

The Truth About Fat, Sugar, and Salt: The War for Your Taste buds



Courtesy of Maria Napoli

*Sometimes it is a battle
Everything looks delicious
I'm drawn to taste it all
I take a mindful moment
My mindless monster is silenced
I make a conscious choice*

(Napoli)

"I think we've made nutrition increasingly confusing. It's very hard to see what is real food. And I think we need to move back to a simpler time, where we're focused on eating real foods—fruits and vegetables and whole grains. It sounds so simple, but it's hard to do, because our behavior has become so conditioned and driven by fat, sugar, and salt that's loaded and layered into our foods, and our brains are constantly being bombarded with food cues."

—Dr. David Kessler, *The End of Overeating*

There is a war underway for your food preferences and eating habits. Much like modern combat, which is waged in stealth mode, the battle for your taste buds is insidious and covert. Food scientists and marketers spend nearly all of their waking hours finding ways to hijack your taste buds and drive you to consume highly processed, unhealthy food (1). Deliberately manipulating the formula of manufactured food products to cultivate taste preferences, this war is a battle for your spending dollars. Some argue it is a battle for your health, and even your life (2).

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Do you wonder why it is so hard to resist the allure of processed foods? Defined as foods that are packaged in boxes, cans, or bags, these foods need to be worked using machines and chemicals to be edible and are not found as in nature. In addition to going through many complex steps, processed foods often contain additives, artificial flavorings, and other chemical ingredients (3). They are impossible to resist. Exerting a powerful siren call, and designed to include just the right combination of fat, sugar, and salt, processed foods make us crave and seek more and more. We eat unconsciously; beyond the point of satiety, beyond fullness. We are engaged in a battle for our hearts and minds, since a diet of mostly processed, manufactured food is associated with poor health outcomes including obesity, Type 2 diabetes, cardiac heart disease, hypertension, and early death (4). The ability to resist the siren call of fake foods is literally a fight for our lives.

FAT, SUGAR, AND SALT IN THE "RIGHT" COMBINATION

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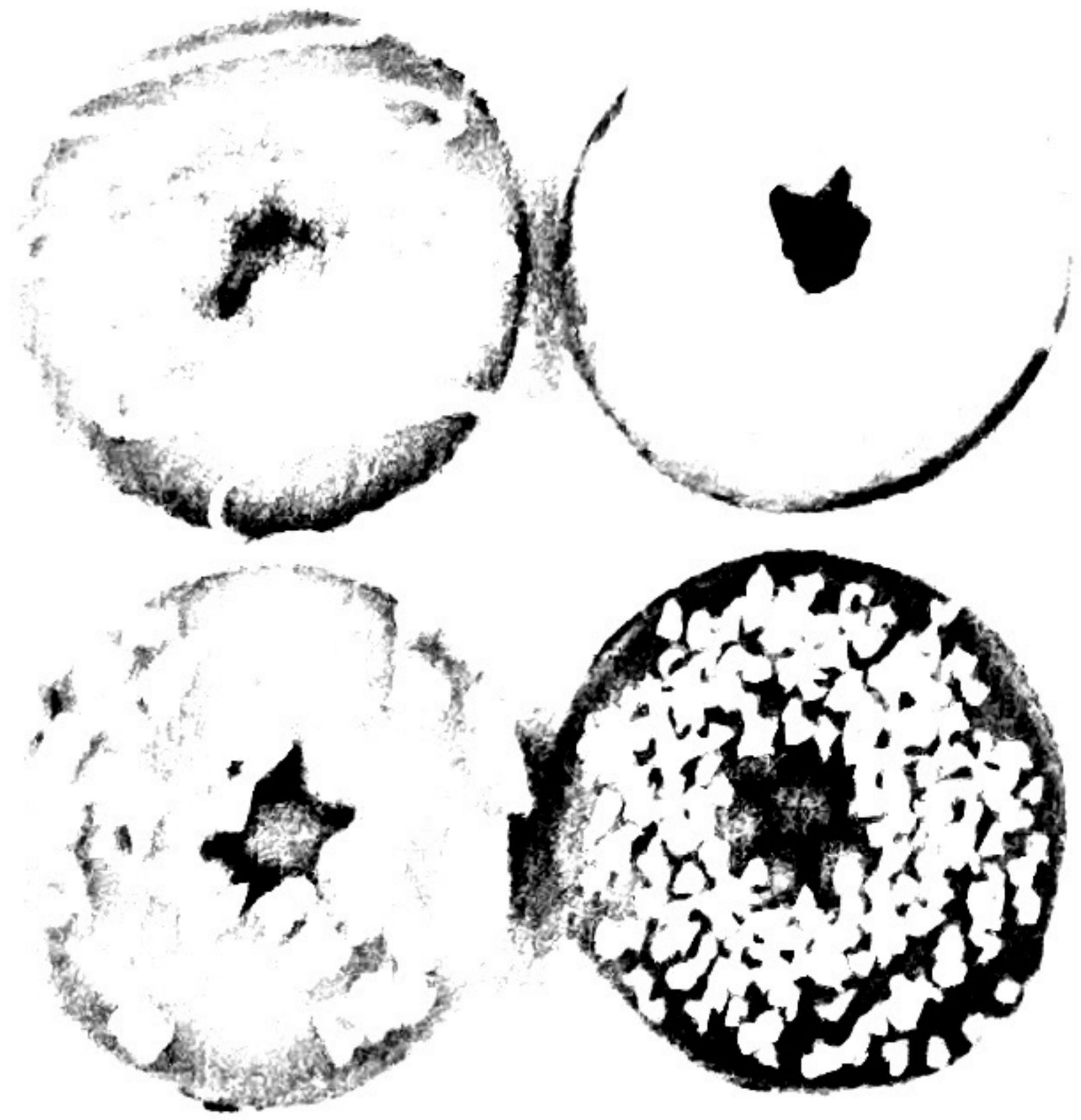


About two-thirds of adults in the United States are overweight (5). The number of overweight and obese children is also growing at an alarming rate. These trends have adverse consequences on health because obesity increases the risk of chronic diseases, notably diabetes, cardiovascular diseases, obstructive sleep apnea, and cancer (6). Obesity is also a major cause of disability and mental health issues (7) (including anxiety and depression) and may shorten lifespan (8).

Unraveling the factors underlying the rising incidence of obesity is complex, as we've seen in earlier chapters. The former chairman

of the Food and Drug Administration (FDA), Dr. David Kessler, has developed a theory worth considering: Modern foods, particularly American foods, are designed not to satisfy, but rather to stimulate the reward pathways in the brain, conditioning us to crave more food in a behavioral pattern he calls conditioned hypereating (9).

If we identify sugar, fat, and salt as the major culprits of modern (American) food responsible for heightening our appetites, inducing overeating, and causing excessive weight gain, we can explain why we have difficulty maintaining normal weight in a land of plentiful processed food. Kessler reminds us how sugar, fat, and salt activate neurons involved in taste perception, reward, and conscious control of eating. The key brain hormones involved are dopamine and opioids, which mediate the rewiring of brain circuits (10). It becomes easy to explain how eating in modern society no longer serves a primary function of satisfying hunger and replenishing energy stores. Rather, eating serves a hedonic (pleasure driven) role to satisfy our liking and wanting of food. Most of us eat out of habit instead of physiological need. This behavior is controlled by social, cultural, and other environmental cues.



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SPECIAL FOODS TO FEED OUR BRAINS— LEADING TO OVEREATING

To hijack our reward systems, the food industry has developed hyper stimulating foods, packaging and marketing them in ways that appeal to our altered brain chemistry (11). Processed foods are laden with sugar, fat, and salt; the list of ingredients is often misleading; and food texture has been altered to make it easier to eat faster. Examples of this in practice include potato chips, chopped-up meats, and cookies that are designed to manipulate the brain response and entice us to eat more. Following exposure to these hyper stimulating foods, some individuals simply cannot control their eating behavior.

