public introduced briefly above. Chapter 2 picks up on clues from Schmidt's talk at the Food Processing Expo, focusing on the K–8 curriculum put together by IFIC's Alliance to Feed the Future. The curriculum is an example of communication aimed directly at the public, and because the lessons aimed to teach students about the "journey from farm to fork" it also highlights the discursive theme "knowing where your food comes from." Because the Alliance put together two different sets of educational materials that together comprised over forty lessons plus posters and take-home pages, this example offers an unusually rich and detailed archive for examining the Real Facts frame in action. The Alliance curriculum was designed to respond broadly to negative perceptions of processed food, but Schmidt described the Alliance as forming in direct response to a curriculum that was being used in high schools alongside the highly critical film *Food, Inc*. Therefore, the chapter puts these two sets of educational materials into conversation with each other, showing how they were shaped by the Real Food and Real Facts frames. The overarching argument of the chapter is that the Discussion Guide designed to be used alongside *Food, Inc*. centered political contestation and sought to prepare students to become active citizens working to shape the food system, whereas the Alliance lessons centered scientism and sought to prepare students to become future consumers of the products of the industrial food system. The methods used in this chapter are quite straightforward, involving a little background research on each

curriculum but primarily focusing on a close reading of the *Food, Inc*. Discussion Guide, as well as the film chapters it was meant to be used with, and the educational materials that were designed by IFIC's Alliance to the Feed the Future.

This example also gives me a chance to highlight the work of IFIC, which has been at the forefront of the industry's effort to counter negative attitudes about processed food. IFIC is a "sister organization" of the International Life Sciences Institute (ILSI), whose efforts to influence research and policy have been the subject of several recent studies. Less is known about the work of IFIC, which focuses on media and communication, though a recent study using documents accessed under transparency laws looks at how it works on behalf of its funders to oppose dietary health interventions. As mentioned at the outset, IFIC is a trade association focused on "communicating scientific evidence related to nutrition, agriculture, and health" to policy makers and the general public. While technically split into two organizations, the trade association and a charitable organization called the IFIC Foundation, the leadership is shared between the two, and it is difficult to discern which organization is behind any given activities.[60] Members and funders of the two organizations include the most powerful food companies in the world, such as Cargill, Coca-Cola, Danone, General Mills, Mendelez International, and Pepsico.[61] The US Department of Agriculture (USDA) was also a funder of the IFIC Foundation.[62]

Chapter 3 looks at how the food industry responded to the Real Food frame with "natural" and "clean label" offerings while also perceiving and representing the demand for these products as driven by public misunderstandings and a threat to both established product development practices and the very basis of the industry's scientific authority. Focused on the domain of the

marketplace and highlighting the discursive theme of naturalness, the chapter begins by looking at how consumers of food products marketed as "natural" were imagined in the pages of two high-circulation food industry publications, *Food Processing* and *Food Technology*. The second half of the chapter looks at how hundreds of food industry trade associations imagined and projected the public in the comments they submitted to the Food and Drug Administration (FDA) in response to that agency's 2015 proposal to regulate the use of the term "natural" on food products. It also looks at comments submitted to the FDA by the public and consumer advocates. I contend that while individual members of the public and consumer advocates argued for "natural" to be defined in a way that would help people act on their concerns about the food system in the marketplace, industry actors deploying the Real Facts frame argued that the term should instead be defined by experts, regardless of whether the result aligns with consumer expectations.

Methodologically, this chapter tracks the Real Facts frame across two different data sets, both quite large. The first half, focusing on media analysis, reflects background research I did collecting and inductively coding about 125 relevant articles in mainstream news sources that mentioned "natural food" between what appeared to be the first relevant appearance in 1976 and the time the research was conducted in 2017.[63] I also thematically coded relevant articles about "natural food" in two influential food industry publications, about 120 in *Food Processing*, which claims it has a worldwide audience of more than 736,000 industry professionals, and about 50 in *Food Technology*, produced by IFT, which describes it as "the leading publication addressing all facets of food science and technology."[64]

To obtain and analyze the comments submitted to the FDA in response to its request for comment about regulation of the term

"natural," I had support from the Digital Scholarship Lab (now DataLab) at UC Davis. After using an automated process to extract all the comments submitted to regulations.gov, those submitted directly into the portal were subjected to a topic modeling process that used word proximity to identify the twenty-five most prominent "topics," or conversations, taking place across the comments. I coded the top ten to twenty comments in each topic (until saturation was reached), identified the central conversation in each, and then grouped the conversations into the themes that informed my analysis. The comments submitted as attachments were handled separately for technical reasons, but because attachments were used by experts who submitted longer comments on company letterhead, the process sorted the data in a way that worked well for my research questions, allowing me to analyze corporate comments separately from public comments. I organized the attachments by submitter type (certifiers, government entities, nongovernmental organizations, professional societies, corporate entities, trade groups, and cooperatives) and captured key pieces of information for each one in a database, including what the comment recommended the FDA do, how it defined "natural," and its point of view on processing, while also thematically coding the attachments using an inductive, or emergent, process.

Chapter 4 focuses on the work of the Center for Food Integrity (CFI), a nonprofit organization supported by industry members and considered a front group by critics, whose mission was to help "today's food system build consumer trust."[65] The CFI is an example of food industry initiatives to develop and promote new ways of communicating with the public in response to the challenges posed by the Real Food frame, and this chapter highlights the discursive theme of transparency, which the CFI promoted as a way to win back the trust of consumers. The CFI challenged the food industry's established approach to communicating with

the public through facts and expertise by advancing new approaches that centered values. The group's work reflected broader changes in science communication, allowing me to track what these changes meant for communication between the food industry and the public.[66] After an introduction that includes details about the history and structure of the CFI, I explore how the CFI developed and disseminated an evolved approach to imagining and communicating with the public that challenged the Real Facts frame, looking at how it trained members of the food industry to communicate with the public through shared values and transparency instead of foregrounding scientific facts and expertise. I argue that while the CFI's aim was to move beyond established approaches to communication between the food industry and the public, the strategies it advanced remained shaped by food scientism and the ever-resilient deficit model of the public understanding of science. I also look specifically at how the CFI enacted antipolitics through its approach to building trust through transparency, as well as its advice to the food industry to focus communication efforts only on segments of the population whose opinions were likely to be moved in a desired direction. Methodologically, research for this chapter is drawn from the CFI's extensive publications, webinars, and training programs, as well as an interview with its founder and CEO.

I focus on the CFI because it was, and is, a dominant actor in this space. It took the lead in pushing the industry to reconsider its relationship with the public and shaped discourses about food, trust, and science in both the business press and popular media while also having a direct impact on how companies approached communicating with the public. I am not aware of any other critical scholarship that has explored the CFI's work. Members, board

members, and funders include and represent many of the most powerful companies in food and agriculture. A 2017 membership list recorded fifty distinct organizations, over half of which were trade groups or commodity boards representing large segments of the food and agricultural industries, including the American Farm Bureau Federation, Bayer, Cargill, Costco, Dairy Farmers of America, Kroger, National Pork Board, Starbucks, and Sysco.[67] Board members have included representatives from across the food and agriculture industries, including Corteva Agriscience, Costco, Grupo Bimbo, and Dairy Farmers of America.[68] In 2015 the CFI published a list of leading companies that had used its new "transparency index" that included giants such as the Campbell Soup Company, ConAgra, DuPont, Kroger, Monsanto, Tyson, and more.[69] The CFI has had a powerful influence on popular and professional discourses about the relationship between the food industry and the public. Between 2009 and 2019 the CFI and its work were quoted, cited, or otherwise favorably discussed in approximately 175 articles in local newspapers (e.g., *Santa Monica Daily Press, Grand Rapids Press*, and *Iowa State Daily*), national media outlets (e.g., NPR, CNBC, CNN, *The Atlantic, USA Today*, *Forbes*, and *Fortune*), and food industry trade publications (e.g., *Food Navigator, Beef Magazine, Corn and Soybean Digest*, and *Food Processing*). During the same period, authors affiliated with the Center for Food Integrity published numerous articles in academic journals, including *Rural Sociology*, *Science Communication*, and *Food Technology*, and the work of the CFI was favorably discussed or cited in a handful of other academic articles.[70]

The concluding chapter follows the Real Facts frame into the future in two ways. First, it looks at how a new agri-food tech sector, influenced by Silicon Valley–style approaches to innovation and finance, promised transformative disruption in the

food system. Focusing on the illustrative example of Impossible Foods—maker of animal-free burgers promising to taste, smell, cook, and even "bleed" just like meat—I ask whether the deficit-driven food scientism of the Real Facts frame was also disrupted by the entrepreneurs, innovators, and investors fueling growing investments in alternative proteins. This analysis is based on extensive research on the agri-food tech sector that I participated in as part of the University of California Agri-Food Tech Research Project (UC AFTeR Project), funded by the National Science Foundation.[71] Between 2018 and 2022 our project team conducted participant observation at just over eighty agri-food tech events. We also conducted nearly one hundred interviews with agri-food tech sector actors, including entrepreneurs, investors, and leaders of tech incubators and accelerators, in which we asked about perceptions of the public. Finding that the Real Facts frame and its antipolitics live on in these future imaginaries, the rest of the conclusion revisits the side effects of the encounters explored in the previous chapters, looking at both the power and the limits of the Real Facts "antipolitics machine."

While this book is very much about the processed food controversy in its specificity, the themes I explore will be familiar because they both resemble and overlap with so many other pressing issues. The processed food controversy has been shaped by, and to a significant extent includes, the contest over genetic engineering that has galvanized activists and shaken scientists and policy makers for decades, and it bears many of the same hallmarks.[72] It also bears the marks of long-standing conflicts over vaccines, and vaccine anxieties, that became exponentially more fraught during the years I was writing this book, which included the Trump presidency, the emergence of post-truth politics, and the COVID-19 pandemic.[73] It is not unrelated to struggles

over climate science, the 2017 March for Science, and the proliferation of yard signs affirming that households believe "Science Is Real."[74] While each of these conflicts is generally taken to be over facts, or what is true, like the conflict over processed food they need to also be understood as contests over the questions that matter. They are produced in the friction between different ways of understanding both science and the public. The idea that people are "antiscience"—whether it's in relation to vaccines, GMOs, or climate change—is a blunt tool that misdiagnoses the problem at hand, reduces public concerns to ignorance and emotion, and creates more, not less, alienation and mistrust between the public and scientific institutions. This book suggests that what is needed instead is a sensitive understanding of the knowledge politics that shape these controversies, with attention to how scientific authority, not just science, is deployed and how publics are imagined and projected, not just how much they understand science.

CHAPTER ONE

How Good Food Became "Real"

In 2013 James Kennedy published a poster titled "Ingredients of an All-Natural Banana" on his blog. Beneath the title, a picture of a banana was followed by an ingredient list packed with unfamiliar, unpronounceable words (Fig. 1). Accompanying text explained that Kennedy, a chemistry teacher in Australia, created the poster to educate people who were concerned about "scary looking ingredients" and push back against the use of words like *pure* and *simple* to describe "natural" products by showing that natural foods are in truth "usually more complicated than anything we can create in the lab."[1] Within a year his simple teaching aid had gone viral with two million views. By 2016 Kennedy had produced eleven more posters (for blueberries, eggs, strawberries, cherries, etc.), launched a successful clothing line, and sold thousands of copies of the original banana poster through his website. The posters were covered in *Vox*, *Forbes*, *Business Insider*, the *New York Times*, and more and, according to Kennedy, received over 700,000 views on his website, not to mention millions more via social media.[2] Building on his platform, Kennedy in 2017 self-published *Fighting Chemophobia: The Story of How We Became Afraid of*

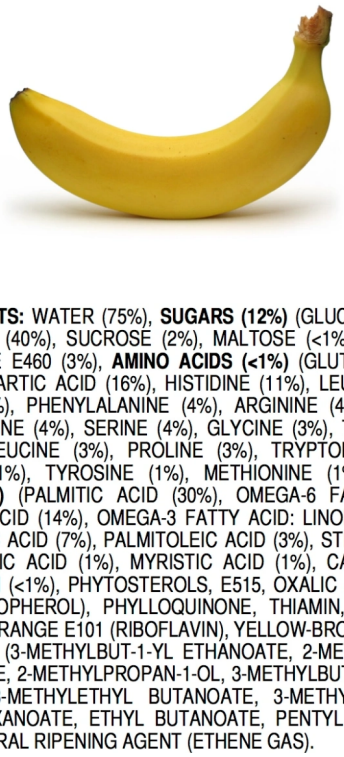


Figure 1. "Ingredients of an All-Natural Banana" teaches the public that even all-natural foods contain complex, "scary-looking" ingredients. Courtesy of James Kennedy, https://jameskennedymonash.wordpress.com/2013/12/12/ingredients-of-an-all-natural-banana.

Chemicals and What to Do about It, a book about the "irrational fear of chemicals" and overreaction to "harmless, negligible sources of contamination" that caused people to seek out natural, organic, and chemical-free alternatives, as well as how to "fight" it.[3]

In 2015 the wildly popular food blogger Vani Hari, better known as Food Babe, was "taken down" in a viral *Gawker* article

written by Yvette d'Entremont, who called herself SciBabe. Blogging since 2011 about health and nutrition, Food Babe initiated a series of campaigns to pressure the food industry into removing harmful ingredients from their products. By 2014 she had amassed a formidable "Food Babe Army," her blog had received over 54 million views, she had nearly a million Facebook and Twitter followers, and *Time* magazine had named her "one of the 30 most influential people on the internet."[4] High-profile campaigns included petitioning Kraft Foods to remove dyes from their macaroni and cheese; asking Subway to remove the chemical azodicarbonamide, also found in yoga mats, from their rolls; and pressuring Starbucks to be more transparent about its ingredients. According to SciBabe, it was Food Babe's 2014 campaign against Starbucks pumpkin spice lattes that drove her to launch her own blog "dedicated to debunking pseudoscience in the blogosphere." In "The 'Food Babe' Blogger Is Full of Shit," which according to her website went "massively viral" in 2015, SciBabe introduced herself as an analytical chemist and described Food Babe as a graduate of "Google University" and an "uncredentialed expert in everything she admittedly can't pronounce." She claimed that "it's rare to come across a single scientific fact" on Food Babe's site and went on to describe the many reasons "she's the worst assault on science on the internet." She berated Food Babe's concerns about the amount of sugar in pumpkin spice lattes, imploring her to look at a "safety data sheet for sugar" she linked to the article, and called her concerns about caramel color ridiculous because the additive was in the same carcinogen class as coffee.[5]

These examples show the Real Facts frame in action and suggest its pervasiveness as a way of thinking about the processed food problem and imagining the public in relation to science. Kennedy and SciBabe were not representatives of the food industry seeking to maintain consumer interest in processed food, but they

shared the worldview of the Real Facts frame in which public concerns about processed food appeared to be the result of misinformation and irrational anxiety. It is true that in the early years of the twenty-first century many people viewed processed food negatively because, among other things, they were concerned about the safety of the ingredients it contained. There were, however, a lot of different questions that could be asked about this. As Gussow reminds us, which questions people choose to ask has a lot to do with the worldview they start out with. For Kennedy, SciBabe, and others immersed in the Real Facts frame, the questions that mattered were those that could be answered by science. These had to do with risk to human health, so they assumed that public concerns had only to do with such risks and dismissed them as irrational because science said the ingredients were safe. Their question thus became, How can we educate the public so they will no longer be irrationally fearful of ingredients they can't pronounce? This chapter explores what this framing missed about the Real Food frame, not by examining the facts in dispute—such as whether the ingredients in question were in fact safe to consume—but by exploring the critical challenges the Real Food frame expressed beyond this narrow view emphasizing health risks and irrational fears.

In their book, *Vaccine Anxieties*, Melissa Leach and James Fairhead show the power of framing public concerns about vaccines in a way that includes not only what people are anxious *about* but also what they are anxious *for*. As they explain, anxieties can be both negative and positive, encompassing not only unease, worry, and concern but also the earnest, focused desire for something or to do something. Focusing solely on the negative anxieties that drive behavior, or what people are anxious about, tends to highlight the public's lack of understanding and trust. A very different picture emerges when the frame also includes positive anxieties,

or what people are anxious *for* and what they *do* understand and desire.[6] Following their lead, in this chapter I push back against the Real Facts frame's understanding of concerns about processed food, which has focused on the public's failure to understand the safety and benefits of processed food and the breaking down of trust in food science. In telling the story of where the Real Food frame came from, I focus on what people did understand and show that the Real Food frame expressed an earnest desire to eat right in the context of a wide range of legitimate concerns about processed food, the industrial food system, and the food industry. At the same time, I show how this alignment of eating right with avoiding processed food was shaped by implicit and explicit challenges to the food industry's relationship with science and scientific authority. Each of the concerns that shaped the Real Food frame played a part in both redefining processed food as "bad" and challenging the scientific basis of the food industry's authority by asking questions about food that science alone could not answer.

EATING RIGHT AT THE TURN OF THE TWENTY-FIRST CENTURY

In my first book, I traced a history of what it has meant to eat right in the United States since the late nineteenth century and argued that during the final decades of the twentieth century eating right became more important for identity and status than it had ever been before. This means that concerns about processed food emerged in the context of historically high levels of positive anxiety about eating right. *Eating Right in America* tells the stories of four dietary reform movements from the late nineteenth to the early twenty-first century, revealing a series of changes

in advice about how to eat right, ideas about why people should eat right, and what it meant to be a "good eater." I found that over those one hundred-plus years, dietary ideals changed and cultural understandings of what it meant to be a responsible person and a good citizen changed, but the relationship between the two remained the same: dietary ideals consistently reflected and expressed social ideals. Therefore, eating right was an important means by which people both constituted themselves and assessed others as responsible subjects and good citizens—or not. Eating right was not simply a matter of biomedical well-being for individuals but also a means of moral self-making that had real social implications. Furthermore, the social importance of eating right increased over time, dramatically so in the final decades of the twentieth century.[7]

At the broadest level, the convergence of neoliberalism and a growing emphasis on chronic diseases during the last few decades of the twentieth century led to increasing pressure on individuals to pursue health through a wide variety of everyday activities, from wearing seatbelts to not drinking too much alcohol. As has been well documented, one of the most striking features of the neoliberalization that occurred over this time was the devolution of responsibility for health to individuals.[8] Simultaneously, the focus of the health community shifted from communicable diseases, which generally required quarantine, to chronic diseases such as cancer, diabetes, cardiovascular disease, and obesity, which were considered matters of behavior and lifestyle. Through these shifts, the range of activities and habits considered related to health expanded dramatically, and health seeking became an increasingly prevalent part of everyday life. Robert Crawford, scholar of the meaning of health in contemporary American culture, argues that at this time the prevention of

illness became a pervasive standard against which an expanding number of behaviors were judged, and both the problems of health and their solutions were increasingly defined within the boundaries of personal control. Health, as something about which individuals should be informed and seek to change, moved to the center of the middle-class experience, and the pursuit and practices of health became central to identity and status. He explains that "health talk became personal responsibility talk," and, because personal responsibility was so central to notions of what it meant to be a good neoliberal subject, personal responsibly for health was "widely considered the *sine qua non* of individual autonomy and good citizenship."[9]

It was in this context that diet became more important to health than ever before and avoiding potentially harmful foods became central to dietary advice for the very first time, factors that together set up the possibility for avoiding processed food to become a central part of responsible self-making. Since the discovery of vitamins in the World War I era, dietary guidance had consistently reflected an "eat more" approach, teaching people how to get enough nutrients every day by understanding the principles of substitution, or how different foods provided similar nutrients. However, as the focus of the broader health community shifted from communicable to chronic diseases, the focus of nutrition shifted from concerns about deficiencies to the role of diet in chronic diseases. Vitamin-oriented nutritional thinking emphasizing the importance of eating a wide variety of health-promoting foods gave way to an "eat less" approach to dietary advice that encouraged people to reduce or limit intake of foods or nutrients—such as fat, sugar, cholesterol, and salt—that were believed to be linked with "the health problems of adults in an affluent society."[10] As has been well documented, the shift to "eat less" dietary advice, or what Warren Belasco calls "negative

nutrition," did not go smoothly; industry lobbyists afraid of the impact on consumer purchasing decisions pushed back, ultimately diluting the USDA's messages to the public (discussed more fully below).[11] Nonetheless, dietary thinking was reshaped by the shift to negative nutrition. Avoiding potentially harmful foods became central to eating right just as diet became central to health, and pursuing health became more important than ever before to identity and status.

This matrix of a growing cultural emphasis on health in general, greater investment in health seeking as central to good citizenship, the focus on diet as a means of seeking health, and the turn toward negative nutrition created a context in which it made perfect sense for people to want to eat right by avoiding potentially harmful foods. They were driven by a powerful positive anxiety comprising a desire to be a good eater and a growing understanding that eating right meant choosing "real" as opposed to processed food. This understanding was shaped by a confluence of concerns about obesity, sustainability, nutrition, and risk. While distinct in many ways, all these concerns raised questions about the role of processed food in the American diet, the impacts of the industrial food system, and the values of the food industry. At the same time, these concerns and the movements that emerged to address them also raised questions about authority and expertise. How do we know what a good diet is? Who gets to decide? Based on what kinds of knowledge and expertise?

OBESITY

Concerns about obesity, which peaked in the early years of the twenty-first century, reshaped ideas about processed food, the food industry, and the relationship between the food industry and scientific authority. Obesity was declared an "epidemic"

in 2001, spurring massive public and private investment in combating it, but different ways of understanding the causes of obesity and what to do about it vied for attention, authority, and dollars.[12] Among these was a public health crisis frame, which emerged in the mid-1990s as concern about obesity in the US spiked in response to a series of studies on population-level weight gain. In contrast to an established medical frame that viewed fatness as a biomedical condition requiring medical intervention and the expertise of physicians, the public health crisis frame looked at fatness as a population-level problem requiring collective solutions and government intervention.[13] But even as the idea that obesity presented a public health crisis became widely accepted, not everyone agreed about the causes of the problem and therefore what should be done about it, resulting in what the sociologist Abigail Saguy describes as a contest between different "blame frames."[14]

The food industry was among those championing a "personal responsibility" blame frame for obesity, in which individuals were seen as responsible for their own fatness. This frame was powerful and pervasive, in part because it drew on deep cultural reservoirs of individualism, belief in the value of self-reliance, and suspicion of government intervention, as well as more recent neoliberal investments in personal responsibility.[15] The media overwhelmingly portrayed obesity as a result of lack of willpower, irresponsibility, and bad choices, blaming individuals for their failure to maintain an ideal body weight and parents for allowing kids to get fat.[16] Diet and exercise were presumed to be the solution, if only people would muster their willpower, take responsibility, and make healthier choices. Advice from the federal government mirrored these assumptions, with the Surgeon General in 2003, for example, urging Americans to address the obesity epidemic by taking "small steps" such as putting the lid on the cookie jar and taking the stairs instead of the elevator.[17] While taking pains not

to dismiss the seriousness of the obesity epidemic, food industry representatives consistently maintained that exercise and calorie control were the keys to addressing it. Trade associations like the International Food Information Council (IFIC) and the Grocery Manufacturers Association (GMA) defended the industry against attacks by emphasizing consumer choice and blaming parents for being too permissive, negligent, or ignorant to manage what their children eat.[18]

Throughout the early years of the twenty-first century, however, researchers and advocates advancing a "sociocultural blame frame" challenged this focus on personal responsibility. The sociocultural blame frame repositioned individual- and population-level weight gain and other health problems related to diet not as the result of individual failures of willpower and responsibility but as the result of sociocultural conditions such as the structure of urban environments, the overabundance of cheap calories, the nature of agricultural subsidies, poverty—and the behaviors of the food industry. Media articles embracing this frame treated the food industry as a "demon industry," and the sociocultural blame frame was used to support calls for greater government regulation of the industry to protect the public.[19]

The sociocultural blame frame gained momentum through a slew of influential articles, books, and films connecting the nation's health and other woes to factors outside individual control, especially the industrial food system.[20] Proponents included activists, authors, filmmakers, and academics, some working at the intersection of the obesity epidemic and a growing "alterative food movement" responding to broader ecological, social, and economic concerns about the food system. High-profile advocates of the sociocultural frame included Marion Nestle, Kelly Brownell, and Michael Pollan, whose work is discussed below, as well as Eric Schlosser (author of *Fast Food Nation*), Greg Critser (author of *Fat*

Land), and Morgan Spurlock (maker of the film *Super Size Me*). I have written elsewhere about how the sociocultural blame frame was not free of pervasive personal responsibility thinking, and I have also critiqued many of its proponents for their normative uptake of the so-called obesity epidemic and its problematization of body size (among other things).[21] My task here is different, as I focus on influential texts to highlight the role of the sociocultural blame frame in simultaneously redefining processed food as bad and challenging the food industry's relationship to scientific knowledge and authority.

As the sociocultural frame for obesity developed, it often focused on processed food and fast food as both problematic in and of themselves and emblematic of larger problems with the food system, including power dynamics that favored the food industry and the way the food industry leveraged scientific knowledge and authority to maintain those power dynamics. For example, *Food Politics*, published by the New York University public health nutritionist Marion Nestle in 2001, advanced a way of understanding the causes of obesity and what should be done about it that centered the behavior of the food industry, particularly its use of marketing and its manipulation of dietary advice. Nestle argued that while food companies pushed a personal responsibility narrative, "we do not make food choices in a vacuum." The emphasis on individual choice and responsibility, she argued, suggested that "nutritionists should be off teaching people to take personal responsibility for their own diet and health—not how to institute societal changes that might make it easier for everyone to do so."[22] Instead, Nestle exposed and critiqued the contexts that created the conditions for individual overconsumption. She argued that obesity and other food-related health problems in America could be traced to "the food industry's imperative to

encourage people to *eat more*" and their subsequent actions, especially efforts to influence information, knowledge, and advice.[23]

Nestle's influential book detailed many ways in which the food industry produced not only food that played a role in causing obesity but also the informational contexts in which Americans understood diet and health and decided what to eat. She described in detail the role food industry lobbyists played in shaping dietary advice issued by the USDA, beginning with the successful efforts of beef and dairy lobbyists to thwart the USDAs first "eat less" recommendations in 1977. The USDA's advice would have included clear suggestions to reduce intake of meat, eggs, and foods high in butterfat, sugar, and salt, but after being met with powerful opposition from cattle, egg, sugar, and dairy interests it was revised to be far less straightforward. For example, the statement "reduce consumption of meat" was replaced by "choose meats, poultry and fish which reduce saturated fat intake." In 1979 the guidance became "choose lean meats."[24] The saga continued over the following decades, with dietary advice consistently embattled by pressure from food industry groups, and as a result, Nestle argued, it ultimately failed to serve the public interest.[25]

Food Politics exposed and critiqued many other ways in which the food industry influenced the informational environment, detailing the nature and extent of industry investment of financial and other resources in forming partnerships with influential nutrition organizations, funding scientific research, publicizing the results of favorable studies, and supporting professional organizations, journals, and conferences.[26] Ultimately, Nestle argued that the facts about a good diet were clear, consistent, and straightforward: people needed to eat more fruits and vegetables and less meat, dairy, and processed food. Confusion about what to eat was produced at the intersection of the media and the food

industry. "The greatest beneficiary of public confusion," Nestle argued, "is the food industry."[27]

While Nestle continued to advance this sociocultural understanding of the causes of obesity and call attention to the food industry's use of scientific knowledge and authority to distort public perceptions of good food in more books and a long-running blog, others championing this frame included Kelly Brownell, of Yale's Rudd Center for Food Policy and Obesity. Brownell, named one of the world's 100 most influential people by *Time* magazine in 2006, built on Nestle's work in many ways, including by following up on her argument in *Food Politics* that parallels between the food industry and Big Tobacco were "impossible to avoid."[28] Brownell and Katherine Battle Horgen advanced a "toxic environment" explanation for obesity in their 2004 book, *Food Fight*.[29] The book argued that the food industry played a central role in creating and maintaining structural conditions that were overwhelming people's willpower and preying on their biology. Their analysis included the role of increasingly sedentary lifestyles but focused on the fundamental economic conditions they saw as creating the obesity epidemic: the overproduction of calories leading to the food industry's many strategies designed to sell them. The problem, they argued, was not that people were irresponsible or lacking willpower but that "unhealthy food is convenient, accessible, good-tasting, heavily promoted, and cheap. Healthy food is harder to get, less convenient, promoted very little and more expensive."[30]

Given these conditions, Brownell and Horgen explained, it is "perfectly understandable" that people would eat more, exercise less, and gain weight.[31] But they were also concerned about how the food industry exercised its power, including through trade associations, to discredit critics and undermine public health by

manipulating scientific knowledge and authority. They explained that for critics like themselves, the very idea of "the food industry" evoked the actions of trade groups that worked to lobby on behalf of particular categories of foods. They pointed to trade associations such as the GMA and the National Soft Drink Association, explaining that it was through the actions of such groups—their congressional testimony, websites, journals, and more—that the "the food industry" became an organized and coherent entity, also noting the problem of the notoriously tight relationships between the food industry and regulatory agencies such as the USDA.[32]

Both *Food Fight* and Brownell's 2009 article with Kenneth E. Warner provocatively titled "The Perils of Ignoring History: Big Tobacco Played Dirty and Millions Died. How Similar Is Big Food?" pointed to close political and financial connections between Big Tobacco and the food industry, as well as similarities in how they used science and scientific authority to defend against critics. They argued that, like Big Tobacco, the food industry claimed a commitment to public health while emphasizing personal responsibility, sought to influence policy decisions in its own favor, contributed millions in political donations, disavowed the effects of advertising on consumption, and silenced critics. Like Big Tobacco, the food industry also paid scientists to produce research instilling doubt, criticized science finding harm from their products, diverted attention away from food, and falsely argued there was no nutrition consensus.[33] Thus, the subsequent uptake of the term "Big Food" by proponents of the sociocultural obesity frame, as well as those critical of the food industry for an array of related reasons, was not just about the size and, thus, power of food corporations. It also expressed these critiques of how the food industry behaved like Big Tobacco, manipulating

scientific knowledge and leveraging scientific authority to defend itself from critics and deflect responsibility for obesity.[34]

ECOLOGICAL FOOD MOVEMENTS

These critical views of processed food and the food industry and its relationship to scientific authority were reinforced at the intersection of ecologically oriented food movements, or "alternative food movements," of the early twenty-first century.[35] Like the sociocultural frame for obesity, these food movements questioned the goodness of processed food and called for new ways of understanding food and health that were broader, encompassing not only things that could be measured by science but also sociocultural as well as ecological factors. While best known for efforts to forge and support alternatives to the industrial food system, these movements also challenged expert authority over the definition of "good food." They were rooted in not only intellectual and activist traditions around purity and agriculture but also social movements that simultaneously championed real food and contested scientific expertise.[36] For example, they rekindled a dormant health food movement that had historically promoted alternative understandings of health and challenged the authority of the mainstream scientific and medical community. Natural food proponents rejected decades of assurances from scientific authorities about the safety of conventionally produced foods, but this was not just a disagreement over the facts. It was also a contest between different worldviews. Natural food proponents have historically raised questions about the kind of knowledge that matters when it comes to food and health, refusing to take for granted the primacy of scientific expertise and emphasizing differences in individual responses to diet rather than statistical

averages.[37] The food movements of the early twenty-first century were also influenced by the food and identity politics of the 1960s counterculture, or what Belasco calls the "countercuisine." As he explains, the countercuisine was shaped by a set of contrasts that expressed ideas about both food and politics, including the politics of expert authority. Proponents embraced "brown" over "white" food and craft over convenience while also championing "improvisation" instead of "specialization," aligning with the broader countercultural goal of undermining the rule of experts and returning power to ordinary people.[38]

Pioneering intellectuals and activists who laid the groundwork for the ecological food movements of the early twenty-first century urged people to think about food through new lenses, moving beyond the nutritional framework that had dominated dietary discourse since its emergence in the late nineteenth century. For example, Joan Dye Gussow, hailed by the *New York Times* as the "matriarch of the eat-locally-think-globally food movement," articulated the ecological ethos of good food as a direct challenge to established forms of nutritional expertise, arguing that averting environmental disaster would require looking through "macroscopes" rather than microscopes.[39] In a 1981 essay she criticized her own field of nutrition for looking at ever smaller and smaller aspects of food, breaking it down into microscopic pieces and "looking at the isolated effects of the isolated behaviors on isolated food substances in isolated biological systems." She argued for the importance of looking beyond connections between nutrients and cells to consider connections between farmers and producers, food policies and environmental policies, the cost of energy and the cost of food, and so on.[40] While not taking on nutrition as directly, the farmer, poet, and environmental activist Wendell Berry urged people to understand eating as an

"agricultural act" with wide-ranging implications for "how the world is used." For Berry, eating was a form of politics that was profoundly connected to questions of freedom and democracy. He urged people to resist the role of passive consumer that served the system of industrial food production by understanding the role they played in the economy of food and learning to eat responsibly. He wanted people to think about good food in these broader terms, taking politics as well as aesthetics and ethics into consideration, and argued that the pleasure derived from knowing where food comes from "may be the best available standard for our health."[41]

Building on these legacies and responding to a growing awareness of the ecological impacts of the industrial food system, early twenty-first-century food movements focused on creating markets for sustainably produced food, including by changing the lens through which people thought about good food.[42] They worked to improve farming and food both by forging more direct connections between consumers and producers and by teaching people to consider the impacts of their food choices far beyond their own health. They urged people to eat in accordance with food system ideals related to sustainability, as well as supporting local economies and communities. Farmers markets, community gardens, community supported agriculture, farm to school programs, and a boom in organic agriculture were all results of these movements. Across these efforts, processed and fast food came to be seen, through these new lenses, as both bad food and emblematic of larger problems in the food system.[43] As the food systems scholar Julie Guthman argues, the alternative food movement was one of the most successful activist movements of its time and "in an important sense redefined good food from 'healthy' to 'real.'"[44]

Pollan's wildly popular writing helped popularize both the idea that "real food" was better than processed and the argument that new lenses were needed for thinking about good food. While I have critiqued Pollan's views on eating right elsewhere, here I am interested in highlighting how he also brought a critique of nutrition science and its relationship to the food industry into the popular discourse.[45] Pollan captivated the nation's attention with his critical perspective on the industrial food system and advice about choosing real food in his 2007 *New York Times Magazine* article, "Unhappy Meals," and 2009 book exploring the same themes, *In Defense of Food*. That book spent six weeks on the *New York Times* best-seller list, and its core ideas were soon after distilled in a compilation of rules, also published in 2009.[46] A whimsically illustrated edition with an additional nineteen rules came out in 2013, and in 2015 *In Defense of Food* was adapted as a PBS documentary. The basic advice at the heart of much of Pollan's work—"Eat Food. Not Too Much. Mostly Plants"—provided a simple, memorable way of thinking about what to eat that hinged on the distinction between "whole foods" and "edible foodlike substances" or "novel products of food science."[47] But this advice not only vilified processed food and the food industry. It also expressed a critique of expert authority over questions of good food.

