

## **The Evolution of Industrial Food Production: McDonaldization and Population Health**

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### **Abstract**

*This paper is an examination of modern food production and its consequences, and of how food production on a mass scale negatively affects health in the United States. The link between food and health at first seems obvious and simple, but the food industry itself affects our health in significant ways. What exists now is a food industrial complex, which focuses on efficiency, high volume production, and profitability. Many citizens, students, and policymakers are simply unaware of the inner workings of the food-industrial complex, along with the dangers inherent in factory farms and other sites of production within this economic sector. We employ Ritzer's theory of McDonaldization to analyze these processes. Emerging from Weber's classic sociological work on rationality and bureaucracy, McDonaldization focuses on themes of profitability, efficiency, calculability, and control. We first introduce the food industrial complex and then discuss the latent and manifest effects of McDonaldization on institutions and industries like agriculture. Finally, we explore the many ways that the food-industrial complex is affecting our health at the population and individual levels. This paper takes a critical look at how food production is affecting health across the United States. We also discuss other major consequences of these processes.*

## INTRODUCTION

The link between food and health at first seems obvious and simple: eat healthy and you will be healthy. But this connection is far more complex, as it is more than just counting calories and carbohydrates, more than eating less and exercising regularly. There exists a whole world outside of the grocery store that is involved in the production of the foods we eat, and the origins of our everyday food products are a major influence on our overall health and well-being. This is the industry of food production – an industry that directly or indirectly affects our health in very significant ways. Over the past two centuries, agriculture and food production in the United States have undergone a number of significant changes. Today, multi-million dollar, large-scale farms, produce and profit more than small-scale farms despite the higher numbers of small-scale farms. (Hoppe & Banker 2010) As well, these large-scale farms show a trend of increasing in size while small-scale farms are growing smaller. Small-scale farms outnumber the large-scale ones yet generate substantially less revenue. For example, “[i]n 2002, 90% of the product (agricultural products) was produced on 15% of the farms. (Ahearn, Korb, & Banker, 2005 (parentheses added)) The 2007 Census of Agriculture shows that small-scale farms (farms with \$250, 000 or less in sales) count for 91% of all farms; this number even increased 1% from 2002 to 2007. Yet, the increase was only for small-scale farms with sales less than \$10, 000 while the number of farms with sales more than \$10, 000 decreased. (2007 Census of Agriculture) However, trends toward large-scale production and corporatization have come to dominate virtually all spheres of social and economic life during this period as well, from health care to corrections to education, and now, also to food production. What now exists is a food-industrial complex, where fewer and fewer farms are independently and/or family-owned but are instead built around the concept of mass production – like the manufacture of cars or computer chips.

In this paper we take a critical look at these processes, and examine the many ways that this mode of food production is harmful to consumers, animals, the environment, and perhaps most importantly, human health. In doing so, we employ the important concept of McDonaldization to analyze the industrial production of food in the United States. Briefly, McDonaldization examines the trend of social structures and institutions adopting the business practices of the fast-food restaurant. (see section titled McDonaldization and Rationalization) Many citizens, students, and policymakers are simply unaware (or misinformed) of the inner workings of the food-industrial complex, along with the dangers inherent in factory farms and other sites of production within this economic sector. So the objectives of this analysis are fourfold. First we must define and deconstruct the food-industrial complex. After exploring these ideas more thoroughly, we will then apply the concept of McDonaldization to better understand the contemporary production of food in the United States. Third, we will also discuss the latent and manifest effects (see Merton, 1949) of McDonaldization on institutions and industries like agriculture. Finally, our discussion will explore the many ways that the food-industrial complex is affecting our health at the population and individual levels.

## THE FOOD-INDUSTRIAL COMPLEX

The Food-Industrial Complex is a critical component of modern agriculture, and is essentially a complex, cooperative agreement among farmers, private industry, and government, which ensures the uninterrupted flow of materials, equipment, and supplies through the food economy. This complex refers to everything involved in the production of food and food products. To better understand these processes, we examine two similar industrial complexes: the medical industrial complex and the military industrial complex. In each instance we can observe symbiotic relationships built around the production of goods, the industries that use these goods, the government that regulates these economic sectors and processes, and finally, the citizens involved in consuming these goods.