PHYSICAL CRAVING AND FOOD ADDICTION

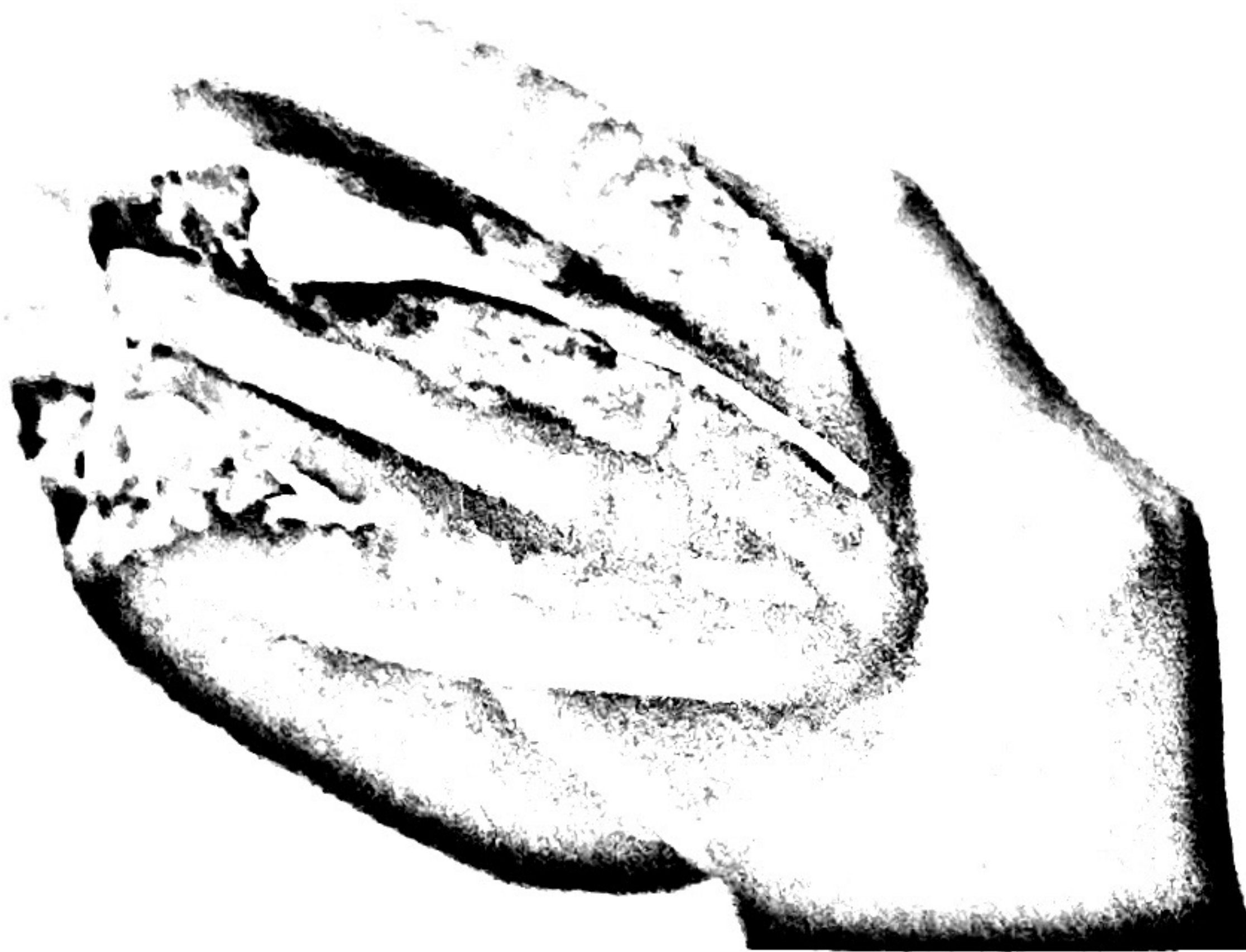
Craving and addiction researchers are turning their scientific attention to the study of food preferences and the desire to eat more and more. Beyond looking at ways we are deliberately manipulated into buying more food products through advertising and taste preferences, psychologists investigating binge eating disorder in the 1990s first suspected that the physical craving binge eaters report is a direct result of eating certain types of food (12). Researchers explained how physical craving describes an experience different from normal hunger. The addiction model of physical craving for certain foods suggests that a person eats a food, and then wants to eat more even though they had not expected to want more before they started eating. Or, the person eats food, and after a period of not eating it, has a stronger desire for the food even though by all objective standards they are “full”.

Many researchers have looked at specific components of processed food, especially salt, sugar, and fat to see if the addiction model can explain why we habitually overeat these ingredients. One study (13) gave rats a 25% sugar solution with rat chow for 12 hours, and then took away their chow for the next 12 hours. Repeating this pattern of excessive sugar intake, then deprivation, for a period of 30 days, their brains were



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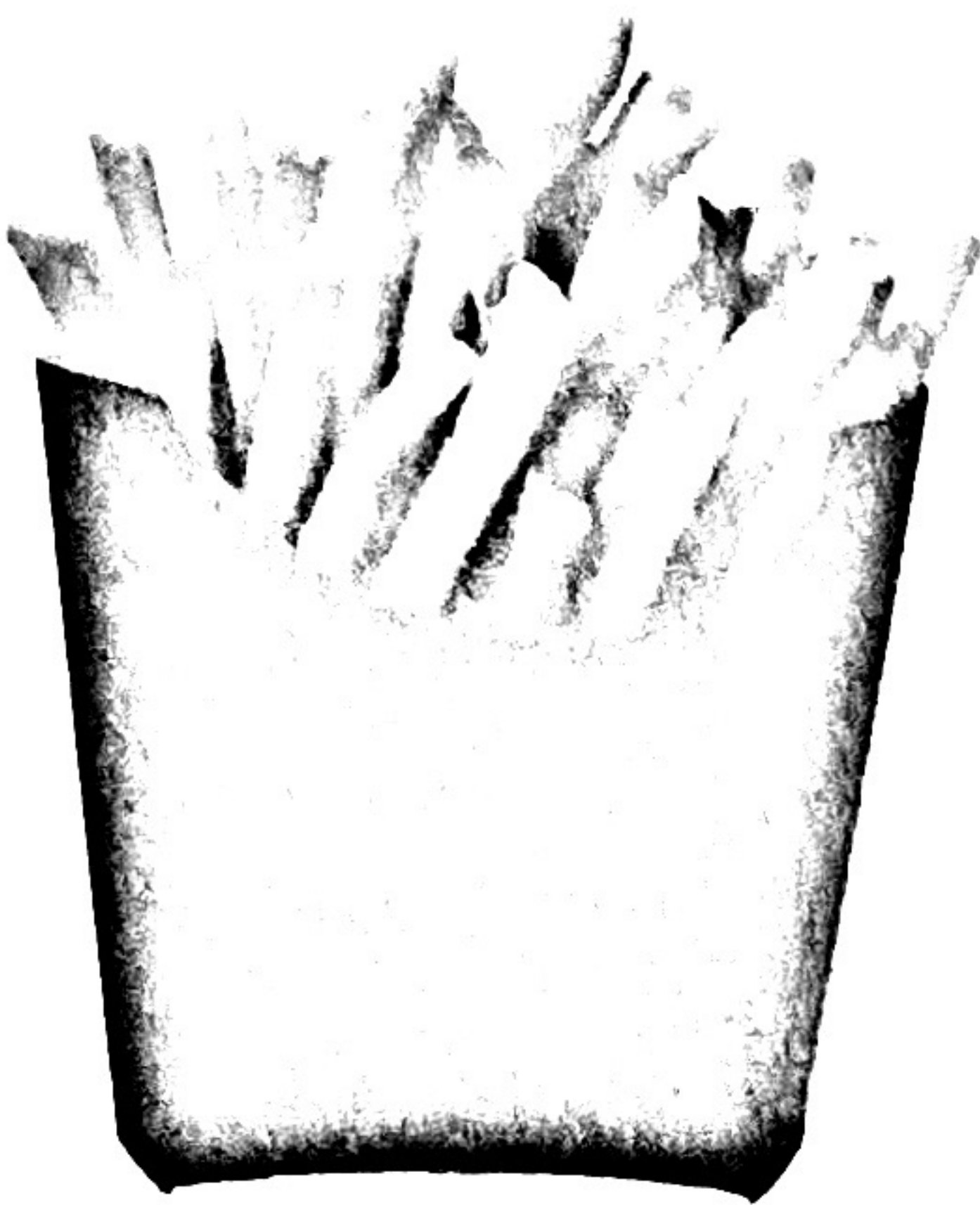
measured to see if their pleasure receptors in the brain showed any changes. Just like drug addiction, the rat brains showed desensitization in the pleasure centers following periods of excessive sugar intake, indicating a pattern seen with certain drugs of abuse. We know from this type of research that daily bingeing on sugar releases dopamine in the pleasure centers of our brains, and this binge pattern can drive us to consume more and more to get the same “pleasure” because we become desensitized to the “addictive” substance (in this case sugar, in other cases, drugs such as cocaine or opiates).