Writing at the intersection of ecological critiques of the industrial food system and the sociocultural obesity blame frame, Pollan echoed many of the arguments about the misuses and manipulation of science discussed in the previous section. But Pollan also went further, drawing heavily on the work of the Australian social scientist Gyorgy Scrinis to directly challenge nutrition's authority over the question of what to eat. Borrowing Scrinis's analysis and coinage, Pollan introduced readers to the

concept of "nutritionism," or the idea that nutrition was an ideology built on the basic assumptions that nutrients are the key to understanding food, that they can only be understood by experts, and that the whole point of eating is biomedical health.[48] He critiqued the food industry's influence on government dietary guidelines but also argued that the problem wasn't just how nutrition was used, but what the science itself was capable of. Like Gussow, he pointed to its narrow approach focusing on single nutrients in isolation, noting that reductionism was perhaps necessary given the field's tools and objectives, but it was inevitably misleading because "people don't eat nutrients; they eat foods."[49] By removing foods from their context, nutritionism prevented people from recognizing that the larger problems in the food system had to do with not just particular nutrients or foods, but large-scale shifts "from whole foods to refined foods" and "from food culture to food science," as well as the rise of nutritionism itself.[50]

Pollan argued that nutritionism served the interests of the food industry; its narrow lens was in part why processed food had passed as good food for so long. Because nutrition sees only nutrients, "qualitative distinctions between processed foods and whole foods disappear," which, Pollan pointed out, was a "great boon" for manufacturers. Nutritionism provided a rationale for both processing food and then further processing foods to align with the latest nutritional theories, for example, by lowering fat or boosting probiotics. Meanwhile, "real food" could not compete under the rules of nutritionism. It could not be reformulated in response to changing nutrition guidance and tended not to come in packages that could bear the sort of single-nutrient health claims that are nutritionism's hallmark.[51] "No idea," Pollan wrote, "could be more sympathetic to manufacturers of processed food."[52] He challenged his readers to question the outcome of putting "science and scientism in charge of the American diet," urging them to

seriously reconsider placing "the authority of science above culture" when it comes to deciding what is good to eat.[53]

NOVA

The argument for using a broad lens to assess food quality, encompassing far more than what nutrition or any science could account for, was eventually taken up and codified into dietary guidance by Brazilian public health researchers. Primarily driven by concerns about obesity, researchers at the University of São Paolo led by Carlos Monteiro challenged the established nutrition paradigm by introducing a new food classification system called NOVA, meaning "new" in Portuguese. Applying a "macroscopic" rather than microscopic lens, NOVA centered processing as a way of thinking about good food while also taking factors such as marketing into consideration. Monteiro first introduced the ideas behind NOVA in a 2009 article in *Public Health Nutrition*, the title of which captured the paradigm-shifting contention that would remain at the heart of this work: "Nutrition and Health. The Issue Is Not Food, nor Nutrients, So Much as Processing."[54] The article acknowledged and recommended the work of Michael Pollan, and Monteiro and Scrinis would ultimately become collaborators. The following year, Monteiro published a commentary in the journal of the World Public Health Nutrition Association that began with this striking sentence: "The most important factor now, when considering food, nutrition and public health, is not nutrients, and is not foods, so much as what is done to foodstuffs and the nutrients originally contained in them, before they are purchased and consumed. That is to say, the big issue is food processing . . . and what happens to food and to us as a result of processing."[55]

Monteiro went on to explicitly name the epistemological crisis caused by the obesity epidemic and the failure of nutrition science

to prevent or curtail it. "To be blunt," he explained, "our science has become somewhat discredited," in part because it had retained obsolete food classifications.[56] He also noted that the theory he was proposing could not be proven precisely because the field of nutrition had historically grouped foods according to their chemical constitution (i.e., food groups), with little to no attention to processing. In other words, the science needed to prove his theory had not been done, but, he argued, "there are occasions in public life that are so urgent, important and critical, that action must be taken before all the evidence that makes scientists and civil servants comfortable is in."[57] He described the new mode of dietary guidance he proposed as using a "big picture approach" for thinking about good food. Therefore, it required types of evidence and kinds of expertise not usually considered relevant. Understanding good food would require taking seriously evidence produced by the so-called soft social sciences, and identifying nutrition as a "social, economic and environmental discipline."[58]

The classificatory system Monteiro proposed would replace established guidance based on food groups with a focus on processing, yet moved beyond the vague idea that food processing in general was a public health issue, instead specifying "the nature, extent and purpose of processing, and in particular, the proportion of meals, dishes, foods, drinks and snacks within diets that are 'ultra-processed.'" Anticipating the reaction of the food industry, Monteiro assured readers of his 2010 commentary that it was not meant as an attack on the food industry, noting the many benefits of modern methods of food production, manufacture, distribution, and sale. He did note, however, that the piece was "indeed implicitly sharply critical of the current policies and practices of food and drink manufacturers, caterers and associated industries, whose profits currently depend on the sale of what are termed here ultra-processed products."[59]

Monteiro and his collaborators' central claim was that the rapid rise of ultra-processed food and drinks since the 1980s was the primary cause of the global rise in obesity and related diseases because of their energy density, appeal, and availability.[60] They initially outlined three categories of food: unprocessed or minimally processed, processed, and ultra-processed. Later iterations of the system would have four groups but remained focused on identifying the characteristics of those foods most important to limit in pursuit of better population health, that is, ultra-processed foods. Monteiro and coauthors described ultra-processed foods as "edible and usually very palatable" but "not real foods," yet distinct from other forms of processed foods. What set ultra-processed products apart was that they "are not made from foods. They are made from ingredients," some of which are derived from foods (e.g., oils, fats, flours, and sugars) but most of which are additives that "make the product look, smell, feel and taste like food."[61] They called the impact of such products a "public health catastrophe" not just because of how they were made but also because of how they were consumed: "any time, everywhere." Ultra-processed foods were energy dense, hyper-palatable, very easy to consume, falsely seen as healthy, and aggressively advertised and marketed.[62] By 2014 the NOVA classification was being used by researchers around the world to track and analyze changes in dietary patterns, assess the impact of industrial food processing on overall quality of diets, and study the availability of ultra-processed products in urban settings. It was also incorporated into the Brazilian Ministry of Health's official Dietary Guidelines.[63]

It didn't take long for Monteiro's ideas to be picked up by the US press and taken up by the many advocates for food and health reform who were already embracing a "big picture approach," raising alarm about problems with processed food, and challenging established nutritional expertise. A week after

Monteiro's commentary was published, CBS News published an online article, "What a Junk Food Diet Tells Us about the Dismal State of Nutrition Science," describing Monteiro's "chiding" of fellow nutrition scientists, introducing readers to the term "ultra-processed food," and making connections to the work of "food industry nemesis," Michael Pollan.[64] Over the next few years the concept of ultra-processed food went from unknown to part of the vernacular of eating right. Uptake of the term and concern about ultra-processed foods spiked in 2016 following the publication on *BMJ Open* of a study by Monteiro and his team in collaboration with researchers from Tufts showing that ultra-processed foods made up more than half of all calories consumed in the US and contributed to nearly 90 percent of all sugar intake.[65] An *Atlantic* article covering the study opened by noting that Pollan's advice "that people should 'eat food, not too much, mostly plants' is oft-quoted, less oft-followed." It went on: "Once again, research has demonstrated that Americans actually tend to eat food, too much, mostly things that are no longer recognizable as plants, if they ever were," and ended by making up a "Pollan-esque mantra" for cutting out "ultra-processed sugar bombs" like soda: "Drink liquids, not too sugary, mostly water."[66] While the term "ultra-processed food" referred to a category of foods that public health professionals deemed particularly dangerous to eaters, like "Big Food," its meaning and salience were rooted in critiques not just of highly processed food itself but also of the limits of nutrition science as a way of knowing good food.

TECHNOLOGICAL RISK AND DEREGULATION

Ideas about good food, in flux for all the reasons described above, were at the same time transformed by changing attitudes about the use of technology in food production that reframed

processed food as risky and added to growing skepticism about the food industry and its relationship to scientific authority. After decades in which science and technology were understood to make naturally occurring risks manageable, toward the end of the twentieth century, people became increasingly aware of, and sensitive to, risks generated by science and industry.

As Ulrich Beck has famously argued, during this time risk became a defining attribute of Western societies, as people became increasingly aware of the negative effects of scientific and technological developments, the benefits of which they increasingly took for granted.[67] Unlike danger, which was perceived as outside one's control, risk was a unique state in which harm seemed imminent, and something should be done about it. While identifying and avoiding risk became a shared preoccupation, risks were complex and largely invisible. Navigating them required reliance on scientific expertise, but the public lost faith in experts to both manage risks and communicate with the public about them. In this context defining risk, and the questions about risk that were important to ask, became increasingly politically fraught.[68]

It was within these broader dynamics of risk that the public became especially sensitive to risks associated with food production, including agriculture and processing, and increasingly skeptical of information about food-related risk provided by science, industry, and the government.[69] Concerns about the purity and safety of the food supply had been around for a very long time, but technological changes that accompanied twentieth-century industrialization, such as the growing use of chemicals in food production and the industrialization of agriculture, raised new concerns about risks related to everything from chemical additives, preservatives, and packaging to the use of antibiotics in animal agriculture.[70] The internet emerged alongside these changes, providing new means of communicating about food

risks, while traditional media sources also paid increasing attention to claims and counterclaims about food risks.[71]

Agriculture technologies, such as genetic engineering and pesticides, and food processing technologies, such as artificial ingredients, were all called into question. All of this led to changing understandings of good food; where people had previously associated risk with natural foods, they came instead to associate risk with processed food and healthiness with "real" food.[72] But public concerns about the role of technology in the food system were not simply about healthiness, or even food safety.[73] They also included the ecological impacts of the ongoing pursuit of efficiency and productivity through technological solutions, as seen in the food movements described above. And they included growing skepticism about expert claims related to new technologies in the food system. The use of biotechnology in food production, for example, became highly politicized at the intersection of concerns about health, environmental effects, power, and inequality in the global food system and doubts about the ability of experts to understand public concerns and effectively regulate risks.[74]

At the same time that the public became more sensitive to risks from technologies used in food production, the regulatory landscape for food in the US loosened and responsibility for self-protection was largely shifted to individual consumers. These changes reflected neoliberalism's privatization of state functions and deregulation of markets.[75] But the regulatory system for food in the US was already built around a "proof of harm" model that favored industry. In *Better Safe Than Sorry*, the sociologist Norah MacKendrick describes this as a "safe-until-sorry" approach because it required evidence of harm to accumulate before restrictions were put into place. This contrasts with a policy approach

based on the precautionary principle, in which regulators prioritize preventing harm to human health or the environment, even when evidence is inconclusive. While this model has been at the center of European environmental policy since the 1970s, the US has taken a "hostile approach" to the precautionary principle, which has been framed by business interests as a threat to innovation and economic growth.[76]

According to MacKendrick, during the 1990s a regulatory system already favoring industry through its proof-of-harm orientation turned decidedly toward encouraging innovation and profit rather than environmental protection and public health.[77] When it came to agricultural pesticides, the 1996 Food Quality Protection Act (FQPA) adopted an unusually precautionary approach and was designed to ensure reasonable certainty of lack of harm from pesticide residues in food. However, as MacKendrick explains, it was never implemented in a way that would allow it to achieve these aims. The FQPA was meant to consider aggregate exposure to pesticides from food and other sources, but only a small amount of food was tested, tolerance levels were set higher than those in the European Union (EU), and testing and monitoring were split among agencies and divisions within agencies. For example, the USDA collected data on residue but was not able to use it for regulatory purposes, and the FDA was not required to test for all tolerances set by the Environmental Protection Agency (EPA). According to the US Government Accountability Office, testing methods used by the FDA and the USDA were "insufficient for safeguarding public health." In response to the poor implementation of the FQPA, environmental groups worked to raise public awareness about insufficient monitoring of pesticide residues on food and provide tools to help consumers avoid them. The Environmental Working Group (EWG), for example,

began publishing its annual "Dirty Dozen Guide" calling out fruits and vegetables with high residue levels in 2004.[78]

As MacKendrick notes, the 1990s were also a turning point for the regulation of chemical additives used in processed foods. To lessen a backlog of applications from companies seeking to introduce new chemicals, the FDA expanded GRAS (Generally Recognized as Safe) certification, originally intended for additives known to be safe, to allow processors to bypass formal review of new additives (except colors). GRAS was created as part of a 1958 food additive law that assumed all new substances would go through a rigorous review process but established a list of substances that were generally recognized as safe, such as spices, salt, and yeast. The process of getting new substances onto the GRAS list was far easier than getting them approved through the review process, and many companies took advantage of this. But in 1997 the FDA made a change to the rules that opened the floodgates and basically sidelined the more stringent process. Rather than petition the FDA to review an item that a company wanted to add to the list, in the new process companies only needed to notify the FDA after making their own safety assessment. Companies were supposed to adhere to guidelines for making those assessments, but they were nonbinding and the agency provided no oversight regarding the qualifications of those enlisted to conduct the reviews.[79] A 2011 report on food additives by the Pew Charitable Trust found that a third or more of the ten thousand chemicals that could be put in food were never formally reviewed by the FDA.[80] An updated report published by Pew in 2013 determined "the FDA regulatory system is plagued with systemic problems" that prevented the agency from ensuring that additives allowed in food are safe. It noted, among other things, that it was impossible for the agency to connect an additive to health problems

because it had not been notified of an estimated one thousand chemicals used in food, had not been informed of actual usage for all chemicals, and had not been alerted to studies suggesting previously unknown potential health effects.[81]

Also in the 1990s, the first genetically modified food—the Flavr Savr tomato—arrived in US stores with no labeling requirement. While the EU, oriented to the precautionary principle, restricted the use of genetically modified organisms in agriculture beginning in 2001, the US was far more permissive. In the absence of restrictions, US consumers and environmental groups began to demand labels that would allow them to at least decide for themselves if they wanted to consume foods produced using biotechnology. The nonprofit Non-GMO project was launched in 2007 and by 2017 had verified the absence of genetically modified organisms in over forty-three thousand products. Meanwhile, food industry trade groups spent decades successfully lobbying against mandatory labeling.[82]

Within this confluence of heightened risk awareness and regulatory laxity, food became an acute arena of risk negotiation for both the food industry and the public. Working largely through trade associations, the food industry sought to downplay risks related to food, while individual eaters decided for themselves what to put into their own bodies or feed to their families.[83] Pressure to avoid technological risks related to food was especially acute for women, as powerful ideologies of motherhood made them responsible not only for their own health but also for the safety and purity of children. MacKendrick and others have found that women across the class spectrum experienced intense pressure to produce both healthy children and a healthy planet by providing "safe" and "clean" food.[84] Mothers sought out what they thought of as "organic" food, which was not necessarily certified

organic but considered "pure, uncontaminated, and lacking the chemicals used in conventional industrial agriculture."[85] In the absence of a precautionary regulatory environment, they adopted time-, labor-, and resource-intensive shopping routines to provide the safest possible food for their families.[86]

Meanwhile, guides, labels, and shopping environments evolved to help shoppers avoid technological risks but at the same time amplified risk awareness and the pressure to avoid potentially dangerous ingredients. A steady stream of consumer guides, such as the "Dirty Dozen," were designed to help people avoid harm but also raised awareness of potential risks. MacKendrick found over twenty-seven organizations publishing consumer guides to help people avoid chemical toxins in food. Together, they recommended over sixty actions that consumers should take to protect themselves. Choosing certified organic fruits and vegetables was among the most common recommendations, but the guides also urged shoppers to avoid synthetic additives (artificial colors, thickeners, and sweeteners), stay away from canned food, and cook from scratch to avoid processed food.[87] Retail environments, such as Whole Foods Markets, also amplified concerns about risk in the context of helping consumers navigate them. Their quality standards and the free-from claims on packages up and down the aisles simultaneously established reasons for concern and sold solutions to them.[88] According to MacKendrick's interviews, women shopped in these curated retail spaces and looked for certified organic food and other promises of purity "as a reaction to the increasing complexity, invisibility and secrecy that characterizes the industrial food system."[89] They understood that choosing organic and "real" food was an inadequate response to risk, but "it remain[ed] their only option."[90] These shoppers, striving to negotiate heightened risk related to food

production in order to be good eaters and good mothers, were the very same ones imagined and projected as irrationally fearful, misinformed, and even antiscience by Kennedy, SciBabe, and other Real Facts frame proponents.

The Real Food frame I describe here was not itself a social movement but the result of distinct yet overlapping movements that converged to change commonly held ideas about good food while also challenging established scientific ways of knowing about food and health. The activists, advocates, and social movements that raised and sought to address concerns about obesity, the ecological impacts of food production, the health effects of highly processed food, and the confluence of technological risk and deregulation offered a shared piece of advice for people wanting to "eat right": avoid processed food and choose real food instead. While the idea that good food was real came from these distinct concerns and movements, it also took on a life of its own, loosely reflecting a generalized skepticism about processed food, the food industry, and the industrial food system.

Told through a focus on what people understood and desired, rather than what they were anxious about, the story of how good food became "real" is not about ignorance, misinformation, and the internet run amok. It shows that the Real Food frame expressed a sociocultural view of good food that included and was inseparable from political issues. These included how the food industry leveraged its power to influence scientific research and the public's access to information about food, the impacts that eating had beyond individual health, the structure of the food system, and regulatory laxity. The Real Food frame didn't just challenge the goodness of processed food. It also challenged established scientific ways of thinking about good food

by insisting on the importance of questions that could not be answered by science: What role should the food industry play in promoting a healthier sociocultural environment for food choice? What could a food system look like if it was driven by ecological and cultural knowledge and values? How can dietary advice help people understand food, beyond what nutrition can measure? Can experts be trusted to understand public concerns about technology and effectively manage risks? Thus, the Real Food frame was not antiscience, but it did challenge food scientism and the food industry's investment in it.

It was this insistence on broadening the lens for understanding good food and asking questions that science could not answer that Real Facts proponents insistently reframed as the result of deficits of scientific knowledge. Focusing on the negative anxieties propelling Americans away from processed foods and drawing on established deficit models of the public understanding of science, representatives of the food industry treated people seeking to avoid processed food as irrationally fearful of things they did not understand: the science of food formulation and processing, the fact that all foods are made from chemicals, the reality that nature is not benign, and so on. The rest of the chapters highlight how the Real Facts frame foreclosed possibilities for the questions about food, the food system, and scientific authority that drove the Real Food frame to be taken seriously.

CHAPTER TWO

Real Food and Real Facts in the Classroom

As the Real Food frame gained momentum, friction over "good food" and the power to define it erupted all over the place. As noted earlier, many tussles took place on the internet, where Food Babe and SciBabe argued about dyes, colors, and credentials and James Kennedy took on "chemophobia" with the ingredients of an all-natural banana. At the same time, some tussles involved the food industry contesting the claims of Real Food frame proponents and defending its own power to define good food. While I explore industry efforts that took place largely outside of the public's view in later chapters, this chapter focuses on a campaign that was aimed directly at the public itself. The Real Food frame taught the public to ask where their food came from and question whether the processed products of industrial production were healthy, safe, and sustainable. One of the most powerful food industry trade associations in the world, the International Food Information Council, responded with a grade school curriculum that focused on explaining and celebrating the benefits of processed food.

According to its president, IFIC's foray into the classroom was prompted by the threat posed by the Oscar-nominated documentary *Food, Inc.* and the Discussion Guide that had been distributed, along with DVDs of the film, to high schools nationwide.[1] *Food, Inc.* was an explosion of Real Food challenges to corporate narratives about food and the food system, vividly articulating concerns about the health and safety of the food supply, negative side effects of science and technology, and power and secrecy in an increasingly consolidated food system. Released in June 2009 and then broadcast on PBS and released on DVD in 2010, the film described itself as "an unflattering look inside America's corporate controlled food industry," promising audiences, "You'll never look at dinner the same way again." A *Variety* review described it as both cheery and politically urgent, a "civilized horror movie" that did "for the supermarket what *Jaws* did for the beach."[2] The film featured interviews with Michael Pollan, who was also a "special consultant," and Eric Schlosser, author of *Fast Food Nation*, who was also a coproducer. The Discussion Guide that IFIC was so concerned about was released in 2011 by Participant Media, an entertainment company focused on social action content, in collaboration with the Center for Ecoliteracy, known for its work integrating sustainability into school curricula.[3] It was made up of nine chapters, each designed to be used alongside a chapter of the film, and Participant Media distributed the guide along with free DVDs of *Food, Inc.* to three thousand schools nationwide, in addition to making it available online.[4]

The same year, IFIC launched the Alliance to Feed the Future, whose signature initiative was a K–8 curriculum.[5] The president of IFIC described the curriculum as an effort to push back against "misleading perceptions of food and agriculture" in the movie *Food, Inc.* and the *Food, Inc.* Discussion Guide. He explained that IFIC formed the Alliance, a collaboration with hundreds of

other organizations, to "provide balanced public dialogue about how modern agriculture and food production benefits society."[6] According to a press release, the aim of the Alliance was "to tell the real story of modern food production" in the face of increasingly common misperceptions. At its inception, the organization had 105 members, which it described as including "professional societies and universities, educational organizations, and industry and commodity groups."[7] However, its membership was primarily composed of trade associations, for example, the American Meat Institute, International Dairy Foods Association, American Frozen Food Institute, Canned Food Alliance, International Food Additives Council, Snack Foods Association, American Soybean Association, Biotechnology Industry Association, Shelf Stable Food Processors Association, and many more. Members also included educational organizations that represented industry and commodity groups, such as American Farmers for the Advancement and Conservation of Technology (AFACT), Council for Biotechnology Information, American Society of Nutrition, Calorie Control Council, and Council for Responsible Nutrition. A handful of academic entities, including several colleges of agriculture and departments of food science and technology, were also among the members.[8]

The Alliance launched its first set of educational materials in summer 2012. "Lunch Box Lessons: Professor G. U. Eatwell and the Journey from Farm to Fork" was a downloadable K–8 curriculum of around fifteen lesson plans for each of three grade ranges (K–2, 3–5, 6–8), as well as classroom posters and parent take-home pages.[9] In November 2013 the Alliance issued an additional set of lessons called "The Science of Feeding the World," which had one lesson per grade level geared to Next Generation Science Standards. The curricula were funded by Farm Credit, the nation's largest agricultural lender, and designed by the Education

Center of Greensboro, North Carolina, a producer of ready-to-use classroom materials.[10] In 2014, IFIC president David Schmidt announced that the materials had already reached 750,000 teachers and 4.5 million students in the US.[11]

The Alliance lessons taught kids that processed foods provided healthy choices and that technologies of "modern agriculture" were necessary to feed a growing population, but they didn't just contest the facts that *Food, Inc*. presented. The stakes of this encounter were much greater, having to do with how the public was imagined in relation to the food system and the role students were being prepared to play in it. While *Food, Inc*. imagined students as citizens having the skills, capacity, and agency to shape the food system, the Alliance imagined them solely as future consumers, whose role was to willingly accept the products of the food system.

As Regula Valérie Burri found in her comparative analysis of how policy makers approached communication about nanotechnology in the US and Germany, "tacit assumptions" about the "ideal form of the science-society relationship" shape how communicators understand the purpose of information and education.[12] This includes different understandings and projections of the skills and capabilities of the public and the role people are expected to play in relation to the assessment and governance of technology. Burri found, for example, that German nanotechnology imaginaries were "intrinsically political."[13] Similarly, the *Food, Inc*. Discussion Guide was shaped by an intrinsically political imaginary, in which the public was perceived and projected as responsible, engaged, and able to acquire new knowledge to participate in dialogue and decision making about the food system. In contrast, the lessons designed by the Alliance to Feed the Future were shaped by a commercial imaginary. Their purpose was to prepare students to act as informed and willing future consumers.

These contrasting imaginaries shaped which facts mattered within the curricula and who had the agency to act in relation to them. The rest of this chapter looks at how the tacit assumptions of the Real Food and Real Facts frames about the ideal form of the science-society relationship and the role of the public in the food system shaped the aims and content of the *Food, Inc.* Discussion Guide and the lessons created by the Alliance to Feed the Future.

It may be surprising that I take the claims in both sets of lessons at face value. The purpose of this chapter is not to take exception to *Food, Inc.*'s claims about the problems with corn in the food system, the Alliance's contention that frozen broccoli is better than fresh, or any of the other claims presented in these lessons. On the contrary, while conflicts between these two educational campaigns and between the Real Food and Real Facts frames more broadly may appear to be over the facts, or what is true about the food system, Gussow reminds us to look beyond this to understand what is really at stake. What really matters is the kind of questions that are deemed important to ask and thus the kinds of information and expertise that are considered relevant.[14] Inspired by Gussow, I seek primarily to understand the questions the Alliance deemed important to ask and the information and forms of expertise it considered relevant in preparing students for their future role in the food system.

PREPARING ACTIVE CITIZENS FOR THE FOOD SYSTEM

The goal of the *Food, Inc.* Discussion Guide was to prepare students to actively participate in dialogue about the food system and play a role in shaping it. This was clear from the very first pages of the Discussion Guide, which opened with a letter from Zenobia Barlow, cofounder and executive director of the Center for Ecoliteracy. In it, she described the role of educators as challenging

students to "think critically and to grapple with complex questions," inspiring them to "become engaged citizens" and helping them "gain the knowledge and skills they need in order to develop sustainable solutions."[15] The letter was followed by a brief section called "Using This Guide" that ended with learning objectives, which included helping students "think through their own perceptions, ideas, and solutions so that they are better prepared to make thoughtful choices about food," "develop the knowledge and skills they need to participate in a meaningful public dialogue about food and the food system," and "take action to address food-related issues in their own lives."[16] In other words, the aim of the *Food, Inc.* Discussion Guide was to produce thoughtful, knowledgeable, active citizens of the food system.

The Discussion Guide's approach to achieving these objectives centered on Socratic discussions. A five-page section, "About Socratic Discussions," described the value of this approach as well as how to facilitate and assess the discussions. It explained, "Socrates believed that helping students to think was more important than filling their minds with facts, and that questions—not answers—are the driving force behind learning." The section then explained that Socratic discussions allow students to "explore issues, ideas, and values in a meaningful way[,] . . . face conflicting viewpoints, test their ideas against their peers, and explore possible solutions."[17] Instructions noted that Socratic discussions required a significant shift in the teacher's role, from teaching content to facilitating students' exploration of their own thinking. After showing a *Food, Inc.* chapter, they suggested "Setting the Stage" by arranging chairs in a circle and reviewing discussion guidelines. The next phase, "Opening the Discussion," began with asking the "Focus Question" the Guide provided for each chapter of the film and allowing time for students to "think

and then respond freely to the question." Teachers were to make it very clear that they were not looking for specific answers and that "in fact there is no right or wrong answer." Their role was to ask questions, "accept students' responses," help them clarify their thinking, and encourage participation by all. The next phase, "Deepening the Discussion," used "deepening questions" to "help students probe further into the topic and clarify their thinking."[18]

Connections between learning about the food system, engaging in debate and dialogue, and acting to shape the food system were built into the lesson plans. Each chapter of the Discussion Guide ended with "Ideas for Action," suggested activities in which students could express their opinions and practice acting in their role as engaged citizens.[19] These included writing letters to people who have responsibility for making change in the food system, learning more about advocacy groups, designing posters or brochures to share learning with others, debating positive and negative impacts of specific technologies, researching laws, exploring what it would take to make changes to rules in their schools, talking to farmers to get their views on issues raised in the film, and so on.

The Discussion Guide's lessons reflected the Real Food frame's view that many forms of knowledge and expertise, not just science, were important to understanding the food system. A section titled "National Standards Correlations" included a long, varied list of standards that the Guide was designed to meet across English, geography, science, and social studies. Together, they acknowledged social, economic, cultural, and political aspects of the food system and sought to prepare students to understand and act in relationship to this complexity. English standards focused on critiquing texts and gathering information to create and communicate knowledge. A geography standard called "Environment

and Society" supported students in knowing and understanding how resource development and use changes over time and the results of policies and programs for resource use and management. Several social studies standards emphasized social relations and power dynamics. "Individuals, Groups and Institutions," for example, focused on evaluating the role of institutions in continuity and change and analyzing the extent to which groups and institutions meet individual needs and promote the common good. "Power, Authority and Governance" examined the rights, roles, and status of the individual in relation to general welfare. "Production, Distribution, and Consumption" helped students analyze the role supply, demand, price, incentives, and profits play in determining what is produced in a market system.[20]

The National Standards Correlations also included some related to science, but they situated scientific knowledge as part of, not separate from, economic, social, cultural, and political contexts. For example, a social studies standard called "Science, Technology and Society" aimed for students to be able to analyze how science and technology influence the core values, beliefs, and attitudes of a society, and vice versa, and evaluate policies that have been proposed to deal with social change resulting from new technologies, such as genetically engineered plants and animals. One "National Science Educational Standard" was also listed: "Science in Personal and Social Perspectives." The objective was for students to develop an understanding of "personal and community health; natural resources; environmental quality; natural and human-induced hazards; [and] science and technology in local, national, and global challenges."[21]

While the National Standards Correlations implicitly reflected the questions about the food system that the Discussion Guide deemed it important to ask, and thus the forms of knowledge

and expertise that its authors considered relevant, the lessons themselves addressed knowledge politics explicitly. The official synopsis of *Food, Inc.* described it as a film that "lifts the veil on our nation's food industry, exposing the highly mechanized underbelly that's been hidden from the American consumers with the consent of our government's regulatory agencies, USDA and FDA."[22] The film thus reflected the assumption, advanced by Pollan and other Real Food advocates, that giving the public access to knowledge and information about the food system could be the basis for a large-scale social movement to reshape it in the public's interest.[23] The Discussion Guide aimed to bring this information to classrooms, where high school students could learn about both hidden parts of the food system and the politics of knowledge in the course of becoming active citizens of the food system.

The film began with Schlosser describing a "world deliberately hidden from us" and talking about his quest as an investigative journalist to "lift the veil." The first chapter included, among other things, his visit to a Tyson chicken farm where a farmer explains that he would have liked to show the film crew the chicken house, but Tyson forbids him from doing so. Another farmer, breaking the rules, provides a grim look into what she derides as her "chicken factory."[24] Deepening Questions in the Discussion Guide include, "As consumers, do we have the right to know how the chickens we eat are being raised? Do we want to know?" A handout showed those involved in raising chickens: a chicken, a farmer, a farmworker, a consumer, and a president of a poultry company. Students were instructed to draw lines between those who are directly connected and put a star next to the individual who was most valued and an X next to the one who was least valued, then rank all of them in order of who has the most and least rights.[25]

The next chapter began with Pollan also discussing the politics of information: "It seems to me that we are entitled to know about our food, who owns it, how they are making it. . . . [C]an I have a look in the kitchen?"[26] The Focus Question in the Discussion Guide was, "Do people have a right to know what is in their food?," and the lesson led students to explore the limits of the information available on food labels. Deepening Questions explored why people tend to be surprised when they learn how much corn is in their diet, asking, "Do you think the government and food producers kept it a secret?" and "How do you feel about ingredients being included without your knowledge?" Then students were prompted to consider whose job it is to inform the public: "Is it our responsibility to find out, the producer's responsibility to make it more clear, or both?"[27]

Chapter 8, "The Veil," was pointedly about power dynamics that constrained the information about food the public had access to and the political stakes of that knowledge. The film described a revolving door between corporations such as Monsanto, the government, and the judicial bodies that are supposed to be regulating them and shows how this dynamic forecloses public debate about the use of technologies in food production. Schlosser describes "power, centralized power" as being used to deliberately "keep consumers in the dark about what they are eating, where it comes from and what it's doing to their bodies." He describes companies fighting "tooth and nail" against labeling and pursuing legislation making it against the law to criticize their products through libel laws. Pollan asserts that "one of the most important battles for consumers to fight is the right to know what is in their food and how it was grown."[28] The Discussion Guide's Focus Question was, "Should a company have the power to decide what information to give consumers about the food it produces?"[29]

The final chapter, "Shocks to the System," also made the Discussion Guide's assumptions about the politics of information and the role of the public in the food system explicit. It engaged viewers and students as agents in the food system with the power to shape it through both consumer choices and individual and collective actions outside of the marketplace.[30] A synopsis of the film chapter noted, "While the average consumer may feel powerless in the face of these issues and vastness of the food system, the system does respond to consumer demand." The film looked at the role consumer pressure played in Walmart switching to rBST-free milk and drew parallels with the fight against tobacco, which Schlosser describes as a "perfect model" of how an industry's irresponsible behavior can be changed. The Discussion Guide described the chapter as offering "hope that individual and collective actions can make a difference and move us toward creating a more sustainable food system."[31] The Focus Question was, "What individual or collective actions are you willing to take to improve our food system, and what would be their impact?"[32]

A Deepening Question for this final chapter asked, "Aside from the supermarket, in what other arenas can individuals and groups make an impact on our food system?" Another asked students to reflect on Pollan's argument in the film that "we need changes at the policy level so that the carrots are a better deal than the chips" and to discuss whether "changing policy or informing the public about health benefits and environmental impacts" would be more effective at changing people's food choices. An "Idea for Action" suggested students should agree on actions to pursue, develop action plans, identify which steps they need to take are collective and which are individual, follow through with the support of the teacher, and report their results to the class.

Another suggested they identify key representatives involved in farm or food policy and write to them, advocating for specific changes in current policies. The chapter ended with a "Things you can do" handout, with the subheading, "You can vote to change the system. Three times a day." The list that followed included actions students could take in the market ("Buy from companies that treat workers, animals, and the environment with respect") and outside the market ("Make sure your local farmers market takes food stamps. Ask your school board to provide healthy school lunches," "Tell Congress to enforce food safety laws").[33]

The *Food, Inc*. Discussion Guide was shaped by and pursued an intrinsically political imaginary of the public. Its approach to education and the facts that it considered relevant reflected tacit assumptions about "the ideal form of the science-society relationship," the skill and capacities of the public, and the role that students would play in the food system.[34] It assumed that students were learning about the food system so that they could engage in dialogue about it and play a role in shaping it through their own actions. The way the learning process was structured, through film screenings followed by "rigorously thoughtful Socratic discussions," assumed that students were capable of reflecting critically on the way things were and forming legitimate opinions about how they should be. Prompts at the end of each lesson explicitly guided students outside of the classroom, where it was assumed they could and should take action to make changes they deemed important. The emphasis on social science knowledge and expertise reflected an understanding that the food system was shaped by a complex set of conditions—including power dynamics and politics—that required more than scientific knowledge to understand. The chapters explicitly politicized knowledge about the food system and clearly prepared students to engage in

a critical challenge to the food system, starting with a refusal of the way things were.

PREPARING WILLING CONSUMERS

The creators of the Alliance lessons assumed that the Real Food frame's concerns about the food system, including those expressed in *Food, Inc*., were the result of lack of knowledge and understanding. A press release announcing the formation of the Alliance explained that its members "share the common goal of building understanding and promoting the benefits of modern food production, processing and technology."[35] When the first lessons were released in July 2012, IFIC president David Schmidt described them as responding to ignorance and misinformation: "More than ever, Americans are separated from farming and distribution of the foods we all enjoy and are exposed to misinformation and myths about modern food and agricultural production." Alliance members, he went on, "believe it is crucial that accurate and straightforward information be made available to teachers, students and parents to demystify the process by which food is produced." Another press release explained, "The more consumers understand how their food is produced, the more they can appreciate the role modern agriculture plays in providing safe, affordable, and nutritious food."[36] In contrast to the Discussion Guide, then, the Alliance imagined that it was preparing students to play the role of willing consumers rather than active citizens. The way it approached educating students, the skills it assumed students needed, and the facts it deemed relevant were all shaped by this commercial imaginary of the public and the ideal form of the science-society relationship that it reflected.

The pedagogical approach of the Alliance lessons was not explained up front as it was in the Discussion Guide, but, reflecting the Real Facts frame's emphasis on expert knowledge, the lessons were structured around a didactic transfer of information from the lesson plans to teachers and from teachers to students. Each lesson plan provided introductory text about the topic the lesson covered as well as instructions and materials for one or more activities. There were detailed scripts telling teachers how to lead students through the activities, including questions to ask with the correct answers provided in italics. Exactly what students were to take away from various activities was explicit in each lesson plan; results of activities and experiments were carefully framed to support the core message of the curriculum about the benefits of modern food technologies.

