Sugar, Fat, Salt
Why Eating More Makes Us Want More (and More!)

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The Stats

- Every year, the average American eats 33 pounds of cheese (triple what we ate in 1970) and 70 pounds of sugar (about 22 teaspoons a day).
- We ingest 8,500 milligrams of salt a day, double the recommended amount, and almost none of that comes from the shakers on our table. It comes from processed food.
- It’s no wonder, then, that 1 in 3 adults, and 1 in 5 kids, is clinically obese.
- It’s no wonder that 26 million Americans have diabetes.
- It’s no wonder the processed food industry in the U.S. accounts for $1 trillion a year in sales, and the total economic cost of this health crisis is approaching $300 billion a year.
How Big is the Processed Food Industry in this Country?

Grocery sales now top $1 trillion a year in the U.S., with more than 300 manufacturers employing 1.4 million workers, or 12% of all American manufacturing jobs.

- Global sales exceed $3 trillion.
- 60,000 - that’s the number of different products found on the shelves of our largest supermarkets.
- Processed foods really took off in the 1950s with the promotion of convenience foods whose design and marketing was aimed at the increasing numbers of families with both parents working outside the home.
- The industry's expansion, since then, has been entirely unrestrained. While food safety is heavily regulated, the government has been industry's best friend and partner in encouraging Americans to become more dependent on processed foods.
Ten mega corporations control the output of almost everything you buy; from household products to pet food to jeans.

Phillip Morris tobacco company owns Kraft Foods

Key brand names owned by tobacco companies: Kraft, Miller, Jell-O, Nabisco, Kool-Aid

Cereals owned by Tobacco companies: Cream of Wheat Cereal, Post Alpha-bits, Banana Nut Crunch Blueberry, Morning Bran Flakes, Carbwell, Cinna Cluster Raisin Bran, Cranberry Almond Crunch, Frosted Shredded Wheat, Fruit & Fibre, Golden Crisp, Grape-Nuts, Grape-Nut O’s, Great Grains, Honey Bunches of Oats, Honeycomb, Natural Bran Flakes, Oreo O’s, Pebbles, Raisin Bran, Shreddies, Shredded Wheat, Shredded Wheat ‘n Bran, Spoon Size Shredded Wheat, Sugar Crisp, Teddy Grahams, Toasties, Waffle Crisp, 100% Bran

What Motivates Us to Eat?

The desire to eat is controlled by two different mechanisms, the body’s homeostatic, or energy balance, system and its hedonic, or pleasure, system.

The homeostatic system is controlled by communication between the hypothalamus and brainstem in the brain and the digestive system to ensure that the body’s energy needs are met. Designed to balance energy intake and energy expenditure.

Hypothalamus continually receives signals from the periphery (nutrients in the blood and hormones derived from the gastrointestinal tract, fat tissue, etc.) which inform the brain about the availability of fuel sources.

Hypothalamus reads and integrates these incoming signals to regulate appetite and maintain sufficient fuel supply to achieve homeostasis.

The homeostatic system, while vital, does not work alone.

If it did, there might not be enough of a drive to encourage us to eat and to store enough calories to protect us from famine or starvation.
Hedonic Hunger

- The **hedonic system** encourage us to seek out that which is pleasurable
- This is essential for survival - it was designed to guide us to eat, rather than waste away, and to procreate so that our genetic lineage doesn’t die out
- Four our ancestors, those who like to eat and procreate were those who were most successful in surviving and passing on their genes!
- Different regions in the brain mediate **hedonic hunger**.
- These “**pleasure**” regions respond to foods, drugs of abuse, and sex in similar manners, seeking reward and rarely sending a strong “**stop**” signal.
- Sometimes referred to as the “**twinkie circuit**”

- Neuroimaging studies of this pleasure circuitry have shown that all it takes is one smell, sight, or taste of palatable food, and instantly a series of sensory, metabolic and neurochemical fireworks go off in the brain that make us want that food, or more of that food
- Palatable food induces a very **potent release of dopamine in the brain**
- The release of dopamine is believed to coordinate many aspects of food reward - increased arousal and attention, psychomotor activation and conditioned learning (remembering food-associated stimuli)
Images of a brain experiencing food pleasure and “Lighting” up.

- Normally the homeostatic and hedonic systems are complementary - they work hand in hand
- But these systems were not designed to handle the obesogenic food environment today
- We have highly palatable, but poor quality food readily available and heavily marketed and advertised
- We are constantly bombarded by highly palatable food
- For many of us, the inner battle between our rational side and our “twinkie circuit” is fought dozens of times a day
- As a result, for many of us, our hedonic system is overriding our homeostatic controls
- We eat more often for pleasure (or escape, or comfort) than actual biological need
- The “hyperpalatability” of our food supply is undermining our normal satiety signals, stimulating the drive to eat even when there is no physiological need for food
Evidence in animals and humans shows that both drugs of abuse and the consumption of highly palatable foods (high in fat and sugar) converge on a **shared pathway in the brain** to motivate behavior.

Scientific evidence shows that repeated exposure to large amounts of palatable foods can **alter the brain** in ways similar to drugs of abuse, essentially “rewiring” the brain to **promote compulsive overeating** and loss of control.

Rat studies have provided evidence that bingeing on sugar can induce behavioral and neuronal changes similar to those induced by drugs.

Both refined foods and recreational drugs **overload the brain’s dopamine-pleasure center**.

Over time this can cause a **decreased sensitivity in the dopamine-reward system** so a person begins to eat compulsively to regain a sense of reward, at least temporarily.