Bruce Brunton (1991) discusses the American military industrial complex and how it developed into what it is today. Many trace the military-industrial complex to President Eisenhower's famous farewell speech where he warned Americans to "guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex" ([www.eisenhowermemorial.org](http://www.eisenhowermemorial.org)). However, this term likely originates earlier, specifically in the work of classical sociologist C. Wright Mills and *The Power Elite* (1956). In this work Mills discusses the importance of military power in a capitalist society. Through this military power, "corporate chieftains" become the power elite and advance their positions. In other words, power is held by the corporations and industries that supply the military with equipment, armaments, and technology, and these companies thrive and grow as the military does. As Mills (1956:4) writes, the power elite "are in the positions to make decisions having major consequences." This conception remains more important when considering who has the power at the local, state, national, and global levels.

Brunton (1991) also discusses the set of institutions necessary in order to promote the military-industrial complex. Institutions are described as "habitual patterns of behavior or ways of thinking" (p. 43) and there are five specific institutions that, together, define this massive complex. First, there is reliance upon private contractors for military procurement; The Boeing Company, Lockheed Martin, and Halliburton Corporation are all examples of private industry. Secondly, there exists a revolving door among top personnel from these private firms and key interest groups and positions of economic power. Third, there exist defense pressure groups that perpetuate the demands for both the complex and its associated preparedness ethos. Next, there is the preparedness ethos itself, which involves the idea that even during times of peace, the military must be constantly ready and well-equipped for war. Finally, state support of strategic industry refers to instances where government contracts with private corporations maintain a defense production base, where military production remains in operation.

Medicine also lends itself well to this type of analysis. In the average doctor's office one can find a number of supplies that originate in the medical industrial complex. Tongue depressors, gloves, soap, clip boards, tiny plastic cups for medicine, even the paper smock you are forced to wear are all products of the connection between industry and medical practice, but the connection is more deeply rooted than this. On the one hand, this complex

is helping advance medical technology, as it requires and demands new products to be produced and developed. Our health care system depends upon technological advancement as well as the products, materials, and equipment that come along with it. On the other hand, we must see that the medical world itself is an industry, and this industry's goal is to produce healthy or well individuals with profitability and output at the forefront. Grace Budrys (2005) succinctly discusses the medical-industrial complex and more specifically how doctors, though they may seem to hold much of the power, are actually as powerless as patients themselves. The medical-industrial complex promotes and requires a steady influx of new products and technologies. These products vary in their overall usefulness, but the promotion and demand of equipment and supplies means that interest groups within the medical-industrial complex can maintain their powerful hold over the medical world and continue or increase their profits. So it may be easy to imagine only physicians collecting profit from surgeries and other medical procedures, putting the doctors in the place of power and the patient in a disadvantaged, subservient position. But doctors are in many ways involved in this complex in the same sense we, the consumers (or patients) are—at the whim of the industry. In this situation the manufacturer of the tools, equipment and supplies are concerned primarily with profit motives, while the health of the consumer, or patient, is relegated to a secondary role.

Similarly, the military industrial complex operates with the same goal-oriented outcome. For the industries that create the machinery, weaponry, and ammunition, war is a good thing, leading to more profit. The connection between the military and industry is now characterized by corporations striving for the next large contract with the military and government. In the United States (where defense budgets dwarf most other government spending: For 2012 The Department of Defense requests a total of 670.9 billion dollars (United States Department of Defense Fiscal Year 2012 Budget request Overview), investing in the military, and becoming an integral part of this complex, is good for business. So in both the military and medical industrial complexes we can easily discern many connections between and among government, business, and industry, all engaged in systematic processes of production and profit in their respective economic sectors. The same patterns and relationships exist in the Food-Industrial Complex. For this complex, industry manufactures the machines to harvest our crops, equipment to process the meat, packaging for goods, and chemicals for fertilizer and pesticides. Companies like Monsanto and Conagra (and countless others) maintain power through the production of these goods and maintenance of this complex. We can apply the example of the medical industrial complex here. The major interests of the Food-Industrial Complex must maintain economic control over the production of food, so companies strive to keep prices of meat low, vegetables year round, and costs cheap. This enables the consumer to buy large quantities of foods at any time, across regions, and in each store find the same or similar selection of goods. For the consumer it can seem as if these choices are undoubtedly the best and offer a wide range of products and choices, but as will be discussed below, these choices do not come without hidden consequences.