The Alliance lessons pushed back against *Food, Inc.*'s embrace of dialogue, critical thinking, and personal opinions, as well as its insistence that the questions worth asking about the food system had to do with the social, economic, political, cultural, and environmental factors that shaped it. Instead, the lessons focused on correcting presumed deficits of scientific knowledge and understanding. As Brian Wynne explains, deficit thinking is an inevitable result of "a culture of scientism" in which it is assumed that support for a particular policy position is determined by scientific fact: "Some kind of public deficit model explanation of public rejection or mistrust 'of science' is almost preordained as a function of this scientistic, culturally entrenched premise about the basic meaning of the issue at hand." The variations of deficit thinking most prevalent in Alliance lessons resembled three described by Wynne in his 2006 list of "public deficit models of mistrust of science—abandoned but reinvented (ca 1990 to the present)." The models include public deficits of understanding of scientific knowledge, public deficits of trust in science, and public

deficits of knowledge of the benefits of science. All of these were accompanied by what Wynne describes as an underlying assumption that public responses are emotional, "epistemologically empty," and susceptible to misinformation.[37]

While all Alliance lessons were shaped by the deficit thinking characteristic of the Real Facts frame, among the larger set of forty-five lessons issued in 2012 there were units for each grade level that focused specifically on addressing, or preempting, deficits of scientific knowledge or understanding that might turn people away from processed food and make them critical of the industrial food system. Though these lessons were designed to meet Common Core standards in English, writing, and math, their emphasis was explaining the role of modern food technologies, extolling their benefits, and portraying them as safe, familiar, natural, and desirable.[38] For example, a unit for third- through fifth-graders called "Understanding the Modern Food System" included the lesson, "A Super System: Understanding the Benefits of the Modern Food Production System." The instructions explained, "At this learning center, students understand how modern technology has helped make our food system safe, convenient and accessible year-round." The lesson came with sixteen "Food System Innovation Cards" and four "Activity Labels." The instructions told the teacher to prepare by gluing each activity label to a separate paper plate. The labels read, "Improves safety," "Improves efficiency (more work with fewer people)," "Increases the amount of food produced," and "Makes products more convenient for consumers." In the activity, students chose an innovation card, each of which highlighted a particular innovation, such as the refrigerator, chemical fertilizer, barbed-wire, flash freezing, the bread slicing machine, the mechanical tomato harvester, and the use of satellites to monitor farm fields. Then they placed the cards on the plate that "best describes the innovation's benefit" (Fig. 2).[39]

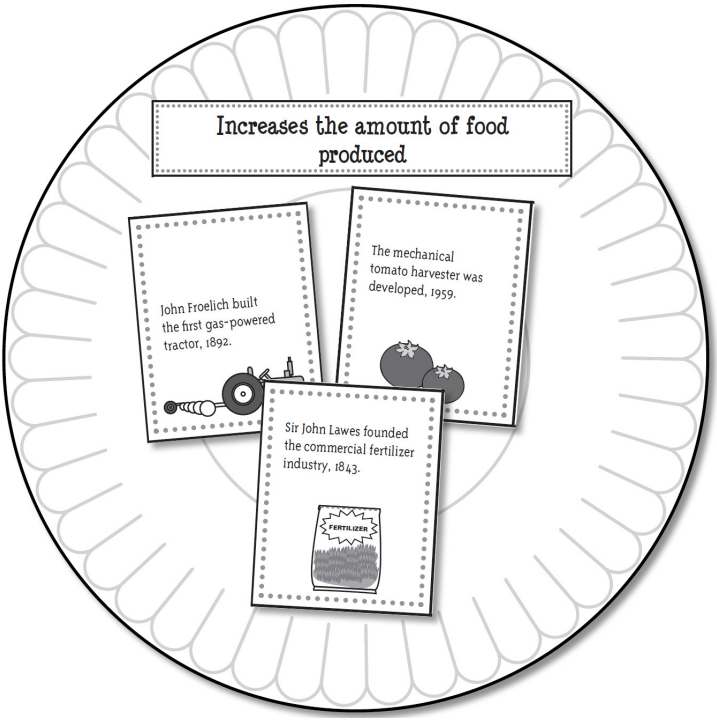


Figure 2. Illustrated example from the lesson "A Super System," showing how students should sort "Food System Innovation Cards" according to their benefits. © 2012 Alliance to Feed the Future, www.alliancetofeedthefuture.org. Text and design by The Education Center, Inc. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

Similarly, a unit for sixth- through eighth-graders called "Buzzwords" included a lesson about unfamiliar ingredients called "It All Adds Up!" The lesson aimed to correct or preempt concerns about unfamiliar chemicals in food by explaining their purpose and benefits, emphasizing their connection to natural or familiar foods, and assuring students of their safety. The lesson plan began, "Is sodium bicarbonate in your bread? What about thiamine mononitrate? Yep, they're both there—and they're supposed to be! Sodium bicarbonate is baking soda, and thiamine

mononitrate is vitamin B1." It continued, "In fact, every food we eat, whether it's picked from the garden or pre-made and packaged, is made up of chemical compounds. However, when students read a food label, that list of long names may be unfamiliar." A text box in the top corner of the lesson read, "Fun Fact: The Food and Drug Administration has a list of more than 3,000 ingredients that can be added to foods, all of which are regulated for safety."

The lesson came with twenty-seven "Food Ingredient Cards" representing eleven categories. Each card highlighted one ingredient category, describing its benefits, and then introduced an example of an ingredient in that category. For example, there were four "color additives" cards explaining that color additives "enhance a food's natural color or add color to colorless foods"; each introduced a specific example, such as FD&C Blue No. 1, "one of nine certified color additives approved for use in the US," and beta-carotene, which "adds orange color to foods, found naturally in carrots." All the color additive cards had the same final line: "The Food and Drug Administration regulates all color additives to ensure they are safe." Two "fat replacers" cards explained they provide texture in reduced-fat foods; one introduced guar gum, which "comes from a shrub in the bean family," and the other xanthan gum, "made by fermenting corn sugar." "Emulsifiers," described as creating smoothness and keeping ingredients from separating, included soy lecithin, which comes from soybeans, and sorbitan monostearate, found in whipped topping. And so on. The lesson plan instructed teachers to hand out a card to each student and challenge them to form groups based on the ingredient categories. Next, each group used chart paper to list the purpose of each additive in their category. Finally, the teachers invited students to come up with a motto for their category such as "less spoiling, less waste!" for the preservatives group or "we're so smooth!" for the emulsifiers (Figs. 3–5).[40]

Figure 3. FD&C Blue No. 1 "Food Ingredient Card" from the lesson "It All Adds Up!" © 2012 Alliance to Feed the Future, www.alliancetofeedthefuture.org. Text and design by The Education Center, Inc. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

The second set of lessons, issued in 2013 to support Next Generation Science Standards, was also haunted by deficit thinking but, in addition, exemplified other aspects of food scientism. These lessons exhibited what Christopher Mayes and Donald Thompson refer to as "attitudinal scientism," in which assumptions about the primacy of science are expressed and reinforced through the use of images, concepts, and practices associated with science.[41] As they explain in a *Journal of Bioethical Inquiry* symposium on scientism, such references are used by people to "'add weight to arguments which they are advancing, or to practices which they

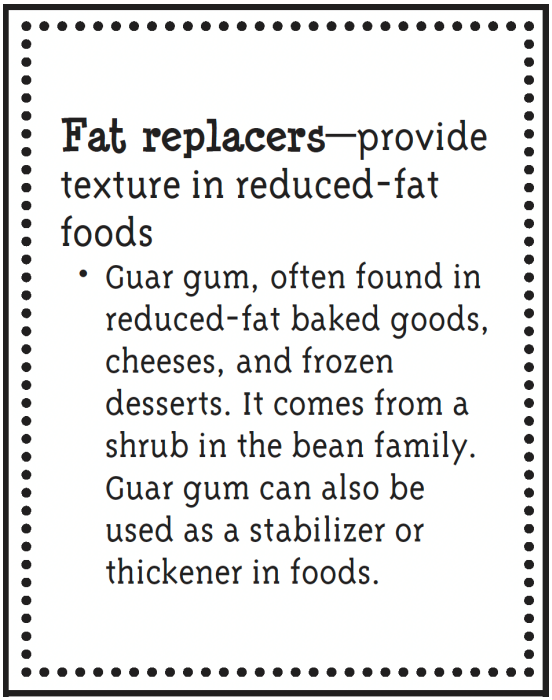


Figure 4. Guar gum "Food Ingredient Card" from the lesson "It All Adds Up!" © 2012 Alliance to Feed the Future, www .alliancetofeedthefuture.org. Text and design by The Education Center, Inc. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

are promoting, or to values and policies whose adoption they are advocating.'"[42] The mascot for the Alliance lessons, "Professor G. U. Eatwell," is a great example of this: the smiling woman scientist in a lab coat was technically associated with all the Alliance lessons but appeared most frequently in the Next Generation Science Standard series (Fig. 6). More importantly, the lessons enacted attitudinal scientism through their association with the Next Generation Science Standards and by taking the form of science lessons.

Consisting of just one lesson per grade plus classroom posters, the lessons supported science learning standards that had

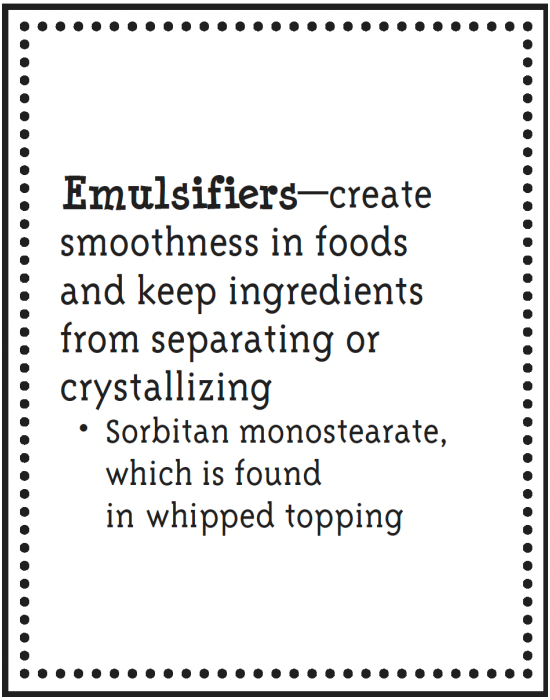


Figure 5. Sorbitan monostearate "Food Ingredient Card" from the lesson "It All Adds Up!" © 2012 Alliance to Feed the Future, www.alliancetofeedthefuture.org. Text and design by The Education Center, Inc. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

recently been developed by a consortium of twenty-six states, along with the National Science Teachers Association, the American Association for the Advancement of Science, and the National Research Council.[43] Each lesson plan noted the standard it was correlated with, described an "application," and used the same introductory text, which read, "Farmers from around the world grow the food we enjoy each day," and then listed the steps that "get food from the farm to the dinner table." Following this, each presented an experiment in which students

Figure 6. One of many illustrations of Professor G. U. Eatwell that appear throughout the Alliance to Feed the Future's lessons, this one is from "Watching Mold Grow." © 2013 Alliance to Feed the Future, www.alliancetofeedthefuture.org. Text and design by The Education Center, LLC. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

learned about a particular food system technology, including carefully scripted instructions directing teachers to interpret the activity in terms of the technology's benefits.

For example, a lesson for first-graders called "Watching Mold Grow" was designated as meeting an engineering design standard (K-2-ETS1-1) related to defining a simple problem that can be solved through the development of a new or improved object or tool. The "Application" section explained, "With food processing, foods stay fresher longer and less food is wasted. This experiment gives students a chance to see how preservatives extend our food supply." The lesson began with the teacher initiating a conversation about how often students eat toast or sandwiches, asking what the one item is that they need to make both (*bread!*) and then asking if they have ever opened a bag of bread to find it moldy. The

teacher was told to "talk about the fact that scientists have created special ingredients called *preservatives*" that "keep food safe by preventing bacteria from growing, keeping food fresh longer, and preventing waste." Next came an experiment in which the teacher put two pieces of bread—one with preservatives and the other without—into plastic bags, sprayed them with water, and had students record their observations every couple of days. The lesson plan provided questions for the teachers to ask about what students observed and the correct answers: "Why do you think one slice of bread has mold on it and the other doesn't? *Preservatives help to keep food fresh longer*. How do preservatives affect the amount of food we have? *Less waste means we get to eat more of the food we grow; we don't have to throw as much away*."[44] Reflecting the food scientism of the Real Facts frame, the lesson both provided information to correct or prevent deficits (i.e., the facts about what preservatives do) and used scientific references, including the Next Generation Science Standards designation and the format of a science experiment, to "add weight" to the arguments, practices, and priorities the Alliance was promoting.[45]

The lesson for third-graders was called "Fortified for Health" and met an engineering standard (3-5-ETS1-2) involving improving "existing technologies or developing new ones to increase their benefits, decrease known risks, and meet societal demands." Focusing on the benefits of fortification, the lesson recalls what Gussow said in her 1980 presidential address regarding the assumptions about the aims and trajectory of the food system that shape the questions people deem important to ask when faced with the facts about fiber (fiber is important to health, and processing removes fiber).[46] The application section explained that fortification adds vitamins and minerals to food to "make it more healthful and help people meet their recommended daily intake of different nutrients." The lesson began with a discussion that

introduced the term "fortification," noting that examples included adding fiber to promote digestive health and that the purpose of fortification is "to provide more nutrients in the foods people eat." Next, the class discussed orange juice fortified with calcium or vitamin D and did a taste test to confirm that they could not tell the difference from regular juice. Then they discussed fortified breakfast cereal, focusing on iron and reasons bodies need it. Finally, the class conducted an experiment that involved crushing a bag of cereal fortified with iron, noting that the iron was not visible. The class then explored other ways to prove that iron had been added; after filling the bag halfway with water and letting it sit for a while, students watched as the teacher placed a strong magnet on the outside of the bag and observed the tiny black specks attracted to it.[47] Through a similar format and also meeting Next Generation Science Standards, students in others grades learned about the benefits of dehydration, ingredients that support special dietary needs such as diabetes and high cholesterol, technologies that allow food to be transported around the world, advancements in processing and packaging that allow food to be stored for longer periods of time, packaging technology that reduces food waste, and technologies that can extend the growing season such as hydroponics.[48]

Advocating for the safety and benefits of processing technologies and processed foods in the form of science experiments, with encouragement from Professor G. U. Eatwell, these lessons, along with those meeting Common Core standards, set out to fix knowledge and trust deficits. Shaped by the food scientism of the Real Facts frame, they treated the concerns of the public as a misunderstanding of science and framed the entire landscape of values, priorities, and policies involved in the food system as a matter of scientific knowledge, subject to scientific authority and value neutral. But, as Wynne argues and *Food, Inc*. made very clear, public

concerns about the uses of technology tend to be driven not by deficits but by questions about the values shaping innovation, who benefits, and the impacts across human, social, and cultural systems.[49] The Alliance lessons enacted antipolitics by treating these concerns as nothing more than deficits that could be corrected with the right information. They furthered this antipolitics in the service of a commercial imaginary of the public, in which the public was assumed to lack the skills and capacities to engage in shaping the food system and was seen solely as consumers. Asserting this imaginary over and against *Food, Inc.*'s vision, in which students were being prepared to act as engaged and knowledgeable agents within the food system, the Alliance lessons prepared students to embrace the products of the food system as future consumers.

FOOD AND HEALTH AS POLITICS

I now turn to the central content of the two curricula: stories about where food comes from and advice about what to do about health. Building on the preceding analysis, I look beyond surface differences in these accounts to explore how they were shaped by different assumptions about what food and health *were*. As the philosopher of food Michiel Korthals explains, competing food system frames are often shaped by overlooked differences in normative assumptions about what food *is*. He argues this is not only "an abstract definition issue, but also a power play that goes into the details."[50] He goes on to describe what he sees as the material effects of ontological differences, or differences in "what counts as food."

> The answer to the question of what counts as food selects certain items and actions in the world and excludes others; the answer

> discloses the world of food in a particular way and structures therefore normative ontological issues with wide reaching institutional and cultural implications. These ontological assumptions do not only regard perceptions, but ways people act upon an event that is seen as food, build networks of food, solve problems, and connect food with other events in the world.[51]

In other words, the meanings of food that animate competing food system frames such as Real Food and Real Facts matter because, usually without being recognized or acknowledged, they determine the kinds of questions and expertise that matter, the courses of action that seem sensible, and the actors who are deemed relevant for solving food system problems.[52] Each of the examples Korthals uses to explain his argument—biofortification, obesity, nutrigenomics—makes a further point about the relationship between what counts as food and what it means to pursue health; they are inseparable. For example, in the case of nutrigenomics, food is understood in terms of disease prevention and health and therefore is a state preceding the possibility of disease in which food choices can reduce risk. Other assumptions follow from this, including that minimizing disease risk through food choices is an individual responsibility.[53] The work of the theorist Annemarie Mol has also shown that what counts as food varies in different dieting techniques and is related to different understandings of the body.[54] Like the imaginaries of the public discussed above, the versions of food and health animating the *Food, Inc*. and Alliance curricula were in one case intrinsically political and in the other decidedly antipolitical.

In the *Food, Inc*. Discussion Guide, food was understood as a complex set of interconnections. What counted as food in the lessons was not simply matter that humans consume to sustain life and growth (dictionary definition) or the products of a food system

designed to deliver nutrition, convenience, and pleasure (Alliance understanding, as discussed below).[55] Food was not a discrete bounded object at all but inextricably and fundamentally connected to broader systems—economic, cultural, social, political, environmental—and thus the welfare of other humans and nonhuman animals. The film and the lessons focused on these connections. The first chapter, for example, told the story of where food comes from by looking at connections between human and nonhuman animal welfare, with questions exploring the kinds of rights animals should have. The next explored links between corn subsidies, the cost of meat, confined animal feeding operations (CAFOs), and the proliferation of both dangerous forms of *E. coli* and regulatory laxity regarding those dangers. A subsequent chapter connected those same policies to disproportionate rates of obesity and diabetes in low-income communities via the proliferation of cheap corn, soy, and wheat-based products ("bad calories"), while prices for healthier produce were, for many, prohibitive.

The point of revealing the connections that made up this version of food was to explicitly politicize food, the food system, the actions of consumers, and the actions of those working within the food system. In keeping with the public health orientation and ecological thinking of the Real Food frame, the lessons made it clear that the point of understanding "where food comes from" was to reveal "costs" long buried by dominant but mistaken notions of food that failed to include such connections and their consequences. The first chapter explained that "while industrially produced food appears inexpensive, the price we pay at the cash register does not reflect its true costs" and pointed to the "costs our society bears" elsewhere from factory farming, including air and water pollution, health problems, government subsidies, and animal suffering.[56] Chapter 5, "In the Grass," also emphasized

that "cheapness comes at a price" and talked about how workers bear unseen costs in the form of dangerous working conditions, low wages, little job security, and the threat of deportation. The Focus Question was, "When deciding what to eat, how much should we consider the workers who pick, process and transport it?"[57] The following chapter, "Hidden Costs," elaborated these themes, explaining that "by focusing on cost and abundance, our society may be trading off safety, health, environmental quality, and other things we value while promoting large profit-oriented corporations at the same time."[58] Here the Focus Question was, "Should price be the most important force behind our food industry? Why or why not? How might our food system change if it was driven by other values, like health or environmental sustainability?"[59] The lesson included an activity in which students placed themselves on a scale between "I'll buy what I like to eat, no matter who makes it" and "I'll buy food only from companies whose values I agree with" and wrote about their positions.[60]

This inherently political understanding of food as comprising its connections extended to how the Discussion Guide talked about health. It did not refer to individual biomedical status, and teaching students what to do about health did not focus on the health outcomes related to individual eating habits. In back-to-back chapters focusing on health, one about food safety and the other nutrition, the Discussion Guide taught instead that health was a social product and what was to be done about health had to do with changing systems and structures. Chapter 3, "Unintended Consequences," focused on food safety through the heart-wrenching story of a mother whose two-year-old son, Kevin, died after eating a burger tainted with *E. coli*, and who had since engaged in a relentless uphill battle to secure a safer food environment through regulatory reform. The film presented the

dangers of *E. coli* as the result of policy (subsidies) and practices (feedlots, slaughterhouse speed, industry consolidation) that led to the proliferation of a particularly life-threatening strain (*E. coli* O157:H7) while also increasing the likelihood of any given burger containing tainted meat. It argued that regulatory agencies were controlled by the same companies that were supposed to be scrutinizing them, and Kevin's mother says, "Sometimes it feels like industry is more protected than my son." In the film Pollan explained that each time the industry encounters systemic problems it turns to "high tech fixes that allow the system to survive" rather than rethinking how to make the system work better, and the chapter ends with unflattering scenes of a factory using ammonia and ammonia hydroxide to produce pathogen-free meat, "through a marriage of science and technology."[61]

The Discussion Guide for this chapter led students to think about where food safety comes from and whose job it was to ensure it. The Focus Question was, "Who's responsible for keeping our food safe?" Deepening Questions prompted students to think about the role of various parties in Kevin's death, including meatpackers, federal court judges, restaurant workers, and the people who started feeding corn to cows in the first place. Activities included reflecting on the question, "Do we have the right to assume our food is safe? If so, who do you think should be responsible for ensuring its safety?" The "Ideas for Action" section suggested inviting students to think about a rule at their school or in their community they would like changed and consider who has the authority to make the change, what the process would be, and what they would need to promote the change. It suggested the teacher "help students develop an action plan for working toward that change."[62]

The following chapter, "The Dollar Menu," focused on dietary health through the story of a family whose ability to eat healthy

foods was constrained by external conditions, including their jobs, limited income, food policy, and the actions of the food industry. The film chapter begins with the family picking up burgers, chicken sandwiches, and sodas from a fast-food drive-through window. As they eat in their car the mother explains she feels guilty giving this food to her kids because she knows it is unhealthy but doesn't have time to cook because of workdays stretching from 6 a.m. to after 9 p.m. and budget constraints that mean the family must choose foods that fill them up cheaply. In the next scene they walk through the produce section of a grocery store agonizing about the cost of the broccoli and pears, which they do not buy because they are so much more expensive than a fast-food meal. Pollan explains that this is no accident because "bad calories" from commodity crops such as corn, soy, and wheat are subsidized, resulting in income level being one of the biggest predictors of obesity. He then describes a food environment that "presses our evolutionary buttons" with foods engineered to satisfy the innate desire for salt, fat, and sugar. The film then returns to the family, and viewers learn the husband is diabetic and the family struggles with choosing between "paying for his medicine to be healthy or buying vegetables to be healthy," with the mother asking, "So which one should we do?" The next scene follows the daughter to a meeting for teens run by the California Center for Public Health Advocacy in which every participant raises a hand in response to a question about whether they know anyone in their family who has diabetes, and the facilitator talks about how Type 2 diabetes is "affecting our community in epidemic proportions."[63]

The Discussion Guide for this chapter explored the contest between a public health–oriented, environment-focused view of health and a dominant "personal responsibility" frame

emphasizing individual bodies and choices, as discussed in chapter 1. Introductory text explained:

> Some say that food choices fall under the realm of personal responsibility; according to this view, what we buy and eat is a choice, and individuals should be responsible for making healthier food choices. Others argue that healthy food choices should be available to everyone and not just those with means; according to this view, people shouldn't have to choose between healthful food and medicine, for example, and the farm subsidy system should be restructured to provide healthier foods for all.[64]

Advocating for the Real Food frame's sociocultural understanding of dietary health, the Focus Question asked, "Should access to healthy food be a right for everyone?" Deepening Questions prompted students to think about how government policies affected the types and costs of available food, how the cheap cost of processed food affects low-income families, and whether cheap, fast food is really cheap for everyone. Like the story of a child who innocently ate a tainted burger and the mother who unknowingly fed it to him, the scenes of the family agonizing over the cost of broccoli compared to burgers brought assumptions about what counted as food and health into stark relief; food was a product of interconnected systems, and these systems, not individuals acting within them, created the conditions for both health and threats to it. The Discussion Guide mentioned safe handling techniques and encouraged making good food choices, but when it came to what students should do about health the emphasis was on politics, not using thermometers, counting calories, or taking more steps.[65]

FOOD AND HEALTH AS ANTIPOLITICS

As Korthals notes, "The answer to the question of what counts as food selects certain items and actions in the world, and excludes

others."[66] In the Alliance lessons, food was not understood as comprising connections; it was a bounded object, produced by the food industry to deliver nutrition, pleasure, and convenience to consumers.[67] The stories Alliance lessons told about where food comes from, therefore, did not involve tracing connections and unveiling hidden costs. They presented the journey from farm to fork as a linear process that began on the farm and ended not at symbolic "vote" by the public for the kind of food system it wanted but as a literal fork in the hand of a satisfied consumer.

For every grade level in the Common Core series, a unit called "Farm to Fork" included at least one sequencing exercise that traced a linear journey through a series of steps leading from the farm to the fork, or plate. The lesson for grades K–2 began with the teacher writing "farm," "production plant," "store," and "fork" on the board and asking students to write or draw their favorite food on a sticky note. Then the teacher "drove" some of the notes through the phases, discussing each step.[68] In another lesson for the same grades, students received a worksheet with images of the different steps to cut out and glue in the correct order: apples growing in an orchard, workers making applesauce, a store selling applesauce, and a girl eating applesauce.[69] Students in grades 3–5 also went through a sequencing exercise, gluing cards to show the correct progression of milk through farm, production plant, store, and "your plate," then discussing how a food they like moves through the same stages (Fig. 7). Afterward, they created cards with illustrations of their favorite foods and cards showing where those foods come from (e.g., eggs on one card, chickens on the other) before playing a game matching the products to their sources and, finally, decorating an envelope with the words, "What Comes from the Farm? Everything!," to store the cards in.[70]

In this version of where food came from, the farm was the first step in a linear process rather than a node within an imagined

matrix of connections. In *Food, Inc*. farms were places where the inevitable interconnections of the food system erupted in suffering for animals and humans: dead chickens chucked into dumpsters, "downer" cows prodded toward slaughter, undocumented meatpackers arrested in company housing, dispirited farmers crushed by debt and intimidated by lawsuits. In the Alliance lessons farms were much happier places, represented by a familiar repertoire of pastoral images.[71] The sequencing exercise for grades K–2 included a photo of a smiling farmer in front of a tractor. The "farm" card in the sequencing exercise for grades 3–5 showed three cows grazing alongside a white picket fence, a storybook image of a barn with silos, and a windmill in the distance (Fig. 7). A lesson explaining that farmers "juggle lots of tasks to bring food to our table" was illustrated with a smiling Professor G. U. Eatwell holding a pitchfork in one hand and a bucket in the other.[72]

Alongside romanticized, pastoral images of silos, picket fences, and happy farmers, the Alliance lessons celebrated the modern technologies used on the farm. The lessons reflected the productionist assumption that feeding a growing population was a technological challenge that could be met by producing more food rather than a social, economic, and political challenge that would require others kinds of solutions.[73] They also reproduced a familiar strategy for dissuading criticism of novel agricultural technologies, especially genetic engineering, by portraying them as urgently necessary for meeting the world's growing food needs.[74] The Alliance taught that modern production technologies, including genetic engineering, were necessary tools that should be embraced by the public, not debated. This was illustrated, for example, by a lesson for students in grades 3–5 with a sidebar explaining farmers would need to double food production by 2050 to feed nine billion people worldwide. The lesson started by noting that one way farmers feed a lot of people is by using

Farm to Fork Cards

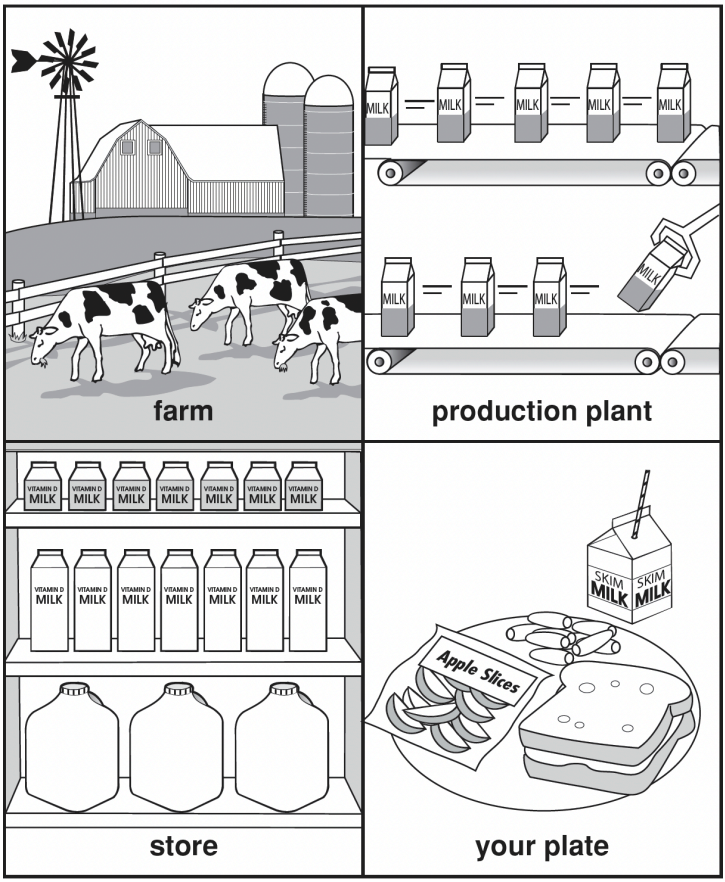


Figure 7. In the lesson "All in Order," students cut out these "Farm to Fork Cards" and placed them in the right sequence. Also note the pastoral imagery on the "farm" card. © 2012 Alliance to Feed the Future, www.alliancetofeedthefuture.org. Text and design by The Education Center, Inc. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

"modern farm equipment." After showing pictures of tractors, plows, seed planters, and cultivators the teacher then explained, "Farmers also work to increase the amount of crops they raise in other ways, too. This is important because there may not be enough land, time, or resources to continually plant more crops

to feed a growing world." Then the teacher introduced the term "biotechnology," breaking the word into pieces (*bio-*, *techno-*, and *-ology*). The lesson plan instructed the teacher to "lead the students to see that this is a scientific process of producing plants and animals that are faster growing, yield more food, and resist disease (and therefore reduce pesticide usage). It is a way for farms to ensure a productive crop to meet the food needs of the world."[75]

Moving along a linear journey from the farm to the plate, Alliance lessons also stopped at the production plant, where processing takes place. Animated by an understanding of food that focused on benefits for consumers, rather than "hidden costs" borne by consumers and others in the food system, the lessons emphasized the ways that processed food was better than fresh. Many lessons set up comparisons between processed and fresh foods to highlight the benefits of processing for consumers in terms of health, convenience, and enjoyment. In one, the teacher left a piece of broccoli out for several days and then displayed the "dried-out and discolored broccoli" along with some frozen broccoli, explaining that both were purchased on the same day. Students drew and recorded their observations and then the teacher explained, "Frozen vegetables are just as nutritious as fresh, and you can keep them longer."[76] In another activity students brainstormed "the steps you must take before eating a carrot," and the lesson plan instructed the teacher to "lead them to conclude that first it must be washed, then peeled, then cut" and explain, "baby carrots are a quick and easy way to eat carrots" and are "considered a convenience food."[77] A unit called "What are Processed Foods?" for grades 3–5 included a game of charades in which students wrote out the steps of preparing a processed food and the same food from scratch, for example, "eating a frozen cherry pie / baking a pie from scratch," and then acted out the steps. The lesson plan explained, "Students will see that while cooking from

scratch can be fun and healthy, processed foods also offer healthful choices and are big timesavers for busy families."[78]

With food viewed as a discrete object that moved through a linear production process ending with consumption, the focus of lessons about health was how individuals interacted with food once it arrived on the table. Not only food but also the body was conceived of much more discretely than in the *Food, Inc*. lessons, as a bounded biomedical entity rather than a socially produced one. Pursuing health—for this body, through this version of food—was thus an individual biomedical matter that required personal responsibility and expert guidance. When it came to both food safety and nutrition, the lessons provided scientific information and taught students to take responsibility for their own health by using it.

Whereas *Food, Inc*. addressed food safety threats as a product of policy and values that required systemic change, the Alliance lessons treated them as technical problems that could be managed with scientific information and personal responsibility. The lessons asserted that regulators were doing their job to keep food safe and provided the basic scientific information individuals needed to do theirs. A lesson for third- through fifth-graders called "Safe and Delicious" began by explaining, "Our modern food production system has many rules and regulations to ensure that food is farmed, processed, packaged, stored and delivered in a safe manner." The class then discussed the places pathogens can enter the system, and the teacher explained that "one job of food producers and safety inspectors is to detect pathogens growing in foods to ensure people don't get sick." The lesson concluded with instructions for managing pathogens at home, such as "Meats must be cooked to specific temperature to ensure they are safe" and "Never serve cooked food on the same plate that held the raw meat." A unit dedicated to food safety for sixth- through

eighth-graders included two lessons teaching students about the steps they should take at home to prevent food poisoning, such as remembering to "clean, separate, cook and chill," using a food thermometer, and rinsing raw produce before using it.[79]

Like food safety lessons, those focusing on dietary health emphasized scientific guidance and individual responsibility, pushing back against the Real Food frame's challenge to both the authority of scientific nutrition and the personal responsibility "blame frame" for obesity and other diet-related diseases.[80] With food understood as the nutrition-, pleasure- and health-delivering products of the food system, students learned that health was a matter of balancing these benefits. The lessons foregrounded the importance of understanding the basics of nutrition and using expert guidance to make healthy choices. Alliance lessons asking the question, "What should we eat?," turned to the USDA's science- and industry-backed MyPlate dietary guidance: an image of a plate with distinct nutritional categories, some slightly larger than others, designed to show how to choose a balanced diet.[81] Lessons taught how to understand and use the guide through activities such as placing pictures of foods into the correct sections of a blank MyPlate diagram.[82] Even when using MyPlate was not the focus, the lessons were shaped by its logic, for example, teaching students to think about food in terms of the categories that MyPlate used (fruits, vegetables, grains, proteins, and dairy) and often encouraging them to look to "packaged and convenience foods" to help them choose a balanced diet (Fig. 8).[83]

Balance was also the focus in lessons about how to avoid overeating or eating too much of foods that were not health promoting. Pushing back against the public health framing of obesity taken up by the Real Food frame and in the *Food, Inc*. Discussion Guide, Alliance lessons taught that avoiding negative health outcomes

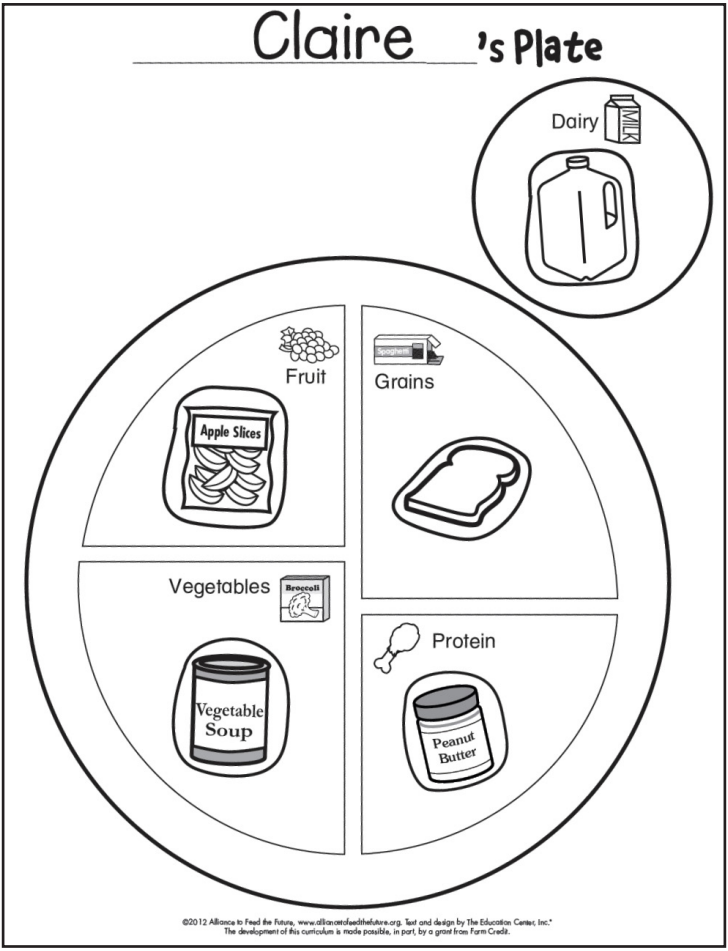


Figure 8. Illustrated example from the lesson "A Full Plate" showing how students should glue pictures of foods onto the correct section of a plate that is divided and labeled like "MyPlate." The instructions note that teachers should encourage students to include fresh, frozen, canned, and packaged foods. © 2012 Alliance to Feed the Future, www.alliancetofeedthefuture.org. Text and design by The Education Center, Inc. The development of this curriculum is made possible, in part, by a grant from Farm Credit.

was a simple matter of information and willpower. They emphasized "energy balance," or understanding how to balance "calories in" and "energy out" by being active and understanding and choosing the proper portion sizes.[84] For example, in "Perfect Portions" for grades 3–5 the teacher presented a chart explaining the correct portion size for a variety of foods and had a volunteer talk about a time they ate "portions that [were] too large, especially when students were not hungry anymore." The students then sorted cards showing specific amounts of different foods (3 cups spaghetti, 10 oz. hamburger, 1 waffle, 2 bagels, etc.) into two categories: "proper portions" and "large portions."[85]

Lessons also taught that some foods were not meant to be eaten often or in large quantities and told students to balance these "sometimes foods" with more healthful choices. For example, in a lesson for grades K–2 the teacher gave each student a card with a food on it (apple slices, salad, eggs, milk, frozen carrots, hot dogs, cake, cookies, and chips, etc.) and asked them to decide if the food on their card would be a good choice for breakfast, lunch, or dinner. Then the teachers explained that the foods on the rest of the cards were "considered 'sometimes' foods, meaning they are ok to eat occasionally, after a nutritious meal," and led students through a series of activities, including a discussion about how sometimes people snack even if they are not hungry. The lesson ended with the teacher encouraging students to become "'smart snackers' and to ask themselves if they are truly hungry before they reach for a 'sometimes' food."[86]

Goal setting and self-tracking activities reinforced the message that health was a product of nutritionally informed individual choices. A page designed to be sent home to families of third- through fifth-graders, for example, described the many kinds of balance students learned about in the lessons and included

prompts for discussions at home about food labels, portion sizes, MyPlate, and so on. It also included a pledge card with boxes to check—"I'm eating balanced meals" and "I'm balancing the calories I eat with the energy I use"—followed by a signature line for parents and students (Fig. 9).[87] Sixth- through eighth-graders tracked their eating and activity for a week, wrote paragraphs summarizing how they were doing, and discussed how to handle any challenges. If students were not eating enough fruit, for example, the lesson instructed the teacher to suggest "trying prepackaged apple slices" or "pop-top cans of sliced peaches or pears." The lesson ended with students setting goals, such as "maintain a healthy weight," and listing what they would do to reach that goal, for example, "eat healthful snacks" and "ride my bike more often."[88]

Through these lessons the Alliance reasserted both the personal responsibility frame for dietary health and the primacy of scientific nutrition as a way of knowing about food. The emphasis on nutrition reflected what Scrinis calls the ideology of nutritionism, in which what matters about food is limited to what can be known about interactions between nutrients and the biomedical body. As he notes, environmental, social, and cultural dimensions of food cannot be accounted for in this worldview.[89] In this sense, nutritionism itself—and the reassertion of nutritionism in these lessons—was a form of antipolitics because it narrowed the assessment to only those factors that could be known through the expert authority of nutrition science. Furthermore, nutritionism provided a foundation for the view that individuals are responsible for their own dietary health, which is also a form of antipolitics because it removes choices about what to eat from the contexts that shape and constrain them. Mayes and Thompson note that the emphasis on individual responsibility for dietary

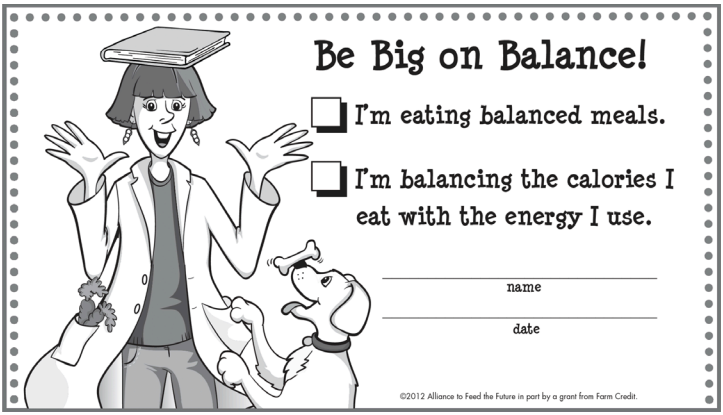


Figure 9. An example of a goal-setting activity reinforcing the message that health is a product of nutritionally informed individual choices, this "Big On Balance" pledge card was to be sent home and signed by families. © 2012 Alliance to Feed the Future, made possible in part by a grant from Farm Credit.

health outcomes stems from a narrow focus on what science can know about food, which they call "nutritional scientism."[90] They explain that a narrow understanding of food in terms of nutrients leads to individuals becoming both dependent on nutritional authority to inform their choices and understood as responsible for their own health through informed choices: "Put simply, the story that foods are comprised of chronic disease-causing or disease-preventing nutrients and that individuals who choose to eat those foods are responsible for their own health outcomes is made possible through the biopolitical use of nutritional scientism."[91]

Alliance lessons telling the story of where food comes from and teaching students what should be done about health didn't just contest the Real Food frame by offering students competing information about production practices or different dietary advice. They presented students with a fundamentally incom-

mensurate understanding of what food and health *are*. Pushing back against the Discussion Guide's politicized version of food, the Alliance lessons reasserted a version of "what counts as food" that was removed from connections and thus politics. Resisting Real Food's reframing of health as a product of a connected system, the lessons reasserted the primacy of scientific nutrition and personal responsibility. As Korthals shows, the meanings of food and health that animate competing food systems frames matter because, though often unacknowledged, they determine the kinds of questions, information, expertise, and actions that make sense.[92] In this case, different versions of what counted as food and health shaped the stories about where food comes from and advice about dietary health that each curriculum provided. They were also inextricable from how *Food, Inc*. and the Alliance to Feed the Future imagined the roles they were preparing students to play in the food system.