At the same time there is evidence that some overeaters may start out with **weaker or blunted reward circuitry**.

This could be due to **genetic differences** in the dopamine system - a decreased number of dopamine receptors.

As a result they may be driven to try to increase their release of dopamine through **overeating highly palatable foods**.

They are eating more, or overcompensating, in an **attempt to achieve a greater dopamine reward**.

The more blunted their dopamine response, the more likely they are to overeat!
- We know that both obesity and addiction run in families.
- What they may be missing, instead of simply willpower, is a normally functioning dopamine reward system.

Animal research suggests that the environment or how often you’ve been exposed to a potentially addictive substance, can **shift brain neurochemistry**, increasing the likelihood of addiction.

- Just an animals repeatedly given cocaine show a decrease in dopamine function, animals who are given high concentrations of sugar solutions also show **changes in brain circuitry that promote addiction**.
- Likewise, when animals are given a cafeteria diet of highly palatable food, their dopamine neurotransmission becomes depressed.
- But they can temporarily restore dopamine levels if they eat **MORE** of these foods.
- It becomes a vicious cycle!
So, if exposing ourselves to highly palatable foods can shift brain chemistry, then we clearly live in an environment perfectly designed to foster food addiction!

What Makes Food Highly Palatable?

- When scientists say a food is “highly palatable”, they are referring to its capacity to prompt us, to drive us, to eat more ... and more
- A high concentration of potent ingredients is key
- Human are [hardwired, or have an inborn preference, for sweet, fatty, salty foods](https://www.example.com)
- Food manufacturers exploit this phenomenon by deliberately making their products extra-sweet, fatty, or salty so that they amp up our neurons so we want more of these foods
- We are driven to compulsively eat more potent foods past the point of fullness!
Researchers have found that repeated exposure to a taste or flavor leads to increased acceptance and desire for foods or beverages characterized by that taste or flavor.

So if you are constantly eating sweet, sweet foods - that is what you crave.

An apple will no longer taste sweet to you.

Your taste buds are conditioned to be constantly ramped up!

Potent foods are typically refined by an industrial food process.

For example, the refining of carbohydrates allows for rapid digestion and, therefore, very rapid absorption.

As a result you have a surge of potentially psychoactive substances dumped into the bloodstream, which can, ultimately, alter our brain chemistry and get us "hooked".

For example, coca leaves have been used since ancient time for their stimulating effects.

But over time people learned to purify and alter the leaves, producing cocaine that can be delivered much more quickly to the brain.

This makes the drug much more addictive.

Food has evolved in a similar manner.
Our ancestors ate whole grains - we eat refined breads, crackers and cereals

Our ancestors ate corn and fruit - we eat high fructose corn syrup

Because humans are so good at solving problems, we’ve figured out how to cheat the system - to trigger it to give us LOTS of dopamine quickly

We’ve taken whole foods - natural foods - and modified them (refined/processed/concentrated them) to a point where they *unnaturally* stimulate our natural reward system

Because these foods stimulate the very same part of our brain that responds to heroin and cocaine, it makes them very difficult to resist

The more you do things that are unnaturally rewarding, the less reward you ultimately get from them

Combining Ingredients

While most palatable foods contain sugar, fat and salt, the art of pleasing the palate depends, in large part, on *combining these ingredients in optimal amounts*

David Kessler wrote in his book, *The End of Overeating*, that food is now being engineered to reach what the food industry refers to as the “bliss point”

*“Bliss point”* is the precise combination of sugar, fat and salt that makes a food *“hyperpalatable”*

For example, as more sugar is added, the product becomes more pleasurable until the *“bliss point”* is reached

It then becomes TOO SWEET if more sugar is added and the level of pleasure drops
If a product succeeds in reaching the bliss point, if it achieves just the right mix, the food becomes more stimulating and, to some people, irresistible.

Multiple taste receptors and neuropeptide systems are activated, stimulating our pleasure circuits so the drive to eat becomes STRONGER.

Research has shown that animals will work hard for a fat reward (a 10% corn-oil solution).

But they will work the hardest for a combined fat and sugar reward.

In fact, they will work for this fat-sugar reward as hard as they will for a cocaine reward!!

When a food reaches the bliss point, it stimulates our appetite rather than suppresses it.

What the food industry is doing is combining substances with each other in ways that are entirely unnatural, but which enhance their hedonic value, their addictive force.

Examples you won’t find in nature:

- Doughnuts - contain refined flour, sugar, salt and fat
- French fries - contain fat, salt and often, dextrose
"Higher sugar, fat, and salt make you want to eat more," a high-level food industry executive told me. I had already read this in the scientific literature and heard it in conversations with neuroscientists and psychologists. Now an insider was saying the same thing.

“Sugar, fat, and salt make a food compelling,” said the consultant. “They make it indulgent. They make it high in hedonic value, which gives us pleasure.”

“Do you design food specifically to be highly hedonic?” I asked. “Oh, absolutely,” he replied without a moment's hesitation. “We try to bring as much of that into the equation as possible.”

Research also shows that having more VARIETY of foods encourages people to consume greater quantities and increases overeating.

The food industry knows this and that is why it introduces thousands and thousands of new processed food products every year.

Grocery stores exploit this phenomenon by devoting large amounts of shelf space to a wide variety of highly profitable, sugar-sweetened cereals, beverages, salty snacks and dessert items.

