What's to blame for the surge in super-size Americans?

It's no one thing, but researchers increasingly point to an alarming, potentially deadly, combination of fast-food culture and biological susceptibility.

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It's a little hard to grasp, but the majority of us--about 65 percent, according to current government estimates--are obese or overweight. Compare that with 1960, when only 45 percent of Americans fell into those categories and proportionally far fewer were obese.

What's happened? Is it overindulgence--too much Ben & Jerry's and too little exercise? Maybe. But science is finding it's not so simple. In a special section of the Feb. 7, 2003, issue of Science (Vol. 299, No. 5608), some of the nation's top obesity experts agreed that multiple, complex factors--environmental, biological and genetic--make losing and even maintaining weight in today's environment an uphill battle.

"When you look at the big picture, there is really a mismatch between our physiology and our environment," says physiological psychologist and obesity expert James O. Hill, PhD, of the University of Colorado Health Sciences Center, who wrote one of the articles featured in Science.

"We have an environment that provides food everywhere--it's inexpensive, good-tasting and served in large portions--and we have a physiology that says, 'Eat whenever food's available,'" Hill says.

Other environmental factors related to a lack of physical activity, such as sit-down jobs with ever-longer hours, further increase the odds we'll put on pounds, he says.

Those extra pounds, as amply noted by the media, can lead to diabetes, stroke, heart attacks and other debilitating conditions, and such problems associated with obesity now cost the health-care system an estimated $117 billion per year. While solutions to the problem differ and much remains to be proven, there's already enough information to tackle the problem with vigor, psychologists concur (see articles, pages [52](http://www.apa.org/monitor/jan04/bringing.aspx) and [56](http://www.apa.org/monitor/jan04/teaming.aspx)).

**Environmental causes?**

Scientists of all stripes now agree that environmental factors such as easy access to junk food, sedentary jobs and high stress rates--once considered a radical and even ridiculous proposition by some--play a major role in the obesity epidemic.

"I think we can make the case that the epidemic is environmental in origin," says nutritional biochemist and pediatric expert William H. Dietz, MD, PhD, director of the Division of Nutrition and Physical Activity at the U.S. Centers for Disease Control and Prevention (CDC). "What we can't be very specific about is which of those environmental factors is most virulent." Data on direct cause and effect are still pretty scarce, he notes, and besides, many factors are probably at play.

Indeed, says Yale University psychologist Kelly Brownell, PhD, an internationally known obesity expert who was the first to finger environmental causes for the epidemic, you could take almost any facet of modern life and find a possible culprit.

His villain of choice is the food industry. In his new book, "Food Fight: The Inside Story of the Food Industry, America's Obesity Crisis and What We Can Do About It" (McGraw-Hill, 2003), Brownell cites several factors he thinks give the convenience-food industry an edge in the fight for consumers' taste buds. Unhealthy foods, he argues, are accessible, convenient, engineered with fat and sugar to be tasty, heavily promoted and cheap. By contrast, healthy foods are less accessible, less convenient, less tasty, not promoted and more expensive.

"If you came down from Mars and didn't know anything about our country but those factors, you'd predict an epidemic of obesity," as he puts it.

Other features of the food business promote weight gain, too, Brownell maintains. More people are eating out than ever, and restaurant food tends to be higher in fat and calories and served in bigger portions than meals made at home. In addition, while research shows that people tend to eat the amount put in front of them, food manufacturers compete with one another to offer ever-larger sizes of low-cost, calorie-laden foods like french fries and soft drinks ([see page 50](http://www.apa.org/monitor/jan04/family.aspx)).

Other researchers are looking at how unhealthy eating may pair with other modern habits, such as television-viewing. CDC's Dietz began looking at the association in children 15 years ago, and others have since picked up the ball, finding what Dietz calls "a clear and significant association between TV-viewing and obesity in kids," and, in some cases, adults. What's not clear, Dietz says--and is an example of the cause-and-effect conundrum--is whether the relationship exists because TV-viewing promotes greater food intake, or because it represents sedentary time that children would otherwise spend being active.

Stanford University pediatric specialist Thomas N. Robinson, MD, is testing these variables, and in a still-unpublished study, shows that youngsters consume about 25 percent of their daily food in front of the television. When they decrease their viewing time, he posits, they eat less.

**Enter the beer belly**

Researchers also are looking at eating habits and obesity in relation to another modern ill: stress. In the November issue of Health Psychology (Vol. 22, No. 6), Debbie Ng, then a graduate student at the University of Minnesota and now at the Fred Hutchinson Cancer Research Center in Seattle, and University of Minnesota psychology professor Robert Jeffery, PhD, examined self-report data from 12,110 mostly white, middle-aged workers employed in a range of settings who took part in an earlier smoking-cessation program at 26 work sites in the Minneapolis and St. Paul, Minn., area.

Those reporting higher levels of stress--measured on a four-item scale asking how often in the past month they'd felt difficulties piling up and getting out of control, for example--also said they ate less healthy, fattier diets and exercised less often than those reporting less stress, the team found. (Stressed workers also reported smoking more.) The study is one of the largest to date to show these associations, Jeffery notes, and adds to research demonstrating that stress and poor health outcomes are often mediated by other factors, such as unhealthy eating habits.

Another new study--lauded as groundbreaking by many scientists--provides a possible biological explanation and working model for why people may eat fattier foods when under chronic stress. The study, by neuroscientist Mary Dallman, PhD, of the University of California, San Francisco, and colleagues, also suggests why stress eaters may initially gain weight in the abdomen.