Ultimately, this was not a contest over the facts about food production or dietary health but over the imaginaries that shaped which facts mattered and who had the agency to act in relation to them. The *Food, Inc*. Discussion Guide imagined a public acquiring knowledge to participate responsibly in dialogue and decisions about the food system, including the assessment and governance of technology. The Alliance to Feed the Future lessons contested this intrinsically political imaginary of the public and the ideal form of the science-society relationship it reflected.[93] Shaped by the food scientism of the Real Facts frame and its intrinsically apolitical imaginary of the public, the Alliance lessons reframed public concerns as scientific knowledge deficits and embraced the classroom as a place to train informed and willing consumers.

CHAPTER THREE

Fighting for "Natural"

The Real Food frame, aspects of which were vividly articulated in *Food, Inc.* and the *Food, Inc.* Discussion Guide, looked very different from the perspective of the food industry. A handful of articles published in one of the industry's leading magazines throughout the summer and early fall of 2015 give a good sense of how members of the food industry, particularly those tasked with making sense of consumer behavior, thought about changes in public perceptions of "good food." Published in *Food Processing*, this illuminating set of articles was contributed by the magazine's product development editor, Lauren R. Hartman. In June, for example, Hartman's "Riding the Free-From Movement" stated that food labels and ingredient statements are "under great scrutiny these days." She described consumers as "increasingly more discerning and educated when it comes to food and beverages" and wanting to avoid a variety of ingredients—gluten, soy, GMOs—while also wanting their food to be nutritious and taste good. Hartman noted that according to the chief sales and marketing officer of a leading maker of foods made with "No Artificial Anything," this growing interest in foods not containing undesirable ingredients or major

allergens was "part of a revolutionary change in the way people are eating."[1]

In an August article, "Food Color Evolves as Consumers Push for Cleaner Labels," Hartman talked about a "health-conscious" movement among "educated customers" who were "reading ingredient and nutritional statements for the foods they buy," prompting growing demand for natural colorants. The article explored the challenges product developers faced making this difficult swap, covered companies offering manufacturers natural colors, and discussed some high-profile switches that had been prompted by consumer demand. Kraft, for example, had recently pledged to remove artificial preservatives and synthetic colors from its macaroni and cheese by January 2016, and General Mills had set a goal for 90 percent of its cereals to have no artificial ingredients by the end of 2016, starting with reformulations for Trix and Reese's Puffs. Taco Bell's bright orange nacho cheese was soon to undergo changes as part of that company's pledge to eliminate artificial ingredients by the end of 2015. The article quoted that company's CEO: "Today's customers want simplicity, transparency and choice in the foods they eat. . . . They're also telling us less is más when it comes to ingredients, so we're simplifying with natural alternatives and staying true to who we are and what makes us unique."[2]

In September, Hartman's "Clean Slate for Clean Labels" reported "purer food formulation" was becoming standard and discussed the serious challenges this posed for product developers. According to Innova Market Insight's director of innovation, "Clean—or 'clear label' as Innova prefers to call it—is far past trend status. It's the new rule. Companies will have to do what they can to clean up labels or be as transparent as they can going forward." The article explained that understanding how clean labels "improve product appeal in consumers' minds can be used

to develop products with short, natural lists of real ingredients." While the meaning of "clean labels" was elusive, according to an analyst for the market research company Euromonitor International, "the food industry can't wait for official clarification. It has to react swiftly to changing consumer demands, which have translated into the by now well-established clean label movement."[3] In November Hartman submitted an infographic from the Hartman Group, an unrelated consumer research company, listing the labels and phrases that influence consumer purchases. The headline explained, "Today's consumers are increasingly aware of the personal, social, environmental and health consequences of the foods they consume. This is why . . . shoppers are likely to look for descriptions that speak to fresh, 'clean' or 'free of' ingredients, less processing and natural aspects of food."[4]

These articles, along with many others published around the same time, translated the critical challenge of the Real Food frame into actionable consumer insights. These were the same concerns about the food system and changes in perceptions of processed food discussed in chapter 1 as seen by trend analysts, consumer researchers, and marketing professionals whose job was to track and understand demographic and cultural changes and provide insights that manufacturers and marketers could use to make decisions about product development and marketing. In this context, concerns about "the personal, social, environmental and health consequences" of food that I have presented as a form of politics were quite literally "rendered technical" as they became mandates for ingredient makers to develop alternatives that would appear more natural or simpler on ingredient panels, for manufacturers to reformulate products to appear less processed, and for marketers to emphasize descriptors like "fresh," "clean," "real," "pure," and "natural" on the front of packages.

The marketplace was clearly an important arena in which the food industry and the public interacted on the question of whether processed food was good. At the center of this encounter was the allure of "natural" claims, for both the industry and the public, as a way to identify "good food." Promises of naturalness, both explicit and implicit, steadily gained momentum alongside the uptake of the Real Food frame. In 2008 sales for "all-natural" products were valued at more than $22 billion, up 10 percent from 2007 and 34 percent from 2004. "All-natural" was also the second most prevalent claim on new food products in 2008, and Innova identified the increased adoption of natural ingredients as its top emerging trend that year.[5] A 2011 survey by HealthFocus International revealed that almost three-quarters of US shoppers thought the term "processed food or beverage" had a negative connotation and that 77 percent were interested in natural foods.[6] In 2013 sales of foods certified as organic and labeled "natural" grew at a faster pace than sales in any other categories, and the natural products industry was worth more than $40 billion.[7]

While the appeal of naturalness was clearly powerful, legal uncertainty about the use of the term "natural" on food led many manufacturers to move away from explicit claims and turn to other means of appealing to processing-averse consumers. The FDA did not provide a formal definition of the term but had instead what it described as a long-standing policy of considering the term to mean "that nothing artificial or synthetic (including all color additives regardless of source) has been included in, or has been added to, a food that would not normally be expected to be in that food."[8] This vague definition, hinging on consumer expectations, resulted in a stream of lawsuits accusing companies of using the term in ways that did not align with the public's ideas about what would "normally be expected" to be in food. In

2007 the Center for Science in the Public Interest backed a class action lawsuit alleging that the "natural" claim on Kraft's Capri Sun beverages was misleading because they were sweetened with high fructose corn syrup and threatened to sue the makers of 7-Up regarding their introduction of a "natural" label.[9] Hundreds of actions along these lines continued in the ensuing years, with some going nowhere and others resulting in multimillion-dollar settlements.[10] Ben and Jerry's dropped the use of the term "natural" in 2010 after coming under pressure because its ice creams contained partially hydrogenated oil.[11] Twenty-five lawsuits were filed over "natural" claims in a six-month period of 2012 in California alone, targeting cane juice, vegetable glycerin, soybean oil, canola oil, alkalized cocoa, yeast extract, beta-carotene, folic acid, ascorbic acid, and high fructose corn syrup. Several cases claimed nutrition bars and granola were falsely labeled "all-natural," and a line of cases targeted major manufacturers such as ConAgra and Frito Lay for marketing their products as natural when they contained genetically modified corn or soybeans.[12]

While manufacturers and marketers continued to use "natural" and "all-natural" claims, many looked for ways to convey similar messages without the legal risks, thus contributing to the growth of a "clean label" trend. While not used on packages or other consumer-facing marketing, the term "clean label" was used within the industry to describe the growing trend. In business-to-business marketing, media, and other communication "clean label" described the attributes consumers influenced by the Real Food frame were believed to be looking for: simple ingredient statements, minimal processing, and a litany of free-from claims such as no artificial ingredients, no preservatives, and no GMOs. In 2013 the percentage of products bearing "all-natural" claims dropped to 22 percent, from 30 percent in 2010.[13] At the same time, the industry press reported on studies showing, for

example, that nearly three-quarters of consumers "find the idea that a product is made with the fewest number of ingredients very/somewhat appealing," 67 percent wanted "common names on the ingredient label," and 8 in 10 equated "preservative-free" with healthy.[14] By 2014 *Food Technology* reported that more than 20 percent of US products featured clean labeling of some kind.[15] As mentioned above, in 2015 the head of research for Innova proclaimed that clean labeling was "the new rule." That year Nestle, Kraft, General Mills, Panera, Taco Bell, Kellogg's, and Pizza Hut all announced plans to remove artificial ingredients from some or all of their products.[16]

This chapter follows the Real Food frame "through the looking glass," where it became natural and clean label trends. It explores an encounter between the food industry and the public that took place in the aisles of grocery stores but focuses on how the food products that appeared there—along with their claims and marketing—were shaped by the way the food industry imagined the public, including its relationship to science. It looks behind the scenes, at how the food industry struggled to make sense of, and profit from, consumer trends it viewed as existential threats. I focus on two interrelated arenas in which this struggle took place: product development and marketing, as depicted in the pages of leading food industry publications; and the regulatory arena, as depicted by a public comment process initiated by the FDA to determine the meaning of the term "natural" for human food.

THROUGH THE LOOKING GLASS: REAL FOOD IN THE MARKETPLACE

For the food industry, the Real Food frame presented product development and marketing opportunities that came with both pragmatic and existential challenges. Advertisements and articles

(many of which functioned much like ads) in *Food Technology* and *Food Processing* explored changing consumer wants, drawing on and promoting the work of consumer research companies. They also shared technical solutions, promoting ingredient companies and their offerings to manufacturers trying to market processed foods to the processed food averse. The publications reported that alongside all the new demands for foods to be healthy and have clean labels, consumers still wanted foods that were shelf stable and expected it to taste the same as it always had and have the right texture, mouth feel, and so on. As one author put it, food product developers had to "rely heavily on their ingredient suppliers to provide them with cleaner sounding ingredients that match their customer's requests. Developers must then creatively incorporate these new ingredients into existing products without impacting the final flavor and taste."[17]

Articles and ads described the technical challenges this presented and promoted solutions in the form of "label-friendly" colors, preservatives, sweeteners, starches, thickeners, gums, dough conditioners, and more. For example, a 2010 article about breakfast cereal and cereal bars described cleaner and simpler labels as a "primary objective" for product developers and profiled ingredients like Tate & Lyle's Promitor Soluble Corn Fiber, which is "not chemical sounding, and it's great for adding fiber and bulk while reducing calories and sugar."[18] A 2011 article about the future of baking announced "cleaner statements are coming out of the oven" and profiled ingredients like LycoRed's "SANTE" (Super Advanced Natural Taste Enhancer) that could be used to replace MSG and a new line of soybean-based products from Bunge Oil that undergo an enzymatic process to eliminate trans-fat because "nothing says clean label in baking like trans-fat free."[19] A 2014 article, "Label It Clean," profiled a host of new

ingredients designed to help brands create clean label formulas, such as new lines of "functional native starches" or "functional clean-label starches" from both Ingredion and Tate & Lyle that allowed manufacturers to remove "modified food starch" from the label and substitute it with ingredients that could simply be called "corn starch" or "rice starch."[20]

While these publications offered insights and strategies to help food manufacturers respond to the "revolutionary changes" in how Americans were eating, they were also full of nervous uncertainty about what consumers really wanted and what "real," "natural," and "unprocessed" meant to them. These were, after all, imperfect and very limited translations of the Real Food frame. As discussed in chapter 1, the Real Food frame was the result of heightened social pressure for people to be "good eaters" in the context of growing concerns about public health, sustainability, and risks related to the use of technology in food production. The concerns of a public moved to seek out "natural" and less processed foods in the grocery store, in other words, far exceeded those that could be met by those foods. In the pages of the industry press, Real Food's excesses often appeared as confusion and consternation about what consumers really wanted.

In 2011, the same year "clean label" was declared a "top trend," *Food Technology* published an article that captured some of the confusion and tension that arose as the food industry attempted to understand the Real Food frame through the lens of consumer research. Written by the head of research for Innova and the president of HealthFocus International, "Cleaning up Processed Food" included a lot of data pointing to worrying disaffection among consumers for processed food. The authors noted with dismay that "healthy and unprocessed are clearly linked in consumers' minds"; only 9 percent considered processed foods either "very

healthy" or "somewhat healthy." While the industry was increasingly turning to clean labels to make processed foods more attractive, the article also talked about how the meaning of "clean label" was unstable and dependent on consumer perceptions. "Clean label" was unregulated, undefined, and subject to a variety of meanings among ingredient suppliers, manufacturers, retailers, and consumers. However, the article noted, meeting the expectations of consumers was paramount, "because in the end the only thing that matters is if consumers repeatedly purchase the product."[21]

Consumer perceptions were, however, a great source of consternation; the way consumers thought about processed food and behaved in relation to it did not make very much sense to the researchers or the article's authors. For example, the article described a 2011 HealthFocus International study of five thousand shoppers that explored "how [they] define processed food; the factors they consider when determining whether a food or beverage is processes or unprocessed; and which brands do the best job of communicating clean label, healthy, and less processed." The survey results suggested "that the *perception* of processed has more impact on a shopper's opinion than does the actual processing that the product undergoes." While those within the industry had a technical understanding of processing, consumer attitudes reflected an understanding that was less literal and more symbolic, representing some of the broader concerns of the Real Food frame about health, sustainability, and risk. With a tone of both wonder and exasperation, the article noted, "Foods that go through processing by food industry standards, such as pasteurization and canning, are not necessarily considered processed by many shoppers." For example, according to the research only 16 percent identified Progresso tomatoes as processed. Even fewer

said Silk soy milk was processed, "which is surprising," noted the authors, "when you consider this is a fluid product extracted from soybeans." There was more than a hint of the deficit model of the public understanding of science in these reactions.[22]

Shoppers' opinions of products also seemed to be influenced by "perceptions of healthfulness, product purity, and clarity of package information" that were unrelated to processing as it was understood within the industry. For example, consumers thought low-calorie frozen meals were less processed than standard frozen meals, "whole grain bread trumped white bread," and organic yogurt was considered less processed than conventional. As the article explained, "All of these similar products were most likely manufactured in the same way, yet, because of labeling they are viewed as being less processed." From their vantage point, processing was a technical process that could be evaluated in terms of its extent and kind, not a signifier of broader concerns about food and the food system that could be expressed in other ways such as through environmental stewardship (organic yogurt), health-promoting whole food ingredients (whole grain bread), and addressing public health concerns (low-calorie meals).[23]

Observing the dissonance between what the public appeared to care about when it came to food and what natural and clean labels actually delivered, Nadia Berenstein describes clean labels' "dirty little secret": what seemed on the surface to be the "unprocessing of processed food" was made possible by "the very latest advancements in food science, with a futuristic supply chain working overtime." More importantly, these products did very little to address the actual concerns of consumers; clean labels were a way of "virtue signaling" without delivering any actual virtue. According to Berenstein, they said very little about health or any of the other factors that mattered to consumers,

such as "food justice, accessibility, environment impact and labor conditions."[24] Similarly, David Scheifler and Michaela DeSoucey argue that advertisements in the business-to-business press both adopted and transformed the broader critiques of what they call the "good food" movement. The ads focused narrowly on health, ignoring structural critiques of the food system and claiming that processed foods could be healthy if formulated with the right ingredients. They did not address good food movement concerns about pesticide use, labor conditions, inequitable access to nutritious foods, or localized ownership of production. Instead, they deflected these concerns and suggested that the industrial food system could answer these critiques by providing healthier, "natural," and "clean" food.[25] Clean labels, in other words, enacted antipolitics by treating the broad concerns of the Real Food frame (or good food movement) as consumer demands that could be met by removing artificial ingredients, constructing ingredients lists that were short and familiar, and using terms like simple and fresh on packages.

Furthermore, the industry press projected imaginaries of the public that were antipolitical because they assumed that people were looking for "real food" not because they had legitimate concerns about processed food or the industrial food system but because they were irrational, misinformed, and even antiscience. Even while many articles described consumers as educated, informed, and empowered, deficit thinking lived on, as articles debunked consumer concerns and dismissed them as unnecessary at best. Articles exploring the technical challenges involved in creating clean label products expressed frustration about working around irrational fears and misinformed desires. For example, a *Food Technology* article titled "Coloring Clean Labels?" offered a detailed critique of every major study pointing

to negative outcomes from artificial colors, beginning with the Feingold hypothesis, popularized in 1970, which had linked colors to hyperactivity in children. The article reminded readers of the importance of coloring for how food was experienced and pointed to the problem facing the industry: "What are popularly termed 'artificial colors' are overwhelmingly viewed as safe food ingredients by every major public health regulatory body in the world, yet nearly 50% of consumers believe these ingredients to be unhealthy." It listed companies that were removing artificial colors, such as Kraft, which had recently pledged to remove #5 and #6 from its "iconic macaroni and cheese," noting that more would likely "jump on the bandwagon" to respond to these unfounded consumer demands for foods without artificial colors. After all of this, the article ended with the requisite nod to the product development opportunity, noting that food technologists would have to figure out how to provide "appealing 'natural' colors that are stable within various processing environments."[26]

A 2015 *Food Processing* article written by a product developer lamented that there were "many healthy ingredients out there in the food scientist's tool kit that the consumer does not perceive as healthy only because those products are described in unfamiliar or vague terms." It discussed the challenge posed when today's "earthwise" consumers believe they want efficient, cost-effective ingredients removed from food products, such as modified starches, artificial flavoring, and chemical preservatives. It also talked about consumers who "wrongfully conclude that natural ingredients with complicated-sounding names must be artificial or 'bad for you,'" as well as "uninformed food bloggers [who] relay false information to the public, causing unnecessary concern."[27]

A pressing question facing the industry was whether ceding to these demands, which were seen as irrational and based

in knowledge deficits, was more dangerous than it was worth. A senior writer and editor for *Food Technology* addressed this issue in a 2014 article, "Quest for Clean Labels Cause Murky Legal Actions." He questioned whether it was prudent to tweak ingredients to label products "natural or all-natural," despite a growing consensus that consumers "want to see fresh, natural ingredients on short, clear lists." Though asked in the context of a discussion of growing legal challenges to natural claims, he wasn't looking for a legal answer to the question. He turned to Fergus Clydesdale, Distinguished Professor of Food Science at the University of Massachusetts, Amherst, who articulated a frank Real Facts perspective. According to Clydesdale, by promoting natural foods as better the industry risked not only damning many of its own offerings but also ceding the ground of truth to consumers who clearly did not understand the most basic scientific facts. He explained, "Sometimes the food industry shoots itself in the foot: [Food companies] label something as natural, which implies that something is wrong with [their] other products.'" This was especially true "when one considers that everything on Earth, including fresh air and water, is made of elements itemized in the periodic table—i.e., chemicals." According to Clydesdale, "'If the FDA made a law about listing all of the ingredients for raw foods, there would never be another demand for natural foods.'"[28]

In 2015 the editor in chief of *Food Processing*, David Fusaro, also took up the controversy over the status of science in the midst of the natural and clean label bonanza in an opinion piece provocatively called "Science Doesn't Matter." He noted that "acceding to consumer demands seems to get more scorn and criticism than it does praise among industry professionals. Why? Because science doesn't back up some of the crazy notions these consumers get in their head. High fructose corn syrup is more fattening than

sugar? Synthetic colors cause autism? Antibiotics in farm animals are creating antibiotic-resistant infections?" While these ideas may be ridiculous in the eyes of experts, he acknowledged that the industry had to nonetheless face the fact that the public's concerns did not come out of nowhere: "Something has gone wrong lately, somewhere in our lives or the environment or we would not have autism, obesity and superbugs." He went on to explain that regardless of what the cause was and whether it was rational to turn to clean labels as a solution, "at the very least it's always good business to 'give the lady what she wants' . . . and clean labels are what at least a segment of the consuming public wants."[29]

Fusaro went on to applaud recent commitments among major manufacturers to remove artificial colors and flavors from macaroni and cheese (Kraft), replace aspartame in diet colas with natural alternatives (PepsiCo), and stop using human antibiotics in broiler chickens (Tyson). Then he described the kind of conflict that likely went on behind the scenes of these companies, as leaders struggled to align deficit-driven imaginaries of the public with the need to satisfy consumer demands: "I strongly suspect that scientists and leaders at each of those companies disagree with the logic behind these decisions. They undoubtedly have full faith in the science that led to the use of those ingredients in the first place. But two facts remain: 1. Consumers want things to happen. 2. Replacing these ingredients can happen." The article ended with the author's somewhat pained and clearly conflicted thoughts on the tension between unreasonable consumer demands and scientific authority, noting, "in the beginning science may matter . . . but in the end, it doesn't."[30] It is unclear exactly what Fusaro meant by "the beginning" and "the end," perhaps that science matters for product formulation (the beginning of the product development process) but not for marketing

(the end), or maybe that science once mattered but does not anymore. In either case, "Science Doesn't Matter" revealed some of the complexities behind the supposed simplicity of "clean labels." Not only were their short, simple ingredient lists and free-from claims a distraction from the highly technical processes that were required to produce them, but their cheerful marketing to the "educated" consumer belied the industry's deficit-driven anxiety that doing so presented a threat to science, on which it rested its own claims to authority.

REGULATING "NATURAL"

The tensions that surfaced in the industry press as manufacturers responded to the Real Food frame in the marketplace also erupted in a debate over whether the use of the term "natural" should be more tightly regulated by the FDA, and if so, how. What should it mean when it appeared on a food product? Whose opinions and what kind of knowledge mattered when it came to deciding if and how to regulate the use of the term? District courts handling misbranding lawsuits related to natural claims had long implored the FDA to provide greater clarity, and pressure mounted in 2014 when the FDA received contesting citizens' petitions on the subject. In March, the Grocery Manufacturers Association (GMA), a trade group representing over three hundred consumer packaged goods companies, petitioned the FDA to issue a regulation clarifying that "natural" foods can contain ingredients derived from biotechnology. The petition argued that the FDA had a long-standing position that foods derived from biotechnology are just as safe as traditional foods, that biotechnology does not change the essential nature of a food, and that plant breeding methods are "not material information for the purposes of labeling or advertising a food." Therefore, it argued, a "natural" claim would be neither

false nor misleading on a food derived from biotechnology solely because it had been so derived. Reflecting the food scientism of the Real Facts frame, the GMA petition also argued that the question of what "natural" should mean was a scientific one, best addressed by experts, and portrayed any argument against considering the products of biotech natural as "illogical." The petition described the regulation of the term as a "complex scientific issue that deals with molecular biology, chemistry and nutrition science" and argued that "the FDA has extensively developed agency expertise and agency resources that put it in the best position to address 'natural' labeling for foods derived from biotechnology."[31]

A few months later Consumers Union, the lobbying wing of the Consumer Reports National Research Center (which publishes *Consumer Reports*), submitted a petition requesting that the FDA ban the use of the term "natural" on food products on the basis that it was misleading to consumers and caused confusion with the much more strictly regulated "organic" label. If the agency declined to ban "natural" claims, Consumers Union requested that the FDA require any product labeled "natural" to also be certified organic, which would guarantee that "natural" claims would not be allowed on foods containing or derived from the products of biotechnology. According to its research, the majority of consumers believed that "natural" on the label meant, or thought it should mean, that no toxic pesticides, GMOs, antibiotics, artificial growth hormones, artificial ingredients, or chemical processing aids were used. Consumers Union argued that the FDA's process should be driven by the public's expectations rather than scientific expertise and criticized the GMA proposal as "out of line" with those expectations.

After receiving additional petitions from the Sara Lee Corporation and the Sugar Association, in fall 2015 the FDA announced the opening of a docket to receive information and public comments

on the use of the term "natural" in the labeling of human food products. This effort to seek guidance from the public on the question of a meaningful definition of "natural" followed a failed attempt in 1991 to do the same. At that time the FDA decided not to engage in rule making following a comment period that, according to the agency, failed to provide the FDA with "a specific direction to follow for developing a definition" of the term. Instead, the FDA decided to maintain its existing policy of interpreting "natural" to mean that "nothing artificial (including all color additives regardless of source) has been included in, or has been added to, a food that would not normally be expected to be in the food."[32] In the 1991 process the FDA did not even consider agricultural production methods and did not explicitly address processing. In 2015 those issues were not only on the table, but at the center of it.

In its Proposed Rule document notifying the public of its request for comments, the FDA asked if it should prohibit or define the term "natural" and then posed a series of questions about what types of foods should be allowed to bear the term if it is defined, how consumers currently understand the term, and what kind of education and enforcement they should consider. Among the questions were the following: Should only raw agricultural commodities be allowed to bear the term? Only single ingredient foods? Or also multi-ingredient foods? Do consumers confuse "natural" with "organic"? Should production practices used in agriculture be a factor? Do consumers associate or confuse "natural" with "healthy"? Should manufacturing processes be considered? Should the term apply only to "unprocessed" food? If so, how should "unprocessed" and "processed" be defined? Should the manner in which an ingredient is sourced be considered? How can we ensure consumers understand what the term means and it is not misleading? Are there public health benefits to defining the term? Should "natural" have nutritional

benefits associated with it? How should we determine compliance with any criteria for bearing the term?[33]

The rest of this chapter explores the approximately 7,690 comments that the FDA received in response to these questions during the time the docket (FDA-2014-N-1207) was open, from November 12, 2015, to May 10, 2016. The docket received comments directly in the online interface, largely from lay members of the public, and as attachments on letterhead from corporations, trade groups, NGOs, and others with professional stakes in the debate. As described in the introduction, I worked with these two types of submissions separately, using a computational process to identify themes in the online comments and traditional qualitative methods to code and thematize the attachments, which were fewer but much longer. After identifying the key themes in each data set, it became clear that for the most part the comments from the lay public articulated arguments about what "natural" should mean and how it should be regulated that expressed the critical challenges of the Real Food frame and urged the FDA to regulate more strictly so that "natural" could be meaningful rather than misleading. The public was joined and supported in these demands by consumer advocates as well as corporations and trade groups in the organic sector, whose commercial interests aligned with public perceptions. The attachments were dominated by corporate perspectives that pushed back against these demands, arguing that the FDA should be guided by science rather than the ill-informed perceptions of the public.

"NATURAL" AS A CRITICAL CHALLENGE

From the perspective of many individual members of the public as well as consumer advocates who submitted comments to the FDA, the problem with foods labeled "natural" was that the

public wrongly believed they were more aligned with their concerns about and aspirations for the food system than they really were. From this point of view, the public was seeking to avoid processed food because of the overlapping concerns about health, sustainability, and risk related to technology in food production discussed in chapter 1. They were turning to "real" and "natural" food to act on these concerns and aspirations, but the term was being used in misleading ways and not delivering on these expectations. Thus, the FDA needed to step in to either ban or more strictly regulate use of the term.

This perspective was articulated in and supported by the work of Consumers Union, which influenced the docket both in its own submissions (including its initial citizens petition, an extensive comment, and a petition) and in publishing its research on consumer opinions about what "natural" should mean in *Consumer Reports* and rallying the public to submit comments to the docket. In the comment summitted to the FDA, Consumers Union wrote, "Consumers who buy food with the 'natural' label feel strongly about health, safety and environmental objectives." It described consumers as interested in issues "such as avoiding foods grown with pesticides, foods processed with chemical processing aids, and foods containing GMOs and artificial ingredients" and pointed to data showing that the intensity of interest in these issues had steadily increased across its 2014, 2015, and 2016 studies. During the time the docket was open, it published an article in *Consumer Reports*, which it also submitted to the docket, noting that according to its research 62 percent of shoppers usually buy foods labeled "natural," nearly two-thirds believe it means more than it does, and nearly half incorrectly believe natural claims have been independently verified. People wanted "natural" to mean no chemicals used

in processing, no artificial ingredients, no toxic pesticides, and no GMOs. A majority of shoppers (more than the previous year) cared about supporting local farmers, reducing exposure to pesticides in foods, protecting the environment from chemicals, and providing better living conditions for animals.[34] Consumers Union also submitted a petition with over 242,000 signatures stating that "natural" labels led consumers to believe the food they buy does not contain such things as artificial ingredients, GMOs, pesticides, and hormones but that without oversight or enforcements, companies can use the label deceptively on almost any food. It urged the FDA, "Fix it or drop it!"

From the perspective of Consumers Union, "natural" labels had the potential to help consumers act on their concerns, values, and aspirations related to the food system. For them, along with others who saw the public (or themselves) as trying to act on legitimate concerns by choosing food labeled "natural," confusion with the label "organic" was a central concern. Prompted by the initial petitions from the GMA, which advocated the inclusion of biotechnology, and Consumers Union, which highlighted confusion between what was natural and what was organic, the FDA had solicited comments on whether production practices used in agriculture should be considered relevant to natural claims and whether consumers confused "natural" with "organic." These questions and their answers were deeply intertwined, because the National Organic Program (NOP) already provided a regulatory mechanism for designating foods produced without the use of biotechnology and synthetic pesticides.[35] As Julie Guthman has shown, organic agriculture and marketing evolved from a social movement driven by alternative values and aspirations for the food system into a massive industry, held together by a USDA certification program focusing on allowable agricultural

inputs and practices.[36] "Organic" labels verified that foods were produced without certain synthetic inputs and without biotechnology. The label may not have meant everything the public imagined, or wanted it to mean—research has shown that many assume organic food is more natural, healthier, and safer—but it was a highly regulated claim, expensive to attain and lucrative to deploy.[37] Thus, companies and trade groups representing the organic industry argued that the meaning of "natural" should be more tightly regulated to align with public perceptions and avoid confusion with organic foods.

The Organic Trade Association (OTA), for example, submitted a forceful fourteen-page argument citing its own consumer studies, Consumer Union's surveys, and research conducted by the Organic and Natural Health Association, all of which showed that consumers were being misled by natural claims. According to the OTA, "As food companies and marketers currently utilize it, the term has misled consumers by implying a slate of benefits that are simply not borne out by current regulations or verified under a product certification program." They made the threat to the organic industry clear: "Allowing companies to use the term 'natural' in a way that can be conflated with 'organic' by consumers misleads consumers about the nature of the food they purchase for their families, and free-rides on the hard work of the certified organic industry in creating, abiding by, and educating consumers about a robust set of standards." Cropp Cooperative, "the nation's largest organic, independent farmer-owned cooperative," described "natural" as "one of the most abused and misunderstood claims currently in use," explaining that consumers perceive "natural" as not only equal to, but in some cases "of higher value or integrity than organic." "Yet this perception is not the reality," the cooperative stated.

Based on these concerns, companies and trade groups seeking to protect the value of organic labeling urged the FDA to either ban or very strictly regulate use of the term, making it much harder—if not impossible—for "natural" to appear on food products. Two basic themes emerged across the comments they submitted. Some argued that the best protection for "organic" was to ensure that "natural" not be allowed to pertain to agricultural production, while others argued that "natural" products should be required to be certified organic and then meet additional standards. The OTA, whose position was also taken up in comments submitted by many of its members, argued that "natural" should be banned and replaced with single-attribute claims such as "no synthetic ingredients," "minimally processed," or "produced without the use of GMOs."[38] Their perspective was that the "natural" label should never be allowed to include production practices because those were already covered by the National Organic Program. Others, following the lead of Consumers Union, advocated for a different solution. The National Organic Coalition, the Organic and Natural Health Association, and the Organic Seed Growers and Trade Association, among others, argued that "natural" should be banned but that if it was not banned it should incorporate organic certification. In this "organic plus" framework, products claiming to be all-natural first would have to be certified organic and then meet additional requirements to align with consumer expectations of artificial and synthetic ingredients. As the comments explained, this would entail clearly defining "artificial" and explicitly excluding products containing nano materials or produced through synthetic biology or genome editing, as well those containing artificial and synthetic vitamins.

