SMALL CHOICES, BIG BODIES

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STATING THE OBVIOUS

Obesity is a problem in America. Even without news reports or scientific studies, most individuals—by quickly scanning offices and shopping malls—can arrive at the conclusion that people today are bigger than ever before. Though few would argue that love handles are less common in modern culture, there’s considerable debate about the cause of those fat rolls.

Health activists and food police single out “junk food” as the culprit behind our burgeoning behinds, but pay little more than lip service to the couch-potato habits that have become the norm in recent years. Blindly pushing a narrow, food-only approach, these sticklers lobby for highly restrictive public health policies that leave no room for common sense.

While researchers publish conflicting reports on diet trends, ordinary Americans don’t have to wait for the next academic journal to find the triggers for our steady weight gain. Questions regarding changes to individual lifestyles can be answered with a short inventory of home and office space. Elevators in almost every building ensure that tenants don’t have to climb the stairs. Moving sidewalks in airports nationwide mean that travelers can make their connections without ever breaking a sweat. And TV sets in 99 percent of U.S. households suggest that time between work and sleep can be spent comfortably on the sofa with a remote control.

The rise of modern convenience is self-evident. But in order to show the link between these creature comforts and the bathroom scale, we first have to look to the past.
AN EPIDEMIC OF CONVENIENCE

Epidemiology is the study of the source of disease. By definition, disease is any deviation from the body’s normal function caused by infection, genetic defect, or environmental stress. Ailments such as flu, cancer, and cholera fall under the scope of epidemiology. But some modern “diseases” do not.

Dr. John Snow, a physician during a great cholera epidemic in 19th century London, is credited as the father of this branch of medicine. Most health officials at that time responded to the outbreak with hysteria and conjecture about the cause. But Snow tried a more analytical approach—plotting individual cases of the disease on a city map, decoding the overall pattern, and identifying the common link: a contaminated water well.

Snow’s method effectively addressed London’s outbreak, as well as countless other cases of infectious and chronic diseases since that time. So why have modern public officials been unsuccessful in applying Snow’s method to today’s obesity “epidemic”?

Because most notably obesity is not a disease but a symptom. Like a sunburn or swelling, love handles are just evidence of a problem, not the problem itself. Just as nausea or fever can be brought on by any one of a thousand conditions, weight gain can be the symptom of countless, different changes.

CAUSE VERSUS RISK

Since Snow’s discovery in 1854, our communities, households, and families have changed. The study of public health has adjusted accordingly. The focus of most epidemiological studies has shifted from infectious disease to ailments such as heart disease and diabetes, which are largely governed by genetics and lifestyle.

Infectious disease follows a single, linear tack. Only one particular bacterium can cause an individual to “catch” cholera. But many modern diseases do not fit in this binary framework. For instance, a person cannot “catch” cancer. So when investigating these chronic diseases, today’s researchers must consider many factors such as family history, gender, environment, occupation, and weight.
Traits that are associated with an increased risk of an outcome—but don’t necessarily cause it—are known as risk factors. For example, age is considered a risk factor for some heart diseases. But while older Americans have a higher risk for heart attacks and strokes than teenagers, growing old does not inevitably cause heart disease.

Some people fail to distinguish between risk and cause. Many health activists have adopted a dangerously myopic focus on certain foods considered to be “obesity risk factors.” In doing so, they have tried unsuccessfully to turn food into this century’s contaminated water well.

With their relentless campaigns to tax, restrict, and ban “unhealthy” foods, these activists neglect to confront the hundreds of other potential contributors to weight gain. To combat this misrepresentation and restore balance to the public health debate, the public needs a better understanding of these other obesity factors.

**BIOLOGY AND MODERN LIVING**

“Diet and exercise” have replaced “take two aspirin and call me in the morning” as physicians’ default prescription for many conditions. In regard to obesity, the merit of this recommendation stems from the first basic Law of Thermodynamics: energy conservation.

Energy can neither be created nor destroyed. It is, instead, constantly transformed from one state to another. This transformation in humans changes food energy (calories) into physical energy, and can impact the bathroom scale when “energy in” no longer equals “energy out.”

Fat is the balancing intermediary in this formula, offering a storage site for excess energy and a fuel source for excess activity. If our energy equation remains lopsided for an extended period of time, then we can grow from a lean body mass (holding two to three months’ worth of energy in fat) to an obese shape (carrying enough fat to provide energy for more than a year).

Their direct impact of diet and exercise on body fat gives them central roles in the weight debate. But the “Big Two,” as scientists have dubbed them, do not provide a sufficient model for weight dynamics on their own because many variables affect both sides of the equation.
GOOD SCIENCE GONE BAD

Most studies used by public health activists today base their findings on the habits and health of a handful of individuals. Unlike experimental studies that are designed to determine cause and effect, these epidemiological studies rely on a wide variety of observations and, therefore, aren’t designed to isolate any one particular risk factor. So these studies can only suggest correlations between a factor and a problem.

Still, researchers sometimes try to tease meaningful results out of mountains of data, matching causes with effects.

Most obesity reports cited by food activists indict one “cause” at a time (a mineral, an ingredient, etc.). However, it is impossible to remove a single variable from its greater context. Calcium is found in cheese. That cheese could be part of a sandwich. And that meal is only one part of an entire diet. How effectively can a study isolate the calcium from every other component in a person’s meal or lifestyle?

It can’t.

Relying solely on oversimplified analysis in the face of such complexity can yield nonsensical results. And many food activists promote quick-fix solutions based on isolated findings from one study about a single food. But when we look at the broader spectrum of collected observations, a bigger picture of obesity’s causes emerges.

SYMPTOM OF CHOICE

Growing waistlines are largely symptoms of our modern lifestyle.