Hooked on Salt?

There is an American love affair with salt. According to many experts, including the American Heart Association (14), we eat too much of it. So much so that the FDA is thinking about limiting the amount of sodium in packaged foods.

Cutting back on sodium would almost certainly be good for the country’s health. The average American consumes nearly 50 % more sodium than experts recommend, most of it from processed foods (15).

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Though it adds flavor and helps preserve food, excess sodium can cause high blood pressure and increase the risk of heart attack, stroke, and other health problems. Even though sodium is found in nature, too much sodium added to our foods results in serious health consequences. Some of the problems include stiffening our arteries, so the heart has to pump harder and harder to circulate blood. The kidneys, whose job is to clean the body of excess compounds, including salt, have to work harder and harder and wear out. Even though the body has a beautiful design as a self-regulating machine engineered to perfectly balance our own levels of salt, it was never designed to handle the enormous amounts we eat, primarily because of processed and fast food.

WHY NOT JUST CUT BACK ON SALT?

Experts tell us that the American palate has become so accustomed to the high levels of sodium and salt added to our meals that the only way to kick the habit might be to wean ourselves off it slowly. If we stop using salt and go cold turkey, there is a significant change in the taste of the food. For most of us, taste is the most important reason why we eat something. If we lower sodium abruptly, food wouldn’t taste good.

HOW WE GOT HOOKED ON SODIUM

Along with sweet, sour, bitter, and umami (a Japanese word that roughly translates as “savory”), salt is one of the five basic tastes recognized by human taste buds. Just as some people have a sweet tooth and some don’t, some people crave that salty taste more than others.

Experts are still trying to untangle the factors that influence an individual’s appetite for saltiness.

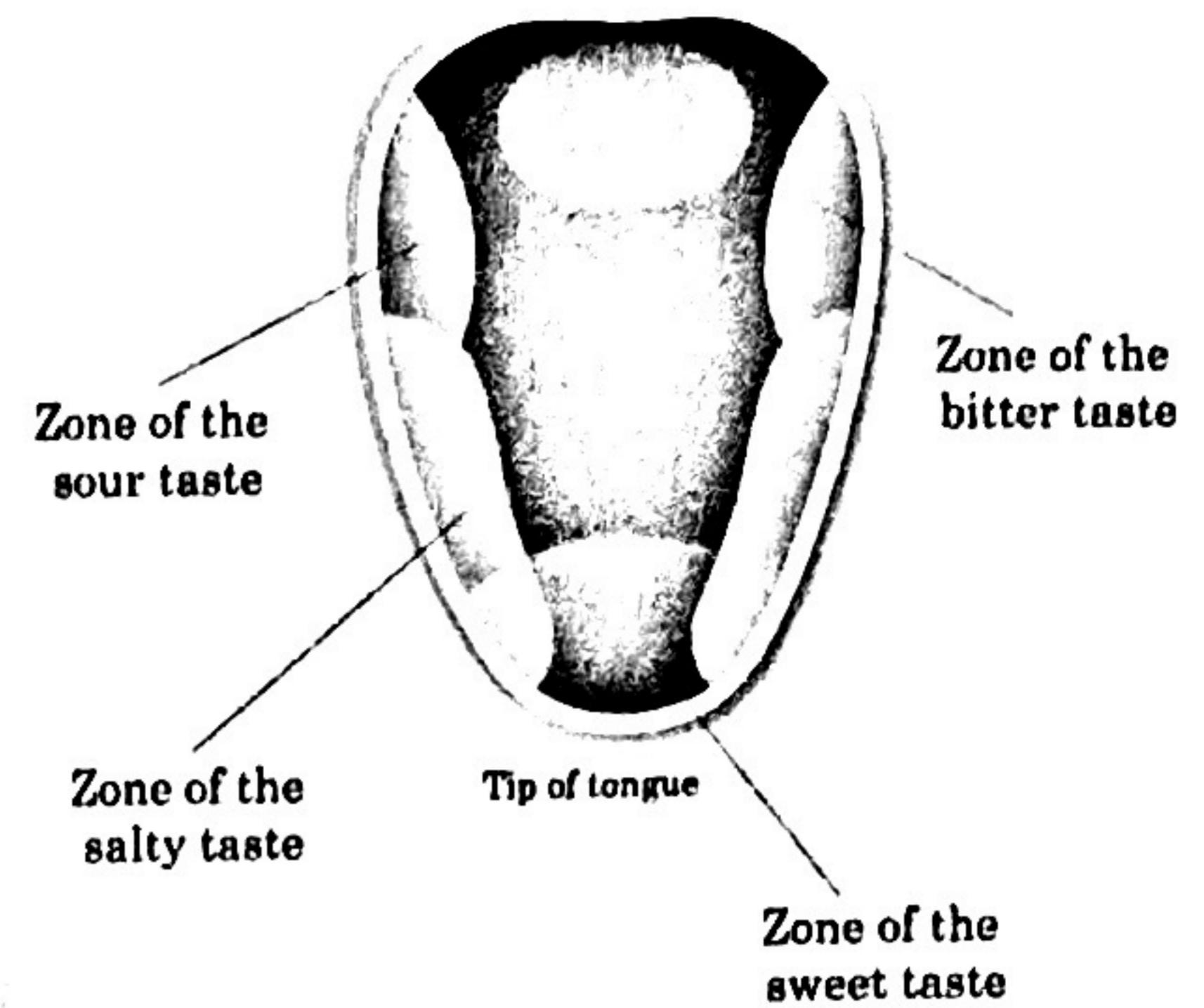
Some appear to be biological. Studies suggest that babies whose mothers suffer from morning sickness tend to have above-average salt appetites, because vomiting depletes sodium levels in the body (16). Other studies have explored whether individual preferences may be related to stress, anxiety, or even personality traits (17). Habit likely plays a much bigger role in salt preference (18). As with any of our eating habits, if we get accustomed to saltier food, we need to maintain that level to continue to enjoy our meals and feel satisfied.

The increasing levels of sodium in our diets—and especially in processed foods—over the past several decades have created what amounts to a “cultural addiction” to the taste of salt (19). However, just as we tend to get used to increased amounts of salt and sodium, we are also relatively quick to adjust to the taste of a diet lower in salt.