The comment advancing perhaps the most explicitly political and optimistic view of what "natural" could be, if properly

regulated, was submitted by the Organic and Natural Health Association, which described itself as representing consumers, retailers, and corporations working together to create "a new paradigm of trust between consumers and the natural health industry."[39] Drawing on a 2015 consumer research study conducted by the Natural Marketing Institute, it argued that consumers of natural food were seeking to have the same kind of impact on the food system that consumers of organic food were seeking to have, but they were being misled into buying natural products. They concluded that consumers "are seeking a 'true' natural definition that mirrors organic" and argued that the FDA should adopt a natural standard that "ensures a continual improvement of the food system by supporting" a comprehensive set of values and practices. This included "reducing the amount of toxic chemicals used to produce food or used as food ingredients," using production methods that don't require synthetic fertilizers or toxic pesticides, accounting for "external costs of human disease, animal confinement, environmental degradation, and community dissolution," and promoting "sustainable farming and consumption that meets present needs without compromising the ability of future generations to meet their needs."

Like the corporations and trade groups seeking to make "natural" a meaningful way for the public to act on the concerns of the Real Food frame in the marketplace, many individual members of the public urged the FDA to ban the term or make it much more difficult to use. Comments submitted by individuals asserted the values and concerns that motivated people to seek out natural foods, castigated the industry for using "natural" claims in misleading ways, and called on the FDA to prioritize consumers and regulate the term to ensure its meaningfulness. These comments were different from those submitted by corporations and trade

groups because instead of focusing on regulatory technicalities and angling for a definition that aligned with their business interests, they tended to debate the meaning of "natural" as both a marketing term and an ideal. In many cases, they articulated ideas about what natural meant or should mean that were illogical from an industry point of view because they did not translate to the context of food production. From a Real Facts perspective, they were irrational, emotional, based in a lack of scientific knowledge and understanding. From my perspective, they were operating on an ideological level and articulating a critical challenge rooted in a refusal of the way things were. My analysis emphasizes how individuals asserted lay expertise and authority in a context they perceived as unfairly influenced by industry interests and scientific authority.

I understand these comments as part of a long history of natural food proponents expressing oppositional politics and identities while also challenging established forms of power and authority. Warren Belasco, for example, describes the oppositional politics of a 1970s countercuisine that expressed many of the same values as the counterculture by eschewing "plastic" food in favor of "natural."[40] Michael Kideckel illuminates a long history of food activists using the language of nature to claim authority for themselves over and against formal expertise.[41] Laura Miller's history of the natural food movement shows that natural food proponents have historically challenged assurances of safety about the conventional food supply from established scientific and medical authorities and questioned "the very basis of professional authority."[42] In addition, scholars working across fields have discussed the semiotic flexibility and power of the terms "nature" and "natural."[43] Anders Hansen notes in his analysis of media coverage of genetics and biotechnology, that "nature" has

a remarkable ability to accommodate contradictory meanings; Raymond Williams called it "perhaps the most complex word in the language."[44] While this semantic richness makes "nature" an extremely powerful construct, "natural" may be even more powerfully ideological, often being used to evoke non-negotiability and preempt further discussion.[45]

In response to the complex, layered questions posed by the FDA about what "natural" should mean, many individuals told the agency to simply "look it up." Many comments included or consisted entirely of dictionary definitions of *natural* or links to them. The *Oxford English Dictionary* (*OED*) was frequently cited: "existing in or caused by nature; not made or caused by humankind." As was *Merriam-Webster's*: "existing in nature and not made or caused by people: coming from nature: not having any extra substances or chemicals added: not containing anything artificial: usual or expected." One person wrote, "Only a corrupt organization would need someone to explain what the obvious definition of 'natural' means," then cited both the *OED* and *Merriam-Webster* definitions. In addition to citing the dictionary, others wrote comments such as: "Why are we needing to define a word that already has a definition?"; "This is not a real question right?"; "Seriously, go to the dictionary and look up 'natural.'" Comments about the sheer obviousness of the meaning of *natural* contested the scientific expertise powerful companies and trade groups would leverage, asserting that no such expertise was necessary to know what it meant or should mean.

Individuals also frequently asserted that "natural" should ensure that foods were produced without science, technology, and scientific expertise. "Nothing chemically derived in a laboratory is natural," commented one person. "If something was done in a laboratory it is not natural," wrote another. One comment began,

"If the food is whatsoever handled by a scientist and changed from its original state or modified from how it came to be from nature then it is not natural." While this logic ran through the comments submitted by individual members of the public, it was especially prevalent in arguments against allowing foods produced using genetic engineering to bear the term "natural." Comments like this one captured a widely shared sentiment: "Anything created in a laboratory is not Natural, so GMOs are not natural. . . . Natural should mean nothing man made. Natural should mean nothing that was created in a laboratory." One person commented, "Nothing that is created in a lab and can only be created in a lab by a trained person with specific and advanced equipment should be called natural. Genetically Engineered Organisms can only be created in a lab through the use of advanced scientific knowledge and equipment and therefore is NOT natural." Another wrote, "It doesn't take a scientist (or, perhaps, it does) to tell you that if some biological material was tinkered with in a lab then 'natural' is far from what it is!! Nature produces what it will, hybridization included. Laboratories do not produce a natural product."

While these were exactly the views on genetic technologies that those influenced by the Real Facts frame dismissed as emotional and irrational, through them the public asserted its own authority by claiming that "natural" food is not something that could be created by or should be governed by experts; in other words, they leveraged the ideological power of "natural" to contest the ideological power of "science." As Hansen notes, uses of "nature" are ideological "in the sense that they serve ultimately the purpose . . . of presenting particular views" as right. Hansen argues that "natural" serves as a "discursive stopper," invoking a sense of non-negotiability and preempting further questioning.[46] Describing something as "natural" shuts down discussion,

implying "'we all know what this means or 'this does not require scientific knowledge.'"[47] Comments submitted by the lay public harnessed this ideological power to assert commonsense meanings of "natural" and to invoke their non-negotiability. Thus, while they may appear antiscience through the lens of the Real Facts frame, these comments were more accurately anti–food scientism. They contested the ideological power of science as a vague but powerful signifier of authority and used the ideological power of "natural" to present the views of the lay public as right and beyond further questioning.

Comments submitted by individual members of the public also addressed the issue of power and authority in the food system directly, pointing to collusion between industry and the government and expressing frustration about uneven power dynamics. The docket was an opportunity for the public to speak directly to the FDA, vent anger and frustration, and demand that the FDA take their concerns seriously. One comment asked sarcastically, "Should the FDA do anything? No, we should have a government that just stands by, collects a paycheck, and watches major food corporations lie to consumers." Another demanded, "You need to label food with the correct ingredients and stop allowing companies to poison Americans." Many of the comments that expressed the most anger about power dynamics implicitly or explicitly concerned the possibility that foods produced using genetic engineering might be allowed to bear natural claims.[48] One argued, "There is nothing natural about it! Stop poisoning our people!! Do your jobs and listen to the people instead of being bought and paid for"; and another wrote, "Label GMOs and stop taking bribes." Many comments were laced with similar outrage that the FDA seemed to work for the industry rather than consumers. "Who does the FDA work for?," asked another, before accusing

the agency of supporting the "greed of the industry" that earns "its millions" deceiving consumers. One person wrote, "I have given up completely on you guys. WAKE Up and do your JOB. Protect the people stop trying and letting companies find loopholes around telling the public what we put in our bodies. The amazing part is your guys let it happen."

Seen through a Real Facts lens, comments from the lay public arguing that "natural" should mean what it already obviously meant and that no expertise or science was necessary for defining it would likely be taken as further evidence of the public's lack of understanding of the scientific and technical aspects of food production. These were exactly the misinformed expectations and antiscience sentiments that the industry press was wringing its hands about. But while the public may have embraced notions of what the term should mean that were impractical from an industry perspective, they were not antiscience so much as they were anti–food scientism. They asserted lay authority over the question of what "natural" should mean, contested the role of scientific expertise, and brought power dynamics—that is, politics—to the fore. Along with the comments from consumer advocates and trade groups aligned with a consumer-driven definition of *natural*, these comments took the concerns of the Real Food frame seriously and urged the FDA to do so as well.

DEFINING *NATURAL* THROUGH "SCIENCE-BASED REASON"

For companies and trade groups influenced by the Real Facts frame, the problem with natural foods was not misleading marketing but misinformed consumers and their advocates whose unreasonable expectations might cause the FDA to take up a

restrictive definition that harmed their commercial interests. Even though these comments differed on how exactly *natural* should be defined and regulated, they shared a central argument that "science-based reason" should prevail over irrational consumer expectations when it came to determining the use of the "natural" label on food. Driven by food scientism, these comments claimed science as a source of authority to set policy and made the case for asserting this authority over and against uninformed or misinformed consumer perceptions.

The FDA's mandate to prevent misleading labeling, along with the fact that the existing policy on labeling foods "natural" hinged on consumer expectations, meant that public perceptions of "natural" had to be contended with even if they would ultimately be overridden. As discussed above, organic interests, consumer advocates, and the lay public all argued that consumer expectations should be the central consideration in defining what was natural. For conventional food businesses and the trade groups representing them, however, negotiating consumer expectations was more complicated. It often entailed acknowledging the importance of the public's perceptions while urging the FDA to prioritize scientific reason. The comment from the American Bakers' Association (ABA), for example, navigated this balancing act by arguing that the policy on natural foods should be based on evidence from "both science (as appropriate) and concrete consumer research." It argued that the FDA needed to thoroughly understand what consumers think natural means—"particularly on clearly processed food products such as bread or baked goods"—and suggested it conduct consumer research studies to do so. But the ABA also argued that in cases where expectations were "unreasonable," the FDA should educate consumers to align their expectations with a rational use of

the term. They explained, "To the extent that consumer expectations may be unreasonable or inappropriate, the FDA should not be bound by them, but instead should remain science- or evidence-based and educate consumers about a more appropriate understanding of 'natural.'" This approach, they explained, would "provide consumers with more scientifically valid information about the food they eat." As an example of "unreasonable or inappropriate" consumer expectations, the ABA pointed to the expectations that might hinder their members' use of the term "natural": "when a 'natural' claim is made on a food that obviously has been processed (e.g., bread that has been baked), any consumer expectation that such claim must mean that the food is unprocessed is not reasonable."

The Sugar Association argued, similarly, that the definition of *natural* needed to be based on "the preponderance of scientific evidence." The association, which represented sugarcane and sugar beet refiners and farmers, elaborately described public knowledge deficits in making the case that the regulation must be science based rather than conform to consumer expectations. They described consumers as having "an inherent lack of knowledge about food ingredients, food technology and food ingredient terminology" that placed them at a "disadvantage when trying to evaluate when a product or ingredient is 'natural.'" They maintained that surveys purporting to report on consumer expectations were unreliable because consumers "often base answers to complicated questions on limited knowledge of complex processes and systems." Consumers must rely, therefore, "on the oversight of regulatory agencies to provide clear, concise and science-based regulations." Driving home these deficit-driven arguments, the comment continued, "It is the duty of experts to ensure that any evaluation of a definition for 'natural'

is undertaken within the proper context of the food supply and food technology, and is accurate and science-based to ensure that consumers are not misled based on opinions that are not supported by facts."

While scientific knowledge was certainly relevant to many of the questions posed by the FDA about natural claims, the question of what the term "natural" should be allowed to mean in the marketplace for food was not one that could be answered scientifically. For example, the central question of whether production practices used in agriculture should be a factor in determining the use of natural claims was blatantly a question of judgment, and a highly charged one at that. Similarly, whether manufacturing processes should be considered and if so, how "processed" and "unprocessed" should be defined and whether the manner in which an ingredient is sourced should be considered were also not questions that could be scientifically determined. Arguments that the question of what *natural* should mean could and should be answered scientifically reflected a larger shift in the role of science in public life, as described by Wynne, from informing policy to determining what kind of information matters and defining acceptable (i.e., "reasonable") public interpretations and concerns. Comments shaped by the Real Facts frame conjured science as what Wynne and Ian Welsh have called a "catch-all signifier of authority" and treated the project of defining *natural* not as a public issue *involving* science but as one that should be defined by it.[49]

As they answered the questions posed by the FDA about where the line should be drawn between natural food and food that should not be allowed to bear the term, companies and trade groups advocated every possible position based on their being scientific, even though the logic rarely involved the application of specific scientific or technical knowledge. For example, many

comments argued that there was a rational, scientific basis for determining a definition of *natural* based on the extent of processing involved and whether the basic composition of the food had been changed. Trade groups representing pistachio growers, frozen food makers, seasoning manufacturers, and juice producers, as well as corporations supplying stevia, sugar, algae, and more, made the case that processes that do not change the "fundamental nature" of the product or its "natural character" or "molecular structure" or "original chemical form and structure" should be allowed to be considered natural.[50] Pistachio growers, for example, systematically made the case that roasted, salted, and flavored nuts should be considered natural because "flavoring does not alter the genetic or biological make-up of the nut" and roasting "does not alter the structural make-up of the product." Similarly, the Sugar Association advanced this perspective in seeking to protect its distinction as natural in contrast to high fructose corn syrup.[51] It argued that starch-based sweeteners were not natural, despite being derived from a natural source, because processing changes the molecular structure of the raw material from which it was physically separated. While these arguments advocated a determination of natural food that could be made scientifically (i.e., whether or not the original chemical form or structure of a food had been changed), the argument that the determination *should* be made in this way was itself subjective and driven by the specific interests of those advocating for it.

Commenters bolstered these scientistic claims to authority by also arguing that their positions were in the public interest. As David Hess explains in his work on "undone science," in the context of contestation over visions of desirable futures competing parties often express their positions in terms of the public good. He explains that members of the "official public"—that is,

incumbents in political, industrial, or other social fields—generally support their positions not by arguing how their own interests will be advanced but by arguing that "their position is the best road toward the goal of producing an outcome in the broad public interest."[52] Furthermore, as Claire Marris argues in her analysis of communication and public engagement initiatives related to synthetic biology, scientific institutions routinely "see 'public attitudes' as a major obstacle to the field that needs to be surmounted in order to deliver its 'public benefit."[53] While comments to the FDA from trade groups and corporations were generally very explicit about the business interests at stake, they also frequently argued that their position on how "natural" should be used was in the public interest and that public perceptions should be overcome, if need be, to provide this public benefit. According to their logic, "natural" was such a compelling marketing term that disqualifying ingredients or technologies that made products safer or more nutritious from being called natural was a threat to public health.

Commenters marshaled science-based authority and argued that public objections needed to be overcome for the sake of the public good when it came to whether technologies that reduced safety risks or added vitamins should be considered "natural." According to the Juice Products Association, for example, pasteurization, heating, freezing, high-pressure processing, and irradiation should not disqualify a food from using a "natural" claim because they reduced or eliminated food safety risk, and "it would be contrary to public policy to force foods in the 'natural' segment to sacrifice food safety." The National Seasoning Manufacturers Association wrote that "any approved treatments that make the product microbiologically cleaner and safer for consumers should not impact the 'natural' status of the product."

Thus, they argued, "FDA-approved microbial reduction process, which currently includes ethylene oxide, irradiation, steam and propylene oxide" should be considered acceptable for use in products labeled "natural." Using the same logic, the National Turkey Federation argued that "use of chlorine in the chiller (and other processing aids such as chlorine dioxide and acid rinses)" should not disqualify a product from being labeled "natural." It urged the FDA to consider the potential economic impacts of an "inappropriate definition" and argued that the ability of the industry to "adopt new technologies to improve the safety of their products is very important and should not be hindered" by disqualifying a product from being labeled as natural.

Commenters made similar arguments in favor of exempting synthetic vitamins from disqualifying a product from being considered natural. The Council for Responsible Nutrition, a trade group representing ingredient suppliers and manufacturers in the dietary supplement and functional foods industry, acknowledged that the current policy on natural food "hinges in part on the absence of synthetic ingredients" but argued that essential nutrients should be exempted from having to meet this qualification because of their importance for the health of the population. They noted that because consumers increasingly seem to be "substituting fortified foods with those that are fresh or minimally processed, made from all-natural ingredients, or organically grown, the prevalence of under-nutrition might increase across the population unless natural and organic foods are fortified with vitamins." Similar arguments were made by a wide range of corporations and trade groups, including the GMA, the National Restaurant Association, Unilever, the Enzyme Technical Association (representing enzyme makers), Citrus World (a grower's cooperative), the Juice Products Association, and the International Dairy

Foods Association. Like the Council for Responsible Nutrition, the GMA argued that an exception to the no-synthetic-ingredients component of "natural" should be made for fortification with synthetic vitamins because "there is a clear benefit to not stigmatizing the addition of vitamins and minerals to foods in relation to the use of the term 'natural' on a food or ingredient label." While these arguments were made in the name of the public good, they were also based in self-interest, and while applying forms of scientific knowledge, they also enacted food scientism by extending the purview of science beyond those forms of knowledge to a general sense of authority over meaning and policy.[54]

All these themes—the deployment of science as a catchall signifier of authority over both meaning and policy, bolstered through alignment with public interests, and asserted over and against public deficits of knowledge and understanding—were especially evident in comments addressing whether agricultural practices should be relevant in determining whether a product could be called natural. As discussed above, the competing citizens' petitions filed by Consumers Union and the GMA made this question central to the negotiation and brought controversy over the relationship between scientific authority and public perceptions to the fore. Consumer research—including Consumer Union's widely cited studies—suggested that most consumers mistakenly conflated "natural" claims with organic certification, but those companies and trade groups who were using "natural" on the products of conventional agriculture and / or biotechnology sought to protect their ability to do so. They criticized the Consumer Union survey results as methodologically flawed and unreliable, cited their own studies suggesting that consumers perfectly understood the difference between natural and organic, and advocated a "harvest forward" approach in which agricultural practices would be considered outside the scope of natural claims.

In its comment, for example, Tyson noted that many organizations submitting comments to the FDA claimed to speak for or understand the desires of consumers, but, they warned, "such claims should be viewed with skepticism in the absence of reliable survey data. As the FDA knows well, not all consumer surveys are created equal. Some surveys are designed to produce results to support a pre-determined point of view or political agenda." The comment went on to name the surveys submitted by *Consumer Reports* as "potentially biased" and to assert that Tyson, "on the other hand, is in the business of meeting, rather than shaping, consumer expectations." According to Tyson's survey of over five thousand consumers, 93 percent "profess to either 'exactly' or 'generally' understand the meaning of 'natural' claims on meat and poultry products." Furthermore, they found that consumers "typically do *not* associate the 'natural' claim with crop production or animal raising methods," including GMOs.[55]

Companies seeking to continue using the term "natural" on foods produced using conventional agriculture and/or biotechnology argued that if natural was to pertain to production practices, the only rational approach would be to maintain the FDA's policy of focusing on the objective characteristics of a food, rather than its source, and allow the products of biotechnology to bear the natural claim. Deficit thinking haunted comments arguing that when it came to deciding whether or not the products of biotechnology should be allowed to be labeled "natural" consumer expectations were too irrational to be taken seriously. These arguments, which echoed the GMA petition but came from a wide range of corporations and trade groups, clearly reflected the discourse on biotechnology taking place outside of the comments, in which a scientistic view of the controversy defined risk as the only legitimate concern, dismissed concerns about risk as scientifically invalid, portrayed remaining concerns about the

technology and its uses as irrational, and called for education to address the deficits behind the problem of public acceptance.[56]

As in the arguments about safety and fortification, those addressing biotechnology deployed science as a vague but superior form of reason for deciding what "natural" should mean. They also invoked the public good, which they aligned with the nation's role as a leader in agricultural innovation and characterized as threatened by irrational public perceptions that needed to be overcome.[57] The Farm Bureau Federation (FBF), "the country's largest general farm organization," for example, submitted a comment that conflated the question of what "natural" should mean with the viability of the products of biotechnology in the marketplace. The FBF reminded the FDA that to "remain internationally competitive and lead the world in achieving productivity and efficiency gains . . . U.S. agriculture must stay on the cutting edge of technology." The comment argued there was no "scientific justification" for treating the products of natural gene transfer differently from the products of genetic engineering and no "scientific rationale" for the FDA to deviate from its long-standing policy of not considering plant breeding methods relevant when it came to considering whether a product can be called "natural." The FBF described the controversy surrounding genetic engineering as "contrary to scientific consensus" and characterized comments against allowing the products of biotechnology to be called natural as in some cases seeking market advantage and coming from "what, in many cases, is emotional or uninformed points of view."

While comments like this one explicitly characterized public attitudes as irrational, others implicitly projected public knowledge deficits by assuming that the public did not see the products of biotechnology as natural because they didn't understand basic facts about agriculture and genetic engineering. The

Biotechnology Innovation Organization (BIO), "the world's largest biotechnology trade association," was also among those positing that the only rational approach would be to disregard production practices or to allow the products of biotechnology to be labeled "natural." The central argument of BIO's extensive "Discussion" section was that "there is no sound legal or policy basis" for forbidding the products of biotechnology from being considered natural because "if natural means the absence of human influence, then *no* agricultural or food production activity is natural." The central assumption of its argument supporting this conclusion was that genetic engineering was perceived as unnatural only because people did not understand basic facts about agricultural breeding, which it summarized as follows: modern biotechnology is a refinement of breeding techniques that have been used for thousands of years; all agriculture has been altered by human intervention; most of our existing crops cannot survive without human aid; the tools used to genetically alter plants and animals come from nature.

BIO's fourteen-page comment also included an extensive "Note on Science and Regulation" that implicitly projected public knowledge deficits by assuming that concerns about genetic engineering being labeled "natural" were the result of the public not understanding basic facts about the safety of foods produced using biotechnology. This section was consistent with the scientism of expert discourse on genetic engineering, in which safety was seen (and dispensed with) as the only legitimate issue for public concern. Yet, as Wynne argues, public concerns embodied "much larger political-economic and human questions and concerns" about how scientific research and innovation, as well as "scientific advice to policy, [are] selectively conducted and controlled."[58] BIO's "Note on Science and Regulation" began by

stating that "there are hundreds of scientific studies supporting the safety of foods improved through biotechnology, including studies from the most credible scientific authorities in the world," such as the National Academy of Sciences, the United Nations Food and Agricultural Organization, the World Health Organization, and the American Medical Association. In a bullet-point list, it cited key points from eight of these studies, noting that these statements were supported by "an abundance of scientific research." By providing an education about agricultural breeding practices and citing scientific assurances of safety, BIO's comment dismissed the view that products of genetic engineering should not be allowed to bear "natural" claims as irrational and emotional without ever even mentioning them.

The comments submitted to the FDA by corporations and trade groups seeking to be able to continue to use the term "natural" in ways that were considered misleading by the public enacted food scientism in its many forms. They assumed that science could and should not only answer relevant research questions but also determine policy and shape public meanings. They were motivated by the assumption that public perceptions of processed food were based on irrational fears of food science and technology and haunted by persistent misunderstandings of public concerns about the uses of science and technology as the result of knowledge and trust deficits.

The fact that the FDA failed to act after collecting comments on whether and how the term "natural" should be regulated aside, the tussle over its meaning is a very good place to see the Real Facts frames in action and track its side effects. Concerned about health, sustainability, and risk and wanting change in the food system, the public sought to act on its values and aspirations in

the marketplace. Narrowly reframing those concerns as demands that could be met through product reformulations and new approaches to marketing—but without serious, systemic engagement with the broader issues they reflected—the food industry provided products that appeared to be more natural, less processed, and therefore better. The antipolitics of this narrow interpretation of what it meant to respond to the Real Food frame was amplified by the imaginary of the public that accompanied it; articles in the industry press and comments to the FDA show that many perceived the consumers of "real food" as irrational and misinformed. Seen through the food scientism of the Real Facts frame, consumer perceptions of processing and what "natural" meant, or should mean, were further proof that the public lacked the skills and understanding to meaningfully participate in the regulatory process, let alone act as knowledgeable participants in the governance of technology and the shaping of the food system.

CHAPTER FOUR

The Paradoxes of Transparency

One way of looking at the challenge the Real Food frame posed to the food industry was as a public relations (PR) problem. The reputations of the food industry as a whole, individual corporations and brands, and even specific ingredients were in question. Big Food was unpopular, food science more feared than appreciated. But were campaigns using science to fix negative perceptions of processed food and the food industry, like the Alliance to Feed the Future's curriculum, working? Even as the food industry continued to back such efforts, some began to wonder if this approach to defending the food industry's reputation—and commercial interests—needed an overhaul. One organization took the lead in rethinking how the food industry should communicate with the public. The Center for Food Integrity, which describes itself as a nonprofit dedicated to helping the food industry earn consumer trust, published its first academic research paper challenging traditional approaches to communication about the food system in 2009 and went on to develop and disseminate new models that foregrounded values instead of scientific facts. Within a few years, the CFI was everywhere—publishing reports, convening

summits for food industry leaders (including one I attended in 2015), hosting webinars and trainings, and being quoted across local, national, and trade media outlets about how to build confidence in the food system through shared values and transparency.[1] Ultimately, it shaped a new conversation about the relationship between the food industry, the public, and science.

The CFI's 2014 research report, "Cracking the Code on Food Issues," gives a good sense of its core concerns. The central question it explored was: "How do we connect when scientific consensus and consumer beliefs are not aligned? When consumers don't accept what science says is true?" The report noted it may be hard for "those dedicated to improving our lives through science-based technologies and innovations" to understand why the public does not defer to scientific authority, explaining that "many issues remain contentious, no matter the facts, because the social decision-making process is complex." It went on to help members of the food industry understand the social decision-making process so they could intervene in new ways, helping consumers make "informed decisions about food" but not by foregrounding scientific authority and facts. Instead, it provided "a roadmap to making complex and controversial technical information relevant and meaningful" that focused on demonstrating shared values, challenging core assumptions of the Real Facts frame by arguing, "more science, more research, more information" was not the right approach.[2]

In arguing that the long-standing "just tell them the facts" model was not working, the CFI critiqued some of the foundational assumptions of the Real Facts approach to communication and challenged the food industry to respond in more meaningful ways to public concerns. Thus, focusing on their work allows me to explore how the food industry sought to evolve in the face of the Real Food frame instead of just reframing its critical challenges

as a misunderstanding that could be corrected with the right information. This chapter explores what happened as the Center for Food Integrity set out to overhaul the food industry's deficit-driven, facts-first, one-way approach to communicating with the public. In doing so, I find many of the issues that STS scholars have discovered in their observations of public engagement practices that seek to go beyond deficit-driven approaches to communicating with the public about science and technology but end up replicating many of the same problems.[3]

Rather than simply criticize the inadequacies of the new forms of communication the CFI developed, however, I heed Alan Irwin's call to trace the ways in which old and new approaches to communication coexist and view the CFI's initiatives as symptomatic of the evolving state of science-society relations.[4] In his analysis of a series of official reports as well as an orchestrated public debate about genetic modification in Britain, Irwin argues that "at the heart of the 'new' resides some very 'old' assumptions."[5] He describes reports on these events reading "as if two voices are struggling to be heard": a dominant voice stresses dialogue, while the other evokes scientistic assumptions about public deficits and the need for deference to expertise.[6] Similarly, my analysis attends to the coexistence of the "new" and the "old" in the CFI's approach to building trust with consumers, listens for the struggle between two voices striving to be heard, and views the stresses and strains as symptomatic of the evolving relationship between the food industry, science, and the public.

THE CENTER FOR FOOD INTEGRITY

The Center for Food Integrity was founded in 2007 by Charlie Arnot. As a point of reference relative to the emergence of the Real

Food frame (and as discussed in chapter 1), Kelly Brownell—the obesity researcher who drew parallels between the food industry and Big Tobacco and introduced the term "Big Food" into the cultural lexicon—published *Food Fight* in 2004 and was named one of the world's one hundred most influential people by *Time* magazine in 2006. In 2007 Michael Pollan published both the *Omnivore's Dilemma* and "Unhappy Meals," the *New York Times* article arguing, among other things, that we would be better off if we followed "traditional authorities" rather than scientists regarding our eating habits.[7] Meanwhile, Arnot learned firsthand that science was no longer a reliable way to earn and maintain the trust of consumers.

Working in PR for the pork industry for about a decade, Arnot deployed established communication strategies, which he described as using "really good science," attacking "those who attacked us," and engaging in traditional public relations. Over time, however, he found that those strategies were no longer working. In the 1990s the company Arnot worked for was reshaping the pork industry with massive infusions of capital and rapid expansion (a barn a day at one point) and became the focus of intense public scrutiny after some "environmental incidents." According to Arnot, the company had the data it needed to support its claims that water leaving its property was cleaner than when it came in, as well as all kinds of data to support other environmental claims. The company even had benchmarking showing that the steps it was taking to manage its public image should be working. Nonetheless, at one point the company was being sued by the state, the federal government, and a citizen's group. In 1995 Willie Nelson held a protest concert next to one of its farms.[8] Arnot concluded that he needed a new strategy and started a PR company focused on building trust rather than "defending a position," which eventually led to his founding of the CFI.[9]

The vision of the CFI was "a transparent sustainable food system in which practices align with consumer expectations and the public discussion is well-informed and balanced."[10] It described its role as "leading the public discussion in fostering trust and facilitating dialogue with stakeholders across the food chain to bridge the gap with consumers" and pursued this with a range of research, communication, and training efforts. These included the annual "Trust Reports," based on extensive research conducted by the CFI, as well as conferences, webinars, trainings, and coaching, including events designed for specific organizations. The CFI also hosted a consumer-facing website called Best Food Facts and engaged in coalition work on specific challenges facing the food industry, such as sustainable egg production and building trust for gene editing.[11]

Structurally, the CFI was a nonprofit supported by its members and managed by Arnot's PR firm, Look East, on behalf of a board of directors. It asserted that it did not "lobby or advocate for individual food companies or brands" and described its members as representing "the diversity of the food system, from farmers and ranchers to universities, NGOs, restaurants, food companies, retailers, and food processors."[12] A 2017 membership list included fifty distinct organizations, over half of which were trade groups or commodity boards representing large segments of the food and agricultural industries. These included powerful national organizations such as the American Farm Bureau Federation, Dairy Farmers of America, the Food Marketing Institute, the Grocery Manufacturers Association, and the United Soybean Board, along with about twenty-five state-level organizations primarily representing corn and soybean producers, with some also coming from dairy and pork. Corporate members included giants from the retail sector (Costco, Kroger, Wegmans), the chemical

and pharmaceutical sectors (Dupont, Monsanto, Merk), food production (Cargill, Grupo Bimbo, Hershey's), and animal agricultural (Smithfield, Purdue, Maple Leaf Foods). The World Wildlife Fund and Chick-fil-A were notable outliers among these general trends, and the list also included Michigan State University and Purdue University.[13]

Functionally, the CFI was a cross between a trade association and a PR firm. It represented the interests of its corporate members, as trade groups do, but focused on communication between the food industry and the public. Because Arnot came from public relations, the CFI applied a sophisticated PR tool kit to rethinking how the food industry communicated with the public. The CFI did engage in some public-facing work, primarily through its Best Food Facts website, which stated that its goal was "to load your plate with a balanced diet of data so that you can make informed decisions for yourself and your family."[14] But its main audience was the food industry. Thus, I focus on the Center's industry-facing work to explore how it sought to rebuild the relationship between the food industry and the public. How was the public imagined and projected in this evolved approach to communication? What were the politics and antipolitics of the CFI's "trust-building transparency"?

SCIENCE DENIED: WHAT COMES AFTER REAL FACTS?

In 2009 Charlie Arnot and five other researchers associated with the Center for Food Integrity and Arnot's private PR firm coauthored an article with the Iowa State University sociologist Stephen Sapp in *Rural Sociology*. "Consumer Trust in the U.S. Food System: An Examination of the Recreancy Theorem" established a trust model that would inform the CFI's work for decades to

come, as well as the academic credibility it needed to get the attention of skeptical members of the food industry.[15] The premise of the research was that the cause of growing public concerns about the industrial food system was distance and alienation. It described consumers as increasingly worried about safety and nutrition and the externalities of the food system, such as environmental degradation and the treatment of employees and animals, because "most know little about how food is produced, processed, transported or prepared for sale." The authors noted, "In short, now that Americans no longer live on the farm, they wonder what's going on down on it. And they worry that the news is not good. At the same time, consumer opinions significantly affect the structure and management of the U.S. system, resulting in what some . . . have depicted as *consumer-driven* agriculture." The article went on to also note, however, that social scientists had proven that "'just tell them the facts' was a flawed approach both in its presumptions and its applications."[16] Given this, they argued, there was a need for "sound basic science" to foster public trust in the food system.[17]

In pursuit of this, the article presented research exploring the extent to which lack of public trust in the food system might be explained by something called the "recreancy theorem," which posited that people's evaluation of risk was based not solely on quantitative risk assessments issued by experts but also on their evaluation of societal institutions, in particular their assessments of institutional responsibility. According to the theory, trust was lost when institutions were "recreant," or failed to behave in accordance with the public's expectations. The research sought to measure the extent to which public trust could be explained by perceptions of the "the competence of institutional actors and their belief that these actors will behave with

fiduciary responsibility."[18] Specifically, it tested the effects of competence (skills and expertise) and fiduciary responsibility (the felt obligation to act on behalf of the trusting party) on public trust with respect to food safety, nutrition, environmental protection, employee care, and the treatment of livestock, using two internet surveys conducted in 2007 and 2008.

The results of the research shocked even Arnot himself. He had been so sure that the study would confirm that science and facts were the answer to building trust that when he saw the data sets he thought they had been accidentally switched.[19] The results showed not only that the recreancy theorem did explain consumer trust in institutional actors in the US food system and that most variances in trust were due to competence and belief in fiduciary responsibility but also that the effects of fiduciary responsibility outweighed those of competence by about three to one. In other words, while informing the public about the competence of institutional actors in the food system was important, conveying "a sense of responsibility" to the public might be even more important to building trust. The article advised, therefore, that companies take "actions indicating corporate social responsibility and responsiveness to technology-related problems." It concluded that "exploring approaches to engendering institutional fiduciary responsibility might be more productive than sharpening institutional actors' techniques of risk communication about their skills and expertise."[20] Based on these foundational findings, the Center for Food Integrity went on to conduct ongoing research and develop a host of programs designed to convince and enable institutional actors within the food system to build trust through engagement with the public around values rather than simply asserting facts and expertise.