## THE TRANSFORMATION OF AGRICULTURE AND AGRIBUSINESS

Agriculture has historically been at the forefront of civilization and society. Societies advanced from hunter-gatherer means of food procurement to low-level food production (Smith, 2001) to eventually what we have today with modern agriculture. Research points to two factors involved in the adoption of agriculture in early societies. These are termed external and internal pressures (Bettinger, Richerson, & Boyd, 2009). External pressures refer to factors like climate change that led to the adoption of agriculture to produce sustainable crops, while internal pressures involve social pressures like increasing population sizes. A hunter-gatherer society expends a lot of energy and time for a minimal yield of food, while agriculture provides sustainable food sources over an extended period of time. Many have theorized about the adoption or transition of agricultural systems (e.g., Bettinger, Richerson, & Boyd 2009; Bruno 2009; Cohen 2009; Smith 2001) and it is easy to see that these systems are a necessary part of social life. In the United States agricultural systems have changed in many ways over the past two hundred years, and many of these transitions have taken place more recently: adoption of monoculture farming, genetically modified farming (organism), seed patenting, and the greater use and dependence of machines (for transportation, harvesting, refining, etc.).

Farming is just one part of the agriculture system and Food-Industrial Complex, as we explored in the previous section, but farming is significant in many other parts of modern society as well. For example, organized farming allows for the production of goods from the local to the regional to global levels. Some have even recognized that the farm and farmers represent a significant ideological role in a society, pointing to the media attention from films, farm aid events, and protests over the preservation of the family farm (Lobao & Meyer, 2001). At the same time we can see that farming has its consequences as well: pollution, environmental degradation, natural resource depletion, animal harm, and most importantly, human harm. These problems emerged with the more recent transformation of agriculture and agribusiness.

Over the past hundred years agriculture in the United States has changed dramatically. Large-scale and nonfamily farms account make up only 12% of total farms in the U.S. yet are responsible for 84% of production and profit. As well, these multi-million dollar farms that are outnumbered by small-scale and non-family owned farms still produce 53% of high-value crops (crops such as hog, beef, poultry, and dairy) (Hoppe & Banker, 2010). This transformation of farming is one of the most dramatic transitions in American society over the past century. In the early 1900s, more than one out of every three Americans lived on farms. But by the end of the century, the farm population was at a staggering two percent of the overall population. Further, among those still in farming, nearly ninety percent of household income came from sources other than farming (Lobao & Meyer, 2001). Essentially, the overall number of farms decreased while the amount of farmland has grown exponentially (Knight, 2006), so what we have today is the loss of the American family farm, part of the American dream, and the adoption of a McDonaldised agricultural system. Lobao and Meyer (2001) critically discuss these transformations and point to a

need for further research. For example, it is important to look at the transition of agriculture to identify the negative impact that the modern system has on the environment, animals, and humans, but also to contribute to sociological analysis and research on this topic. To better illustrate the negative effects of a McDonaldized farming and agriculture system, we specifically explore two examples where production on a mass scale have taken over and affected our lives and health: cornification and animal production.

Cornification is centered on one crop—corn—and its multiple uses as a food, but also as feed and even as a fuel source. According to the work of Michael Pollan (2002a), many of the problems associated with cornification originate in the system that produces the corn but also in the high intake of corn or corn products. Our agriculture and farming system is surrounded by and dependent on corn and corn byproducts. On one hand we ingest high amounts of corn in its many altered states (e.g., high-fructose corn syrup, corn syrup, and crystalline fructose are commonly used *natural* sweeteners used in many products). The Corn Refiners of America initiated an entire public relations campaign to combat people's concerns about the high intake of corn sweeteners and are stubborn in repeating that these products meet the U.S. Food and Drug Administration's (FDA) qualifications as a natural product (Corn Sweeteners are Natural).

