



METABOLISM-U BLUEPRINT SERIES

BP-032

ULTRA-PROCESSED FOODS

Why Some Foods Are So Easy to Overeat—and Hard to Stop Eating

Understand the Food • Understand the Environment • Take Back Control

Metabolism-U Perspective

Obesity is not simply a failure of willpower. Eating behavior emerges from an interaction among human biology, food properties, learned behavior, the food environment, and individual susceptibility. Understanding how ultra-processed foods can influence eating may help us make more deliberate choices without demonizing food, or the people who make or eat it.

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Why This Blueprint Matters

Have you ever opened a bag of chips intending to eat a handful and suddenly realized the bag was nearly empty? Or walked past food you were not thinking about, saw the package, smelled it, heard an advertisement, and suddenly wanted it? Experiences like these are often interpreted as failures of discipline. But eating behavior is more complicated than willpower.

Human appetite evolved in a food environment very different from the one surrounding us today. Modern foods can combine concentrated energy, refined carbohydrates, added fats, salt, sweetness, appealing textures, rapid eating rates, convenience, large portions, and powerful sensory cues. Food is also inexpensive, portable, heavily promoted, and available almost everywhere. These characteristics can interact with appetite, reward, learning, habit, and individual susceptibility in ways that make passive overconsumption easier.

This does not mean that every ultra-processed food is unhealthy, that processing itself is inherently harmful, or that the food industry is responsible for every case of obesity. It does mean that understanding how food properties and the food environment influence what, when, how quickly, and how much we eat has become an important part of understanding obesity.

What Is an Ultra-Processed Food?

The NOVA classification system groups foods according to the nature, purpose, and extent of processing. Ultra-processed foods generally include industrial formulations made largely from refined ingredients, extracts, additives, flavorings, sweeteners, emulsifiers, or other components uncommon in ordinary home cooking. Common examples include many packaged snack foods, confectionery products, sweetened beverages, reconstituted meat products, and ready-to-eat meals.

But NOVA is a classification system, not a nutritional verdict on every individual food. Ultra-processed foods are heterogeneous. Some are high in calories, refined carbohydrate, fat, sodium, or added sugars; others may provide useful protein, fiber, vitamins, or minerals. The practical question is not simply whether a food has been processed, but what the processing has done to the food and how the resulting product affects eating behavior, nutritional quality, and overall health.⁸

Metabolism-U Insight

Processing is not automatically the problem. The more useful questions are: What did processing do to the food, and how does that food affect our eating behavior, weight, and overall health?

The Experiment That Changed the Conversation

In a landmark NIH inpatient randomized controlled trial, Kevin Hall and colleagues gave adults either an ultra-processed or unprocessed diet for two weeks at a time and allowed them to eat as much or as little as they wanted. The diets were designed to be similar in the calories, macronutrients, sugar, sodium, and fiber presented to participants. During the ultra-processed phase, participants spontaneously consumed about 500 more calories per day and gained weight; during the unprocessed phase, they lost weight.¹

That experiment did not prove that every ultra-processed food causes obesity or identify which characteristics of the diet produced the increased intake. It did demonstrate something important: under controlled conditions, participants spontaneously consumed substantially more energy from the ultra-processed dietary pattern.¹

Why Some Foods Are So Easy to Overeat

Calories are invisible to the senses. We experience food through volume, texture, taste, chewing, aroma, temperature, portion size, reward, fullness and even sound. A food can therefore deliver substantial energy before the signals that normally help terminate a meal fully catch up.

Texture, Eating Rate, and Energy Intake

Food texture matters because it affects how quickly we eat. Soft foods that require little chewing can often be consumed rapidly. Controlled trials increasingly show that slowing eating through food texture can reduce energy intake, including within diets composed largely of ultra-processed foods. A 2026 randomized crossover trial found that participants consumed approximately 369 fewer calories per day on a slower-eating ultra-processed diet than on a faster-eating ultra-processed diet, even though the diets were matched for several important characteristics.²

Energy Density and Portion Size

Energy density describes how many calories are packed into a given weight of food. Energy-dense foods provide more calories per unit of weight than less energy-dense foods. For example, one ounce of peanuts contains roughly 160 calories, whereas one ounce of apple contains roughly 15 calories. Portion size describes how much food is served or made available. For example, if one-half cup of cooked rice provides about 120 calories, one full cup provides about twice that amount. Controlled research shows that serving larger portions increases food and energy intake in adults, while portion size and energy density can independently and additively influence energy intake.⁹ In practical terms, a large portion of a calorie-dense food can deliver substantial energy before fullness becomes a strong enough signal to stop eating. Think of a festive meal served during a holiday.