The CFI introduced its new trust model in the first of its annual trust reports, published in 2011. The opening pages depicted the new trust model as a balance with "shared values" on one end outweighing "skills" on the other, along with text explaining that "shared values are 3–5x more important in building trust than competence" (Fig. 10). The message conveyed in this graphic was also emphasized by a quote, attributed to Theodore Roosevelt: "People don't care how much you know until they know how much you care." In seeking to motivate food industry communicators to consider this novel approach, the report explained the reason building and maintaining trust was so important: at stake was "social license," or the freedom to operate with minimal "formalized restrictions." If the industry did not act to effectively establish trust with consumers, the report warned, it would face "social control" through regulation, legislation, litigation, or market mandates, which are costly and lead to both the loss of "operational flexibility" and increases in "bureaucratic compliance."[21]

The report went on to explain that the tactics the industry had been using to maintain social license such as "attacking the attackers," using "science alone to justify current practices," and confusing "scientific verification with ethical justification" were no longer effective and even likely to increase suspicion and skepticism. To secure social license, the food industry needed to do something different: namely, embrace "meaningful stakeholder engagement and effective values-based messaging" and ensure practices were ethically grounded and aligned with the values of stakeholders. While these were big steps to take, the report reiterated that "maintaining public trust that protects your social license to operate is not an act of altruism; it is enlightened self-interest."[22] The CFI was not always as overt about this instrumentalization of trust, but its work was ever driven by

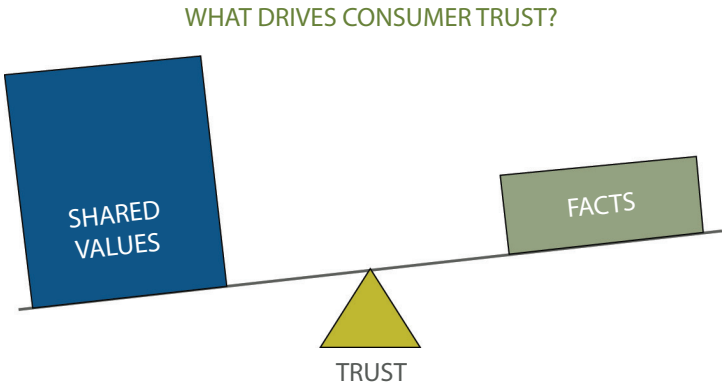


Figure 10. An illustration of the CFI's finding that shared values are three to five times more important than competence, or facts, in building trust between the food industry and the public. Center for Food Integrity, https://foodintegrity.org/trust-practices/first-in-consumer-trust/what-drives-trust. © 2006 CMA Consulting. Courtesy of Charlie Arnot, Center for Food Integrity.

the aim of maintaining social license. As Brian Wynne notes, "instrumentalization of trust" is a contradiction in terms. And his critique is prescient for the CFI: "Instrumentalism itself is not the problem, but the assumption and imposition of the terms of this imagined and instrumental outcome on the other participants while deceiving oneself into thinking that one is genuinely listening to them."[23]

While the CFI challenged the Real Facts frame by advocating a new approach to communication that centered values rather than facts, food scientism shaped the strategies it promoted. This was especially clear in the CFI's second trust report, "Cracking the Code on Food Issues," published in 2014 and mentioned at the beginning of this chapter. The signs of scientism were clear in the premise, which was that problems in public trust in the food system were the result of consumers not accepting scientific truth: "Overwhelming scientific consensus tells us that childhood vaccines and genetically modified foods are safe, that humans

contribute more to antibiotic resistance than animals, and that climate change is real. Yet the debate rages on." It defined the goal of communication with the public as "informed public evaluation" of the use of technology in the food system, which suggested the opening up of dialogue, but also fostering "informed decision making that encourages technology and innovation in society's best interest," which hints at the predetermined aims of such dialogue. The opening paragraphs explained that while the use of technology in food and agriculture provided countless benefits to society, some issues remained contentious "no matter what science says," thus asserting a scientistic premise that the problem is not how science and technology are deployed within the food system but the public's unfounded skepticism. However, the report also described consumer concerns as understandable and urged the industry to shift its goals from winning conversations to finding meaningful ways of introducing science and technology into the decision-making process.[24]

"Cracking the Code" set out to get the food industry to accept that consumer decision making was driven by more than just facts and to help readers understand the roles that beliefs, opinions, and feelings played in how people evaluated the use of technology in the food system. Drawing on theories from anthropology, sociology, and psychology, the report explained that the decision-making process was complex and *social*, an orientation that suggested the possibility of taking seriously the kinds of concerns about the food system that constituted the Real Food frame. But the drive toward "informed decision making" reframed what might otherwise have been understood as politics driven by contested values as new forms of deficits that needed to be overcome.

This was depicted graphically in the "Decision-Making Maze," in which a woman pushing a shopping cart stands on one side

of a maze, "informed decision making" on the other. Within the maze, all the pathways that might lead the shopper to "informed decision making" are blocked by orange construction cones, each bearing a flag labeled with the name of a barrier: bounded rationality, tribal communication, a history of contradictions, confirmation bias, bad news bias, big is bad bias, influence of group values, and scientific illiteracy (Fig. 11).[25] Shaped by insights from the social sciences, these barriers looked different from the cognitive deficits of the original deficit model and even the deficits of trust and understanding of the benefits technology Wynne identified in his list of abandoned but reinvented public deficit models. Like them, however, these deficits were accompanied by the underlying assumption that public responses were emotional, "epistemologically empty," and susceptible to misinformation.[26]

Among the barriers to informed decision making in the maze all but "a history of contradiction" pointed to social, emotional, or cognitive conditions, or deficits, affecting consumers rather than industry behaviors that might be a cause for reasonable skepticism. For example, the "biases" in the maze all pointed toward psychological conditions residing within consumers and causing them to be unable to see things how they really are. "Confirmation bias" described a tendency to favor information that confirms existing beliefs and values whether or not it's true, which the report described as particularly prevalent when it comes to "emotionally charged" issues like choosing how to feed your family. "Bad news bias" referred to the tendency for negative information to weigh more heavily on decisions than positive information, which meant that any bit of "bad news" shared about the industry could have an outsized influence on the erosion of trust. "Big is bad bias" pointed to the tendency among consumers to mistakenly believe that the larger a

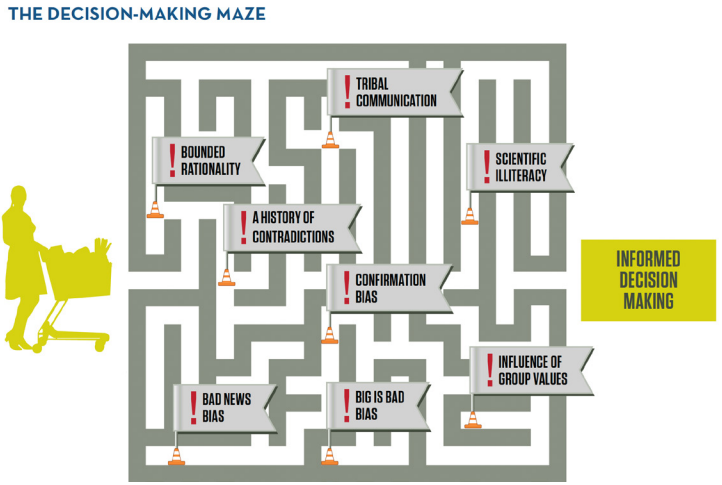


Figure 11. "The Decision-Making Maze" illustrates the social and psychological factors that come between shoppers and "informed decision making." Center for Food Integrity, "Cracking the Code on Food Issues: Insights from Moms, Millenials and Foodies," *Consumer Trust Research*, 2014, p. 6. Courtesy of Charlie Arnot, Center for Food Integrity.

company, the less likely it was to share their values. The report acknowledged that the emergence of "big is bad bias" was connected to a broader erosion of trust in "big" due to deadly incidents caused by technologies that were supposed to be safe, but the examples (oil spills and car crashes) made no mention of such incidents in the food and agriculture sectors, and the "bias" label reinforced locating the problem within the minds of individual members of the public rather than the actions of those who they held accountable.[27]

The rest of the barriers in the maze focused on how "informed decision making" was also compromised by the social context in which decisions were made. For example, "tribal communication" among communities of shared values online was described as giving anyone a platform by which to influence others, leading people to "assign credibility to those who share tribal values

but lack technical expertise to support decision making that incorporates factual information." Furthermore, people tended to endorse positions shared by their social group and interpret any new evidence through the lens of their existing biases (aka "Influence of Group Values," a concept developed by Yale Law School's Cultural Cognition Project). "Bounded rationality" described how decision making was inevitably limited because most decision makers did not have the resources to fully understand a complex issue and therefore decided based on very little knowledge. Old school deficit thinking, with its emphasis on cognitive deficits, also got a mention with one barrier labeled "scientific illiteracy." Moving beyond both psychology and the social context for decision making, "a history of contradictions," was the only barrier to refer outward toward the actual conditions of the food system, noting that "informed decision making" had been compromised by ever-changing nutritional advice, such as about whether foods like butter, eggs, and coffee are "good for us." Nonetheless, this depiction narrowly implicated nutrition rather than its uptake in industry marketing or industry influence on the production of contradictions through the funding of self-interested studies.[28]

CONNECTING THROUGH SHARED VALUES

The central message of the CFI's 2014 report was that "connecting through values" was the first step in "cracking the code on food issues." As it explained, "Only after you state the values-based connection are you given 'permission' to introduce technical information."[29] This message was at the heart of all the CFI's work as it taught industry communicators that barriers to "informed" decision making could not be overcome with information alone; "shared values" had to come first. Centering values represented

a significant departure from typical Real Facts–informed approaches to communication with the public and opened possibilities for industry actions to be influenced by consumer values and concerns, which is explored in the next section. But a look at how the CFI trained industry members to interact with individuals and the media through shared values also reveals the persistence of scientism and its antipolitics.

The Engage training was one of many means through which the CFI prepared industry members to communicate and build trust through shared values. The training was initially offered as interactive workshops teaching participants how to communicate with consumers, the media, and online audiences, as well as on college campuses through a program called "Engage Young Leaders" that focused on training college students to "advocate for their industries."[30] Starting in 2017, the Engage training was also available in five interactive online modules modeled after the in-person course, which a press release described as having trained thousands in the food and agricultural industries since it first launched in 2009.[31] The first two modules of the online training explained the social context for the erosion of trust in agriculture and introduced the importance of shared values as the foundation for building trust. In the other three modules—"The Power of Shared Values," "Engage in Three Simple Steps," and "Your Values Message"—participants learned and practiced how to connect through shared values.

One aim of the training was to teach participants what a values statement was and how to recognize the difference between values statements and those based on science or economics, so they could learn to lead with values. Thus, the lessons asserted both the inclusive aspiration to center values and the scientistic assumption that economics and science were distinct from values. In

one activity, for example, the learner was presented with a series of statements and prompted to choose whether the statement reflected science, economics, or values. While the lesson acknowledged that both consumers and producers had values, it also presented industry views on controversial technologies as scientific rather than values-driven. Consumers' values needed to be engaged with because they could get in the way of their acceptance of what the industry already knew was right based on science and economics, which were seen as separate from values.

After they practiced distinguishing values statements from those based in science and economics, participants in the Engage training learned that the first step in having values-based conversations was actively listening, without judgment, so as to understand how people's concerns about the food system were connected to their values. In one exercise participants viewed a clip of a consumer talking about her Real Food frame–informed concerns. While these concerns might normally be dismissed as irrational, here participants were prompted to select the values the consumer was expressing, such as "this person values food source and safety," "this person values trust," or "this person values animal welfare." They were then guided to find shared values by asking questions that helped to further the conversation. One exercise presented a series of statements consumers might make about modern agriculture or food processing and prompted participants to select responses that showed interest and helped invite further conversation. For example, in one scenario a consumer says, "What I hear about industrial agriculture affecting the environment today is very concerning. I just have a lot more trust and respect for family farmers." Wrong answers: "Aren't all farmers local to someone?" and "Agriculture affecting the environment? Let's talk about all the others at the table!"

Right answer: "When you say 'industrial agriculture' what do you mean?" A pop-up response explained that this kind of question would give the industry communicator insight into the consumer's values and perceptions and offered some encouragement for difficult encounters: "Don't let your feathers get ruffled!"[32]

The next step in the Engage training's communication process was for the industry member to share their own perspective through values, adding facts only after the connection had been made. While centering values suggested the possibility of dialogue and even disagreement, the process of engaging values the CFI taught was about finding areas of agreement. The point was not to explore the values driving different visions of how technology should be used in the food system, and toward what ends, but to find common ground. The training prompted participants to reflect on and identify their own values but also explained that connecting through shared values did not require sharing personal values with your audience because universal values such as compassion, responsibility, respect, fairness, and truth are widely shared and can be a "go to" for quickly finding common ground. After learning to listen for common ground and ask questions for clarification, participants were coached to talk about why they do what they do through slightly more specific yet also very abstracted values, such as "protecting the land, ensuring a safe food supply, caring for your employees, contributing to your community and taking care of your animals."[33] While politics resides in the details of how these values are acted upon, Engage enacted antipolitics by teaching communicators not to discuss or deliberate these differences but to establish agreement around abstracted principles in order to pave the way for the industry member to then introduce facts, framed as value-neutral.

The training ended with a series of scenarios in which the entire Engage process was put into practice; industry

members bumped into the Real Food frame in public settings and participants selected options for moving through difficult conversations by finding common ground. When Ben starts a conversation in the produce section about how he has heard that GMOs are harmful and prefers to buy food "that's grown the natural way," the right response was not about research showing there are no nutritional or safety differences in food with GM ingredients, or citing extensive safety testing, but acknowledging shared values around food safety: "It's understandable you want safe food for your family—of course, I do too. Being part of this industry, I know farmers feel responsible for growing safe food for their families and ours." After Ben says he has also heard GMOs are bad for the environment, tempting wrong answers included, "Yes, but that's just not true. Have you done any research on how regulatory agencies test to ensure GMOs don't adversely affect humans?" The right answer was empathetic rather than dismissive and ostensibly established a shared value (protecting the environment) before presenting facts: "I have. Protecting the environment is so important to farmers. It may be surprising, but did you know that GMO crops actually help farmers reduce their environmental impact?"[34]

Similarly, in an encounter at a petting zoo Mia shares her concerns about animals being raised indoors without access to "natural things like grass and water." Wrong answers were confrontational and facts driven, addressing perceived cognitive deficits: "Pictures that are floating around give modern agriculture a bad rap. We've kept animals indoors for centuries. Animal welfare regulations promote the welfare of animals." The right answer was understanding, assumed a deficit of trust rather than information, and used abstractions that were easily agreed on to endorse practices that were harder to agree on: "Animal health is important to me too. The indoor environment allows me to

ensure their health and respond quickly should they become sick."[35] Nowhere were the commitments to GMOs, antibiotic use, or indoor animal agriculture discussed in relation to the larger values driving the use of such technologies in the food system. As the next section explores, such concerns about values were seen as forms of "bias" to be overcome through new communication strategies rather than legitimate disagreements that might be engaged through debate or dialogue.

TRANSPARENCY MEETS "BIG IS BAD BIAS"

In the Engage training, transparency was evocatively depicted as an empty picture frame gripped by two raised hands in the middle of a sky dotted with white clouds. While the intent seemed to be to conjure the notion of transparency as a window onto an unobstructed reality, together the sky continuing beyond the boundaries of the empty frame and the hands wrapped tightly around that frame suggested the inevitable and even intentional circumscription of what is "revealed" by transparency (Fig. 12). Similarly, the title of the CFI's 2015 Research Report, "A Clear View of Transparency and How to Build Consumer Trust," conjured the promise of transparency to provide an unobstructed view of reality, but the strategies behind creating the experience of transparency for consumers were clearly more complex than the simple, honest revealing of reality that was implied.[36] The historian Anna Zeide notes that transparency has been a core problem facing the food industry since its inception. According to her research, in the early days of food processing manufacturers sought various ways of overcoming the fact that consumers could not see into cans, including scientific research meant to ensure safety and thus trust. She notes that transparency has ever since

Figure 12. A graphic from the CFI's Engage online training illustrating the paradoxes of transparency. Center for Food Integrity, "Engage Online," 2017. Courtesy of Charlie Arnot, Center for Food Integrity.

remained a complicated and shifting goal for the food industry, used strategically and for its own purposes along with other marketing tools.[37] At the same time, transparency has been a goal of many Real Food frame proponents who have sought to "lift the veil" on the food system, teaching people where their food comes from as a foundation for bringing a better one into being, as seen for example in *Food, Inc*. (see chapter 2).[38] Yet scholars of the food system and beyond have also explored the limits and contradictions inherent in the pursuit of transparency.

Speaking broadly of the culture-wide embrace of transparency, the scholar of contemporary culture Claire Birchall notes it has become "the secular version of a born-again cleanliness that few can fail to praise," a sign of both cultural and moral authority. Yet, she argues, secrecy is not the opposite of transparency so much as it is integral to and constitutive of it.[39] Writing about practices of auditing, quality assurance, and accountability in the university setting, the anthropologist Marilyn Strathern similarly

notes there is "nothing innocent about making the invisible visible." She argues that while such practices produce a lot of information, they tend to ignore if not obscure "the 'real' workings" of institutions, such as their values and social structure.[40] Building on these insights, Susanne Friedberg explores the "paradoxes of transparency" in specialty produce supply chains as retailers in the UK responded to growing consumers demands for transparency. Notably, she found that transparency in practice not only produced new forms of vulnerability and exploitation in food exporting countries but also left these power dynamics entirely outside of the frame: "what transparency concealed, ultimately, was the power that made transparency possible."[41] The CFI's pursuit of transparency built on the long history of transparency as a food industry marketing concern, responded to the Real Food frame's interest in the promises of transparency, and was fraught with paradoxes.

The CFI developed and advanced an approach to transparency that was based on "7 Elements of Transparency." The foundational element was "Motivation," which was about overcoming "motivation bias," also known as "big is bad bias." According to the CFI, this bias caused the public to believe that the larger an institution was, the less likely it was to be motivated by the public good as opposed to profit. As previously discussed, the CFI generally portrayed this "bias" as having little to do with the behavior of the food industry, locating it instead within the minds of consumers, a point driven home by an illustration in its 2015 report showing a human head with "big is bad" written in the brain area (Fig. 13).[42]

More specifically, the CFI understood motivation bias as the result of an unfortunate confluence of broader changes in institutional trust and advancements in agriculture. According to their oft-repeated narrative, 1968 was a watershed year in which everything started to change for trust in institutions through the

Figure 13. Illustration from the CFI's 2015 Trust Research suggesting that the idea that larger institutions are likely to be less motivated by public good than profit is a bias residing in the minds of consumers. Center for Food Integrity, "A Clear View of Transparency and How It Builds Consumer Trust," *Consumer Trust Research*, 2015, p. 8. Courtesy of Charlie Arnot, Center for Food Integrity.

unfolding of events such as the Vietnam War, the assassinations of Robert Kennedy and Martin Luther King Jr., and soon after the Kent State massacre, then Watergate. The violations of trust in institutions kept coming in a "cascade" that included Three Mile Island, Iran Contra, Exxon Valdez, and scandals involving Jimmy Swaggart and Jim Bakker in the 1970s and 1980s, followed by the Clinton scandal, Arthur Andersen, Abu Ghraib, the subprime mortgage crisis, the BP oil spill, and more in the 1990s and into the 2000s.[43] According to the CFI, while these assaults on trust occurred outside the food system, they coincided with the food system becoming larger and more integrated, industrialized, and consolidated, thus increasingly resembling the kind of institution the public was learning to distrust.[44] Because of this, positive advancements in agriculture and the food system were mistakenly caught up in the growing worldview among consumers that large institutions were not to be trusted. According to the CFI, those working in the food system had "assumed that consumers would think our advancements were good," but because of its size Big Food was increasingly perceived as "out of touch with the values of the consumers and likely to put profit ahead of public interest."[45]

For the CFI, the fundamental aim of transparency was to overcome this mistaken perception that the bigger a company was, the more likely it was to be motivated by profit rather than public interest. That is why the first element of transparency entailed acting "in a manner that is ethical and consistent with stakeholder interest."[46] The CFI taught that companies should both adopt and communicate motivations that responded to the public's desire to see that "ethical principles seem to guide the behavior of the company." According to the first element of transparency, the public also wanted to know that a company was "interested in the well-being of people like me, not just itself." They wanted to see that a company wants to be accountable for its actions, that it does not intentionally mislead people, and "when making decisions, [it] takes public interest into consideration rather than only considering profits."[47]

Paradoxically, while these suggestions were designed to address public concerns about the role of profit in decision making, they did not include the role of profit within the scope of what was revealed by transparency, instead redirecting attention to ethical principles and public interest. According to Claire Marris, strategies like this are based on a persistent misunderstanding of the public's concern about profit. She argues that skeptical reactions of the public "are often reactions to the *absence* of any mention of commercial purposes in public communication. Thus, public responses are misinterpreted as a negative response to profit-making *per se*, rather than to this lack of transparency." The misunderstanding, she notes, creates a "vicious circle whereby public communication actively promotes grand societal promises, while minimizing profit motives, thus generating more public alienation."[48] Seen in this light, the CFI's trust-building strategy was built on a fundamental paradox in which concerns about the role profit played in "Motivation" were addressed through forms

of transparency that occluded, rather than included, the role that profit played in motivation.

The other six elements of transparency that the CFI promoted also generated paradoxes as they reached for meaningful engagement with consumer values but generally delivered deficit-driven tactics that did little to address legitimate concerns the public might have about the effects of consolidation in the food industry. The second element, "Disclosure," was described as treating consumer concerns as "real" and sharing information, both positive and negative, that is useful, easy to understand, and timely. Element 3 was "Stakeholder Participation," which was explicitly about moving beyond the deficit-driven facts-dumping approach of the Real Facts frame by explaining how decisions are made and asking for opinions and input before making decisions. "Relevance" entailed sharing information deemed relevant by stakeholders; "Clarity" emphasized providing information that was easy to understand; and "Accuracy" meant the information was accurate, reliable, and did not leave out relevant information. The final element, "Credibility," required that the company apologize when it made mistakes, demonstrated it cared, engaged critics, and presented more than one side of controversial issues.[49]

Despite the potential for meaningful engagement, and even politics, that these elements suggest, the practices that followed were heavy on one-way disclosures of information that seemed designed to address perceived cognitive deficits and focused solely on downstream impacts rather than the value commitments that drive Big Food. As Wynne argues, even when public discourses are enlarged to include the public's ethical concerns about science and technology, they often "exacerbate pubic alienation and mistrust" by imposing a limited definition of what counts as an ethical issues, attending only "to downstream impacts" rather than the "upstream (usually unaccountable) driving human visions,

interests and purposes" that shape the development and uses of science and innovation.[50]

In a 2015 webinar series on transparency the CFI recommended best practices related to a variety of topics. When it came to food and health, for example, the webinar explained that the best practice was to "engage in a meaningful and two-way dialogue." However, examples of how to do so were heavy on the distribution of "information" such as providing ingredients glossaries, using simple names for ingredients, including information about preservatives and GMOs on product labels, and making product information easily available through QR, or quick response, codes. With regard to food safety, the webinar pointed out that consumers wanted to hear "both sides of the story" but emphasized the "accurate presentation of risk," conceived through a narrow scientistic lens of quantitative risk assessment. Best practices also included taking concerns about animal well-being seriously, addressing them by providing videos demonstrating the treatment of animals and describing the training of animal caretakers.[51] While responsive to consumers' concerns that previously may have been dismissed as misinformed, videos about animal treatment—like many of the other best practices suggested in the webinar—provided a highly curated, one-way flow of information already constrained by embedded normative assumptions about the goals, purpose, and values of the food system.

While consistently paradoxical, the "7 Elements of Transparency" as envisioned by the CFI did open the possibility for public concerns about the food system to have an impact on the decisions of corporate actors. Theoretically at least, aligning industry behavior with consumer values and expectations was the ultimate aim of trust-building transparency, and the CFI emphasized that transparency was not, and could not

be, simply PR. Arnot explicitly argued that transparency had to be "genuine and authentic" and warned that if a company approached transparency as PR it was likely to end up worse off than it was before.[52] The Center's communication and trainings around transparency emphasized that motives, practices, and communication all mattered. Communication without a true commitment to "doing what's right" was described as pointless, as was a credible commitment without effective communication strategies; "genuine transparency" comes from a combination of the two.[53] Arnot explained that once the "curtain is lifted" through the practices of transparency, consumers would either appreciate that company practices aligned with their values or discover that practices were "fundamentally inconsistent with their values and demand change or reject the brand." In either case, transparency resulted in alignment of consumer values and corporate behavior.[54] Thus, while the transparency promoted by the CFI functioned as PR aimed at maintaining social license for Big Food, because it had to be grounded in behaviors that were adapted to consumer concerns it also had potential to effect changes in how companies operated.

The mandate for transparency to act as a feedback loop between consumers and corporate practices was present throughout the CFI's publications, trainings, webinars, and so on, intermingling with another "voice" similar to the older voice Irwin observed, which he described as operating "within a narrower universe in which objectives are clear and decision-making involves choosing between alternative methods for attaining them."[55] This was especially evident in the "Optimizing Sustainability Project," which launched in 2018 as a series of printed reports and in 2020 as a website with click-through modules. The project was designed to provide a framework to help companies respond to

pressure from "stakeholders to adopt or reject a specific practice." It viewed "sustainability" in a way that was consistent with the concerns of the Real Food frame, defining it as "incorporating interconnected sets of issues tied to being a responsible consumer and responsible citizen" and including not only environmental issues but health, wellness, animal welfare, labor issues, food waste, packaging, and "impacts on local and indigenous communities."[56] The modules taught companies that before they could be ready to respond to a request from the public related to sustainability practices they needed to set their own sustainability priorities through an eight-step process that included appointing leadership; identifying objectives, internal and external stakeholders, and relevant sustainability attributes; extensive data collection and analysis of stakeholder concerns to identify priority issues; and evaluation of potential trade-offs between priority attributes using techniques such as life cycle assessment. When it received a request to change its practices, the company should then undertake another process in which it conducted research to understand the issue, evaluated the source of the request, and assessed the relationship of the request to current sustainability priorities. If the request aligned with the sustainability strategy and priorities, the company should then communicate about how the issue was already being addressed. If not, the company should undertake an extensive review of trade-offs and implications and then decide whether to "agree to or decline to take the requested action or position" and finally plan its communication strategy.[57] This process clearly set up the potential for the public's values and concerns to influence corporate practices that was not present within a typical Real Facts–informed, linear model of communication. At the same time, these moves toward openness and inclusion remained constrained by food scientism.

The Optimizing Sustainability training included examples for evaluating trade-offs related to cage-free egg production, conservation tillage in corn production, rBST-free milk, and slower-growing chickens (broilers) that were shaped by predetermined notions of relevant expertise and embedded assumptions about the values and priorities of the food system. While seeking to exemplify a balanced appraisal of trade-offs, each of these case studies drew on a single source of scientific information that was already heavily influenced by industry interests. The broiler production case drew on a study by the National Chicken Council and the milk production case on a study by the Innovation Center for U.S. Dairy, both major industry trade groups. The corn tillage case drew on research conducted by the US Department of Agricultural Research Service at UC Davis and the egg production assessment drew on research by the CFIs Coalition for Sustainable Egg Production, whose members included over 20 poultry trade groups and corporations, plus a handful of academic scientific groups and the American Humane Society. In each case, while the evaluation of trade-offs was presented as objective, it was laden with normative assumptions about how the food system should work, and the values driving it. For example, in the broiler case, the assessment found that raising slower growing birds would cause a "sharp increase in chicken prices" noting that such increases "would increase food instability for those who can least afford to absorb increased in food prices." Among other things, this assumed that all costs would be passed on to consumers while ignoring, for example, the well-documented role the food industry itself played in creating widespread food insecurity among its own workers through low wages.[58] When it came to the question of whether any of these trade-offs might be worth it because of benefits to health and

welfare, the assessment cited the absence of research in this area, not surprising given the politics of "undone science."[59] Each of the cases, similarly, folded normative values into the assessment of what were called "economic attributes," such as "food affordability," and disregarded the politics of expertise that informed them, thus delineating a purview for transparency that did not include how knowledge was produced or came to matter.[60]

The many assumptions that informed and constrained these case studies were a microcosm of the ways in which the CFI's vision of engaging through shared values and building trust through transparency opened new opportunities for listening, understanding, and engagement between Big Food and the public while also enacting antipolitics through what was either taken for granted or entirely left out of the frame. Across the CFI's work, the technological promises of "modern agriculture" were both explicitly and implicitly taken for granted. Public concerns were framed as emotional and psychological and as focused on downstream impacts rather than "the upstream driving purposes" of the food system. The only options that animated these antipolitics of transparency were acceptance or rejection; despite the promise of engagement and dialogue, there was *still* no room left for what Wynne describes as "constructive negotiation of possible alternatives, multiple trajectories, and different technologies, including of different social ends."[61]

"THE MOVEABLE MIDDLE"

Throughout its efforts to promote trust building through shared values and transparency, the CFI also offered guidance to the food industry about who *not* to engage with, when to *disengage*, and where to focus to have the most influence. The very first trust report defined the CFI's aim as a food system that was "truly

sustainable and supported by our stakeholders and a rational majority of consumers," thus subtly but clearly signaling that some audiences were too "irrational" to be part of the conversation.[62] Advice in the Engage training about where to focus and not focus communication efforts also illustrated this point of view. In Engage, the target audience was referred to as "the moveable middle." A slide depicted "the moveable middle" as the center of a bell curve, with arrows noting to "focus here," while at either end of the curve more arrows warned "don't concentrate here." Conflating malleability toward predetermined ends with sincerity and rationality, Engage lessons described people in the movable middle as "the reasonable majority that craves balanced information about food from trusted sources" and "those who have sincere questions and a desire to know how their food is produced."[63] This implied, in contrast, that those outside the middle were not worth engaging with because their views were too extreme or entrenched to be considered reasonable, or "moveable." This focus on malleable audiences in the Engage training and beyond mirrors the "high valuation on mobility of citizens and their opinions" that Javier Lezaun and Linda Soneryd found in their analysis of "the configuration of legitimate constituencies" in exercises designed to elicit the public's opinions on technoscientific matters. They describe an antipolitics enacted through the "fundamental moral imperative" that participants "allowed themselves to be moved."[64]

Throughout its work, the CFI sought to help the industry identify and influence members of the public whose opinions and attitudes about the food system were likely to change through the encounter and/or who were likely to influence change among others.[65] The first trust report introduced the idea that "winning public acceptance of a new product, process or system is more easily achieved with the backing of a segment of the population known

as early adopters." The report referred to the "Diffusion of Innovation" model developed by Everett Rogers in the 1960s, which showed that "early adopters" are opinion leaders and drivers of social change. It described early adopters as "more rational, intelligent, and able to deal with uncertainty than others" and also "information seekers" interested in "sources they view as balanced and credible." [66] The report primed food companies to influence these drivers of public opinion with insights into how they got information about food issues (increasingly from the Web) and details about their Web use, such as how often they went online, the devices they used to do so, and the topics they most frequently researched when looking for food information. The report also included a detailed look at what it called "Messages That Matter," that is, those messages "that had a statistically significant impact on the attitudes of early adopters" in relation to nutrition, food safety, the humane treatment of animals, and the responsible use of technology. The messages themselves took the familiar form of establishing vague values-based foundations before introducing science and economics, which I have already discussed as enacting antipolitics in and of itself.[67] The point here is that antipolitics was also enacted by identifying early adopters as the audience of choice for "messages that matter" because of the likelihood of their opinions changing (in the desired direction) and their ability to influence others toward mobility.

As the CFI developed increasingly refined approaches to delineating relevant audiences, the virtue of mobility was increasingly intertwined with projections of both cognitive and psychological deficits. Audience segmentation and lines of influence between different segments were a major focus of the organization's 2016 and 2017 trust research. In 2016 "Inside the Minds of Influencers: The Truth about Trust" moved on from the broad generalizations

of the movable middle and early adopter frameworks to offer a more fine-tuned understanding of "the voices that impact the decision of others as they make choices at the grocery store or form opinions about the products, processes, people and brands that define today's food system." Ultimately, the research identified one group, representing a third of the population, as the prime target for engagement because of deficits that made them particularly mobile. It described "Providers" as open to influence because they "never feel quite good enough," and "when a food issue is placed before them they feel anxious that they don't have the information or trusted sources they need to decide what is right and wrong." This made them vulnerable to the influence of "Peak Performers," who seemed to be influencing Providers in a way that the CFI wanted to interrupt.[68]

The report described the influence of Peak Performers on Providers as the reason "more Americans are flocking toward various attributes of food they consider evolved and that signify progress" such as less processed food, clean labels, and GMO-free claims. The opportunity the report focused on was for the industry to step in to offer Providers the guidance they needed, thus coming between them and Peak Performers. The projection of deficits as an opportunity to move people toward desired ends was frank and explicitly gendered. "Pam the Provider" is shown standing in a grocery store reading a cereal box with a thought bubble over her head that contains nothing but a question mark. In the same image, "Paul the Peak Performer" stands beside Pam, taking advantage of the mobility created by her deficits of knowledge and confidence with the simple question, "Do you have any idea how processed foods impact your performance?" Pam was also described as pressured to stay away from processed food in her Facebook feed and at soccer games. This left her full of angst,

because in trying to feed her family convenient heathy meals on a budget she often used foods that "aren't considered particularly 'clean' by the influencers whispering in her ear." The report urged its audience to take advantage of Pam's mobility themselves rather than allow others to do so, suggesting that companies use the CFI's communication strategies to "support and empower her; provide balanced information; instill confidence about the value of processed food; earn trust."[69]

The CFI's focus on segmenting consumers to better understand and target lines of influence between them took a fascinating turn in 2017, with a report called "Connecting with Consumers in a Post-Truth Tribal World: What Makes Food and Information Credible," which divided the public along a continuum of relationships to "the Truth." The premise itself rejected the Real Facts frame's insistence on a singular science-driven Truth and, therefore, its inability to understand skeptical publics as anything but misinformed or antiscience. The central contention was that how people assessed the credibility of information about food was shaped by where they stood on a "belief spectrum" between "rational scientific objectivity" and "values-based subjectivity." While on one end truth was grounded in evidence-based science, on the other people's "assessment of news credibility and information is not as much about its scientific validity, than it is about the emotional resonance it has and the extent to which it 'gels' with their other deeply held desires and beliefs."[70]

The research identified five "archetypes" along the belief spectrum, each representing a set of shared beliefs in the context of credibility, and then mapped the lines of influence among them. Following the CFI's critique of Real Facts, the report found that "Scientifics," located on the farthest "rational" end of the spectrum, might be "technical information pioneers," but they had

very little influence because they were too "dogmatic," lacked clarity, and were unable to simplify conversations to make them relatable. Far more influential was the next group, whose approach to credibility mirrored the CFI's: "Philosophers" learned about research from "Scientifics" but integrated it with ethics and morality to convey "a story that relies on scientific evidence, but is communicated through an ethical and moral lens." The target audience for engagement was once again identified based on mobility as both a virtue and a feature of deficits that made particular consumers vulnerable to influence. The report deemed 52 percent of the population to have opinions too entrenched and extreme and/or to have too little influence over the mobility of others to be viable for "engagement." This included "Scientifics" who overcomplicate, "Wishful Thinkers" who "spiritualize" and "over-exaggerate," and "Existentials" who were too "politically charged in their discussions about food." The central opportunity was to target the 39 percent of the population who were "Followers" and the "Philosophers" (9 percent of the population) who influenced them.[71]

Followers were the prime target for engagement because they were both mobile, because of deficits that made them "vulnerable," and influential. Located in the middle of the objective/subjective truth spectrum, Followers were described as less scientifically literate, overwhelmed by the amount and complexity of scientific information, anxious about "doing the wrong thing," and looking for "reassurances." The report identified them as both "the largest cohort that is malleable" and as well positioned to influence others, particularly those segments closer to the subjective end of the truth spectrum. Each archetype was richly developed, with sections explaining what food news symbolized to them, their demographics, what motivated them, how they acted

on their beliefs, and what type of information they preferred. When explicitly discussing how to influence them, the focus was on understanding "triggering vulnerabilities" that might lead them to change their beliefs.[72]

The report explained that Followers' perspectives on both sugar and omega-3's had recently changed, and in both cases communication leading up to the changes followed the same formula. Experts removed ambiguity and repackaged the science simply, attached simple recommendations to the information, and addressed "a specific vulnerability": wanting to be a good parent. The three-step formula they recommended for "evolving the beliefs of Followers" was, therefore, to communicate through trusted experts, deliver unambiguous information and simple solutions, and address a specific vulnerability of the Follower. The report explained that these vulnerabilities stemmed from the fact that "Followers fear they will miss something or do the wrong thing, thus jeopardizing the health of their families or themselves." The simple version of the communication formula was, "trusted expert + relevant info + addresses vulnerability."[73]

This approach to delineating relevant audiences based on their propensity for mobility made it clear that while the CFI promoted a broad emphasis on engagement through shared values and transparency, the kind of conversations worth having were the ones in which the public participants—not the industry communicators—were likely to be moved. Members of the public holding strong opinions and unlikely to be moved were defined as outside of "engagement," while the most important targets were those who were seen as the least knowledgeable, informed, and confident in their opinions or concerns about the food system. There was little interest in conversations that enacted politics by producing disagreement over values, or conflict over the

direction of the food system, or even in which the result was a public unmoved.

Despite—and alongside—its efforts to overhaul the approach the food industry typically took to communicating with the public, the Center for Food Integrity's work reproduced many of the foundational assumptions and limitations of the Real Facts frame. The central paradox of the CFI's approach to building trust with consumers through transparency was that, much as Friedberg discovered in the supply chain, it maintained a veil of secrecy around the power dynamics that produced transparency itself.[74] Connecting through shared values and practicing the seven elements of transparency left embedded assumptions about the aims and purpose of the food system unexamined and assumed that public concerns about the food system were narrowly focused on impacts rather than the power dynamics that determined what questions mattered and which forms of expertise were relevant. The CFI's critique of deficit-driven communication produced new forms of communication and even engagement between the food industry and the public but at the same time remained shaped by deficit thinking. It projected a view of the public not only lacking information and understanding but also compromised by social and psychological hindrances to rational, science-informed decision making, not to mention plagued by insecurity. While the CFI taught corporate actors that their motivations, practices, and behaviors all mattered for building trust, it also located the emergence and persistence of lack of trust in the minds and social contexts of the consumer rather than the actions, inaction, and assumptions of industry actors. In other words, the Center for Food Integrity produced an antipolitics of transparency.