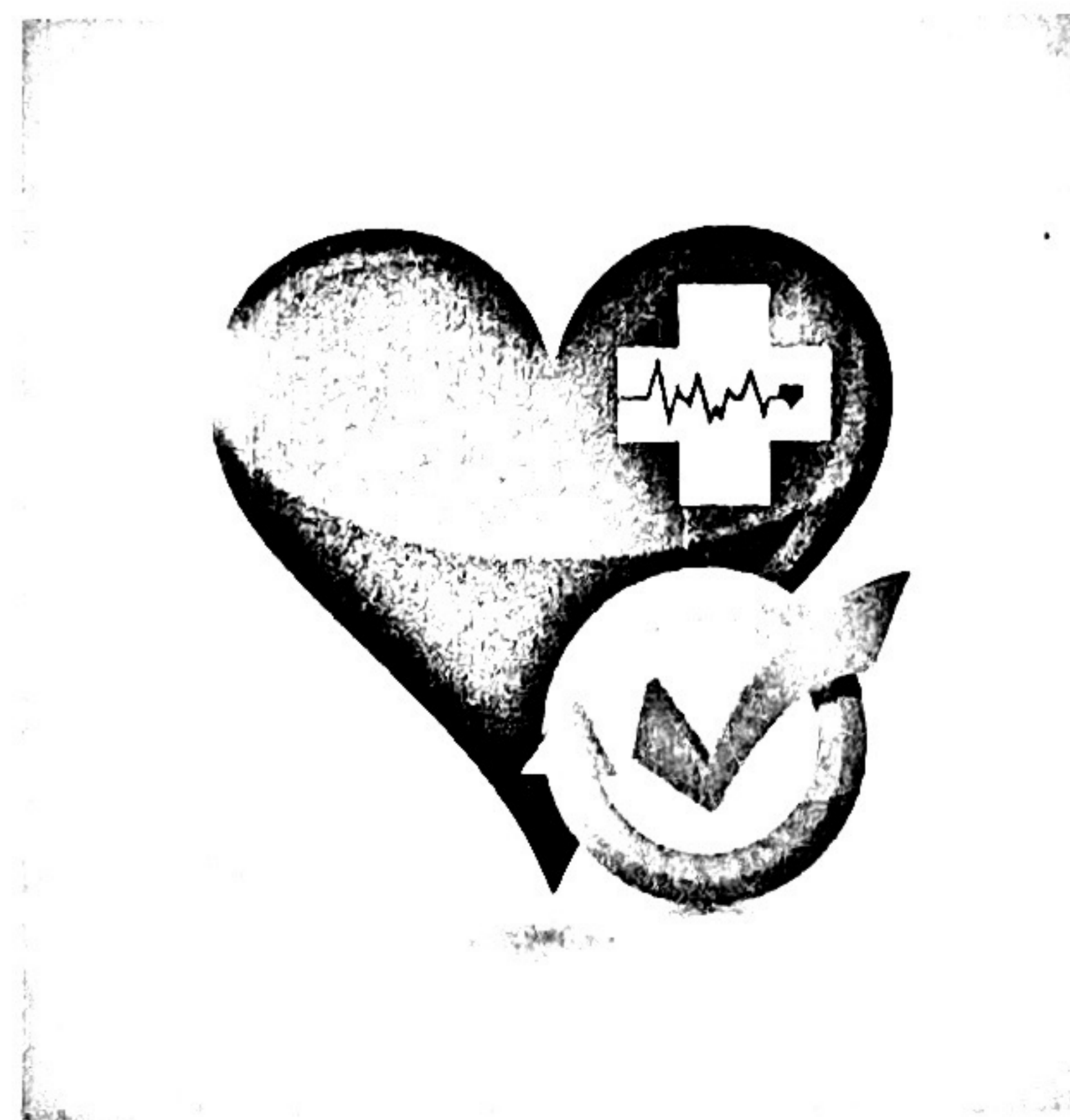
Studies show that people who switch to reduced-sodium diets develop a heightened sensitivity to saltiness within about 2 to 3 months, and therefore need less salt to get the same pleasure from their food (19).

More than three-quarters of our sodium intake comes from processed foods, while only about 6% comes from the saltshakers on our dinner tables (20). Even if you don’t add salt to your food, your intake of sodium is likely much higher than healthy if you eat processed or fast food.

Basic tastes



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Balancing Sodium and Potassium: Intake of salt and potassium must be in balance for both minerals to provide maximum health benefits

HEALTH BENEFITS OF SALT AND POTASSIUM

Salt provides two elements—sodium and chloride—both of which are essential for life. Your body cannot make these elements on its own, so you *must* get them from your diet.

The debate about the dangers of eating too much salt has gained a new wrinkle: A federal study suggests that the people most at risk are those who also get too little potassium (21). Potassium-rich foods, including fruits and vegetables, are recommended as a dietary defense against heart disease and other chronic illnesses. A research study looking at the relationship of salt, potassium, and heart disease deaths shows that if you have too much sodium and too little potassium, it’s worse than either on its own (22).

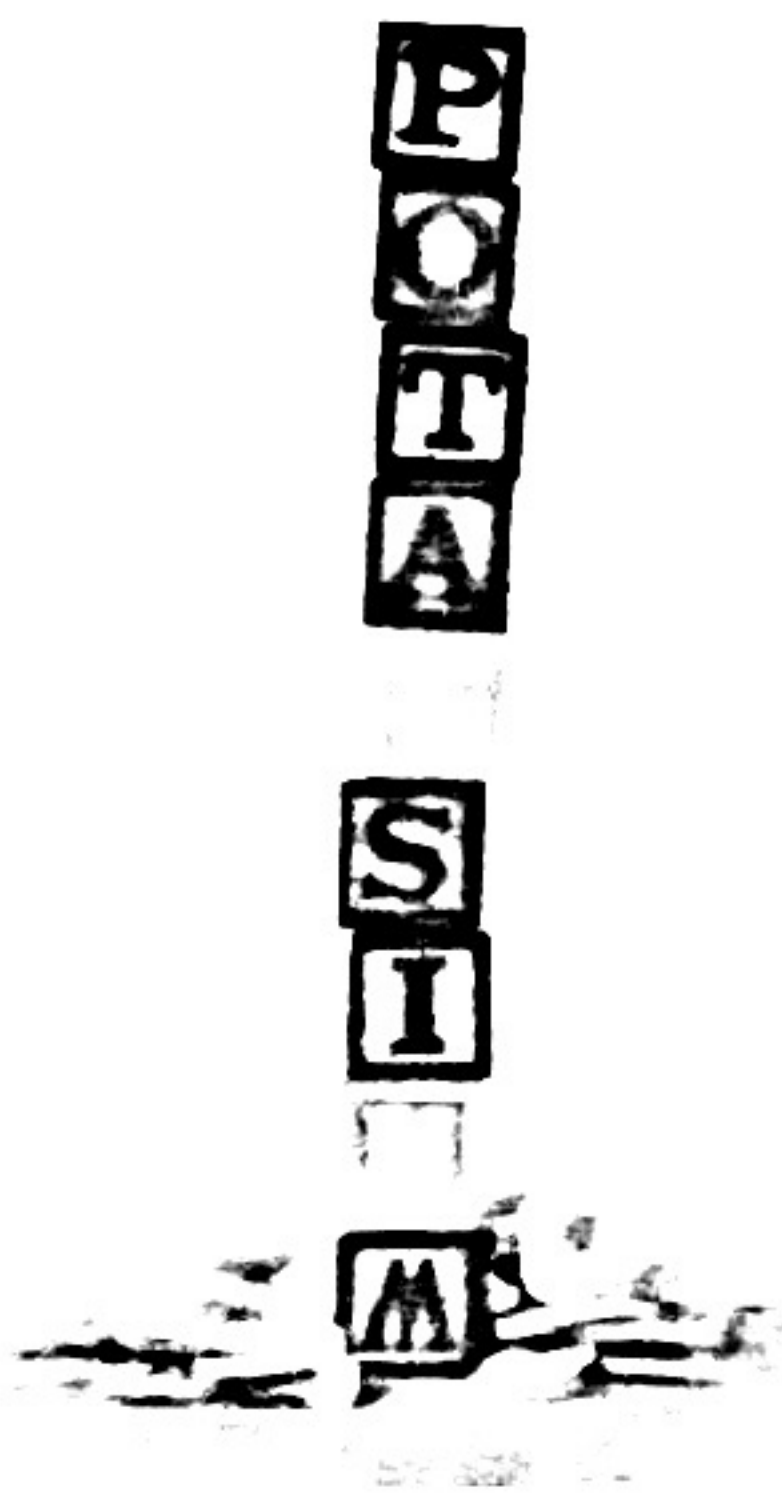
This is because potassium may neutralize the negative effects of salt, including the heart-damaging effects of too much salt in the diet. We know that sodium increases the risk of high blood pressure, a major cause of heart disease and stroke.