There are over 400 different types of cereal in the market today.
**Sensory Specific Satiety** - the tendency to stop eating and feel full or satisfied when variety is limited, but do just the opposite (keep eating) when food is varied

Food companies use this concept to “layer” flavors in foods. Snickers bar, for instance, is extraordinarily well engineered. As we chew it, the sugar dissolves, the fat melts and the caramel traps the peanuts so the entire combination of flavors is blissfully experienced in the mouth at the same time.

When there is an abundance of different flavors at one meal or snack the brain’s appetite center tends to be overstimulated, so that we end up overeating, well before our brain has a chance to tell us that we’re full

Thanksgiving Syndrome!

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People do the same: In the book *Mindless Eating*, Wansink demonstrated that if people are offered 10 different colors of jellybeans they will eat 43% more candies than if they are only offered a 7-color combination

This is the case even if THEY ALL TASTE PRETTY MUCH THE SAME!

People will eat more pasta if it is served in different colors and shapes!
One approach is to offer less variety of the things we want people to eat less of, such as sweets and salty snacks

Don’t keep a lot of these in your home

Offer MORE variety of the things we do want to eat more of, such as fruit and vegetables

If a range of different colored fruits and vegetables are offered in a variety of different shapes, people are likely to eat more of them and benefit from the fiber, antioxidants and phytochemicals they contain

Sugar and Heart Disease

New Study: Researchers from the U.S. Centers for Disease Control and Prevention (CDC) looked at data from, 40,000 people who participated in the most recent National Health and Nutrition Examination Survey. Published in the JAMA Internal Medicine

They found that adults whose sugar consumption amounted to between 17-21% or more of their daily calories had a 38% increased risk of dying from heart disease

The danger was even greater among those whose sugar consumption exceeded 21% or more of their daily calories - they are at double the risk of dying from heart disease compared to study participants whose sugar consumption was low - 8% of daily calories or less

Sugar calories quickly add up: One teaspoon has about 16 calories; one 12-ounce can of non-diet soda contains has about 9 teaspoons of sugar or about 140 calories; many cinnamon rolls have about 13 teaspoons of sugar; one scoop of chocolate ice cream has about 5 teaspoons of sugar

This study accounted for all other potential risk factors including total calories, overall diet quality, smoking, cholesterol, high blood pressure, obesity and alcohol.

Major sources of added sugar in Americans’ diets are sugar-sweetened beverages, grain-based desserts, fruit drinks, dairy desserts and candy. A can of regular soda contains about 35g of sugar (about 140 calories).
Sugar

- Humans like sweet foods
- Innate preference for sweetness does not necessarily lead to obesity or other diet-related diseases
- Sugar-containing foods in their natural forms (fruits, vegetables) tend to be highly nutritious and contain beneficial vitamins, minerals, and phytochemicals
- These foods elicit a high level of satiety and satisfaction - lots of fiber, flavor
- It is only when sugars are refined and concentrated and consumed in large amounts that they become a problem
- Most sugars found naturally in foods like fruits, vegetables and milk products are present within the cell walls of plants - they are naturally occurring
- The majority of sugar in the American diet is from “added sugars”

Added Sugars

- Added sugars are defined as sugars and syrups that are added to foods during processing or preparation, including sugars and syrups added at the table
- Added sugars: white sugar, brown sugar, raw sugar, corn syrup, corn-syrup solids, high-fructose corn syrup, malt syrup, maple syrup, pancake syrup, fructose sweetener, liquid fructose, honey, molasses, dextrose
- Soft drinks and other sugar-sweetened beverages (Starbucks!) are the largest source of added sugars in American’s diet - accounting for about 35% of our total added sugar
Why are sugars added to foods?

- Sugars sweeten foods and beverages and increase palatability
- Also used for preservation purposes and to confer certain attributes such as viscosity, texture, body and browning capacity

Sugar Kills

- On average, adults in the USA in 2010 consumed about 15% of their daily calories — about **300 calories a day**, based on a 2,000-calorie diet — from added sugars
- That's far more than the American Heart Association's recommendation that women consume no more than 100 calories a day from added sugars, or about 6 teaspoons of sugar; and men consume no more than 150 calories a day, or about 9 teaspoons
- The World Health Organization recommends consuming less than 10% of calories from added sugars.
- **One can of regular soda** contains about 140 calories of added sugar. That's about 7% of the daily calories of someone eating 2,000 calories a day, Yang says.
Sugar Kills

- Scientists aren’t certain exactly how sugar may contribute to deadly heart problems, but it has been shown to increase blood pressure and levels of unhealthy cholesterol and triglycerides; and also may increase signs of inflammation linked with heart disease.
- The study in JAMA showed that as sugar intake increased, risks climbed steeply.
- Obesity didn’t explain the link between sugary diets and death - that link was found even in normal-weight people who ate lots of sugar.
- Researchers took into account other factors known to contribute to heart problems, including smoking, inactivity and excess weight, and still found direct risks for sugar.

American Heart Association

For most American women, that’s no more than 100 calories per day, or about 6 teaspoons of sugar.

For men, it’s 150 calories per day, or about 9 teaspoons.

The AHA recommendations focus on all added sugars, without singling out any particular types such as high-fructose corn syrup.
Is Sugar Addictive?

- Reward center of the brain (Mesolimbic) - very powerful motivator of human behavior
- Researchers find excessive eating mirrors patterns of **drug addiction**
- Few people who compulsively consume - food, drugs, tobacco, alcohol - are **unaware** their habit could kill them
- Few have power to stop, at least not easily

- Researchers made an intriguing discovery about sugary chocolate chip cookies
- The compulsion to overindulge these and other sweets could be suppressed by the **SAME drug that doctors use to block and counter the effects of heroin!**
- This research was one of the earliest pieces of evidence that obesity had parallels to drug addiction
What Happened to Yogurt?