The problem is much greater than the foods that directly contain corn. Another side of the issue is the use of corn as feed for virtually all animals, even grazing animals which should not consume corn in such high quantities (Pollan, 2002a). Corn was at the forefront of American agricultural systems far before the claiming and colonization of these lands, and it's fairly cheap and easy to grow. Yet, we arguably grow too much corn and with no end in sight. The government subsidizes corn by the bushel and promotes monoculture farming of corn, where the same crop is grown on the same lands year after year. Corn is at the point where we're changing the crop itself, not only into sweeteners, but also into fuels, plastics, and even vitamin C (Pollan, 2002a). Through genetics and lab testing, we find that corn is a good product that can do many things, but corn is overly used and produced. On one side we as a society are able to make new products that could solve some problems (e.g., corn as fuel or plastic) but at the same time, the reason we have so much corn is because we are growing it exponentially by the bushel. Corn is very much involved in the world of agriculture, as a food source (both meat and non-meat products) and as the fuel used by the trucks and agriculture equipment. In short, our food system is cornified.

The production of animals on a mass scale is another significant part of the agricultural system and the food-industrial complex. While a complete discussion of animal production is beyond the scope of this paper, it is nonetheless important to look at how the majority of our meat is produced, how it affects the environment and finally, how it affects our health. Meat production has doubled over the past fifty years yet is available to only those who can afford it (Horrigan, Lawrence, & Walker, 2002). With more and more meat production, we can conclude that people are consuming it at higher rates as well. To keep up with demand, animal farmers have developed and implemented new methods of raising, fattening, and slaughtering animals to maintain supply. In the United States, ten billion animals per year

are slaughtered, including chickens, pigs, and cows. As a nation we are fixated on eating meat and have normalized high meat consumption. About eight ounces of meat per day is the average for an American carnivore, which is close to twice the global average (Bittman, 2008). So just how do we feed so many people so much meat?

In the article, "Power Steer," Michael Pollan (2002b) follows his newly purchased veal cow from the farm at which it was born to the feeding lot and finally to the slaughter house. The entire process is summed up and Pollan narrates the journey of the veal cow itself, but also describes the farmers and factories involved. The food industry is able to produce such high quantities of meat within such a short periods of time because of feed and hormones. Prior to the implementation of modern production methods, an average cow would be four to five years old before it was slaughtered. With industrial feeding operations, this time is down to fourteen to sixteen months, mostly due to feeding these animals high amounts of corn, proteins (through various supplements), and injecting them with growth hormones (Pollan, 2002b). These feeding operations, known as CAFOs (Concentrated Animal Feeding Operations) play a major role in the factory production of meat. The entire process rests on productivity and profit, thus making it difficult to concern itself with environmental or health concerns (see Horrigan, Lawrence, & Walker, 2002).

So with cornification and concentrated animal production methods we can see that food production structures are far from the idealized family farm of the American Midwest. Agriculture and farming have come a long way, but have more recently adopted industry standards and practices that put profit and production well ahead of major environmental and health concerns. There are many problems that are a result of the food system's adherence to these industry standards. These effects exist at both the population and individual levels. At the population level there are environmental effects like pollution and depletion of nutrients in the soil. At the individual level we can see the impact of these farming and agricultural practices coinciding with rates of diabetes, cancers, and heart disease to name a few. Foods are being produced quickly and in abundance yet these products are lacking the proper nutrients and can even be dangerous (only one example is the relatively recent recall on peanut butter or spinach in the United States). In addition, we must consider what foods are being produced and how this production affects our dietary and nutritional practices. Diet is extremely important, as will be discussed later, but are the foods being produced in abundance those which are the healthiest for us? The next section will introduce the important concept of McDonaldization. These ideas help us better focus in on both the intended and unintended results of a McDonaldized food system in the United States. (For more information on the impact of large-scale food production see Horrigan, Lawrence, & Walker, 2002; Osterberg, & Wallinga, 2004; Tilman, Cassman, Matson, Naylor, & Polasky, 2002; Walker, Rhubart-Berg, McKenzie, Kelling & Lawrence, 2005)