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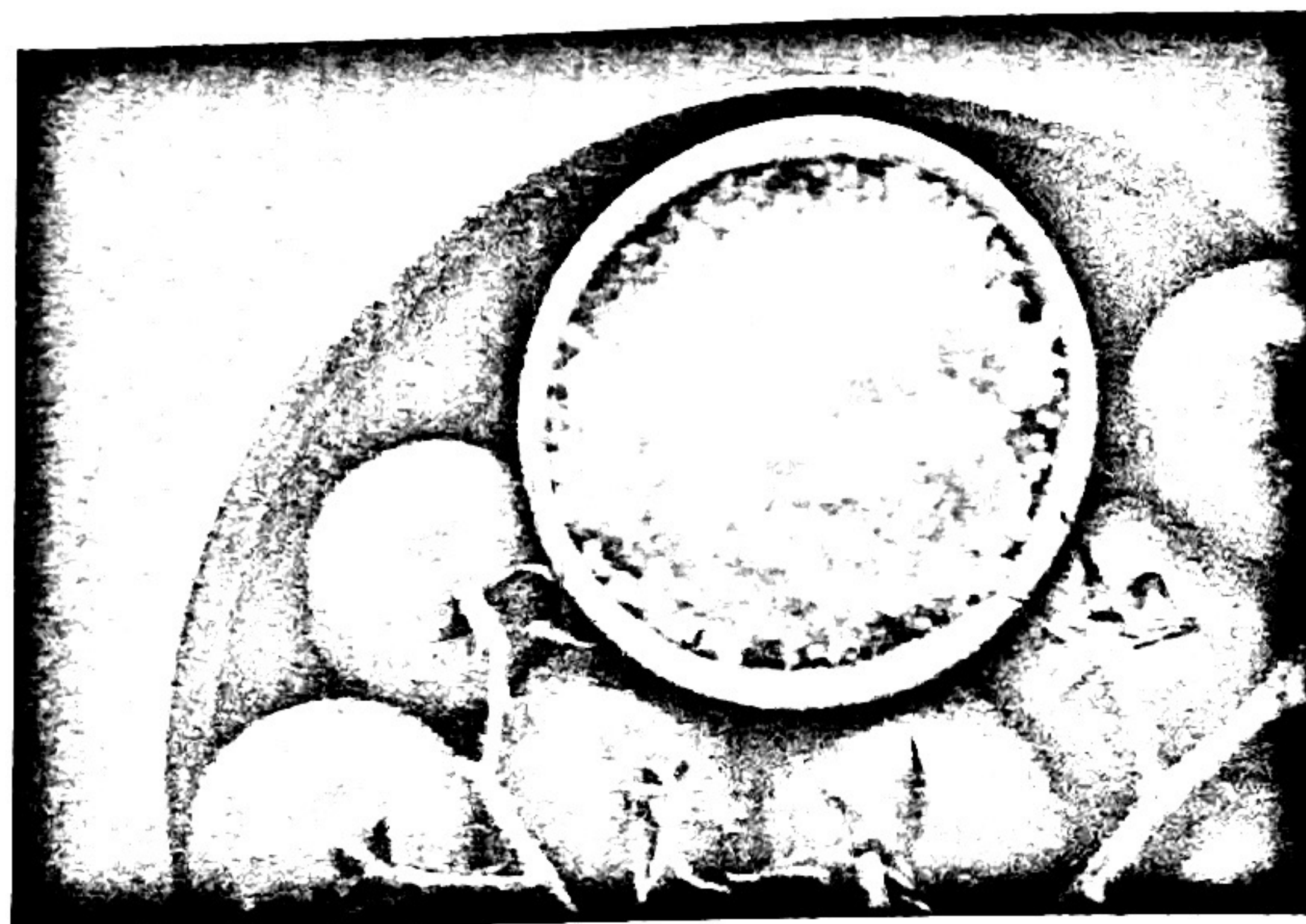


Study findings show that people who eat a lot of salt and very little potassium are more than twice as likely to die from a heart attack as those who ate about equal amounts of both (23). This imbalance of nutrients poses a greater risk than simply eating too much salt.

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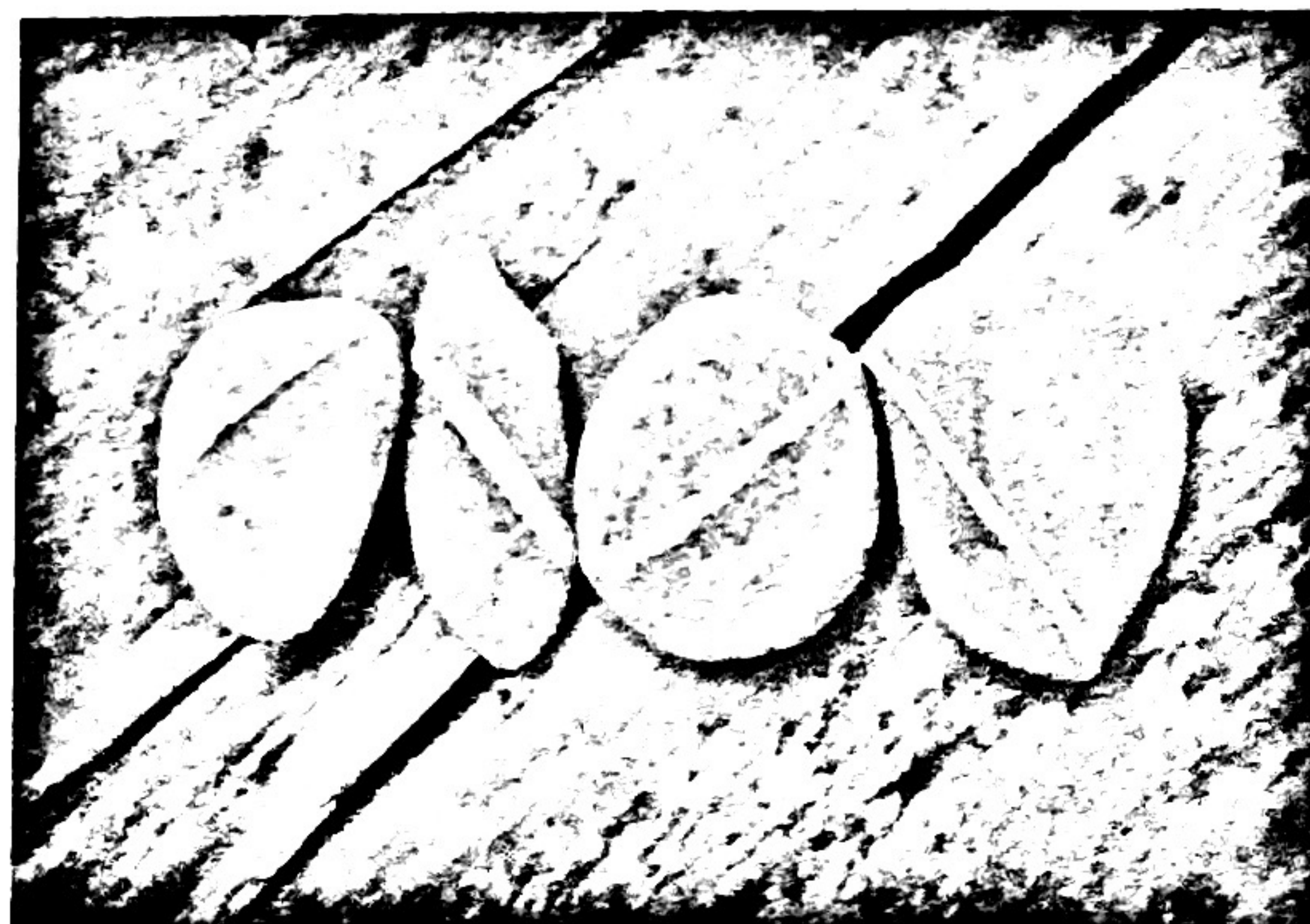


