

METABOLICAL by Dr. Robert Lustig, Part III
A Book Report by David G. Schwartz, M.D.
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In this presentation Dr. Lustig discusses the agricultural, social, economic, and political costs of processed food, food fraud, and how to un-process our food supply.

Processed food is defined by 7 engineering criteria: 1. Mass produced. 2. Consistency batch to batch. 3. Consistency country to country. 4. Specialized ingredients from specialized companies. 5. Pre-frozen macronutrients 6. Emulsified to keep fat and water from separating 7. Long shelf or freezer life.

Public classification systems convey nutritional misinformation. The Great Depression resulted in severe public malnutrition. The USDA in 1940 developed guidance for 7 food groups, carbohydrates, fats, proteins, fiber, vitamins, minerals, and water. Then with rationing in WWII, dairy and meat consumption dwindled, and after the war, the dairy and meat industry pushed the USDA in 1956 to change this to 4 basic groups. 1. Dairy 2. Meat 3. Fruits and vegetables 4. Breads and cereals. Fruit juice was classified as fruit, and fiber was eliminated.

Then in 1992 came the food pyramid. The USDA's policies since the 1980's of supporting agricultural monoculture, resulted in a glut of cheap refined carbohydrates, which became the base of the pyramid. See my article in the archives about [Diet For A Dead Planet](#). The nutritionists had at first recommended 5-9 servings of fresh fruits and vegetables per day, but the final result was 2-3 servings of them and 6-11 of all types of carbohydrates. This alteration was done by the Reagan administration. A quotation from Louise Light, one the originators of the food pyramid, sums it up. "Ultimately the food industry dictates the government's food advice, shaping the nutrition agenda delivered to the public. In fact, to the food industry, the purpose of the food guide is to persuade consumers that all foods (especially those they are selling) fit into a healthful diet." So I ask, how can we encourage people to eat healthful food, when the government itself, the USDA, does the bidding of the food industry to promote disease-inflicting processed food?

So ultra processed food now accounts for 70% of the items in the supermarket and provides 60% of all our energy intake. Like alcohol, sugar, and trans-fats, ultra processed food has calories but is not food. The [JAMA](#) article mentioned in last month's article states that ultra processed foods are low in protein, minerals, vitamins, and fiber, and is associated with increased risk of total mortality, cancer, and cardiovascular disease.

In the USA the Nutrition Facts label can tell what things have been added, but not what's been subtracted or adulterated or the degree of processing. Other countries are starting to do that. The Nutri-Score in Europe doesn't address processed food directly, but it highlights sugar and fiber in it's calculation of the score, showing how likely the food is to make you sick. Brazil came up with the NOVA classification that rates foods in 4 categories in the degree of processing. Instead of "You are what you eat," we need to look at "Your are what they did with what you eat." Adulterations include environmental chemical toxins and heavy metals, branched-chain amino acids (BCAA's), omega 6 fatty acids, trans-fats, polycyclic aromatic hydrocarbons (PAH's), advanced glycation end products (AGE's), and 3-MCPD (3-monochloropropanediol) fatty acid esters. Some of the toxins include mercury in fish, PCB's and dioxins in animal fat, and other heavy metals in baby food, rice, and juices.

Branched-chain amino acids in corn-fed beef is needed if you're a body builder, but if not, they go to the liver, and like fructose, can produce fatty liver and insulin resistance. They can make the cattle sick and the people who eat them. Countries whose cows are fed primarily grass have much lower incidence of fatty liver than ones who import American beef.

The pro-inflammatory omega-6 fatty acids, primarily linoleic acid, are abundant in industrial corn fed cows, chicken, and fish. Their concentration in human fatty tissue increased dramatically from 9% in 1959, to 21% in 2008, so consuming corn, safflower, and soybean oils and eating the meat that has those fatty acids raises risk of all those inflammatory diseases (most of chronic non-infectious disease). Grass fed meat has less of these and more of the beneficial anti-inflammatory omega-3's.