- General Mills transformed yogurt with its Yoplait brand.
- The company’s Yoplait brand transformed the traditional unsweetened breakfast yogurt into a dessert-like snack.
- It has twice as much sugar per serving as Lucky Charms, the sweet, marshmallow-filled cereal.
- **Yoplait yogurt has 28 grams of sugar per serving. Lucky Charms has 13 grams per serving.**
- But because of yogurt’s **well-tended image** as a wholesome, life-giving snack, sales of Yoplait are soaring with annual revenue topping $500 million.

What Happened to Cereals?

- Does the ingredients list for your cereal look a lot like that on a box of cookies?
- **One ounce of Mini Oreo cookies has 11 grams of sugar** and 130 calories (34% of its calories come from sugar).
- And sugar is the second ingredient listed (enriched flour is first).
- Lots of cereals have ingredient lists that look similar -- like Cookie Crisp Cereal, with 44% calories from sugar.
- Frosted Flakes has 11 grams of sugar in 1 cup
- **Raisin Bran Crunch has 20 grams of sugar in one cup.**
Orange Juice

- **8 oz (240 ml) Serving:** Sugars, total: 24g Calories from sugar: 96
- **16 oz Bottle** Sugars, total: 48g Calories from sugar: 192

Coca Cola

- **12 oz (355 ml) Can** Sugars, total: 39g Calories from sugar: 140
- **20 oz (590 ml) Bottle** Sugars, total: 65g Calories from sugar: 240
- **1 Liter (34 oz) Bottle** Sugars, total: 108g Calories from sugar: 400
Starbucks Peppermint White Chocolate Mocha with Whipped Cream (venti, 20 fl oz)

- 660 calories, 95 g sugars = 380 calories from sugar
- **Sugar Equivalent:** 8½ scoops Edy’s Slow Churned Rich and Creamy Coffee Ice Cream

Remember, liquid calories do not provide the same degree of **satiety** that solid calories do

There is evidence our bodies simply do not recognize calories in liquids the same way they do calories in a solid form

The rapidly absorbed carbs in sugar sweetened beverages contribute to a high glycemic load which **actually stimulates appetite**

Research links sugar sweetened beverages to hyperinsulinemia and insulin resistance, high blood pressure, high triglycerides, low HDL, high inflammation, metabolic syndrome and diabetes
What about artificial sweeteners?

- Several studies show that artificial sweeteners actually contribute to weight gain.
- The dissociation of the sensation of sweet taste from caloric intake may disrupt appetite regulation.
- Artificial sweeteners may cause people to continue to crave something sweet.
- Artificial sweeteners may alter taste preference – Aspartame, acesulfame potassium, saccharin, sucralose and neotame are 180, 200, 300, 600, and 7,000 times sweeter than sugar, respectively.
- Intense sweetness of these substances can lead to taste distortion, essentially raising our "sweet threshold" and increasing our preference for sweet flavors overall.
- Animal studies show that aspartame is toxic to neurons in the brain that regulate appetite.

How to Cut Back on Sugar

- Read ingredient labels. If sugar is in the first 3 ingredients, it is most likely high in sugar.
- Lower the "sweet volume" to reduce your "sweet threshold" - the goal is to get your taste buds more sensitive to sugar, so that high sugar foods are less appealing.
- Have fresh fruit for dessert instead of sweets.
- Don’t keep high sugar foods in the house.
How to Cut Back on Sugar

- Cut back on the amount of sugar added to things you eat or drink regularly like cereal, pancakes, coffee or tea. Try cutting the usual amount of sugar you add by half and wean down from there.
- Buy fresh fruits or fruits canned in water or natural juice. Avoid fruit canned in syrup, especially heavy syrup.
- Instead of adding sugar to cereal or oatmeal, add fresh fruit (try bananas, cherries or strawberries) or dried fruit (raisins, cranberries or apricots).
- When baking cookies, brownies or cakes, cut the sugar called for in your recipe by one-third to one-half. Often you won’t notice the difference.
- Instead of adding sugar in recipes, use extracts such as almond, vanilla, orange or lemon.
- Enhance foods with spices instead of sugar; try ginger, allspice, cinnamon or nutmeg.
- Substitute unsweetened applesauce for sugar in recipes (use equal amounts).
- Use Stevia sparingly (negligible effect on blood sugar).

FAT

- Fat is composed of a glycerol molecule and three fatty acids (long chain fatty compounds). Some of these are essential (the body cannot manufacture them).
- Fat essential for assimilating fat-soluble vitamins.
- Fat is a flavor enhancer and carrier.
- Good fats and bad fats:
  - Saturated and trans fats, Polyunsaturated and Monounsaturated.
25-30% of calories from fat

Example:
- 1200 calories  33-40 grams total fat
- 1500 calories  42-50 grams total fat
- 2000 calories  56-66 grams total fat
- A Chipotle vegetarian burrito with rice/beans/guacamole/sour cream has 985 calories and 42 grams of fat!