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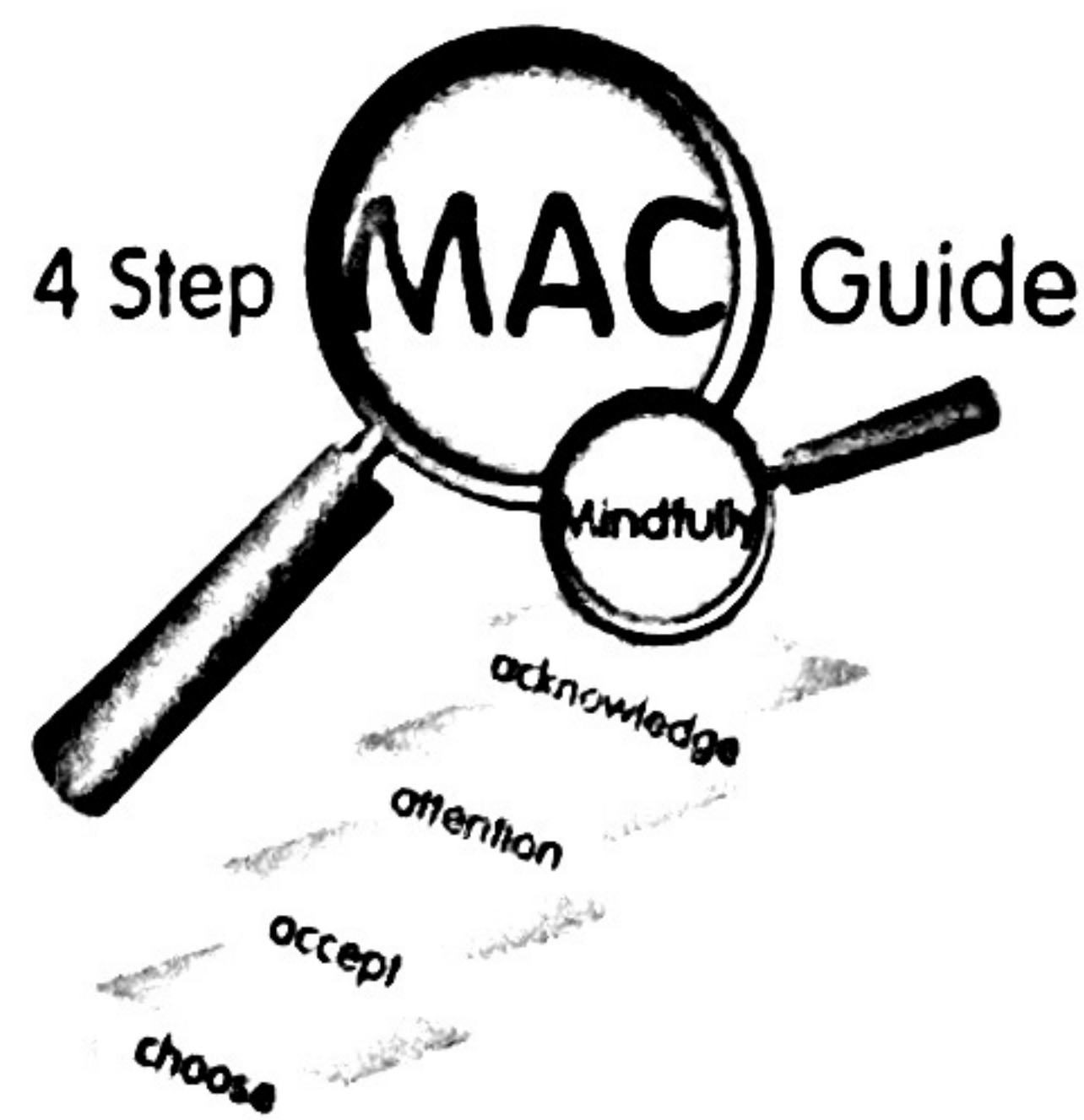


Isn't All This Just Confusing Crazy Talk?

Here's what matters: there is a tremendous amount of confusion about salt—how much is too much, whether or not going “cold turkey” with excess salt is satisfying, and how to take skillful action. One thing is certain: many of these confusing messages are coming from those who are hurt the most if we cut back on salt: the *food industry* (24). Their messaging machine is in high gear, making sure our confusion turns into passive inaction. Not held accountable for their actions, they endanger the lives of children and adults, hooking our taste buds and creating salt addicts for life, shortening our life spans. What's a mindful person to do?



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Mindfulness Matters: How It Helps

Know what matters. *Excess salt is harming the health of Americans.* The research is unequivocal and undeniable (25). *Most sources of salt in our diets come from processed foods and fast foods.* The research is clear: processed foods are designed to alter our taste buds, and habituate us to eat more and more in ways that change our brain chemistry (26).

Take skillful action. It is important to remember that there are vested interests in the battle for our taste buds—lobbyists and insiders for the food industry love to confuse us, keep us coming back for more and more. What is the simple answer to an addiction to salt? **Change your diet.** Eat a lot of fresh fruits, vegetables, and other potassium-rich foods, and eat less salty, processed foods. In my work as a Certified Nutritionist and a weight loss expert, I've encouraged hundreds, if not thousands of people over the past 25 years to change their diets and do just that. Guess what happens? Clients notice after just a few days that their taste buds adjust, and they notice the natural saltiness and sweetness in condiments available to season foods, especially when they eat a wide variety of whole fresh foods including herbs and seasonings. **Put away the saltshaker.** Health officials say no one should eat more than 2,300 milligrams of sodium a day, equal to about a teaspoon of salt (27). People with high blood pressure should eat much less. Just remembering that nearly 75% of the sodium in the typical American diet is in processed foods can help you take skillful action. **Limit, or eliminate, processed and fast foods** from your diet. When you consume them, if you can't eliminate them, make changes at other meals to compensate, choosing whole fresh foods, mostly plants, as a way to balance consumption of processed foods.

Eat a diet rich in potassium containing foods. Remember that potassium is essential to balance sodium intake, and a potassium deficiency can be harmful to your health (28). Potassium deficiency can result in electrolyte imbalances. Recommendations are to eat 4,700 milligrams a day. How to hit these numbers: again, eat sources of potassium-rich foods.

Some of the best sources of potassium are also the most delicious: try a cup of cooked white beans, which provide 561 milligrams per serving. One cup of cooked dark leafy greens, like spinach, provides over 800 milligrams per serving. A baked potato with skin is close to 1,000 milligrams, and even a medium banana provides over 400 milligrams.