Frying with unsaturated fats, including olive and canola oils, and heating beyond the smoking point of 320° F, produces the deadly trans-fats. The PAH's from vehicle exhaust, also come from barbecuing meat and vegetables and promote many kinds of cancer. Dietary AGE's from heating glucose or fructose with proteins, resulting in caramelization, or browning, present in many processed foods, correlate strongly with cardiovascular disease and cancer. One AGE, acrylamide, formed when heating carbohydrates and fat at high temperature (french fries) also correlates heavily with cancer. 3-MCPD fatty acid esters from flash heating fat with salt, are toxic to the kidneys, testes, and probably many other organs.

Fermenting raw foods can make some nutrients more available, provides preservation without heating, and can help gut microbiome diversity, but processed foods cannot be fermented. (They lost their natural bacteria.)

Subtractions include taking the fiber out of grains or taking insoluble fiber out of fruit by juicing and pulverizing the insoluble fiber in smoothies. This doesn't allow the insoluble fiber to protect the liver, although the soluble fiber feeds the gut. To feed the gut and protect the liver, the soluble and insoluble fiber have to be together, as in whole, unprocessed food.

Selective out-breeding to make tomatoes sweeter results in less lycopene, important for heart health, eyesight, and the prostate. Also the sweeter the grapes, the less vitamin C. Those are the trade-offs.

Omega 3 fatty acids, so important for brain development, reducing inflammation and depression, are decreased or removed by fish farming, and by corn-fed chickens and eggs. They are left intact in wild-caught fish and grass-fed chickens and eggs.

Food additions include antibiotics, DDT, glyphosate, atrazine, flavor enhancers, bovine growth hormone, estrogens, preservatives, trans-fats, and sugar. Diacetyl butter flavoring can cause severe lung fibrosis. Potassium bromate added to flour is a known carcinogen. I would add that the bromine interferes with iodine. For "natural" flavors (about which no information is available as to what they are), they usually need an emulsifier, a solvent, and a preservative. Bovine growth hormone, estrogens, and bisphenols from cans, preservatives such as BHT (a carcinogen), propyl gallate, nitrates in processed meats (carcinogens), trans fats, and sugar are added to food or get into the food in the processing.

Fast food has salt, fat, sugar, and caffeine. They all show some characteristics of addictive substances, but sugar meets the DSM-5 addiction standards of tolerance and dependence. The processing turns caffeine and sugar into drugs, as additives, no longer part of the real food.

Processed food is more vulnerable to fraud, since many of the ingredients are “trade secrets.” The main examples of food fraud is 1. Dilution, 2. Substitution, 3. Intentional contamination or concealment, 4. Country of origin, 5. Organic labeling (because of high price and profitability), and 6. Counterfeiting. Processed food often has 6 or more ingredients, and the probability of adulteration increases to the 1.7 power for each additional ingredient. Food fraud is like “the wild west.” Agencies like the FDA don’t have enough “boots on the ground” to do adequate monitoring, and testing methods are in their infancy. The main caveats for buying food are: 1. The more ingredients, the more risk, 2. Beware of the organic label, as it is more susceptible to fraud, 3. Buy directly from the farmer.

Where are the food police when we need them? He is speaking of the sugar industry that gets people addicted to sugar, starting in childhood. See the movie “Fed Up,” and Dr. Lustig’s book, Fat Chance, for which the reports on each are in the archives. The tobacco industry got its clues from the sugar industry, using the same tactics of deny, deflect, distract, and delay. Some tactics were to influence scientists, the governments, the courts, and public opinion. It tries to distract from the problem of processed food being a primary cause for diabetes, fatty liver disease, heart disease, and tooth decay, correlative for cancer, dementia, hypertension, addictions, and depression, by referring only to the “obesity epidemic,” focusing just on calories and lack of exercise. It influences scientists and public health experts with money. Coca Cola sponsored research with 128 articles and 471 authors, the sponsorship kept secret for a long time. The studies sponsored by the industry are 7.4 times more likely to show a positive report on processed food, than when research is done independently of the industry. A director of the CDC invested in the tobacco industry and took money from Coca Cola.