## **MCDONALDIZATION AND RATIONALIZATION**

Ritzer's (2006) formulation of of McDonaldization is an amplification and extension of classical sociologist Max Weber's work on the rationalization process and more specifically

formal rationality. The rationalization process involves four key systemic processes that maintain and promote productivity, output, control, etc. in a rationalized system. That is, a rationalized process needs to be efficient, calculable, predictable, and have control over both the people involved and the system itself (Ritzer, 2006). Weber pointed to formal rationality as the best descriptor of a Western, capitalistic society as it involves rules, regulations, and social structures. For Weber, the best example of formal rationality is the bureaucracy - a highly organized and structured system which ranks individuals in the system to promote or maintain order (Weber, [1922] 1978). The bureaucracy relates to formal rationality as the fast-food restaurant relates to McDonaldization (Ritzer, 2006). A formally rationalized system gives people little choice and only offers the best and optimum outcomes as related to the eventual goal, namely profit. Weber warned about a system becoming overly rationalized to the point that it could in turn become irrational. At this, Weber cautioned about the "iron cage" of rationality whereby everything would become rationalized so that one would be stuck in a system with no means of escape, no alternatives, other than the rationalized ones. (Weber, [1922] 1978)

McDonaldization is a modern conceptualization of Weber's theory of formal rationality and the rationalization process. It's easy for us to understand control and domination in a system when it has a recognizable symbol or face attached to it. In this case, George Ritzer is able to use one of the most widely recognized symbols across the world; the golden arches. But, this process of McDonaldization applies to other institutions as well as the fast food industry. In this paper we apply the McDonaldization process to food production and the food-industrial complex but it has been applied in other areas as well, from the drug care industry (Kemmesies, 2002) to education, (Wilkinson, 2006; Hartley, 1995) and consumer culture (Turner, 2003). The process of McDonaldization concerns domination over sectors of American and others societies and itself rests on four principles that we have already mentioned: efficiency, calculability, predictability, and control. (Ritzer, 2006) For a system to be highly McDonaldized it should follow these principles enabling, thus ensuring optimum productivity and of course, profit.

Efficiency involves getting from one point to the next in the best and most streamlined manner possible. The modern fast-food drive-thru is a good example of an efficient process. In this scenario one can move from station to station (e.g. from menu to window, to window) without leaving the comfort of a car. This applies to the workers inside the restaurant as well; each should have their own specific station or task to perform that should be organized in such a way that it is cost, labor, and time conscious. Orders at the drive-thru window are quick, including the ordering, exchange of money and reception of one's order making the entire process efficient to the point that repetition is enabled.

Coinciding with an efficient process, calculation must be made to keep up with the amount of goods that are demanded and means to provide the product. For this principle, quantity is desired over quality and achieving the greatest output within a given time period is the ultimate goal (Kemmesies, 2002). It is important for a McDonaldized system to know exactly how long a process will take (and thus can calculate and maintain its efficiency),

exactly the resources needed, the profit to be collected, and the amount of workforce, tools, supplies, etc. required. In the case of the drive-thru window, without predicting exactly what is needed to fulfill the demands, the process would cease to be efficient, fast, and profitable.

Standards of predictability also must be in place in a McDonaldized or rationalized system. This applies more to the consumer or recipient of the process than the actual process of production. In this case the actual services need to be predictable both over location, or space, but also across time. (Ritzer, 2006) The same can be applied to those within the system itself, so in the case of the drive-thru window we expect the same service from the workers as we do in the product. This process should be repeatable at different times in the day and at different locations; even the drive-thru in Europe, Dubai, or China should all meet the same standards. One should expect the same manner of goods and services at any location and at any time (the proceedings of an “iron cage” Weber warned against).

The principle of control applies to humans but emphasizes non-human technology and control over the industry or sector of society itself. Control is necessary to gain or maintain the other core principles (efficiency, calculability, and predictability) in both the consumer and produce side of this process. Control applies to the workers of the system requiring them to have rules, regulations, punishments, enforcement, etc. which are enforced with strict penalization. Control also relies heavily on non-human technologies to replace human workers and promote the other principles of a McDonaldized system. Non-human technology also applies to the patrons or users of this system and in turn can promote efficiency and calculability. In the example of the fast-food drive-thru, we don't see people driving backwards, skipping lines, or walking up to the windows (for the most part) and this is due to the control through standards and norms of the drive-thru that are in place. People order their foods through a highly technological system with the computer screen ordering systems. The employees are able to use computers to keep track of orders but also in assistance with making the foods, combining and separating orders, and delivering the final product to the consumer.