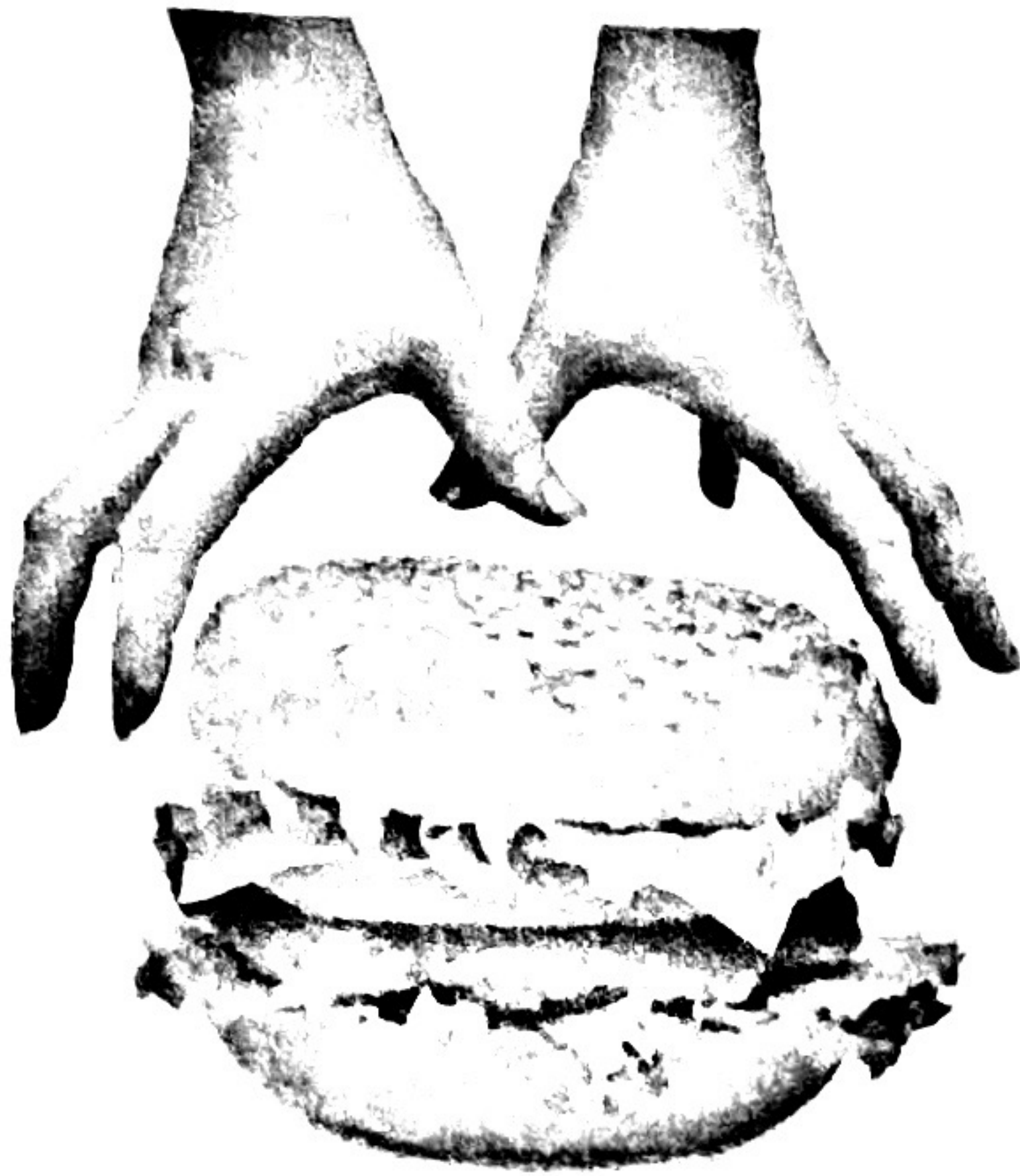


HOOKED ON FAT: THE AMERICAN LOVE STORY

Like many people, rats are happy to gorge themselves on tasty, high-fat treats. Bacon, sausage, chocolate, and even cheesecake quickly became favorites of laboratory rats that recently were given access to these human indulgences—so much so that the animals came to depend on high quantities to feel good, like drug users who need to up their intake to get high.

Researchers decided to see if rats' attraction to fat is connected to changes in the brain connected with neurochemical dependency (29). Many pleasurable behaviors—including eating, sex, and drug use—can trigger the release of dopamine, a feel-good neurotransmitter in the brain. This internal chemical reward

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increases the likelihood that the associated action will eventually become a habit through positive reinforcement conditioning. If activated by overeating, these neurochemical patterns can make the behavior tough to change. It is one explanation why researchers find most people who are overweight say, “I would like to control my weight and my eating,” but they find it very hard to control their food-related behavior.

Even though research shows a connection between overeating and habit-driven behavior, it has been unclear whether extreme overeating starts because of a chemical irregularity in the brain or if the behavior is changing the brain’s biochemical makeup. The rat study suggests that both conditions are possible.

To see just how overeating and obesity alters the brain’s reward center, they placed stimulating electrodes in the rats’ brains to monitor their changing reward levels. Some rats were given only one hour a day to freely feed on tasty, high-fat foods, and others had unlimited access (18 to 23 hours a day). All the rats, including a control group that was given no human food, had open access to water and standard, healthful lab rat chow. Researchers found that the rats with extended access to the high-fat foods ate little to none of their bland healthy rat chow and quickly grew obese—consuming about twice the amount of calories as the control, chow-only group. The researchers also found that even the rats with limited access to the unhealthful food were doing their best to keep up. These subjects managed, on average, to consume 66% of their daily calories over the course of the single hour per day in which they could eat the junk food, *developing a pattern of compulsive binge eating*. Only the obese rats with extended access to the bad food, however, had sharply increasing thresholds for reward levels.

CREATING OVEREATERS: HOW FOOD COMPANIES CONSPIRE TO HURT OUR HEALTH

“The food industry understands how to construct and develop food for optimal sensory stimulation and pleasure. Hedonics involves five factors: anticipation, visual appeal, aroma, taste and flavor, and texture, and mouthfeel. We now know that this involves activating certain parts of the brain.”

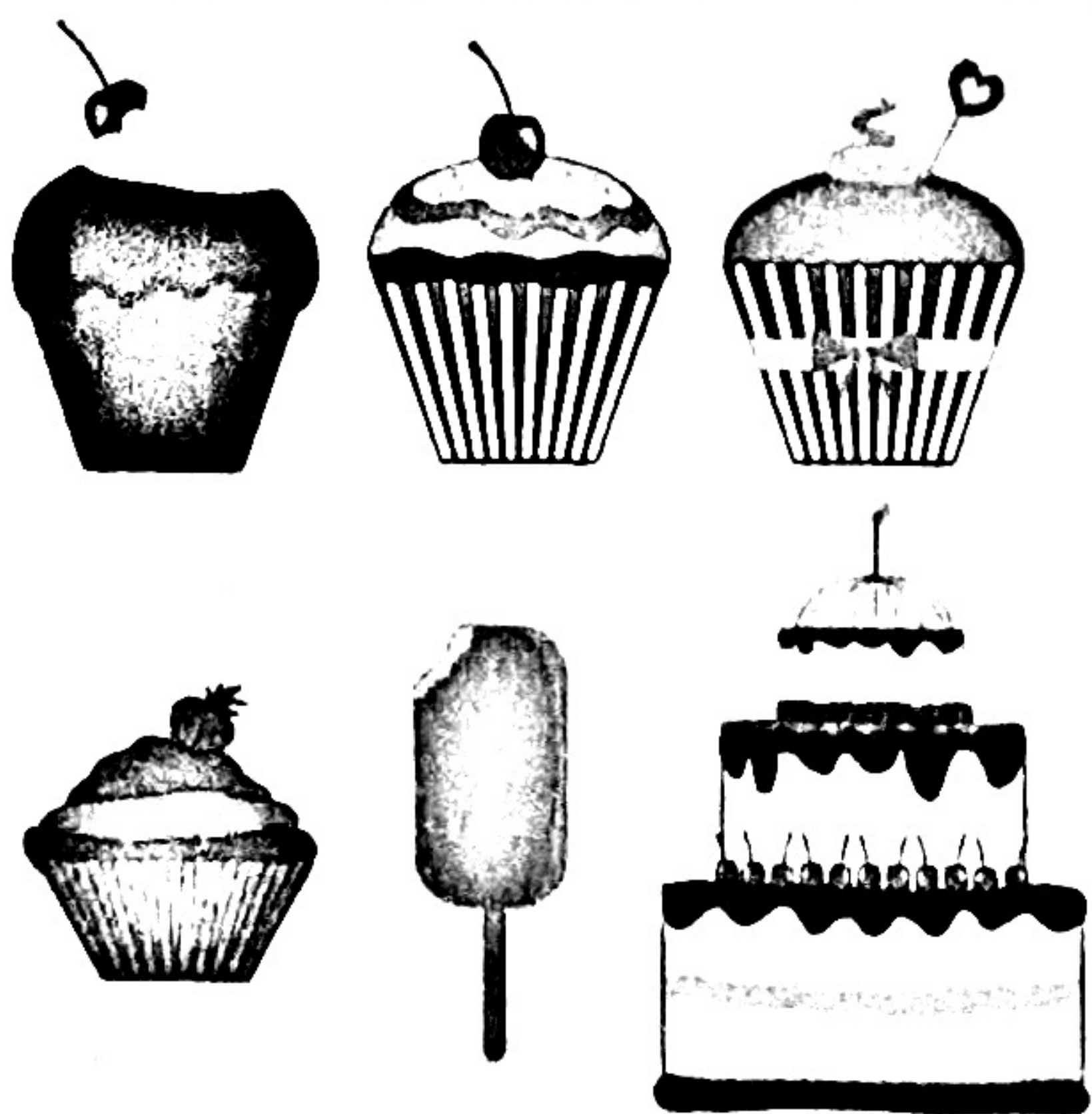
—Dr. David Kessler, *The End of Overeating*