The industry has used the same ideology of “personal responsibility” that the tobacco industry used, but personal responsibility requires 4 conditions for it to be relevant, knowledge, access, affordability, and externalities. 1. Knowledge: People need to have access to accurate information. Most of this is withheld by the industry. 2. Access: Food swamps are areas where lack of real food (food deserts) is accompanied by an overabundance of processed convenience foods. You can die sooner by drowning in a swamp than starving in a desert. 3. Affordability: Real food costs twice as much as processed food, the latter of which is subsidized. Families with children, working 2-3 jobs, find it difficult to afford real food and the time it takes to plan and prepare it. The processed food industry is glad to fill the gap. 4. External factors: Individual health behaviors have consequences to the society at large. Smoking, obesity, and the diseases of metabolic syndrome have an immense cost to employers and to the social safety net (Medicare and Social Security). The industry should bear some financial responsibility for its promotion of these diseases.

In the 1960’s the consumer movement and environmentalism got its debut. Then in the 1970’s Big Industry, including Big Food, waged a propaganda war with Congress and the Supreme Court, flooding the government with lies and disinformation, pressuring Congress to “de-claw” the Federal Trade Commission from limiting junk food advertising. Also the American Legislative Exchange Council (ALEC) started in the 1970’s. It writes bills for state legislators and Congress and pays off legislators to introduce bills favorable to fossil fuel, pharmaceutical, tobacco, alcohol, and food industries. Trade organizations blatantly pro-sugar, claim to provide scientific information for health professionals, academics, and the media. Many nonprofit organization pretend to be grassroots “citizens” organizations with nice sounding names, and purposes to protect consumer choice, when they are heavily funded by the food industry. One of the most egregious is ILSI, the International Life Sciences Institute. Though nonprofit, it has a \$17 million budget, and it is a corporate lobbying group, funded by 400 corporate members, including General Mills, Coca Cola, Pepsico, etc.

Some food industry executives tried to reform their industries from the inside, and they are now *former executives*. Change has to come from the outside.

The USDA is a political arm of the food industry, and the FDA is a political arm of the pharmaceutical industry. The USDA runs the Supplemental Nutritional Assistance Program (SNAP). It doesn't pay for alcoholic beverages, but it spends \$600 million on soft drinks and \$110 million on juices. Banning sodas from SNAP could prevent 400,000 cases of obesity and diabetes. Forty-two million people depend on SNAP for food. Ketchup was considered a vegetable in school lunch programs by Ronald Reagan, and technically he was correct. By its definition as part of a plant used as food, I suppose chewing tobacco could also be called a vegetable.

The FDA can only protect people from acute poisoning in foods, for which it usually does a good job, like for melamine, salmonella, botulism, etc. But it does not have the authority to regulate substances that cause chronic toxicity, even when a chronic exposure could be fatal. And then there is misleading labeling, as evaporated cane juice is actually sugar, but it is considered to be a juice. According to what the FDA calls healthy would include an ultra-processed food if it contains potassium, vitamin D, or polyunsaturated fat.

Claims of "natural" mean nothing, because high fructose corn syrup and sugar are natural because they come from a natural source. The GRAS (Generally Recognized As Safe) list no longer means much. After 1997 a food company no longer needs to petition the FDA to get an additive onto the list. A company can just pay a group of scientists to declare it so without even reporting to the FDA. Studies show that added sugar is a cause of cardiovascular mortality, independent of total calories, and for every 150 extra calories, in a given county, diabetes incidence increases by 0.1%. If the extra calories is sugar, it increases by 1.1%, 10 times as much. Sugar should be removed from the GRAS list and should be considered an additive, not a food, since fructose is not a nutrient. No necessary bodily function requires fructose. Alcohol should also be reclassified. However, it is very difficult to get a substance removed from the GRAS list. It took 25 years for the FDA to remove trans-fats from the list, after they were determined to be toxic. Lead was first known to be toxic in 1892, but it took 96 years to get it removed from paint and gasoline. The victims of lead poisoning were mostly poor and people of color, as in the Flint water crisis. Processed food affects also mostly people of color and the poor. *Another Immoral Hazard*.