## **MCDONALDIZATION EFFECTS**

The McDonaldization process is a modern standard in a post-Fordist, industrial society. Many have contributed to the writing on this topic (e.g., see specifically Ritzer, 2006) and have applied the process to other dimensions of social life (Bryman, 1999; Esmer, 2006; Hartley, 1995; Kemmesies, 2002; O'Toole, 2009; Turner, 2003; Wilkinson, 2006; and others). In this paper we apply the process of McDonaldization to the food production industry and the food-industrial complex. In this complex we can see that application of McDonaldization fits well; we have high output and a profit centered system with assembly line-like production techniques, utilization of machinery, and adherence to the four principles of rationalization discussed above (i.e., efficiency, calculability, predictability, and control). As it applies to food production we can begin to uncover both good and bad consequences to this highly rationalized or McDonaldized system. The use of highly

rationalized techniques themselves, along with effects on the environment, humans, and animals are all important to note when considering the application and consequences of these processes.

For McDonaldization and a McDonaldized system these core principles are the intended and desired results. The food industry is one sector of society that this process has been applied perfectly, with profit and production at the top of the list of priorities. As a result, efficiency and calculability can lead to higher rates of production and profit, while predictability for industry and consumers equates to higher profits through sustained and expected consumption and markets. Finally, control is maintained so that the system continues to be as productive and profitable as possible. Apply these principles to food production and we have a system that is focused on profit and production just like any other highly rationalized market or industry.

While the manifest, or intended, effects of McDonaldization have been discussed above, the latent effects of these processes are perhaps more important to consider. Indeed, the unintended consequences directly harm humans, animals, the environment, and the economy. Because our foods are produced at such a high rate, because our foods are produced quickly, and because profit is the primary goal of food production, societies around the world suffer. Monoculture farming as with corn, results in fertile soil becoming depleted of its nutrients. Farming animals the way we do causes toxic chemicals to seep into other crops, the meat itself, and eventually make their way to our dining tables. Animals are abused in the way they are raised, fattened and slaughtered. Using high volumes of oil for both the production equipment as well as the transportation equipment contributes overwhelmingly to carbon emissions. Finally, let us more specifically consider how this industry affects population health as a whole, as well as the health of individuals. .

## HEALTH IMPLICATIONS

At the broader societal level of analysis, there are many problems resulting from but also affecting the animals in animal feeding operations. As previously mentioned, Concentrated Animal Feeding Operations (or CAFO's) are large scale, confining feeding sites for meat-producing animals (e.g., cows, pigs, chickens, and even turkeys). In all stages of animal production (handling, transporting, veterinarian, meat processing, and rendering) there are increased risks of infectious diseases for the animals and workers. (Gilchrist et al., 2007) Major concerns about CAFO's include eventual resistance to frequently used antibiotics, the spread of infectious viruses, and airborne endotoxin exposure for workers and workers' families. The resistance to antibiotics within animals is linked to the use and overuse of antibiotics. Long-term, low-level antibiotic use can potentially enable bacteria to build up resistance and potentially becoming untreatable, such as methicillin-resistance *S. Aureus* (MRSA) as one prominent example. These resistance genes can pass from animals to workers and eventually co-workers and workers' families. Infectious disease can be passed from animals to workers but can also be transmitted through water and air surrounding the CAFO sites. The infectious diseases, such as Influenza, H1N1, and Salmonella tend to

be amplified in animals raised in CAFO's (Gilchrist et al., 2007). In addition, we can see great risks for workers and families exposed to dusts from CAFO's such a wide range of respiratory health effects (asthma, wheezing, and allergies) (Heedrerik et al., 2007). Animal or livestock production has also been linked to greenhouse gas emissions, specifically gases such as methane and nitrous oxide (McMichael, Powles, Butler, & Uauy, 2007).