Types of Fat

- **Saturated Fat**: animal fats, tropical oils (bacon, butter, red meat, cheese, sour cream ice cream, hot dogs, beef). Limit/Eliminate these
- Always choose lowest animal fat content possible; extra lean meat and cheese, skim or 1% milk
- Strong body of evidence indicates that saturated fats raise total blood cholesterol, and LDL cholesterol, which can increase risk of cardiovascular disease and type 2 diabetes because it promote insulin resistance
- No more than 7% of total calories from saturated fat:
  - 1200 calories:  9 grams or less
  - 1500 calories: 12 grams or less
  - 2000 calories: 15 grams or less
Major Sources of Saturated Fat

- Major sources of saturated fat in the American diet:
  - Full fat cheese - 9% of total saturated fat intake
  - Sausage, beef, bacon and ribs - 8%
  - Pizza - 6%
  - Grain-based desserts - 6%
  - Dairy-based desserts - 6%
  - Chicken and chicken mixed dishes - 6%

Red Meat and Diabetes

- Study by Harvard School of Public Health found **strong association between consumption of red meat - especially processed red meat - and an increase of type 2 diabetes**
- 442,101 participants in study.
- Daily serving 3-4 oz of unprocessed red meat was associated with a 19% increase risk of type 2 diabetes
- One daily serving of half that quantity in processed meat (one hot dog or sausage or 2 slices of bacon) associated with a 51% increased risk
How to Lower Saturated Fat Intake

- Replace solid fats like butter with vegetable oils
- Instead of butter on your toast use nut butter
- Use lower fat cheese, milk, yogurt
- Trim fat from meat before cooking and eating
- Use hummus on sandwich instead of mayonnaise

Trans Fat

- Trans fats are double trouble for your heart
- Raise LDL bad cholesterol
- Lower HDL good cholesterol
- Promote insulin resistance and favor a state of systemic inflammation in the body
- Hydrogenated fats, usually manufactured by adding hydrogen to liquid fat to stabilize it.
- Now mandated to be listed on Nutrition Facts Label - will soon be phased out altogether
- Look for lowest possible number. Try to get as little as this type of fat as possible: 0 grams per day
Trans Fat

- Chemically processed “partially hydrogenated” oil
- Stick margarine
- Baked good: cookies, crackers, pastries
- Fast Food
- “Trans Fat Free” if less than 0.5 grams PER SERVING

Monounsaturated Fats

- **Monounsaturated Fats, or omega-9 fatty acids**, have been shown to promote healthy blood lipids, reduce blood pressure, improve insulin sensitivity and regulate glucose levels
- Found in olive oil, peanut oil, canola oil, avocados, nuts and seeds
- Central part of the Mediterranean diet
- Although the Mediterranean diet is a fairly high-fat diet, it has been shown to be more effective for weight loss than a traditional low-fat diet
- Helps reduce inflammation
**Polyunsaturated Fat**

- Omega 6 and Omega 3 fatty acids
- Omega 6 to Omega 3 **should be in a 2:1 ratio**
- Typical American diet: more like 20:1 ratio
- We overeat Omega 6 fats and don’t get enough Omega 3 fats
- Opposing but complimentary functions in the body
- Many experts contend that a high omega-6/omega-3 ration typical in the American diet is partly responsible for the epidemic of inflammatory, autoimmune and cardiovascular diseases that we face today
- Higher omega-3 intake would be more **protective against these diseases**

**Omega 6**

- Widespread in foods
- Vegetable oils (safflower, sunflower, sesame, corn)
- Salad dressings made with above oils
- Margarines
- Crackers, bread, chips, popcorn, etc
- Increase inflammation in the body
- **Reduce intake of Omega 6 fats**
Omega 3 Fats

- Increase HDL “good” cholesterol
- Reduce blood clot formation
- Suppresses inflammation in the body
- Decreases triglyceride levels in blood
- Decreases risk/incidence of sudden death and MI
- Inhibits growth of plaque
- Promote arterial relaxation, lowers BP
- Reduce susceptibility to arrhythmias

Inflammation

- Omega 3 fatty acids act as an anti-inflammatory
- Inflammation has a profound effect on cardiovascular system
- Inflammation is one of the risk factors for heart disease, diabetes, obesity and even some cancers
- Omega-3 fatty acids have been shown to play a crucial role in normal brain function
- People who do not get enough omega-3 fatty acids in their diets, or who do not maintain a healthy balance of omega-6 to omega-3 fatty acids, may be at an increased risk for depression as well as mood and behavioral disorders
Sources of Omega 3 fats

- Increase intake of Omega 3 fats
- Choose fatty fish (salmon, sardines, herring, trout)
- Flaxseed and flaxseed oil
- Edamame
- Omega-3 eggs
- Dark leafy greens, wheat germ
- Walnuts and walnut oil, pumpkin seeds

Fat in Processed Food

- Fat is seen as one of the **most potent components of processed food**
- 2/3 of the calories in cheese come from fat, which packs more than twice the energy of sugar
- If sugar is the methamphetamine of processed food ingredients, with its high-speed, blunt assault on our brains, then fat is the opiate, a smooth operator whose effects are less obvious but no less powerful
- BOTH sugar and fat stimulate areas of the brain in the reward center, which generates feelings of pleasure
- In recent years, Unilever (Dove, Ben & Jerry’s brands, etc.) alone invested $30 million on a 20-person team that used **brain imaging tools** to study the sensory power of food, including fat
- Fat and sugar both produce **strong reward effects in the brain**
Fat and Sugar

Researcher Adam Drewnowski, a professor of epidemiology at the University of Washington at Seattle, directs the Center for Obesity Research.

His research showed him that there is no “bliss point” for fat like there is for sugar (our liking for sugary concentrations goes only so far; after a point - known at the “bliss point” or “break point” - adding more sugar only lessens the appeal.

“But there is NO bliss point, or break point, for fat,” says Drewnowski.