The research, reported in the Sept. 30, 2003 online, early edition of the Proceedings of the National Academy of Sciences (Vol. 100, No. 20), compared rats placed under chronic stress by physical restraint or exposure to cold with rats under acute stress and those not stressed at all. Chronically stressed rats chose fattier, more sugary diets, gained weight in their bellies and became calmer as a result. It also points to likely hormonal underpinnings of those behaviors--essentially, that chronic stress activates a particular negative hormonal feedback system in rats' brains that's aborted when the animals eat high-fat food and gain belly fat.

"The research strongly suggests that eating high-carbohydrate and high-fat diets increased abdominal fat in these rats," says Dallman. "That, in, turn, reduced the brain's drive to activate the chronic stress response system."

The reason weight goes to the belly rather than elsewhere, Dallman posits, is that belly-fat cells host more steroid receptors than subcutaneous fat cells, allowing fat to move quickly to the liver and be converted to energy.

"The belly is a wonderful depot, as long as you don't overdo it," Dallman says. "If you do overdo it, it gets you into all kinds of trouble--the kinds of problems doctors worry about when they see patients who have a 'gut,'" she notes.

**The gene factor**

Others are examining genetic reasons why some of us may be more prone to weight gain than others, given the same environmental influences.

Neurobiologist Sarah Leibowitz, PhD, of Rockefeller University, has been studying strains of rats that are prone or resistant to obesity. Some of the rats are genetically engineered, or inbred, while others represent natural variation, called outbred. While she studies obesity-proneness in both strains, Leibowitz says she is "particularly eager to detect predictive markers in the outbred animals because they mimic the human population." About 30 percent show a strong propensity toward obesity, she says.

Obesity-prone rats of both types, she is finding, have different endocrine responses to eating than resistant rats. These responses are associated with disturbances in gene expression in the brain, she is finding, and also predict long-term weight gain.

Over time, Leibowitz says, she'd like to define markers of gene expression in obesity-prone rats while they're still of normal weight, to help predict future weight gain and to design interventions accordingly. "The understanding of such markers could eventually help us target these kinds of systems in people at an early age," she explains.

Related to these findings, a November study reported in the new online journal PLoS Biology ([www.plosbiology.org](http://www.plosbiology.org/)) by French researcher Philippe Froguel and colleagues shows that obese people harbor a different form of a chromosome 10 gene, GAD2, than their non-obese relatives. The researchers hypothesize that having the gene variant may increase the amount of the neurotransmitter GABA--known to stimulate appetite--in the hypothalamus of the obese subjects.

The two findings square with general scientific wisdom on the topic, which holds that genes may influence different people's susceptibility to obesity and overweight, says CDC's Dietz. Some studies, in fact, suggest that as much as 50 percent of the population may be so prone, he says.

**What to do?**

Given the apparent difficulty of knocking weight off, especially for some of us, what's to be done?

Individual and group interventions are one solution, and a number boast intriguing success (see articles, pages 52 and 56). Other proposed fixes include wide-scale public health and policy interventions. State legislatures introduced about 150 bills last year related to the topic, and federal legislators are jumping on the bandwagon as well. In November, Rep. Rosa L. DeLauro (D-Conn.) and Sen. Tom Harkin (D-Iowa) introduced companion bills in the House and Senate that would extend nutrition labeling beyond packaged foods to include foods at fast-food and other chain restaurants. (Groups like the Center for Consumer Freedom are proposing countervailing legislation that would ban obesity-related lawsuits against restaurants.)

Brownell says such legislative hardball is a good solution: Food companies that create unhealthy food products and use aggressive or underhanded means to promote their products should be challenged, he says, much in the manner that the tobacco industry has been challenged. Likewise, he writes in "Food Fight," political leaders should be encouraged to be innovative and to remove political barriers that prevent good national policy on the matter, he says.

Brownell acknowledges, however, that answers may end up coming not from the political arena, but from the grassroots. He cites recent moves by the cities of Los Angeles and New York to ban soft drink machines in schools as examples. He also believes in framing the argument around protecting children.

"If we feel that children are victimized by this environment and that they are a group we need to protect, then many things will fall into place," he explains.

Hill is involved in an innovative public intervention that starts with a simple premise: Energy in = energy out. Called "America on the Move," the program is based on calculations showing that the average American--who has been gaining an extra pound or two a year--has to burn off about 100 extra calories a day to "break even" at the end of the year.

Hill deliberately touts the program as one to help people prevent weight gain rather than lose weight--an aim he says is the product of 25 years of seeing how difficult permanent weight loss can be, especially for some. Using the energy-balance formula, "it doesn't matter what your genetic pattern is, you won't gain weight," he explains.

Eight states are currently signed up for the program and 20 more are interested, Hill says. It's being disseminated though a number of vehicles including a Web site ([www.americaonthemove.org](http://www.americaonthemove.org/)), organizations including the YMCA, AARP and American College of Sport Medicine, and soon, health-care professionals.

Hill notes that while people can achieve the 100-calories-a-day goal by eating less or exercising more, he emphasizes physical activity because of how difficult it is to restrict eating. Among his simple suggestions is using a step counter to log an extra 2,000 steps a day--the distance, roughly a mile, that it takes to burn 100 calories.

He admits that given the complexity of the problem, it's a pretty basic plan.

"It's a simple idea, and that's what we were worried about--that people would say, that's just too simple to work," he notes. "But, in fact, it's simple enough that it works."

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