It is no coincidence that so many people are obese, and despite widespread knowledge that it’s bad for you, many people continue to crave junk food. Junk food manufacturers know this and they use the science of nutrition to help capitalize on this fact. Food manufacturers work hard to create “feel-good food” made to include just the right combination of the sugar, fat, and salt our limbic brains love.

Writers have shared how food companies use manipulation of ingredients to create food that we can’t resist (30). There is even terminology to describe this process: words like pillar ingredients describe the key foundations of processed foods: fat, sugar, and salt. Other terms that relate to processed food include bliss point, which refers to the optimal combination and amount of the pillar ingredients; mouth feel, which is how food “feels” inside a consumers’ mouth; flavor burst, where salt crystals are altered scientifically to hijack our taste buds, encouraging overeating; and vanishing caloric density, when processed food melts in our mouths so quickly it overrides the normal process of satisfaction and satiety. We lose the signal from the brain to stop eating with certain foods that are high in fat.

David Kessler describes vanishing caloric density as adult baby food.

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"It starts with how many chews there are in a bite. If you take a stimulus and you get a sensory hit and it disappears, what do you do immediately next?"

You take another bite.

We're eating, in essence, adult baby food. Twenty years ago the average chews per bite was about 20, now it's two or three. The food goes down in a whoosh and it's very stimulating. It's layered and loaded with fat, sugar, and salt. It's as if you have a roller coaster going on in your mouth. You get stimulated, it disappears instantly and you reach for more." (31)

MINDFULNESS AND THE ABILITY TO CHANGE

Awareness is the first step of mindfulness. In any mindfulness practice, we notice how we feel, and without judgment, pay attention to the experience of feelings (32). Experts in overeating and food addiction suggest that **awareness is the first step** in breaking conditioned hypereating (33). It's no surprise this is the first step alcoholics take when beginning the change process. Once you understand that your brain is being activated, you can consider questions like, "how do I cool off the stimulus?" **Step number 2 is developing your own set of rules regarding overeating.** Kessler believes that it is not possible to try to eat a highly palatable food such as French fries, because it is impossible to stop. So, he suggests a rule to not eat them. In managing his personal issues with overeating, this has been a highly effective strategy. Interestingly, I've found the same types of rules work for me, too—there are just many foods I won't eat because of their ability to manipulate and hijack my taste buds. **Step number 3 is create structure around your eating.** Create a plan, know what you're going to eat, when you're going to eat it, and eat with a certain structure so you're not grabbing food constantly throughout the day. This way of creating boundaries is very helpful in controlling overeating. Boundaries and rules keep the brain in check. If I tell myself, "no French fries, ever," then I'm not tempted each time I drive past a fast food restaurant. It ends the dialog and allows me less anxiety, which means less suffering.

Step number 4 is eat in a planned way, which is peaceful. Chaotic eating patterns cause difficulty for our brains. Snacking constantly is simply a response to cues in the environment. If we eat every time we get a cue from the environment, we're eating all the time. Having a planned structure and routine with food settles this habit response to food stimulation, which is everywhere.

Avoid processed and junk food filled with salt, sugar, and fat. When we eat combinations of fat, sugar, and salt, our brain is being so highly activated, our working memories are preoccupied. We then do not sense the sensation of fullness. This creates habitual overeating. Keeping the hyper stimulation of the reward circuits of the brain calm helps to prevent overeating.

Change how you perceive food. If you look at a food item and say, "look how this is loaded and layered with fat, sugar, and salt; that's not my friend,"(34) we can find a way to end overeating. Changing our own emotional appraisal of food is a type of counter-conditioning that works. If we look at comfort foods such as chocolate cake and say "that's going to make me feel better" we only want it more. Changing for us the unchallenged narrative about these foods is a key. If we continuously seek to feel better through overeating highly palatable foods, we ultimately lose.

We can learn how to become aware of food ingredients and avoid cues that make us overeat. Noticing what ingredients are in processed food, we can shift in our perception of processed foods from a sense of comfort and pleasure to disgust and harm. Through self-education about processed foods and their health risks, we can learn how to understand our biological foibles and weaknesses with curiosity, compassion, and interest. Through the ability to pay attention without judgment, we open the doorway to a life of purposeful food choice and consumption, maximizing our health benefits and leaving a smaller environmental footprint.

A wonderful way to start the day is with a homemade drink that is healthful, easy to prepare, and nutritious. Filled with potassium, its natural sweetness from fruits and vegetables is undeniable. Enjoy with a slice of 100% whole-wheat toast and nut butter for a nutritionally balanced meal.



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The Green Goddess Smoothie

Serves 1

Ingredients

- 1 apple (cut in quarters)
- 1 pear (cut in quarters)
- 1 banana (break in two pieces)
- Juice of a lemon
- 1.5–2 cups of water (can substitute plant-based milk)
- ¼ cup chopped parsley
- 3 tablespoons fresh mint (chopped)
- 1–2 handfuls of fresh greens (any variety)

Place all ingredients in a blender. Blend until desired consistency. Enjoy right away, or save ½ of the drink for later in the day.

REFERENCES

1. Ahima, R. S. 2009. "The End of Overeating." *Journal of Clinical Investigation* 119 (10), pp. 2867–2867.
2. Myles, I. A. 2014. "Fast Food Fever: Reviewing the Impacts of the Western Diet on Immunity." *Nutrition Journal* 13, p. 61.
3. Jacob, A. "Processed Food Definition." [Webpage] *SF Gate Healthy Eating*. Available from: <http://healthyeating.sfgate.com/processed-food-definition-2074.html>.
4. BioMed Central Limited. 2013, March 7. "Processed Meat Linked to Premature Death, Large Study Finds." *ScienceDaily*. [February 27, 2015]. Retrieved from: www.sciencedaily.com/releases/2013/03/130306220950.htm.
5. Centers for Disease Control and Prevention. 2014. "Overweight and Obesity: Adult Obesity Facts." <http://www.cdc.gov/obesity/data/adult.html>.
6. Fontaine, K. R., and Barofsky, I. 2001. "Obesity and Health-Related Quality of Life." *Obesity Reviews* 2, pp. 173–182. doi: 10.1046/j.1467-789x.2001.00032.x.
7. Malnick, S., and Knobler, H. 2006. "The Medical Complications of Obesity." *QJM*, 99, pp. 565–579. doi: <http://dx.doi.org/10.1093/qjmed/hcl085>.
8. US Department of Health & Human Services. 2014. "NIH Study Finds Extreme Obesity May Shorten Life Expectancy up to 14 Years." *National Institutes of Health*. <http://www.nih.gov/news/health/jul2014/nci-08.htm>.
9. Kessler, D. 2009. *The End of Overeating: Taking Control of the Insatiable American Appetite*. New York, NY: Rodale.