Palatability and Highly Rewarding Food

Researchers have also studied foods containing particular combinations of fat, simple sugars or refined carbohydrate, and sodium. Some investigators use the term “hyper-palatable foods” for products meeting predefined combinations of these nutrients.³ Hyper-palatable and ultra-processed are not synonymous, and palatability is not inherently harmful. But foods that are intensely rewarding, easy to eat quickly, and readily available can create an environment in which repeated intake becomes easier. It’s not hard to imagine sitting in front of the television, watching a good movie late at night, and before you know it, the entire bag of hyper-palatable, ultra-processed, calorie-dense potato crisps has been devoured.

A Useful Distinction

Hunger is a biological drive for energy. Satiety helps end a meal. Satiety helps delay the next one. Craving is a desire for a particular food. These states can overlap, but they are not the same thing.

Can Food Become Addictive?

This is one of the most debated areas of obesity science. Research using the Yale Food Addiction Scale has identified addiction-like patterns of eating characterized by craving, loss of control, continued intake despite negative consequences, and clinically meaningful impairment. Highly processed foods rich in refined carbohydrates and/or added fats are frequently implicated in research on these addiction-like eating patterns.⁴

The evidence is important, but the terminology requires care. Food addiction is not currently a standalone diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-5-TR), a standard diagnostic reference used in psychiatry. Researchers continue to debate whether the phenomenon is best understood as a substance-like addiction, a behavioral addiction, compulsive eating, or overlapping processes. Not everyone who enjoys highly rewarding food is addicted, and obesity itself does not establish food addiction. Regardless of how the phenomenon is ultimately classified, many people report strong cravings for particular foods, including some energy-dense, ultra-processed foods.¹⁰

The Food Environment Is Eating With You

Eating decisions do not begin at the first bite. They begin with exposure, or even thoughts. Food cues can trigger attention, expectation, craving, and learned responses before a person is physiologically hungry. A meta-analysis of food-cue reactivity found that cravings and cue responses predicted eating and weight-related outcomes, with visual food cues producing meaningful effects.⁵

This helps explain why wanting to eat is not always the same biological state as needing energy. Repeated pairings among certain foods, locations, activities, emotions, advertising, or routines can become learned cues. For me, I wake up in the morning and the first thing I think about is breakfast, regardless of whether I am hungry. Television at night, driving past a familiar restaurant, opening a delivery app, or simply seeing food on the counter may become part of an automatic eating sequence.

Marketing Can Influence Choice—Without Becoming a Conspiracy

Food companies operate in competitive markets. Like other businesses, they use product formulation, packaging, pricing, placement, branding, convenience, promotion, and advertising to influence attention, preference, purchase, and repeat purchase. Research in marketing and behavioral science shows that these factors can affect food choice and consumption.¹¹ That is different from claiming that companies intentionally cause obesity or that any particular product was created to produce addiction.

For Metabolism-U, the important point is environmental rather than accusatory: food choices are made inside systems designed to compete for our attention. Understanding that fact can help us become more deliberate consumers. If I see a commercial advertising a pizza, I’m ready to place the order—extra-large, cheese and mushroom, please.

Sonic Branding: Marketing Science, Not Biological Science

The food environment even has a soundtrack. Sonic branding uses distinctive sounds, music, audio signatures, and repeated auditory cues to strengthen brand recognition, memory, and expectations. Experimental marketing research suggests that characteristics of sonic logos can influence how consumers perceive food products—for example, whether a product seems more or less healthful.⁶

Sonic branding belongs primarily to marketing science, not biological science. Evidence does not establish that a sound logo directly alters metabolism or causes obesity. Its relevance is that hunger is not the only influence on food choice: sight, sound, memory, familiarity, convenience, and learned associations can all shape what we want.