Conclusion

Future Food Imaginaries of the Public

If the Center for Food Integrity delivered more of the same "anti-politics machine" even as it pushed the food industry to communicate with the public in new ways, what about the people who set out to radically disrupt and transform the food system itself? Did innovators and entrepreneurs promising to revolutionize the food system with novel technologies and Silicon Valley–style approaches to business also rethink how to communicate with the public about the food system? How did they imagine the public and understand the role of communication? To explore these questions, let us look briefly into the most vibrant arena of the food tech sector, alternative protein innovation, and focus on one of the most headline-grabbing, hype-generating, and investment-attracting companies in this space: Impossible Foods.[1]

"Building the Food System of the Future Through Next Generation Products," one of many sessions at the two-day Future Food Tech Summit held in San Francisco in 2019, began with the moderator addressing the founder and CEO of Impossible Foods, a company that aimed to "disrupt" animal agriculture by making "raw meat" from plants: "You've made something

exactly the same out of something not exactly the same—not a theory of change, but a change of theory." Prompted to explain how he came to this breakthrough, Pat Brown, who had been a professor of biochemistry at Stanford, said that he asked himself what the most important problem in the world was that he could contribute to solving by means of basic biomedical research. He decided that "by a huge margin the biggest threat we face and maybe have ever faced is the catastrophic use of animals in the food system," but there was no way people were going to change their diets. After all, he noted, steak was served at the Paris climate meetings, and nothing changed after China asked its population to cut back on meat consumption. So Brown set out to deliver the meat people wanted "without the carcass" by replacing "the old technology" (animals) with something new. The discussion, which included four other panelists, eventually turned to regulatory processes, and Brown reflected on how his company was navigating its use of "heme," a genetically engineered protein credited with making the plant-based burgers look, taste, smell, and even "bleed" like meat. In addition to working closely with the FDA to go through a full review process rather than claiming GRAS status for heme, Brown explained that the company made a point of telling the public they use engineered yeast to make the product, because "transparency is the magic ingredient to winning the confidence of the public."

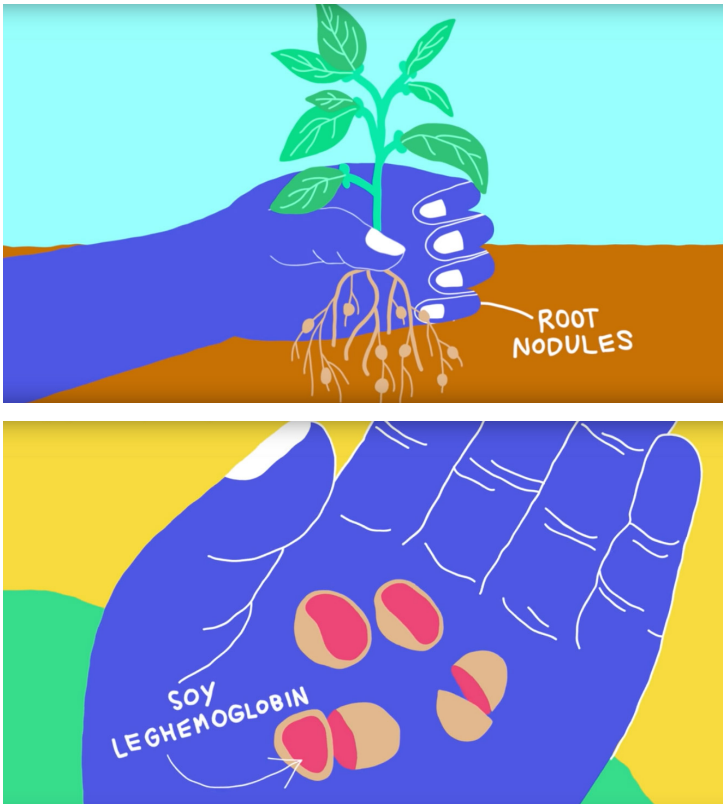
About a year later, during a webinar called "Using Microbial Technologies to Revolutionize Our Food System," also put on by Future Food Tech, then vice president for research and development at Impossible Foods, Ranjani Varadan, both discussed and demonstrated the company's approach to transparency, which involved simplified explanations of how heme was made emphasizing its naturalness, familiarity, and safety, as well as the

Figure 14. Ingredients of Impossible Beef made familiar and natural; heme is represented by a soy plant with dirt still clinging to the roots. Source: Impossible Foods, https://impossiblefoods.com/nz-en/products/beef/340g-pack.

company's commitment to the public good. For example, one slide showed an image of the roots of a soy plant as found in nature alongside text explaining, "Heme is a ubiquitous ingredient in nature. Plants have heme, too[,] . . . but extracting lehemoglobin from root nodules at scale is not sustainable." Another slide showed all the ingredients of an Impossible Burger as if laid out in a home kitchen, each labeled using familiar words linking it to a natural source, for example, soy protein as a soybean pod, coconut oil as a coconut, and heme as a soy plant root with dirt still clinging to it (Fig. 14). During the discussion Varadan fielded a question about how her company was responding to the growing need for clean labels. She acknowledged that "consumers are getting more and more savvy" and explained that Impossible's

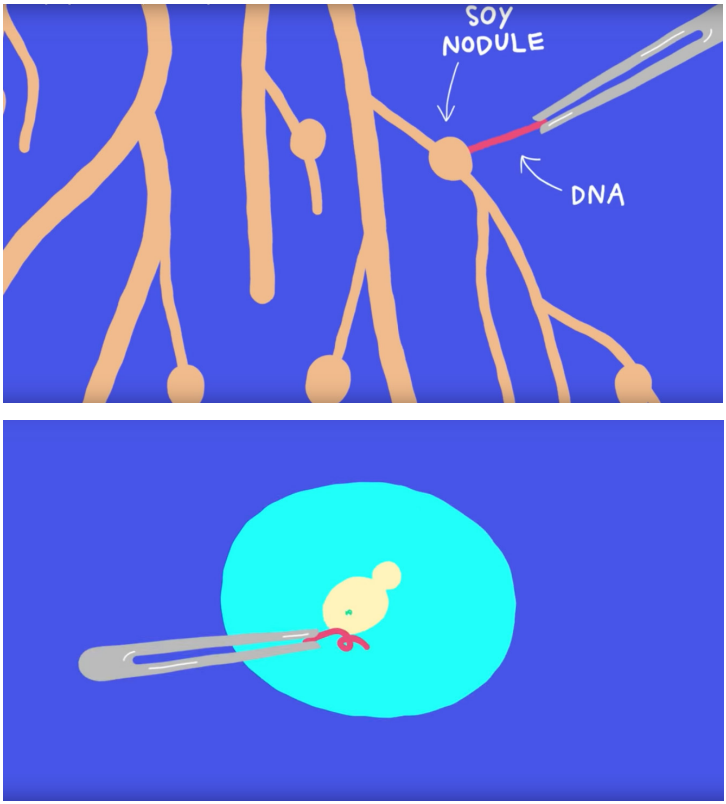
approach was "to be transparent and educate the consumer about what we use and how we use it," noting, "people tend to be a little scared if they don't understand," even though everything Impossible uses is "safe and approved for food."

The company's approach to transparency was also on full display on its website. The pages about heme explained that it was an essential molecule found in every living plant and that theirs was made "via fermentation of genetically engineered yeast, and safety-verified by America's top food-safety experts and peer reviewed academic journals."[2] A short video called *Heme—the Magic Ingredient in the Impossible Burger* used colorful animations set to soothing music to explain why the company used genetic engineering to produce heme and how the process worked. A female scientist explains, "Every decision that we make is really driven by our values and our mission. We want to feed the population in 2050. We want to do it in a way that does not destroy the planet. All of the decisions that we've made have been to produce a product that we can make in a way that is scalable and sustainable and safe, and that applies to heme." Later, as animations show a root being picked from the ground by hand, another female scientist explains that while heme could come from the root nodules of soy plants, the other option "would be fermentation, which is a far more scalable and sustainable way of making that protein" (Figs. 15 and 16). She notes that the process is something people are familiar with because yeasts are also used for making certain kinds of beers and wines. After some footage of blue-gloved technicians in lab coats producing heme in an industrial setting, the imagery returns to brightly colored cartoon animations playfully depicting DNA, represented as a little red squiggle, being pulled from a soy nodule with tweezers and then inserted into "our yeasts" (Figs. 17 and 18).[3]



Figures 15 and 16. Two stills from *Heme—The Magic Ingredient in the Impossible Burger* as the narrator explains that heme (soy leghemoglobin) could come from the root nodules of soybean plants. Source: Impossible Foods, https://impossiblefoods.com/heme.

While Impossible Foods promised something entirely new when it came to how meat was made, the company clearly adopted a familiar approach to imagining and communicating with the public. Impossible imagined a public that feared heme and the technology behind it and whose objections needed to be overcome so the public benefit could be delivered.[4] Shaped by food scientism, Impossible assumed not only that technological innovation was the solution to the challenge of feeding a



Figures 17 and 18. The narrator explains that Impossible produces heme through fermentation instead, first taking DNA from the soy leghemoglobin (figure 17) and then inserting it in "our yeasts" (figure 18). Source: Impossible Foods, https://impossiblefoods.com/heme.

growing population on a warming planet but also that any public skepticism of this technofix must be because of lack of scientific understanding rather than legitimate concerns about the aims and assumptions behind the innovation or its potential impacts beyond individual health and safety.[5] The company sought to assure the public that heme was natural, familiar, and safe because it believed people's concerns could only be the result of misunderstandings, fear of the unfamiliar, or calculable risks

to personal health. Also reflecting the kind of communication strategies promoted by the CFI, Impossible sought to build trust through shared values and transparency. Its communication was upfront about heme being produced through genetic engineering but, instead of leading with science and expertise, foregrounded the company's commitment to sustainability while carefully assuaging imagined fears with a version of transparency that, paradoxically, did not include questions about the power dynamics that produced either the technology or the transparency.[6] The goal of being transparent and educating the public about heme was not to foster space for dialogue that might include disagreement, or require innovators to reflect on or even change their own assumptions about the trajectory of the food system. It was to produce informed and willing consumers for Impossible products and maintain its "social license" to operate with minimal "formalized restrictions."[7]

Even as those involved in the agri-food tech sector promised to radically disrupt and transform the food system, the Impossible example shows that the Real Facts frame lived on in the way they imagined and communicated with the public. My research on the broader Bay Area agri-food tech sector confirms that many innovators, entrepreneurs, and investors advancing tech-driven approaches to meeting "grand challenges" related to feeding a growing population in the context of climate change imagined a fearful public whose irrational concerns about the uses of technology in the food system had to be overcome, just like the food industry "incumbents" whose businesses they aimed to disrupt. Within the agri-food tech "ecosystem," social, economic, and political questions having to do with the future of food were insistently re-posed as technical questions, amenable to technological solutions.[8] At the same time, questions about consumer acceptance

of these edible technofixes were re-posed as communication challenges, amenable to the solution of transparency.[9]

The problems with agri-food tech imaginaries of the public were the same as those explored throughout this book, only set into more stark relief because of the radical transformations promised, as well as the very real potential—and urgent need—for the food system to be remade at this moment of reckoning. Furthermore, expert perceptions and projections of the public played an outsized role in the sector that, unlike the conventional food system discussed in the rest of this book, was dependent on private investment. Agri-food tech startups operated within an intensely investor-dependent, entrepreneurial-driven political economy. To secure essential support, they had to convince investors and others in the sector that their innovations were radically disruptive and at the same time certain to be embraced by the public, often before they even existed. Therefore, while innovation processes took place outside of any engagement with the public, imaginaries of the public as future consumers played a critical role. As I have argued elsewhere, the concerns of the public were first imagined (as deficit driven) and then handily dispensed with as innovators assured investors that eager consumers existed or that potentially reticent consumers would be overcome by transparency. Those promising to radically transform the food system through technological innovation showed no interest in engaging the public in any form of meaningful dialogue about their visions of desirable futures, assumptions about the trajectory of the food system, or who might win and lose should these visions come true.[10]

Imaginaries of the public and assumptions about the ideal form of the relationship between science and society played an important role not only in the way the agri-food tech sector has

taken shape but also in its potential. Many scholars, including me, have elaborated the limits of the disruptions both promised and delivered by the sector, showing for example the narrowness of how sustainability has been defined and calling for questions of power and justice to be centered rather than considered outside the scope.[11] Fewer have attended to how knowledge politics and projections of the public are inseparable from this. Looking at both plant-based and cell-cultured animal product alternatives (also referred to as cellular, cultivated, and lab grown, among other names), Garrett Broad assesses the possibility for what he calls "food tech justice," arguing that while it is most likely that these alternatives will be incorporated as reforms into existing corporate food regimes, the potential for meaningful systemic change is worth pursuing. In his view food tech justice would require that the production of alternative proteins benefit animals, the environment, and human health and actively seek to redress food system marginalization and inequities.[12] But as Broad and I argue elsewhere, a justice-oriented approach would also have to move beyond simply "building trust" in products that have already been developed. It would have to reckon with the legitimate concerns of the public, including the power dynamics shaping both innovation and communication with the public about it.[13]

Throughout this book I have argued that the Real Food frame should be seen as a practice of politics, an expression through both words and deeds of a critical challenge to the food industry that was rooted in refusal of the way things were. Composed of a loose collection of discourses and actions among activists, advocates, and individual members of the public, the Real Food frame appears—from a distance—as a refusal of processed food that

expressed serious questions and concerns about the aims and trajectory of the food system. Good food became "real" in a cultural context that included higher social stakes around eating right than ever before and an "eat less" approach to dietary advice that focused on avoiding potentially harmful foods. A confluence of concerns about obesity, sustainability, nutrition, and technological risk raised public awareness about the potential health risks associated with processed food—such as weight gain and harms from unregulated ingredients—while also raising broader questions about the role of processed food in the American diet, the impacts of the industrial food system, and the values of the food industry. Implicit and explicit challenges to the food industry's relationship to science and scientific authority were central to all these concerns—and to the various social and consumer movements that arose to address them. Ultimately, what appears in retrospect as the Real Food frame presented a critical challenge to established understandings of good food, established ways of knowing good food, and long-standing imaginaries of the public. The Real Food frame reimagined the public not just as consumers whose role was to accept the products of the food industry, but as citizens who could shape the food system through their actions both within and outside the marketplace.

I have also shown that, through the more immediate, defensive lens of food industry experts, the refusals of the Real Food frame were based in irrational and misinformed fears of unpronounceable ingredients, unfamiliar processes, and technologies that were essential for delivering safe, abundant, and affordable food. The loosely coordinated, dynamic, evolving approaches that food industry actors took to responding to the critical challenges of the Real Food frame were shaped by shared ideas about both science and the public. These included an understanding that science was

the most important way of knowing about food, or food scientism, and a related assumption that negative perceptions of food processing and other uses of technology could only be the result of the public's lack of scientific knowledge, or, in other words, a deficit model of the public understanding of science. The responses of food industry actors to the Real Food frame were also shaped by the business imperative to ensure that processed foods continued to be purchased. The purpose of communication with the public, therefore, was to overcome knowledge deficits and ensure willing and eager consumers. Across all three domains explored in the chapters of this book, actors representing the industry sought to "correct" the concerns of the Real Food frame with the right kind of information. Science lessons for schoolchildren explained and celebrated the benefits of unfamiliar ingredients and modern farming technologies, comments to the FDA resisted the public's unscientific ideas about what "natural" should mean, and the organization leading a new approach to building trust sought to connect through "shared values" only to arrive at the same predetermined ends as traditional approaches.

The core commitment of this book has been to reveal the "side effects" of these efforts to educate the public about processed food and modern food production. One such effect has been the entrenchment and expansion of scientific authority over questions about food and the food system, or food scientism. The campaigns I have explored narrowly construed the issues at hand as having to do only with risks to individual health and safety posed by ingredients, technologies, and processes. Through classroom science lessons and comments to the FDA, they entrenched food scientism by narrowing the terrain of allowable questions to those science could answer. They shored up authority with vague references to science, such as Professor G. U. Eatwell and the

mantra "science-based reason." They evoked science as a source of authority in ways that extended beyond scientific and technical domains, asserting scientific authority over questions of meaning and policy, such as what "natural" should mean.[14]

Another side effect of efforts to defend the food industry and maintain interest in processed food was antipolitics. The food scientism of the Real Facts frame was a form of antipolitics because it reframed the politics of the Real Food frame as ignorance and misunderstanding. Everything that followed from or was otherwise interrelated with the fundamental assumption that Real Food should and could be "corrected" by experts through education and communication contributed to the "antipolitics machine" I have sought to reveal. Time and time again the Real Facts frame re-posed concerns about processed food and the food system as problems of misunderstanding amenable to new and better forms of education, outreach, or PR. It refused to entertain the bigger question expressed by the Real Food frame—What kind of food system do we want?—and instead sought to convince the public not only that processed food was safe, healthy, and even better than fresh but also that the big questions about the food system and the uses of technology within it were best left to experts. The food industry's projection of the public as misinformed, irrationally fearful, and lacking an understanding of food science justified not taking seriously the concerns activists, advocates, and individuals raised in both words and deeds. It also justified not taking seriously the role its own words and deeds played in the public's growing distaste for processed food and distrust in the food industry.

Food scientism and the Real Facts "antipolitics machine" are manifestations of broader patterns in the culture of scientific institutions and science-society relations. Wynne has argued that

the unacknowledged problem facing contemporary scientific institutional culture is not the public's failure to trust but "its persistent routine externalization and projection onto others of its own possible responsibility for public disaffection or disagreement."[15] The public mistrust of science is, he argues, an effect of scientific misunderstandings of the public, which are themselves "provocative and alienating."[16] Scientific knowledge and scientific institutions imagine and project the public in reflection of their own unspoken needs. The deficit model of the public understanding of science, in its many iterations, operates as what Wynne calls a "repertoire of possible alibis which prevent an honest institutional-scientific self-reflective questioning, in public; and as an inadvertent alibi for the continued presumptive imposition of scientific meanings on public issues." He goes on: "This evasion chronically undermines what could be vigorous, mutually educative and more humanly as well as technically intelligent innovation and science."[17]

How could we get there? According to Wynne, taking seriously concerns that have been treated as misunderstandings and distrust would require institutional and cultural change. It would require debate both within and outside science over the "proper ends and purposes of knowledge, and the proper conditions of distribution, ownership, and control of the capacity for and practice of scientific knowledge production. It would also involve a socially and ethically informed debate about the relations between scientific knowledge and other legitimate forms of knowledge and practice."[18] Rather than strategize about how to induce the public to trust, scientific institutions would have to reflect on and take responsibility for their own trustworthiness. This, Wynne explains, would entail being "openly self-aware and questioning"

of their own imaginations and assumptions about both science and publics.[19] What might this look like in the context of the food system? What would happen if the food industry responded to the critical challenges and refusals of the Real Food frame without "reposing" political questions about the food system as technical problems of misunderstanding, amenable to the solution of better communication? What if resources currently being used to diagnose and correct the deficiencies of the public were used instead to question food scientism, rethink deficit-driven projections of the public, and reimagine the relationship between science and publics?

The institutional and cultural changes that it would take to dismantle the Real Facts antipolitics machine are difficult to imagine, difficult to chart a path toward. At the same time, they are already taking place. As Tanya Li notes, while "rendering contentious issues technical is a routine practice for experts . . . this operation should be seen as a project, not a secure accomplishment. Questions that experts exclude, misrecognize, or attempt to contain do not go away."[20] The Real Food frame and the Real Facts frame produce each other through infinite points of friction, a tiny fraction of which I have isolated and described here. The seeds of ongoing, emergent critical challenges lie in both the Real Food frame and in the misdiagnoses, re-posed questions, and alienating tactics of the Real Facts frame itself. While I have argued that industry attempts to educate the public about processed food and the benefits of modern food production produce an "antipolitics machine" as a side effect, I have not shown that it has made politics disappear. On the contrary, the Real Facts antipolitics machine is an ongoing product of its own failure. The critical challenges of the Real Food frame are both "squashed"

by the Real Facts frame (to use Ferguson's term) and exceed its antipolitics machine, presenting an ongoing challenge to the food industry and its scientific authority.[21]

My role as a critic has been to read a mundane set of conflicts in a new way, surfacing the significance of what appears to members of the public as a problem with processed food and to experts as a problem of public misunderstanding. Having shown that the contest between Real Food and Real Facts is much more than either of these things, I invite all of us to creatively engage the central question—What kind of food system do we want?—in a way that includes rather than evades questions of power and knowledge. As my work demonstrates, the public is not anti–food science, which opens new questions about what the purpose of communication about food production is. There is no such thing as communication between food industry and the public that does not include and seek to operationalize ideas about the role the public should play in the food system and how power should operate. There are countless ways in which these assumptions about the ideal relationship between the public and the food industry can be surfaced, scrutinized, and reimagined.

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NOTES

INTRODUCTION

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8. Lowe, Phillipson, and Lee, "Socio-Technical Innovation," 227, 29.

9. See e.g., Marion Nestle, *Unsavory Truth: How Food Companies Skew the Science of What We Eat* (New York: Basic Books, 2018); D. A. Zaltz, L. E. Bisi, G. Ruskin, et al., "How Independent Is the International Food Information Council from the Food and Beverage Industry? A Content Analysis of Internal Industry Documents," *Global Health* 18, no. 91 (2022), https://doi.org.10.1186s12992-022-00884-8; Erin Trauth, "Nutritional Noise: Community Literacies and the Movement against Foods Labeled as 'Natural'," *Community Literacy Journal* 10, no. 1 (Autumn 2015): 4–20; S. Steele, L. Sarcevic, G. Ruskin, and D. Strucker, "Confronting Potential Food Industry 'Front Groups': Case Study of the International Food Information Council's Nutrition Communications Using the UCSF Food Industry Documents Archive," *Globalization and Health* 18, no. 16 (2022), https://doi.org/10.1186/s12992-022-00806-8.

10. See, e.g., Kelly D. Brownell and Katherine Battle Horgen, *Food Fight: The Inside Story of the Food Industry, America's Obesity Crisis, and What We Can Do about It* (New York: McGraw-Hill, 2004); Marion Nestle, *Food Politics: How the Food Industry Influences Nutrition and Health* (Berkeley: University of California Press, 2002); Michael Moss, *Salt Sugar Fat: How the Food Giants Hooked Us* (New York: Random House, 2013).

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12. See, e.g., Marie-Monique Robin, *Our Daily Poison: From Pesticides to Packaging, How Chemicals Have Contaminated the Food Chain and Are Making Us Sick* (New York: New Press, 2014).

13. My understanding and approach to frames and framing contests is informed by Abigail Saguy's work on framing contests over obesity. See, e.g., Abigail C. Saguy, *What's Wrong with Fat?* (New York: Oxford University Press, 2012); Abigail C. Saguy and Kevin W. Riley, "Weighing Both Sides: Morality, Mortality, and Framing Contests over Obesity," *Journal of Health Politics, Policy and Law* 30, no. 5 (2005): 869–921.

14. Rachel Schurman and William Munro, *Fighting for the Future of Food: Activists versus Agribusiness in the Struggle over Biotechnology* (Minneapolis: University of Minnesota Press, 2010), xvii.

15. Ibid., 17–19.

16. Ibid., 189.

17. Ibid., chap. 3.

18. Tim Lang and Michael Heasman, *Food Wars: The Global Battle for Mouths, Minds and Markets* (London: Routledge, 2015), 24.

19. Ibid., chap. 2.

20. STS scholars also argue that contests appearing to be about knowledge, or epistemology, are really about different meanings, cultural worlds, and social and political commitments. See, e.g., Brian Wynne, "Public Engagement as a Means of Restoring Public Trust in Science—Hitting the Notes, but Missing the Music?," *Community Genetics* 9, no. 3 (2006): 216. Sheila Jasanoff, "Ordering Knowledge, Ordering Society," in *States of Knowledge: The Co-Production of Science and the Social Order* (London: Routledge, 2004), 45. While the concept of frames is used here to highlight that Real Food and Real Facts are different ways of seeing the same thing (i.e., the problem of processed food), I also note that these two are not seeing the same thing at all but ontologically different things called "food" and "health." This argument is elaborated in chap. 3.

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22. Ibid., 140–42; quotes on 141.

23. In doing so, I am both inspired and informed by Leach and Fairhead's *Vaccine Anxieties*. Here I am borrowing and paraphrasing one of the questions that drives their analysis. Melissa Leach

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24. Claire Marris, "The Construction of Imaginaries of the Public as a Threat to Synthetic Biology," *Science as Culture* 24, no. 1 (2015): 83–98; Geoffrey Evans and John Duran, "The Relationship between Knowledge and Attitudes in the Public Understanding of Science in Britain," *Public Understanding of Science* 4, no. 1 (1995): 57–74; Wynne, "Public Engagement."

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26. Wynne, "Public Engagement"; Ian Welsh and Brian Wynne, "Science, Scientism and Imaginaries of Publics in the UK: Passive Objects, Incipient Threats," *Science as Culture* 22, no. 4 (2013): 540–66; Marris, "Construction of Imaginaries"; Leach and Fairhead, *Vaccine Anxieties*.

27. Marris, "Construction of Imaginaries," 83.

28. Aya Hirata Kimura, *Radiation Brain Moms and Citizen Scientists: The Gender Politics of Food Contamination after Fukushima* (Durham, NC: Duke University Press, 2016); Christopher Mayes, Claire Hooker, and Ian Kerridge, "Bioethics and Epistemic Scientism," *Journal of Bioethical Inquiry* 12, no. 4 (2015): 565–67; Leach and Fairhead, *Vaccine Anxieties*; Welsh and Wynne, "Science, Scientism and Imaginaries."

29. Welsh and Wynne, "Science, Scientism and Imaginaries," 542.

30. Brian Wynne, "Risky Delusions: Misunderstanding Science and Misperforming Publics in the GE Crop Issue," in *Genetically Engineered Crops: Interim Policies, Uncertain Legislation*, ed. Iain E. P. Taylor (New York: Routledge, 2007), 341–66. See also Kinchy's overview of this phenomenon in chapter 2, Abby Kinchy, *Seeds, Science, and Struggle: The Global Politics of Transgenic Crops* (Cambridge, MA: MIT Press, 2012); and Jasanoff's detailed analysis in Sheila Jasanoff, *The Fifth Branch: Science Advisors as Policymakers* (Cambridge, MA: Harvard University Press, 1990).

31. Welsh and Wynne, "Science, Scientism and Imaginaries," 542.

32. Wynne, "Public Engagement," quote on p. 214.

33. Ibid., 212.

34. Ibid., 214.

35. James Ferguson, *The Anti-Politics Machine: Development, Depoliticization, and Beauracratic Power in Lesotho* (Minneapolis: University of Minnesota Press, 1994), 171, 74.

36. Also known as solutionism. See Evgeny Morozov, *To Save Everything Click Here: The Folly of Technological Solutionism* (Philadelphia: Public Affairs Press, 2013). For more on solutionism in the food system, see Charlotte Biltekoff and Julie Guthman, "Conscious, Complacent, Fearful: Agri-Food Tech's Market-Making Public Imaginaries," *Science as Culture* 32, no. 1 (2022): 58–82; and Julie Guthman, *The Problem with Solutions: Why Silicon Valley Can't Hack the Future of Food* (Oakland: University of California Press, 2024).

37. Tania Murray Li, *The Will to Improve: Governmentality, Development, and the Practice of Politics* (Durham, NC: Duke University Press, 2007), 12.

38. Ibid., 7.

39. Regula Valérie Burri, "Imaginaries of Science and Society: Framing Nanotechnology Governance in Germany and the United States," in *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, ed. Sheila Jasanoff and Sang-Hyun Kim (Chicago: University of Chicago Press, 2015), 233–53.

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42. Marris, "Construction of Imaginaries," 85.

43. Wynne, "Public Engagement," 214.

44. Leach, Scoones, and Wynne, "Science and Citizens," 10.

45. Kinchy, *Seeds, Science, and Struggle*, 2, 30–31, 164.

46. Kimura, *Radiation Brain Moms*, 11.

47. Ibid., 13–14.

48. Anna Zeide, *Canned: The Rise and Fall of the Consumer Confidence in the American Food Industry* (Oakland: University of California Press, 2018), 12.

49. Ibid., 166–68.

50. Sarah N. Heiss, "'Healthy' Discussions about Risk: The Corn Refiners Association's Strategic Negotiation of Authority in the Debate over High Fructose Corn Syrup," *Public Understanding of Science* 22, no. 2 (2013): 220.

51. Ibid., 223.

52. Ibid., 224.

53. Ibid., 223.

54. Ibid.

55. Michele Simon, "Best Public Relations Money Can Buy—a Guide to Food Industry Front Groups," Center for Food Safety, 2013, 4, https://www.centerforfoodsafety.org/reports/2210/best-public-relations-that-money-can-buy-a-guide-to-food-industry-front-groups.

56. Ibid., 5.

57. Ibid.

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Scholars have also written extensively about food industry efforts to shape or influence the scientific process, such as by funding favorable nutritional or toxicological studies. See, e.g., Nestle, *Unsavory Truth*; Norah Mackendrick, *Better Safe Than Sorry: How Consumers Navigate Exposure to Everyday Toxics* (Oakland: University of California Press, 2018). Historians have also shown that science has long been used by the food industry to win consumer trust. See, e.g., Zeide, *Canned*; Jonathan Rees, *The Chemistry of Fear: Harvey Wiley's Fight for Pure Food* (Baltimore: Johns Hopkins University Press, 2021). Among those observing how science is also taken up by critics and activists, Mackendrick looks at the use of biomonitoring by environmental activists (Mackendrick, *Better Safe Than Sorry*), and Julie Guthman discusses the role of science and scientific research in movements for sustainable agriculture: Julie Guthman, *Agrarian Dreams: The Paradox of Organic Farming in California* (Oakland: University of California Press, 2004). Abby Kinchy looks at how, even as they were being demonized as irrational science deniers, anti-biotech activists drew on dominant discourses of scientific risk assessment to express their opposition, incorporating science into their tactics by "using counter experts, publicizing suppressed studies, and carrying out their own participatory research" (Kinchy, *Seeds, Science, and Struggle*, 15).

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71. National Science Foundation Award #1749184. Julie Guthman was the principal investigator (PI) for this project. In addition to me, the other co-PIs were Madeleine Fairbairn and Kathryn De Master.

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Biology Reports 2, no. 7 (2001): 545–48; Brian Wynne, "Creating Public Alienation: Expert Cultures of Risk and Ethics on GMOs," *Science as Culture* 10, no. 4 (2001): 445–81; Heidi Zimmerman and Aaron Eddens, "Governing the Liberal Self in a 'Post-Truth' Era: Science, Class and the Debate over GMOs," *Cultural Studies* 32, no.6, (2018): 953–74.

73. See Leach and Fairhead, *Vaccine Anxieties*; Amit Prasad, "Anti-Science Misinformation and Conspiracies: COVID-19, Post-Truth, and Science & Technology Studies (STS)," *Science, Technology & Society* 27, no. 1 (2022): 88–112.

74. Rachel Ankeny, "Science in an Age of Scepticism: Coping with a New Age of Controversy," *Griffith Review* (2020), https://www.griffithreview.com/articles/science-in-an-age-of-scepticism/. See also Alissa Overend, *Shifting Food Facts: Dietary Discourse in a Post-Truth Culture* (London: Routledge, 2021).

CHAPTER ONE. HOW GOOD FOOD BECAME "REAL"

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3. James Kennedy, *Fighting Chemophobia: The Story of How We Became Afraid of Chemicals and What to Do about It* (North Charleston, SC: CreateSpace Independent Publishing Platform, 2018), back matter.

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7. Charlotte Biltekoff, *Eating Right in America: The Cultural Politics of Food and Health* (Durham, NC: Duke University Press, 2013).

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10. Nestle, *Food Politics*, 39.

11. Warren Belasco, *Appetite for Change: How the Counter Culture Took on the Food Industry, 1966–1988* (Ithaca, NY: Cornell University Press, 1989); Nestle, *Food Politics*.

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15. Ibid., 72–73, 85–89.

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17. Biltekoff, *Eating Right*, 133.

18. Saguy, *What's Wrong with Fat?*, 84; Brownell and Horgen, *Food Fight*; Oliver, *Fat Politics*; Moss, *Salt Sugar Fat*.

19. Saguy, *What's Wrong with Fat?*, 77.

20. See, e.g., Eric Schlosser, *Fast Food Nation: The Dark Side of the All-American Meal* (Boston: Houghton Mifflin, 2001); Morgan Spurlock, dir., *Super Size Me* (Samuel Goldwyn Films, Roadside Attractions, Los Angeles, 2004); Stephanie Soechtig, dir., *Fed Up* (Weinstein Company, Los Angeles, 2014); Robert Kenner, dir., *Food, Inc.* (Magnolia Pictures, New York, 2009); Raj Patel, *Stuffed and Starved: The Hidden Battle for the World Food System*, rev. and updated (Brooklyn, NY: Melville House Publishing, 2007).

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27. Nestle, *Food Politics*, 20–21.

28. Ibid., 361.

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50. Pollan, "Unhappy Meals"; Pollan, *In Defense of Food*, 83–136.

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https://www.cbsnews.com/news/what-a-junk-food-diet-tells-us-about-the-dismal-state-of-nutrition-science/.

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67. Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage, 1992); Heiss, "'Healthy' Discussions about Risk"; Lowe, Phillipson, and Lee, "Socio-Technical Innovation for Sustainable Food Chains," 228.

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69. Heiss, "'Healthy' Discussions"; Sarah N. Heiss, "A 'Naturally Sweet' Definition: An Analysis of the Sugar Association's Definition of the Natural as a Terministic Screen," *Health Communication* 30, no. 6 (2015): 536–44.

70. Angela N. H. Creager and Jean-Paul Gaudillière, Introduction to *Risk on the Table: Food Production, Health, and the Environment*, ed. Angela N. H. Creager and Jean-Paul Gaudillière (New York: Berghahn Books, 2021), 3.

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73. As discussed in the introduction, the reduction of public concerns about the food system to quantifiable risk is an effect of scientization.

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75. Kinchy, *Seeds, Science and Struggle*, 25–26.

76. MacKendrick, *Better Safe Than Sorry*, 26–33.

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80. Helena Bottemiller, "Food Chemical Safety Relies on Self-Policing, Pew Finds," *Food Safety News*, October 7, 2011, https://www.foodsafetynews.com/2011/10/food-chemical-safety-relies-on-self-policing-pew-finds/.

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83. Blue, "Food, Publics, Science," 148.

84. At the same time, these goals were much easier to achieve for those with greater resources. MacKendrick describes, for example,

the extra time and labor involved in practicing what she calls "precautionary consumption" on a restricted budget. MacKendrick, *Better Safe Than Sorry*, chap.6. See also Kate Cairns, Josée Johnston, and Norah MacKendrick, "Feeding the 'Organic Child': Mothering through Ethical Consumption," *Journal of Consumer Culture* 13, no. 2 (2013): 97–118.

85. Cairns, Johnston, and MacKendrick, "'Organic Child,'" 101.

86. MacKendrick, *Better Safe Than Sorry*, chap.6.

87. Ibid., 72–75.

88. Whole Foods advertises nine different "quality standards," including one for food ingredients that proudly bans over 230 ingredients. Ibid., 96; "Food Ingredient Quality Standards," https://www.wholefoodsmarket.com/quality-standards/food-ingredient-standards.

89. MacKendrick, *Better Safe Than Sorry*, 93.

90. Ibid., 155.

CHAPTER TWO. REAL FOOD AND REAL FACTS IN THE CLASSROOM

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2. "IMDb: Food, Inc.," https://www.imdb.com/title/tt1286537/; John Anderson, "Food, Inc.," *Variety*, September 11, 2008, https://variety.com/2008/scene/markets-festivals/food-inc-1200470691/.

3. "Participant Media Teams with Center for Ecoliteracy to Bring Food, Inc.-Inspired Discussion Guide to 3000 U.S. Schools" (2011), http://www.participantmedia.com/2011/03/participant-media-teams-center-ecoliteracy-bring-food-inc-inspired-discussion-guide-3000-u-s-schools/.

4. Center for Ecoliteracy, "*Food, Inc.* Discussion Guide" (Participant Media, LLC., 2009), https://www.ecoliteracy.org/download/food-inc-discussion-guide.