Animal production is not the only sector of the agriculture system that is affecting the environment and entire human populations. Industrialized agriculture has been linked to a slew of hazardous effects. Horrigan, Lawrence, and Walker (2002) overview the major impacts of industrialized agriculture on our environment, ecosystem, and health. Specifics include the use of fertilizers and the increased acidity of soils that can impede plant growth, increased and consistent pesticide use that can lead to crops becoming vulnerable to pesticides and also to the decline of insect and bird populations. Also, airborne pesticides can seep into surface and ground waters and drift into other areas not treated by pesticides (Horrigan, Lawrence, & Walker, 2002). Some studies have suggested that exposure to pesticides within urban environments leads to serious neurological, and other serious effects on children. (e.g., see Ritter et al., 2006)

Industrialized agriculture is also responsible for the degradation of lands, especially the soils used for farming, and can in extreme cases result in desertification or the transforming of fertile lands into desert-like ones. Biodiversity is therefore at risk, especially with the prevalence of monoculture farming (such as with corn) and seed consolidation (the use of hybrid and patented seed varieties), but also through the use of pesticides and fertilizers (Horrigan, Lawrence, & Walker, 2002). Finally, industrialized and intense agriculture creates the highest amount of human-generated green house gases, which not only puts the environment at risk but also affects the future harvesting of foods, those foods' nutritional quality, and the health of entire populations (McMichael et al., 2007).

In the United States, health and mortality trends follow distinct epidemiological patterns. According to the Centers for Disease Control's (CDC) National Vital Statistics Reports (2007), the leading causes of death are heart disease, cancer, and strokes (diabetes is fifth, close behind respiratory disease and accidents). It's no mistake that the rates of these diseases are rising at the same time industrialized agriculture is becoming the norm. The importance of proper (i.e., healthy and safe) food should be apparent, along with its nutritional values, the types of foods, and the amount consumed. In short, food is fundamental to health (Jacobs, Linda, & Tapsell, 2007). The link between our lifestyle choices, including the foods we eat, and the leading epidemiological killers is a strong one. A diet composed of all fats and calories is not sufficient while at the same time it is important to consider the types of fats being consumed. Adams and Standridge (2006) write about these leading killers and their links to diet and nutrition. They specifically focus on the connections between heart disease, stroke, cancer, diabetes, and hypertension (both directly and indirectly) and dietary considerations. They point out that it's not just the amount of foods and nutrients being consumed, but more specifically the types of foods and nutrients being consumed: whole grains, fruits and vegetables, specific types of fish and

meats, amounts of salts, types of fats, and so on. What we can gather from their analysis is that it is important to understand our foods as well as the nutrition our foods provide and how this can affect our health. This includes understanding the inner workings of the food industrial complex.

Using the prevalence of obesity as only one example, we can link the food industry and industrialized food production to our health as individuals. Obesity and overweight is an obvious area of concern for the general public. The rates of obesity have been increasing steadily for the past thirty years. In Britain the rates have nearly tripled, while in China, the rates of preschool children in urban areas who are obese or overweight has jumped from 1.5% to 12.6% (Ogden et al., 2006). The consequent health effects are detrimental to the health care industries and economies. Conditions such as diabetes, hyperlipidemia, hypertension, coronary heart disease, and some cancers are all related to the industrial production of food. In the United States, more and more people are consuming more foods that are industrially produced (Young & Nestle, 2007). As Ludwig and Nestle (2008) point out, if the industry responsible is “[l]eft unchecked, the economic costs associated with obesity alone will affect the competitiveness of the U.S. economy.” (p. 1810)

In conclusion, there are three primary contributions in this paper. First, we define and discuss the food industrial complex as a McDonaldized structure of production. We then use Ritzer’s (2006) ideas on McDonaldization to better focus upon the intended and unintended effects of these processes. Finally, we link the McDonaldized food-industrial complex to various health and environmental issues affecting individuals and societies at multiple levels of analysis. As we have shown, there are many problems related to the food industry at large. We have argued here that the food system is a complex and McDonaldized system in which profits and production are put ahead of any negative effects. We have argued here that this system is involved is a complex but also McDonaldized one, putting production and profit ahead of any negative effects. The negative effects on the environment, animals, and humans are considerable, and should be further examined in future research. As well, effects on humans have been shown, specifically in the example of obesity which is a major problem facing youth and adolescents (Powell, Han, & Chaloupka, 2010). We as individuals but also as a society must seek solutions to these pressing social issues, and one of the first steps toward doing so involves calling serious attention to these complex problems. This paper is one of those first steps, where we hope to further emphasize the problems associated with food production in contemporary society.

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