Metabolism-U Insight
Your environment can create a desire to eat before your body creates a need to eat.

Why Willpower Alone Is an Incomplete Strategy

Self-control matters, but relying on self-control at every eating decision is inefficient. A person who repeatedly encounters highly rewarding food, large portions, visual cues, stress, inadequate sleep, hunger, easy delivery, and habitual routines must continually override those influences. Changing the environment can reduce the number of battles that require conscious restraint. Over the years I have developed personal strategies that reduce how much I have to rely on willpower. For example, before going to a restaurant I will check its menu online and decide what I will order before I ever arrive. The goal is to recognize influences that often operate automatically and arrange the environment so that the easier choice more often supports the life and health we want. One practical strategy is to remove many of the highly energy-dense, ultra-processed foods that are personally difficult to regulate from your immediate living environment and replace them with foods that are less energy-dense and less refined.

From Automatic Eating to Intentional Eating

The answer is not to fear food, pursue dietary perfection, or prohibit every ultra-processed product. I use whey isolate protein powder regularly—an example of why the degree of processing alone does not determine whether a food is useful or appropriate in an individual diet. A more sustainable strategy is to reduce the degree to which highly rewarding, calorie-dense foods dominate the diet while increasing access to foods that provide protein, fiber, water, volume, texture, and nutritional value.

The Metabolism-U REGAIN CONTROL Framework

RECOGNIZE	Identify the foods, places, times, emotions, advertisements, routines, and situations that reliably trigger automatic eating.
REDUCE	Decrease routine exposure to foods you personally find difficult to regulate. Less visibility and availability often means fewer decisions.

RESTRUCTURE	Make the desired choice convenient: organize the kitchen, workplace, shopping routine, portions, and meal plan around foods that support your goals.
REPLACE	Do not rely only on removal. Replace highly rewarding defaults with satisfying alternatives that provide protein, fiber, volume, and nutritional quality.
RELEARN	Practice separating hunger from craving and habit. Eat more slowly, notice satiation, and allow repeated healthier routines to become familiar.
REGAIN CONTROL	Use the environment to support intentional choices rather than requiring willpower to defeat the same cue repeatedly.

Obesity Is Not Caused by One Thing

Ultra-processed foods are one part of a much larger system. Genetics, appetite biology, previous body weight, sleep, stress, medications, physical activity, socioeconomic conditions, food access, mental health, learned behavior, and individual susceptibility can all influence weight. Two people can live in the same food environment and respond differently.

Population studies consistently associate higher intake of ultra-processed foods with obesity and several adverse health outcomes, but most of those studies are observational and cannot by themselves prove causation. A 2024 umbrella review found broad associations across multiple health outcomes while also showing that certainty varies considerably across outcomes.⁷ Controlled feeding studies provide stronger causal evidence for short-term energy intake and weight change, but they do not justify blaming one food category for every case of obesity.

Practical Takeaways

Start with patterns rather than labels. Ask which foods you tend to eat rapidly, beyond fullness, or without intending to eat. Notice whether large packages, delivery apps, television, driving, stress, boredom, or particular times of day reliably trigger intake. Keep highly satisfying whole and minimally processed foods convenient. Portion foods before eating rather than relying on the package to signal when to stop. Eat slowly enough to notice satiation. And when a food repeatedly produces loss of control, changing its availability may be more effective than repeatedly testing your willpower.

If eating feels compulsive, produces significant distress, involves binge episodes, or repeatedly feels outside your control, the solution should not automatically be stricter dieting. Eating disorders and clinically significant compulsive eating deserve appropriate professional evaluation.

Final Thoughts

The lesson of ultra-processed food is not that humans have suddenly become weak. It is that the environment in which we make food decisions has become extraordinarily powerful. Some foods can be consumed quickly, deliver substantial energy, provide strong reward, arrive in large portions, and be surrounded by cues that encourage repeated consumption.

Understanding those influences gives us something more useful than blame. We may not control the entire food environment, but we can learn how it influences us and redesign the environment immediately around us. The goal is not perfect eating. The goal is more intentional eating, and greater control over the trajectory of our health.

**Better Metabolism – Stronger Body – More Independent You.
ABOVE ALL — NEVER SETTLE.**

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