FAT and SUGAR

He gave 16 students 20 different mixtures of milk, cream and sugar and asked them how much they liked each combination.

His experiments showed him that no matter how rich a food is, people in his experiments never gave the signal to stop eating.

Their bodies wanted more and more fat.

Food manufacturers add lots and lots of fat to products to make us crave them more and give them more “mouth feel” - creaminess, add texture, moistness.
Fat and Sugar

- The heaviest cream tasted **even better** to his subjects when he added a little sugar
- There was something about this combination that created a **powerful interplay**
- Fat and sugar **boosted one another** to levels of allure that neither could reach alone
- Think Snickers and chocolate M&Ms

Another experiment - Drewnowski had 50 college students taste and rate 15 different formulations of cake frosting in which the sugar and fat content was varied
- The tasters were able to taste and quantify the sugar content of each sample quite accurately, **but not the fat content**
- The participants in the study found it difficult to detect its presence with a any precision at all
- On top of that, when sugar was added to the fattier formulations, the students mistakenly thought the fat had been reduced
- In effect the fat had gone into hiding
- Food manufacturers can reduce the fat content by adding **MORE sugar**
USDA

- United States Department of Agriculture’s agenda is overseeing the food that Americans eat.
- Its principal mission is to **ensure the integrity of the country’s most fundamental life-giving force, from farm to fork**.
- On the one side are the 312 million or so **people** of the United States and their health.
- On the other side are the 300 or so **companies** that form the $1 trillion industry of food manufacturing, companies that the USDA feels obligated to placate and nurture.
- **Conflict of interest** - nowhere is the tension between what is good for the companies and what is good for the people more evident than in one of the pillars of processed foods: **fat**.

- On the one hand, the USDA has the task of tackling the obesity epidemic by encouraging healthier eating habits. Yet it must also **promote the interests of U.S. agriculture**.
- Fat, of course, is the lubricant that sustains the $90 billion trade in snack foods, providing that crucial element known as “mouthfeel” to corn chips and crackers, ice cream and cookies.
- But neither chips nor desserts are pumping anywhere near the levels of fat into our bodies as 2 other mainstays of processed foods.
- In fact the biggest deliverers of **saturated fat** are **cheese and red meat**.
- The Department of Agriculture has joined industry as a full partner in the most urgent mission of all: **cajoling the people to eat MORE**.
Two divisions: One is the Center for Nutrition Policy and Promotion. It creates and promotes an official guide to better eating first published in 1980.

It gets updated every 5 years by a panel of “experts” including doctors, dietitians, researchers, etc.

USDA records show that 7 of the panel’s 13 members in 2010 were nominated by the Grocery Manufacturer’s Association.

The USDA acknowledged that cheese is high in saturated fat, but said that lower milk consumption had made cheese an important source of calcium.

So why is USDA in bed with dairy lobbying groups? That’s its other job. From its beginnings in the 1860s, USDA’s role was to promote U.S. agricultural production and sales, with the full support of what was then a largely agricultural Congress. Only in the 1970s, did USDA pick up all those pesky food assistance programs and capture the “lead federal agency” role in providing dietary advice to the public.

The government’s semi-public commodity checkoff programs are a big deal, collecting more than $600 million each year to promote a variety of products.

The Research and Promotion Division of the USDA implements, coordinates, and monitors federally-legislated promotion and research programs for beef, pork, eggs, soybeans, and cheese. These programs are requested, administered, and funded by the industries themselves.

Commonly referred to as “check-off” programs, they operate under promotion and research orders or agreements issued by the Secretary of Agriculture and are financed by industry-established assessments.

These programs support many advertising campaigns you may know, for example: “Beef. It’s what’s for dinner,” “Pork. The other white meat,” “Ahh, the power of cheese,” and “Got milk?”

The biggest funding shares are for dairy, beef, and pork. There is no checkoff funding for poultry, and very little for fruits and vegetables.
Domino’s Pizza

- When Domino’s pizza sales started to slide they reformulated their pizzas to contain nearly twice as much cheese; and launched an ad campaign which took the bold step of acknowledging just how awful its old pizzas were, while gushing about the “cheese, cheese, CHEESE!!!” that distinguishes the new recipe from the old one.

- Domino’s effort to rebrand itself and thereby revive its flagging fortunes was partly financed by a government handout, or, if you prefer, corporate welfare. According to the Times’ Michael Moss, Domino’s $12 million marketing campaign was created and financed by a USDA-funded organization called Dairy Management.

Much of Food Politics is devoted to describing the USDA’s severe conflict of interest in developing dietary advice to “eat less” of basic agricultural commodities.

- As Times reporter Marian Burros put it in one of her articles about the fights over the 1992 Pyramid, which visually suggested eating less meat and dairy, “the foxes are guarding the henhouse.”
USDA

- How to change this system? One possibility might be to move dietary guidance into a more independent federal agency, NIH or CDC for example.
- Another might be to recognize the ways in which corporate lobbyists corrupt our food system and do something about election campaign laws.