The author points out that Real Food is good for the planet. Soil erosion, pollution, water contamination, super weeds, super bugs, greenhouse gases, and micro-plastics can each in some way be traced back to the processed food supply. The environmental result of processed food addiction will ultimately be famine if it is not stopped. Sugar addiction is about to pressure the plowing down of millions of hectares of the Amazon rain forest to raise sugar cane, if the Bolsonaro government carries through with its plan. Soil erosion is a problem also with sugar beets or sugar cane. Real Food means fewer greenhouse gases from both animals and plants, from less synthetic fertilizer, better manure management, shorter transport, and less waste. Again I refer to Diet For A Dead Planet. In the last 50 years, government policy has been to make food cheap, resulting in lower prices for corn, wheat, and soybeans, used for processed food, all driving non-communicable diseases, costing more in medical care costs, disability, and the social safety net, affecting largely the poor and people of color.

The economic costs to all of us of non-sustainable, non-organic, subsidized agribusiness in the aforementioned environmental damages, health care costs, etc., is 3 times as much as the profit the food industry makes. These costs amount to \$2.3 trillion/year. An example of the political obstacles to changing governmental policy is how Iowa, a huge agribusiness state, has more political clout due to

the Senate's design. With 0.95% of the US population, Iowa sends 2% of the US senators to Washington. And then the pharmaceutical companies can also price gouge the public. The government will not allow Medicare to negotiate prices with the drug companies. So the drug companies profiting from people's sickness is another *Immoral Hazard*.

So is it possible to change a country's behavior? We reduced smoking and drunk driving. We can learn from alcohol and tobacco control. It takes a double strategy of *personal and societal intervention*. Neither works without the other. Education by itself never cut into cigarettes, alcohol, meth, cocaine, or heroin, but combined with regulatory controls on pricing, marketing, and distribution, it worked with tobacco. Reducing availability reduces consumption, which reduces health harms.

Three ways of reducing availability are pricing strategies (taxation), restriction of access, and interdiction. The 3rd has never worked well, but the first 2 did. The public health criteria for regulation of a substance are ubiquity (Sugar is in almost every food we buy.), toxicity, (well-proven), abuse (clearly so for sugar), and externalities, how the individual's actions affect other people and the society at large. There is no agency for processed food comparable to the Bureau of Alcohol, Tobacco, and Firearms.

In the UK, the government gave people a monthly stipend, bonds that could only be exchanged for real food. At the University of California at San Francisco, from 2013 to 2015, a ban on all sales of sugared beverages on campus resulted in halving the sugared beverages drunk, and an increase in water sales. Also people had improvements in waist circumference, insulin sensitivity, and decrease in blood lipids, *and no one complained*.

Differential subsidization could tax sodas and subsidize water, could tax corn and soy and subsidize fresh fruits and vegetables. The best place to begin would be with WIC, SNAP, and NSLP. Health care insurers could provide grocery retailers subsidies for real food. This is how it could work: One food delivery system coordinates with the consumer, health care provider, the insurance company, and the supermarket. According to a person's biochemical profile, it determines which foods would optimize health, checks nutrition facts labels, and determines which recipe from thousands best fit the person's nutritional recommendation for a particular meal, say chicken cacciatore. Then it delivers the groceries to the person's home with the recipe. The insurance company pays the bill. The insurance company gains because people are healthier and utilize the insurance less. The return on the investment by the insurance company could be fairly quick. Health can improve pretty rapidly after the switch to real food. When schools teach students to prepare healthful meals, they eat them.

The entire contents of the [Fat Chance Cookbook](http://www.eatreal.org) are posted on www.eatreal.org.

We can make a difference in public attitudes and policy, but it may take time. At one time, if we saw someone smoking, it would be considered hip, but now we feel pity for the person. Ten years from now we may feel pity for someone drinking a Coke.

This book is a treasure trove of the valuable information that we can use to turn things around. Kudos to Dr. Lustig for summoning the courage to speak out and to urge us to take action to make our society more healthy and to save enormous sums of money and to prevent much harm to our people and to our environment. We all need to *eat Real Food*.