5. IFIC describes itself as "a 501(c)(3) nonprofit educational organization with a mission to effectively communicate science-based information about health, nutrition, food safety and agriculture."

Members include Cargill, Coca-Cola, Danone, General Mills, Mars, Mendelez International, and PepsiCo, among others. International Food Information Council, "About IFIC"; International Food Information Council, "Membership," https://ific.org/work-with-us/our-membership/. More information about IFIC is available in the introduction.

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9. Alliance to Feed the Future, "Alliance to Feed the Future Provides Lessons on 'Farm to Fork' in New Educational Curricula for Elementary and Middle School Students," news release, July 31, 2012, https://www.newswise.com/articles/alliance-to-feed-the-future-provides-lessons-on-farm-to-fork-in-new-educational-curricula-for-elementary-and-middle-school-students.

10. Alliance to Feed the Future, "Alliance to Feed the Future Offers New Educational Curricula on 'the Science of Feeding the World' for Students in Grades K–8," news release, November 12, 2013.

11. Schmidt, "Consumer Opinions about Processed Foods."

12. Burri, "Imaginaries of Science and Society," 233, 242.

13. Ibid., 244.

14. Gussow, "The Science and Politics of Nutrition Education."

15. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide" (Participant Media, 2009), 8–9.

16. Ibid., 10–12.

17. Ibid., 16.

18. Ibid., 16–19. The discussions were likely not as open ended as this rhetoric imagines them to be. Questions the guide posed and activities it suggested both inside and outside the classroom clearly had specific directions and outcomes in mind. Nonetheless, the professed desire for open-ended debate and dialogue about the food

system remains significant, especially in contrast to the avowedly didactic, linear transfer of expert knowledge that the Alliance lessons embraced.

19. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 10.
20. Ibid., 12–15.
21. Ibid., 13–14.
22. "About *Food, Inc*.," https://www.pbs.org/pov/films/foodinc/.
23. These assumptions were behind much of Pollan's work, as well as other work that sought to inform the public about where their food comes from such as Schlosser's *Fast Food Nation*. Pollan, *The Omnivore's Dilemma*; Pollan, *In Defense of Food*. The concept has been discussed at length in the agri-food scholarship. See, e.g., Ian Hudson and Mark Hudson, "Removing the Veil? Commodity Fetishism, Fair Trade, and the Environment," *Organization & Environment* 16, no. 4 (2003): 413–30; David Goodman, E. Melanie DuPuis, and Michael K. Goodman, *Alternative Food Networks: Knowldege, Practice, and Politics* (Abingdon: Routledge, 2012); Alison Hope Alkon and Christie Grace McCullen, "Whiteness and Farmers Markets: Performances, Perpetuations . . . Contestations?," *Antipode* 43, no. 4 (2010): 937–59.
24. Kenner, *Food, Inc*.
25. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 26, 29.
26. Kenner, *Food, Inc*.
27. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 34.
28. Kenner, *Food, Inc*.
29. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 81.
30. The role of consumption and consumer politics in food politics and alternative food movements has been richly discussed and debated. See, e.g., Alan Warde, *Consumption, Food, and Taste* (London: Sage, 1997); Guthman, *Agrarian Dreams*; Julie Guthman, "Neoliberalism and the Making of Food Politics in California," *Geoforum* 39, no. 3 (2008): 1171–83; Blue, "Food, Publics, Science."
31. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 87.
32. Ibid., 89.
33. Ibid., 89–93.

34. Burri, "Imaginaries of Science and Society."

35. Alliance to Feed the Future, "'Alliance to Feed the Future' Forms."

36. Alliance to Feed the Future, "Alliance to Feed the Future Provides Lessons on 'Farm to Fork" and "Alliance to Feed the Future Offers New Educational Curricula."

37. Wynne, "Public Engagement as a Means of Restoring Public Trust in Science," 214.

38. For discussion of similar strategies in relation to genetic engineering, see Marris, "Public Views on GMOs"; Erika Szymanski, "Constructing Science in the Public: Framing Synthetic Yeast in News Media," in *Exploring Science Communication: A Science and Technology Approach*, ed. Ulrike Felt and Sarah Davies (London: Sage, 2020), 150–69. For discussion of similar strategies in relation to alternative protein, see Alexandra E. Sexton, Tara Garnett, and Jamie Lorimer, "Framing the Future of Food: The Contested Promises of Alternative Proteins," *Environment and Planning E: Nature and Space* 2, no. 1 (2019): 47–72.

39. Alliance to Feed the Future, "A Super System: Understanding the Benefits of the Modern Food Production System," 2012.

40. Alliance to Feed the Future, "It All Adds Up!," 2012.

41. Christopher R. Mayes and Donald B. Thompson, "What Should We Eat? Biopolitics, Ethics, and Nutritional Scientism," *Journal of Bioethical Inquiry* 12, no. 4 (December 2015): 592.

42. Iain Cameron and David Edge, *Scientific Images and Their Social Uses: An Introduction to the Concept of Scientism* (London: Buttersworths, 1979), 2; Cited in Mayes and Thompson, "What Should We Eat?," 592.

43. "Next Generation Science Standards, FAQ," https://www.nextgenscience.org/faqs##3.3.

44. Alliance to Feed the Future, "Watching Mold Grow," 2013.

45. Mayes and Thompson, "What Should We Eat?," 592.

46. As discussed in the introduction, Gussow notes that when faced with the same facts about fiber, different assumptions about the aims and trajectory of the food system will cause some to ask, "In what form should we be fortifying food with fiber?," while

others ask, "In what ways should we be modifying our processing methods so as to retain more fiber in food?" Gussow, "Science and Politics," 141.

47. Alliance to Feed the Future, "Fortified for Health," 2013.

48. Alliance to Feed the Future, "Fruits of our Labor," "Endless Options," "Mapping Meals," "Precious Produce," "Egg Drop Dare," "Growing with Hydroponics," 2013.

49. Wynne, "Public Engagement," 214.

50. M. Korthals, "This Is or Is Not Food: Framing Malnutrition, Obesity and Healthy Eating," in *Climate Change and Sustainable Development: Ethical Perspectives on Land Use and Food Production*, ed. Thomas Potthast and Simon Meisch (Wageningen, Netherlands: Wageningen Academic Publishers, 2012), 289.

51. Ibid., 289–90.

52. For discussion of the "ontological turn" in STS, see, e.g., John Law and Marianne Elisabeth Lien, "Slippery: Field Notes on Empirical Ontology," *Social Studies of Science* 43, no. 3 (2012): 363–78; Annemarie Mol, "Ontological Politics: A Word and Some Questions," *Sociological Review* 47, no. S1 (1999): 74–89; Steve Woolgar and Javier Lezaun, "The Wrong Bin Bag: A Turn to Ontology in Science and Technology Studies?," *Social Studies of Science* 43, no. 3 (2013): 321–40.

53. Korthals, "This Is or Is Not Food."

54. Annemarie Mol, "Mind Your Plate! The Ontonorms of Dutch Dieting," *Social Studies of Science* 43, no. 3 (2012): 380–81.

55. "Food," https://www.dictionary.com/browse/food.

56. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 23.

57. Ibid., 58.

58. Ibid., 64.

59. Ibid., 66.

60. Ibid., 68.

61. Kenner, *Food, Inc*.

62. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 43.

63. Kenner, *Food, Inc*.

64. Center for Ecoliteracy, "*Food, Inc*. Discussion Guide," 49.

65. Ideas for Action in "Unintended Consequences" included "have students research E. coli and other food contaminants and

create a brochure for families on keeping food safe from contamination." Ideas for Action in "The Dollar Menu" included "encourage students to keep a food log for a week and to look for ways to include healthy food in their diet" and a prompt for creating a cookbook of inexpensive, simple recipes using nutritious ingredients. Ibid., 44, 52.

66. Korthals, "This Is or Is Not Food," 289.

67. As Woolgar and Lezaun suggest, the insistence on "a singularized world" and on the unproblematic and ordinary status of a contested entity is a form of ontological politics. In their case study focusing on trash bags (aka bin bags), they explain, "The claim the bin bag can only be what it already is makes possible, and goes hand in hand with, the denigration of other 'versions' of the bag as motivated, influenced, socially informed and, in short, political" ("Wrong Bin Bag," 334). Similarly, the reassertion throughout the lessons that food could "only be what it already was" went hand in hand with the Alliance's denigration of *Food, Inc.*'s version of food as "misinformation."

68. Alliance to Feed the Future, "A Food Journey," 2012.

69. Alliance to Feed the Future, "Apples to Applesauce," 2012.

70. Alliance to Feed the Future, "All in Order," 2012.

71. For more on romantic pastoral imaginaries, see Alkon and McCullen, "Whiteness and Farmers Markets"; Kim Q. Hall, "Cripping Sustainability, Realizing Food Justice," in *Disability Studies and the Environmental Humanities: Toward an Eco-Crip Theory*, ed. Sarah Jaquette Ray and Jay Sibara (Lincoln: University of Nebraska Press, 2017), 422–46.

72. Alliance to Feed the Future, "A Food Journey"; "All in Order"; "What Does a Farmer Do before Breakfast?," 2012.

73. Lang and Heasman, *Food Wars*, 25–31. For another example of this kind of argument in action, see Jeff Simmons, "Why Agriculture Needs Technology to Help Meet a Growing Demand for Safe, Nutritious and Affordable Food," *Food Economics and Consumer Choice* (2009), https://www.slideshare.net/trufflemedia/food-economics-and-consumer-choice-white-paper.

74. For more on the framing of technological urgency around the coming nine billion by 2050 in the context of agri-food tech, see Sexton, Garnett, and Lorimer, "Framing the Future of Food"; Julie Guthman et al., "In the Name of Protein," *Nature Food* 3 (2022): 391–93; Benjamin Aldes Wurgaft, "Meat for Spaceship Earth?," Semicopia, http://www.semicopia.com/meat-for-spaceship-earth.html.

75. Alliance to Feed the Future, "Growing and Growing," 2012.

76. Alliance to Feed the Future, "Food Choice, Cost and Convenience," 2012.

77. Alliance to Feed the Future, "Heathful Eating on the Go," 2012.

78. Alliance to Feed the Future, "Food Charades," 2012.

79. Alliance to Feed the Future, "Play It Safe," 2012; "Party Crashers," 2012.

80. Saguy, *What's Wrong with Fat?*

81. US Department of Agriculture, "MyPlate," https://www.myplate.gov/; Nestle, *Food Politics*.

82. Alliance to Feed the Future, "A Full Plate," 2012.

83. Alliance to Feed the Future, "Food for a Day," 2012; "Two Full Plates," 2012. These were clearly shaped by nutritionism, especially nutrient reductionism that blurred the boundaries between whole and processed food and participated in the making of what Scrinis calls nutricentric subjects. Scrinis, *Nutritionism*.

84. Alliance to Feed the Future, "Which Meal?," 2012; "Food for a Day."

85. Alliance to Feed the Future, "Perfect Portions," 2012.

86. Alliance to Feed the Future, "Which Meal?"

87. Alliance to Feed the Future, "Healthful Eating and Energy Balance, Parent Send Home Page," 2012.

88. Alliance to Feed the Future, "Tracking My Daily Activities," 2012.

89. Scrinis, *Nutritionism*.

90. Mayes and Thompson, "What Should We Eat?," 592.

91. Ibid., 593.

92. Korthals, "This Is or Is Not Food."

93. Burri, "Imaginaries of Science and Society."

CHAPTER THREE. FIGHTING FOR "NATURAL"

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2. Lauren R. Hartman, "Food Color Evolves as Consumers Push for Clean Labels," *Food Processing*, August 25, 2015.

3. Lauren R. Hartman, "Clean Slate on Clean Labels," *Food Processing*, September 15, 2015.

4. Lauren R. Hartman, "Infographic: What Consumers Look for When Buying Food Products," *Food Processing*, November 19, 2015.

5. Monica Eng, "'Natural' Isn't Always Organic," *Los Angeles Times*, July 11, 2009, B4; Diane Toops, "Have Food Processors Found the Holy Grail of Sweeteners?," *Food Processing*, January 27, 2010; "Natural Label to Gain Momentum in 2008," *Food Processing*, January 4, 2008.

6. A. Elizabeth Sloan, "Navigating the Natural Marketplace," *Food Technology*, 65, no.7 (July 2011).

7. Stephanie Strom, "The Food Is Modified, the Label Is 'Natural,'" *New York Times*, December 20, 2013, B3; Matthew Mientka, "The Unnatural Death of 'Natural,'" *Newsweek*, November 22, 2013, 1.

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9. Leslie Krasny, "Natural Claim Still Subject to Uncertainty over Standards," *Food Processing*, April 3, 2007; Carolyn Fisher and Ricardo Carvajal, "What Is Natural?," *Food Technology*, November 2008. Also in 2007, actors hired by small chicken processors wore chicken suits in a demonstration in Washington, DC, demanding that the two biggest processors, Tyson and Pilgrim's Pride, no longer be allowed to call their saltwater-pumped chickens "100% natural." Cindy Skrzycki, "Crying Foul in Debate over 'Natural' Chicken," *Washington Post*, November 6, 2007, D02.

10. Mientka, "Unnatural Death."

11. "Just What Is 'Natural' Food?," *Los Angeles Times*, November 21, 2012, A14.

12. Noah Hagey, Matthew Borden, and Rebecca Cross, "How Food Processors Can Avoid 'Natural' Disasters," *Food Processing*, March 14, 2012; Mientka, "Unnatural Death."

13. Julia Dayton Klein, "An Eater's Guide to the Natural Labeling Food Fight," *Landslide: A Publication of the ABA Section of Intellectual Property Law* 9, no. 1 (2016), https://www.americanbar.org/groups/intellectual_property_law/publications/landslide/2016-17/september-october/eater-s-guide-natural-labeling-food-fight/; Anahad O'Connor, "Is Your Food Natural? FDA to Weigh In," *New York Times*, May 17, 2016; Strom, "Food Is Modified."

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16. Lu Ann Williams, "Formulating for Clean Label Products," *Food Technology* 70, no. 1 (January 2016): 36-47; Hartman, "Clean Slate"; Sloan, "Clean Label Rules"; Melanie Zanoza Bartelme, "Clean Label Is Here to Stay," *Food Technology* 69, no. 11 (November, 2015): 12; Tarver, "Food Labels"; Karen Nachay, "Giving Consumers Clarity in Their Food Choices," *Food Technology* 69, no. 9 (September 2015): 16; Innova, "Innova's Top 10 Food, Beverage Trends for 2016," news release, November 17, 2015; Karen Nachay, "Foreseeing Future Food Trends," *Food Technology* 69, no. 1 (2015): 14; Dave Fusaro, "Pizza Hut and Taco Bell Clean up Their Menus," *Food Processing*, May 28, 2015; Roger Clemens, "Coloring Clean Labels?," *Food Technology* 70, no. 3 (2016): 19–20; Tarver, "Food Labels"; Karen Nachay and Melanie Zanoza Bartelme, "Ingredients for a Changing Consumer Landscape," *Food Technology* 70, no. 6 (2016): 50–96; Lauren R. Hartman, "Processor of the Year 2016: Research & Development at General Mills," *Food Processing*, December 12, 2016; Lauren R. Hartman, "Making Foods Transparent," *Food Processing*, April 11, 2016.

17. Rachel Zemser, "Tastes Like, Reads Like Homemade," *Food Processing*, September 2015, 3–5. Supplement, "The Clean Label Challenge: Improving Ingredient Statements and Transparency."

18. Food Processing, "The Battle for the Cereal Bowl," *Food Processing*, August 2, 2010.

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26. Clemens, "Coloring Clean Labels?"

27. Zemser, "Tastes Like, Reads Like Homemade."

28. Toni Tarver, "Quest for Clean Labels Causes Murky Legal Actions," *Food Technology* 68, no. 7 (2014): 36–46.

29. Dave Fusaro, "Science Doesn't Matter," *Food Processing*, May 22, 2015.

30. Ibid.

31. All of the documents related to the FDA's request for public comment and referenced in the rest of this chapter (including the request itself, the citizens' petitions, and all of the comments submitted to the docket) can be found online at https://www.regulations.gov/document/FDA-2014-N-1207-0001. Additional details: Docket #: FDA-2014-N-1207-0001; Document ID FDA-2014-N-1207-0001; Federal Register Number 2015-28779; Federal Register Citation 80 FR 69905; start and end page 69905–69909.

32. Krux, "Use of the Term 'Natural' in Human Food Products."

33. Ibid.

34. "Peeling Back the 'Natural' Label," *Consumer Reports* 81, no. 3 (2016): 10. See also "The Trouble with Labels Like 'Natural' and 'All Natural,'" *Consumer Reports*, February 16, 2016, http://www.consumerreports.org/food-safety/the-trouble-with-labels-like-natural-and-all-natural/.

35. Details on the policy are available at https://www.ams.usda.gov/services/organic-certification/organic-basics.

36. Guthman, *Agrarian Dreams*.

37. Sally Eden, "Food Labels as Boundary Objects: How Consumers Make Sense of Organic and Functional Foods," *Public Understanding of Science* 20, no. 2 (2009): 179–94; Cairns, Johnston, and MacKendrick, "Feeding the 'Organic Child.'"

38. E.g., Cropp Cooperative, Global Organics, and Nature's Path.

39. The Organic and Natural Health Association's stated mission: "Unite consumers and corporations and transform business practices in alignment with regenerative systems to support the health of people and planet." The organization operates as a trade group, engaging in advocacy, education, and research. Association members "pledge to adhere to a compendium of quality standards requiring integrity throughout the entire supply chain and commit to continuing to advance these standards." Members include biotech companies, functional ingredient and nutritional supplement makers, an association representing grass-fed animal producers, the American Nutrition Association, the Organic Consumers Association, and more. See https://organicandnatural.org/.

40. Belasco, *Appetite for Change*.

41. Michael S. Kideckel, "Anti-Intellectualism and Natural Food: The Shared Language of Industry and Activists in America since 1830," *Gastronomica: The Journal of Critical Food Studies* 18, no. 1 (2018): 44–54.

42. Miller, *Building Nature's Market*, 17.

43. Heiss, "A 'Naturally Sweet' Definition"; Helena Siipi, "Is Natural Food Healthy?," *Journal of Agricultural and Environmental Ethics* 26, no. 4 (2013): 797–812; Trauth, "Nutritional Noise"; Mark Sagoff, "Genetic Engineering and the Concept of the Natural," *Philosophy & Public Policy Quarterly* 21, no. 2–3 (2001): 2–10; Anders Hansen, "Tampering with Nature: 'Nature' and the 'Natural' in Media Coverage of Genetics and Biotechnology," *Media, Culture & Society* 28, no. 6 (2006): 811–44; "Discourses of Nature in Advertising," *Communications* 27, no. 4 (2002): 499–511.

44. Raymond Williams, *Keywords: A Vocabulary of Culture and Society* (London, Flamingo / Fontana: 1983), cited in Hansen, "Tampering with Nature," 812.

45. Ibid., 827.

46. Ibid.

47. Ibid., 813.

48. See Sagoff, "Genetic Engineering and the Concept of the Natural," for an interesting argument about the role the food industry itself plays in stoking public desire for "natural" food while also wanting the public to embrace genetic technology even though it "belies the image of nature or of the natural to which the food industry constantly and conspicuously appeals" (2).

49. Welsh and Wynne, "Science, Scientism and Imaginaries," 546; Wynne, "Creating Public Alienation."

50. See, e.g., comments from Heliae, Sugar Association, Pure Circle, American Pistachio Growers.

51. For a more thorough analysis of the role of natural claims in the Sugar Association's efforts to position sugar against high fructose corn syrup, see Heiss, "A 'Naturally Sweet' Definition."

52. Hess, *Undone Science*, 12.

53. Claire Marris, "The Construction of Imaginaries of the Public," 84.

54. Wynne, "Public Engagement as a Means of Restoring Public Trust in Science"; Brian Wynne, "Further Disorientation in the Hall of Mirrors," *Public Understanding of Science* 23, no. 1 (2014): 60–70; Wynne, "Public Alienation."

55. Sun-Maid and the Produce Marketing Association were also among those that criticized the Consumer Reports research.

56. Wynne, "Public Alienation"; Marris, "Public Views on GMOs"; Welsh and Wynne, "Science, Scientism and Imaginaries."

57. Marris, "Construction of Imaginaries."

58. Wynne, "Further Disorientation," 64.

CHAPTER FOUR. THE PARADOXES OF TRANSPARENCY

1. As noted in the introduction, between 2009 and 2019 the CFI and its work were quoted, cited, or otherwise favorably discussed

in about 175 articles spanning local newspapers (e.g., *Santa Monica Daily Press, Grand Rapids Press*, and *Iowa State Daily*), national media outlets (e.g., NPR, CNBC, CNN, *The Atlantic*, *USA Today*, *Forbes*, and *Fortune*), and food industry trade publications (e.g., *Food Navigator*, *Beef Magazine*, *Corn and Soybean Digest*, and *Food Processing*).

2. Center for Food Integrity, "Cracking the Code on Food Issues: Insights from Moms, Millenials and Foodies," 2014 Consumer Trust Research Report, 2014, 1–4.

3. Brian R. Cook et al., "The Persistence of 'Normal' Catchment Management Despite the Participatory Turn: Exploring the Power Effects of Competing Frames of Reference," *Social Studies of Science* 43, no. 5 (2013): 754–79; Alan Irwin, "The Politics of Talk," *Social Studies of Science* 36, no. 2 (2006): 299–320; Alan Irwin, "From Deficit to Democracy (Re-Visited)," *Public Understanding of Science* 23, no. 1 (2014): 71–76; Sheila Jasanoff, "A Mirror for Science," *Public Understanding of Science* 23, no. 1 (2014): 21–26; Leach, Scoones, and Wynne, *Science and Citizens*; Wynne, "Public Engagement."

4. Irwin, "Politics of Talk."

5. Ibid., 304.

6. Ibid, 301. Here Irwin is citing R. P. Hagendijk, "The Public Understanding of Science and Public Participation in Regulated Worlds," *Minerva* 42 (March 2004): 41–59.

7. Brownell and Horgen, *Food Fight*; Pollan, "Unhappy Meals"; Pollan, *The Omnivore's Dilemma*.

8. Jack Witthaus, "Missouri Farm Advocates Thank Willie Nelson for 1995 Flatbed Concert," *Columbia Tribune*, March 31, 2015, https://www.columbiatribune.com/article/20150331/News/303319901.

9. Charlie Arnot, interview by Charlotte Biltekoff, September 15, 2020.

10. Center for Food Integrity, "Inside the Minds of Influencers: The Truth about Trust," 2016 Consumer Trust Research Summary, 2.

11. "Best Food Facts," https://www.bestfoodfacts.org/; "Coalition for Sustainable Egg Supply," https://www2.sustainableeggcoalition.org/; "Coalition for Responsible Gene Editing in Agriculture," https://geneediting.foodintegrity.org/.

12. Center for Food Integrity, "Cracking the Code."

13. The CFI publishes a list of members on its website (https://foodintegrity.org/members/cfi-members/). The list cited here is from

a July 2020 download of membership materials, which included a 2017 membership list marked as last updated February 9, 2018.

14. "Best Food Facts."

15. Arnot stated this directly in our interview, but it's also clear from the frequency and prominence of the CFI's own references to its peer-reviewed publication in the annual trust reports and other materials.

16. Stephen Sapp et al., "Consumer Trust in the U.S. Food System: An Examination of the Recreancy Theorem," *Rural Sociology* 74, no. 4 (2009): 526; original emphasis. The social science they cite here: Judith. Bradbury, "The Policy Implications of Differing Concepts of Risk," *Science, Technology & Human Values* 14 (1989): 380–99; Bernard L. Cohen, "Criteria for Technology Acceptability," *Risk Analysis* 5, no. 1 (1989): 1–3; Baruch Fischhoff, "Risk Perception and Communication Unplugged: Twenty Years of Progress," *Risk Analysis* 15 (1995): 137–45.

17. Sapp et al., "Consumer Trust," 527.

18. Ibid., 529–30.

19. Arnot interview.

20. Sapp et al., "Consumer Trust," 542.

21. Center for Food Integrity, 2011 Consumer Trust Research, 3, 5.

22. Ibid.

23. Wynne, "Public Engagement," 220.

24. Center for Food Integrity, "Cracking the Code," 4, 2.

25. Ibid., 6.

26. Wynne, "Public Engagement," 214.

27. Center for Food Integrity, "Cracking the Code," 2–7.

28. Ibid.; Scrinis, *Nutritionism*; Nestle, *Unsavory Truth*; Nestle, *Food Politics*.

29. Center for Food Integrity, "Cracking the Code," 16.

30. Center for Food Integrity, "The Center for Food Integrity," Flyer, 2015.

31. Center for Food Integrity, "New Online Training Provides Tools to Engage with Consumers in a New Way," news release, April 24, 2017.

32. Center for Food Integrity, "Engage Online," 2017.

33. Ibid.

34. Ibid.

35. Ibid.

36. Center for Food Integrity, "A Clear View of Transparency and How It Builds Consumer Trust," 2015 Consumer Trust Research Report.

37. Zeide, *Canned*, 9.

38. Susanne Freidberg, "Cleaning Up Down South: Supermarkets, Ethical Trade and African Horticulture," *Social & Cultural Geography* 4, no. 1 (2003): 27–43; Julie Guthman, "If They Only Knew: Color Blindness and Universalism in California Alternative Food Institutions," *Professional Geographer* 60, no. 3 (2008): 387–97; Eden, "Food Labels as Boundary Objects." This construct is similar to the deficit model of the public understanding of science but is not tethered to scientism.

39. Clare Birchall, "Introduction to 'Secrecy and Transparency': The Politics of Opacity and Openness," *Theory, Culture & Society* 28, no. 7–8 (2012): 8.

40. Marilyn Strathern, "The Tyranny of Transparency," *British Educational Research Journal* 26, no. 3 (2000): 309.

41. Susanne Freidberg, *French Beans and Food Scares: Culture and Commerce in an Anxious Age* (Oxford: Oxford University Press, 2004), 209; Freidberg, "Cleaning Up"; Susanne Freidberg, "The Ethical Complex of Corporate Food Power," *Environment and Planning D: Society and Space* 22, no. 4 (2004): 513–21.

42. Center for Food Integrity, "A Clear View of Transparency and How It Builds Consumer Trust," 2015 Consumer Trust Research.

43. Charlie Arnot, *Size Matters: Why We Love to Hate Big Food* (Cham, Switzerland: Springer International, 2018); Center for Food Integrity, "Engage Online."

44. In his 2018 book Arnot discusses the role that two major food industry scandals played in reducing consumer trust in the food system. Arnot, *Size Matters*, chap. 2.

45. Center for Food Integrity, "Engage Online." Wynne talks about the production of the 1996 mad cow crisis as a creation myth for public mistrust in science in the UK, projecting blame onto

"incompetent publics, irresponsible and misinformed media and non-governmental organizations, as well as other convenient scapegoats" while refusing to consider the ways institutional science itself was implicated in the "public mistrust of science problem." Wynne, "Public Engagement," 212.

46. Center for Food Integrity, "CFI 2015 Consumer Trust Research: Part 1: Transparency," webinar, December 10, 2015.

47. Ibid. See also CFI's subsequent webinars on transparency: "CFI 2015 Consumer Trust Research: Part 3: Transparency: Impact of Diet on Health," presented by Sarah Downs, January 21, 2016; "Part 4: Transparency: Impact of Food Safety," presented by Roxy Beck, June 15, 2016; "Part 7: Transparency: Animal Well-Being," presented by Donna Moenning, March 24, 2016.

48. Marris, "The Construction of Imaginaries," 93.

49. Center for Food Integrity, "Nourishing Trust-Building Transparency," webinar, presented by J. J. Jones, 2019, https://www.youtube.com/watch?v=oL6mbVZDj0Y.

50. Wynne, "Public Engagement," 217.

51. Center for Food Integrity, "Nourishing Trust-Building Transparency."

52. Center for Food Integrity and Food Marketing Institute, "Transparency Roadmap for Food Retailers: Strategies to Build Consumer Trust," 2018 Consumer Trust Research Report; Arnot interview.

53. Center for Food Integrity and Food Marketing Institute, "Transparency Roadmap," 8.

54. Arnot, *Size Matters*, 48.

55. Irwin, "Politics of Talk," 305.

56. Center for Food Integrity, "Optimizing Sustainability Project: Responding to Requests for Commitments," 2018 Consumer Trust Research Report, 3; Center for Food Integrity, "Optimizing Sustainability Project: Setting Sustainability Priorities," 2018 Consumer Trust Research Report, 3. See https://optimizingsustainability.org/.

57. Center for Food Integrity, "Optimizing Sustainability Project: Responding to Requests," 4; Center for Food Integrity, "Optimizing

Sustainability Project: Prioritizing and Communicating." See https://optimizingsustainability.org/.

58. Center for Food Integrity, "Optimizing Sustainability Project," https://optimizingsustainability.org/evaluating/case-studies/; Center for Food Integrity, "Optimizing Sustainability Project: Setting Sustainability Priorities," 2018, 14–15. See also Laura-Anne Minkoff-Zern, "Knowing 'Good Food': Immigrant Knowledge and the Racial Politics of Farmworker Food Insecurity," *Antipode* 46, no. 5 (2012): 1990–2004; Laura-Anne Minkoff-Zern, "Hunger amidst Plenty: Farmworker Food Insecurity and Coping Strategies in California," *Local Environment* 19, no. 2 (2014): 204–19; Michael B. Elmes, "Economic Inequality, Food Insecurity, and the Erosion of Equality of Capabilities in the United States," *Business & Society* 57, no. 6 (2018): 1045–74; Valeria Morrill, Raychel Santo, and Karen Bassarab, "Shining a Light on Labor: How Food Policy Councils Can Support Food Chain Work" (Johns Hopkins Center for a Livable Future, 2018), https://assets.jhsph.edu/clf/mod_clfResource/doc/FPC-Labor-Guide-Final.pdf.

59. Hess, *Undone Science*.

60. Center for Food Integrity, "Optimizing Sustainability Project," https://optimizingsustainability.org/evaluating/case-studies/; "Optimizing Sustainability Project: Setting Sustainability Priorities," 2018, 14–15.

61. Wynne, "Public Engagement," 217, 218.

62. Center for Food Integrity, "2011 Consumer Trust Research," 5.

63. Center for Food Integrity, "Engage Online," 2017.

64. Javier Lezaun and Linda Soneryd, "Consulting Citizens: Technologies of Elicitation and the Mobility of Publics," *Public Understanding of Science* 16, no. 3 (2016): 279, 287.

65. Another example: in the Optimizing Sustainability framework for responding to requests from the public to change or implement practices, the CFI urged a careful assessment of the group making the request in order to determine whether the interlocutor was interested in "positive interaction" or "just agitating" and in order to distinguish between groups that are "genuinely interested

in collaboration vs. just raising an issue to promote their agenda." Center for Food Integrity, "Optimizing Sustainability Project: Responding to Requests."

66. Center for Food Integrity, 2011 Consumer Trust Research, 17.

67. Ibid., 21–29.

68. Center for Food Integrity, "Inside the Minds of Influencers," 4, 6–7.

69. Ibid., 6–9.

70. Center for Food Integrity, "Connecting with Consumers in a Post-Truth Tribal World: What Makes Food Information Credible?," 2017 Consumer Trust Research.

71. Ibid.

72. Ibid.

73. Ibid.

74. Freidberg, *French Beans*, 169, 209.

CONCLUSION

1. For more about the outsized role protein innovation plays in the agri-food tech sector, see Julie Guthman and Charlotte Biltekoff, "Agri-Food Tech's Building Block: Narrating Protein, Agnostic of Source, in the Face of Crisis," *BioSocieties* 18 (2022): 656–78. Select media about Impossible Foods: Emiko Terazono and Leslie Hook, "Impossible Foods Raises $500m During Turmoil," *Financial Times*, March 17, 2020; Jessica Glenza, "Inside the Impossible Burger: Is the Meat-Free Mega Trend as Good as We Think?," *The Guardian*, March 14, 2019; Matt Simon, "The Impossible Burger: Inside the Strange Science of the Fake Meat That 'Bleeds,'" *Wired*, September 20, 2017; Nivedita Balu, "Impossible Foods Raises $200 Million in Fresh Funding," Reuters, August 13, 2020; Monica Burton, "Achieving the Impossible," *Eater*, June 26, 2019; "Impossible Foods Raises $500 Mln in Funding Round Led by Mirae," Reuters, November 23, 2021. Research referenced in this section was conducted as part of the UC AFTeR Project. Details are in the introduction.

2. Impossible Foods, "Heme + the Science Behind Impossible," https://impossiblefoods.com/heme.

3. *Heme—The Magic Ingredient in the Impossible Burger*. Video available on the Impossible website, https://impossiblefoods.com/heme, and its YouTube channel, https://www.youtube.com/watch?v=n6U4H8WC9jg.

4. Marris, "The Construction of Imaginaries."

5. On technofixes, see Michael Huesemann and Joyce Huesemann, *Techno-Fix: Why Technology Won't Save Us or the Environment* (Gabriola Island, BC: New Society Publishers, 2011); Sean F. Johnston, "Alvin Weinberg and the Promotion of the Technological Fix," *Technology and Culture* 59, no. 3 (2018): 620–51. On agri-food tech's technofixes, see Biltekoff and Guthman, "Conscious, Complacent, Fearful"; Guthman et al., "In the Name of Protein;" Guthman, *The Problem with Solutions*.

6. Freidberg, *French Beans*. Garrett Broad and I explore the way evolved communication approaches like those promoted by the CFI have been taken up by cellular meat proponents, calling the deficit thinking they employ "deficit model 2.0." Broad and Biltekoff, "Food System Innovations, Science Communication, and Deficit Model 2.0."

7. Burri, "Imaginaries of Science and Society;" Center for Food Integrity, 2011 Consumer Trust Research, 5.

8. Ferguson, *The Anti-Politics Machine*; Guthman et al., "In the Name of Protein."

9. Biltekoff and Guthman, "Conscious, Complacent, Fearful."

10. Ibid. Like those in the conventional food industry, these companies conduct consumer and sensory research after the technology has already been developed to test and refine product formulations and marketing approaches. But there is an important distinction between "end of pipe" and "up-front engagement." See Lowe, Phillipson, and Lee, "Socio-Technical Innovation for Sustainable Food Chains."

11. Madeleine Fairbairn, Zenia Kish, and Julie Guthman, "Pitching Agri-Food Tech: Performativity and Non-Disruptive Disruption in Silicon Valley," *Journal of Cultural Economy*, 15, no. 5 (2022): 652–70, Julie Guthman and Charlotte Biltekoff, "Magical Disruption? Alternative Protein and the Promise of

De-Materialization," *Environment and Planning E: Nature and Space* 4, no. 4 (2020): 1583–600; Julie Guthman, "The CAFO in the Bioreactor: Reflections on Efficiency Logics in Bio-Industrialization Present and Future," *Environmental Humanities* 14, no. 1 (2022): 71–88; Emily Reisman, "Sanitizing Agri-Food Tech: COVID-19 and the Politics of Expectation," *Journal of Peasant Studies* 48, no. 5 (2021): 910–33; Garrett M. Broad, "Plant-Based and Cell-Based Animal Product Alternatives: An Assessment and Agenda for Food Tech Justice," *Geoforum* 107 (2019): 223–26.

12. Broad, "Plant-Based and Cell-Based Animal Product Alternatives," 225.

13. Broad and Biltekoff, "Food System Innovations, Science Communication, and Deficit Model 2.0."

14. Wynne, "Public Engagement."

15. Ibid., 219.

16. Ibid., 212.

17. Ibid., 216.

18. Ibid., 219.

19. Ibid., 220.

20. Li, *The Will to Improve*, 10.

21. Ferguson says development interventions "may effectively squash political challenges to the system." Li takes a different approach when it comes to the accomplishment of antipolitics; her purpose is to draw attention to "the gap between attempted and accomplished." Ferguson, *The Anti-Politics Machine,* 171; Li, *The Will to Improve*, 1.

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Charlotte Biltekoff is Professor of American Studies and Food Science and Technology and Darrell Corti Endowed Professor in Food, Wine, and Culture, University of California, Davis. She is author of *Eating Right in America: The Cultural Politics of Food and Health.*

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