How to get more good fats

- Use olive oil in salad dressings, or walnut or avocado oil
- Add some flaxseed oil
- Sprinkle sliver nuts or sunflower seeds on salads instead of bacon bits
- Snack on a small handful of nuts rather than crackers or potato chips
- Add slices of avocado rather than cheese to your sandwich
- Prepare fish such as salmon instead of meat/chicken twice a week
How to Reduce Bad Fats

- Eat fewer foods that contain solid fats. This would include cakes, cookies, ice cream and other desserts that are make with butter, cream and shortening.
- Eat less pizza, full-fat cheese, process and fatty meats like sausage, hot dogs, bacon, ribs.
- Select lean meats and poultry
- Choose fat-free or low-fat milk and milk products
- When cooking, replace solid fats like butter, beef and chicken fat with vegetable oils or choose cooking methods that do not add fat
- Choose baked, steamed or broiled rather than fried foods

Sodium

- Sodium is essential for normal body function
- Helps maintain the right fluid balance in the body, helps transmit nerve impulses, and influences the contraction and relaxation of muscles
- The problem is we get TOO MUCH SODIUM in our diets
- Food manufacturers love it because salt helps prevent food from spoiling by inhibiting the growth of bacteria, yeast and mold
- It brings out the flavors in foods
- It helps retain moisture, reducing the perception of dryness in foods such as crackers and pretzels
Sodium

- Processed foods tend to be high in sodium because the food industry knows that sodium makes the taste of food more appealing.
- In fact, adding lots of salt is the **cheapest and easiest way to make food products palatable**.
- Many experts believe that the high amount of salt in processed foods is one of the most important reasons for the **current obesity epidemic**.
- It leads to **higher consumption of poor quality foods**.
- It makes poor quality foods more desirable as it aims to achieve the “**bliss point**”.

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Sodium

- The more potent and multisensory (sugar, fat, salt!) the product is, the greater the reward we experience and the greater our drive to consume more of the product.
- Palatability is the primary driver of food choices.
- When we get used to the taste of higher sodium foods, it raises our “salt threshold” and other, less salty foods taste bland in comparison.
- Where do we get most of our salt?
  - 5% added while cooking
  - 6% added while eating
  - 12% from natural sources (vegetables, dairy products, meat, shellfish)
  - **77% from processed and prepared foods**.
What’s so bad about salt?

- Research shows that on average, the higher an individual’s sodium intake, the higher their blood pressure.
- A study published in the *New England Journal of Medicine* in 2010 used sophisticated, computerized, predictive modeling to estimate the benefit of a population-wide reduction in sodium.
- It determined that a sodium reduction of 1,200 mg per day would reduce the annual number of new cases of coronary heart disease by 60,000 to 120,000 and the number of new cases of stroke by 32,000 to 66,000.
- Researchers estimated that if Americans halved their sodium intake, as many as 150,000 premature deaths could be prevented each year.

Why do Food Manufacturers like so much SALT?

- Humans are hardwired to like salt.
- As there are for sugar, we have taste receptors for salt that go all the way through the mouth and down to the gut.
- But we only need about 1,500 mg per day.
- Each year American food companies use about 5 billion pounds of salt in their products!
- Salt is the great fixer - it corrects myriad problems that arise as a matter of course in the factory: takes away metallic taste in cornflakes, makes crackers less bitter and soggy, acts as a preservative, "pops" sweet flavors.
- Salt costs about 10 cents a pound, much cheaper than herbs and spices!
Sodium

- ¼ teaspoon = 600 mg sodium
- ½ teaspoon = 1,200 mg sodium
- ¾ teaspoon = 1,800 mg sodium
- 1 teaspoon = 2,400 mg sodium
- 1 tsp baking soda = 1,000 mg sodium
- It is estimated the average man gets about 4,000 mg of sodium/day
- It is estimated the average woman gets about 2,900 mg of sodium/day
- American Heart Association guidelines for the prevention of cardiovascular disease is 1,500 mg per day

Sodium

- Nuts
- Potato chips
- Cheerios
- Bread
- **Cherrios 1 cup** = 160 mg
- **Raisin Bran**: 210 mg
- **Lay’s potato chips 1 oz** = 170 mg
- **Orowheat whole grain oat nut bread 2 slices** = 270 mg
- One fast food English muffin with cheese and Canadian bacon: 729 mg
- 1 cup of canned sweet corn: 571 mg
- One large fast food taco: 1,233 mg
- **Planter’s Mixed nuts (lightly salted) 1 oz** = 55 mg
- Newman’s Own Organic Pasta Sauce: 650 mg in ½ cup

- Addiction to salt can be **readily reversed**
- All that is needed is to **stop eating processed foods for a while**
- Researchers performed an experiment - subjects were asked to slash their consumption of salt by half by **avoiding certain processed foods**
- For the first few weeks nothing much happened, apart from the subjects missing the foods they used to eat
- But then, slowly, bit by bit, a **radical change occurred**
- The test subjects didn’t stop liking salt, nor did they lose their taste for it
- Rather, the salt-sensitive taste buds in their mouths - the same ones that had grown used to bombardment by salty foods - **became more SENSITIVE to salt**, so they needed less salt to experience its pleasures - **a LOT less**
- At the end of 12 weeks researchers allowed them to add back as much salt as they wanted and all they added back to their diet was about **20% of what had been taken out**
Sodium

- Make your own salad dressing/marinades
- Make your own stock and gravy instead of using bouillon cubes or granules
- Mrs. Dash spices and marinades
- Low-sodium cookbooks and web sites
- Use herbs/spices vs salt
- Cut WAY DOWN on processed foods

Sodium

- When eating out, order foods that have been grilled, baked, steamed or poached instead of fried, battered or “smothered”
- Low-sodium canned soup (150 mg or less)
- Natural low-sodium, low-fat cheese vs processed cheese
- Unsalted or lightly salted popcorn, nuts, etc
- Use fresh poultry, fish and lean meat, rather than canned or processed.
- Buy fresh, plain frozen or canned with “no salt added” vegetables.
- Use herbs, spices and salt-free seasoning blends in cooking and at the table; decrease or eliminate use of table salt.
- Choose ‘convenience’ foods that are lower in sodium.
Sodium

- Dehydrated onion soup mix (1 packet): 3,132 mg sodium
- Seasoned bread crumbs, 1 cup: 2,111 mg sodium
- Soy sauce, 1 tablespoon: 1,260 mg sodium
- Beef Bouillon cube: 930 mg sodium
- Subway tuna and cheese wrap: 1,310 mg sodium
- Wendy’s roasted turkey and Swiss cheese sandwich: 1,530 mg sodium
- Panera Bread French onion soup: 1,790 mg sodium
- Taco Bell Southwest Steak Border Bowl: 2,330 mg sodium

Reducing Sodium in the Diet

- When available, buy low- or reduced-sodium or ‘no-salt-added’ versions of foods like:
  - Canned soup, canned vegetables, vegetable juices
  - Low-fat cheeses
  - Condiments like soy sauce
  - Crackers and snack foods like nuts
  - Processed lean meats
### Food Labels

<table>
<thead>
<tr>
<th>Claim</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Sodium</td>
<td>&gt;140 mg/serving</td>
</tr>
<tr>
<td>Very Low Sodium</td>
<td>&gt;35 mg/serving</td>
</tr>
<tr>
<td>Sodium Free</td>
<td>&gt;5 mg/serving</td>
</tr>
<tr>
<td>Reduced Sodium</td>
<td>25% less than original</td>
</tr>
</tbody>
</table>

### Understanding Sodium Terms:

- **Reduced Sodium**  25% less
Conclusion

- Food scientists use cutting-edge technology to calculate just the right amount of sugar to add to a food or beverage in order to make it most appealing. A “U” shaped pleasure curve exists, where more sugar adds to the appeal of a product, to a point. This amount is referred to as the “bliss point.” Beyond that amount, excess sweetness is a taste turn-off.

- Salt’s powerful flavor turns even the poorest quality foods into pleasurable experiences. It also acts as a food preservative.

- The third pillar used by the food giants to hook us is fat, which can be added in almost limitless quantities—making it the most toxic of the three ingredients, especially when it comes to obesity and diabetes.

- When food manufacturers add all three - we are hooked!

- When health concerns about salt, sugar, or fat in their products arise, food marketers respond by dialing back on one ingredient and then pumping up the other two!

- They advertise the new food line as “no sugar added,” “fat-free,” or “low-sodium.”

- These taglines attract new customers and lower “the guilt factor,” which helps keep the most loyal patrons, called “heavy users,” buying their products.

- Kraft American cheese singles: 200 mg sodium
- Kraft 2% American cheese singles: 220 mg sodium
- Haagen-Dazs Strawberry Ice Cream - 1 cup: 33 g fat, 44 g sugar
- Haagen-Dazs Wildberry Low-fat Frozen Yogurt: 4 g fat, 54 g sugar
Conclusion

- Salt, sugar and fat drive consumption by adding flavor and allure.
- But surprisingly, they also mask bitter flavors that develop in the manufacturing process.
- They enable these foods to sit in warehouses or on the grocery shelf for months.
- And, most critically to the industry's financial success, they are very inexpensive.

Conclusion

- The most alluring products--those with the highest amounts of salt, sugar and fat--are strategically placed at eye-level on the grocery shelf.
- You typically have to stoop down to find, say, plain oatmeal. (Healthier products are generally up high or down low.)
- Companies also play the better-nutrition card by plastering their packaging with terms like "all natural," "contains whole grains," "contains real fruit juice," and "lean," which belie the true contents of the products.
- Reading labels is not easy. Only since the 1990s have the manufacturers even been required to reveal the true salt, sugar, fat and caloric loads of their products, which are itemized in the "nutrient facts."
- But one game that many companies still play is to divide these numbers in half, or even thirds, by reporting this critical information per serving--which are typically tiny portions. In particular, they do this for cookies and chips, knowing that most people can't resist eating the entire three-serving bag. Check it out sometime. See how many "servings" that little bag of chips contains.
Conclusion

- It can be quite challenging to consume a healthy diet
- We live in an obesogenic environment perfectly designed to foster food addiction
- We have a food industry that is doing its best to maximize the hedonic value of the foods, to make them hyperpalatable, by tweaking the amount of sugar, fat and salt they contain
- Add in aggressive advertising and marketing and it becomes very difficult to resist temptation
- Some general steps to take to defend yourself against the onslaught of unhealthy foods:

  - **Lower your sweet threshold** by limiting your consumption of refined sugars
  - Choose **whole, quality carbohydrates** that are high in fiber and have a low glycemic load
  - **Eat less processed foods** - whole foods, or foods that typically list fewer ingredients on the label
  - Consume **less of a variety of highly processed foods** (variety promotes overeating)
  - Choose **higher quality fats** - monounsaturated and omega-3 fatty acids
  - Gradually **reduce your sodium intake**
  - Be aware that it takes a while - 8 to 12 weeks - for your taste buds to get used to a better quality diet
Conclusion

- It may not be easy in the beginning - **stick to it!**
- If we improve the quality of our diets and stay the course, we can **reset reward circuitry and create a hedonic shift**
- This means that, even though poor eating may have become a habit, if we practice better eating behaviors, we can essentially **rewire our brains** so that the **healthier behaviors become as natural and as pleasant as the unhealthier behaviors they are replacing**
- You might be surprised and somewhat relieved to find that foods that once held you captive are no longer all that appealing!!!!!!!!!!