The human body is built to survive laborious work and travel. But most travel today is accomplished in the comfortable recline of a driver’s seat. And many modern workers sit in air-conditioned offices that encourage very little physical exertion. Additionally, the prevalence of excess weight—historically a sign of wealth and leisure—is evidence that all members of modern society have access to goods and services that were once considered luxuries.

So obesity does not fit into the framework originally intended for epidemiology. Obesity is not a “disease” in the traditional sense of the word. It’s not communicable. Obesity is a consequence of our choices. And many of those choices are made passively, in a comfortable but rigor-free environment.
Over the past four decades, many fat-inducing elements of the American lifestyle have driven weight gain. But many health officials and food activists have largely ignored these trends in people’s personal lives or paid lip service to their existence. Instead, in an attempt to influence public policy, they have labeled obesity an epidemic and gone on a witch-hunt for a modern-day contaminated well.

**NAMING THE OTHER OBESITY RISK FACTORS**

Countless dimensions of American life impact our weight. Since many factors overlap to some degree, they have been grouped into five categories: Personal and Mental Health, Occupation, Changes in Physical Activity, Housing and Transportation, and Family Life.

Viewed separately, the changes outlined in each category seem relatively small. But collectively the small changes in lifestyle over the past several generations can largely explain the population’s growing waistline.

- The “Changes in Physical Activity” chapter covers the increasingly sedentary activities, entertainment, and hobbies Americans seek during down time. (Pages 7–13)

- The “Personal and Mental Health” chapter examines how prescription drugs, smoking cessation, and yo-yo diets contribute to weight gain. (Pages 15–23)

- The “Occupation” chapter follows the shift in the type of jobs performed by Americans and the minimization of activity within existing professions. (Pages 25–29)

- The “Family Life” chapter outlines the changes in Americans’ family structure, from parental employment to number of siblings, that affect a person’s weight. (Pages 31–38)

- The “Housing and Transportation” chapter highlights the rise in popularity and availability of the car, the suburbs, and the thermostat in modern life. (Pages 41–49)

Each of the changes listed in the following chapters contributes to a mismatch between modern lifestyle and human biology.
CHANGES IN PHYSICAL ACTIVITY

Leisure time in the United States is at an all-time high. Americans today accrue more cumulative work hours than their 1950s counterparts, because more women work outside of the home. But during the past three decades, new technologies and greater productivity have reduced the average time spent per person at work. Between 1950 and 2000, the average hours worked per worker dropped 5 percent. Though more Americans may be going to work, they are spending less time there.

So what is the population doing with all of this spare time? Recreational activities today vary greatly from earlier generations in time and type.

• While countless activities fall under the “leisure time” category, the popularity of television in particular has skyrocketed over the past half-century.

• With hundreds of channels from which to choose, adults and children spend more time watching sports than playing them.

• Even in school settings, today’s kids rarely (if ever) play outdoors.

• With more and more free time spent on the couch, modern Americans simply move less than the generations before them.
TELEVISION

In 1950, only 9 percent of U.S. homes had a television. By the turn of the century, almost every household owned one or more TVs.

We spend an unprecedented amount of time in front of our TV sets. By 2006, the average American spent more than two months of the year (1,672 hours) watching television. And the average number of TV sets outnumbered the average number of people (2.73 vs. 2.55) per household.3 Passively watching television has been the most popular recreational activity for several decades and has accounted for a higher percentage of leisure time than movies, sporting events, books, video games, and gardening combined.

Recent research indicates that the amount of time spent in front of the television is the single most important factor in predicting weight gain.4 Studies suggest that television’s impact on basic metabolism, physical activity, and sleep plays an important role in obesity. More time spent watching TV means less energy burned,

The Calorie Difference Between Watching One Hour of TV and …

Bathing the kids 130 CAL
Scrubbing the floor 448 CAL
Raking the lawn 255 CAL
Folding laundry 130 CAL
“Unfortunately, the ‘electronic revolution’ does not help induce a healthy lifestyle and will have a negative impact on children’s health. Those who are not subjected to adequate exercise are expected to develop cardiovascular and/or cerebrovascular risk factors, thus impacting their morbidity and mortality from health complications. They will gain abnormal body weight and may develop a high body mass index (BMI).”

—UN Chronicle, 2006

“Mean child BMI increased stepwise from ‘least’ to ‘most’ television viewing categories, as did unadjusted odds ratios for being overweight or obese.”


even while a child is resting. This means heavy television watchers burn fewer calories over time compared to occasional viewers regardless of whether they are physically active.

TV viewing uses only slightly more energy than sleeping; consequently, people who choose surfing channels over more active endeavors expend very little energy during that time. Television can hinder a good night’s sleep. And the less we sleep, the more likely we are to have high Body Mass Indexes (BMIs). Accordingly, children with TVs in their bedroom are 30 percent more likely to be obese than their peers. These links between TV and weight gain make turning on the tube tantamount to turning on the fat.

“Starting in the 1950s, television entered most households in technologically advanced societies and has had a profound impact on the way many people, and whole families, spent a great deal of their leisure time. It has been well documented that watching television has been a major past-time for many people, especially children, adolescents, and young adults.”

—Research Quarterly for Exercise and Sport, 1996
CHILD’S PLAY

Where children’s playtime is concerned, older generations may offer an objective comparison when they recall the “good old days” when children played outdoors, rode bikes, played tag, and skipped rocks. In contrast, today’s deskbound students, structured athletics, and indoor-only play spaces have practically guaranteed inactivity and obesity in American youth.

With reductions in physical education (PE) classes and recess periods, American schools have become sedentary environments. Between 1984 and 2003, student enrollment in PE classes fell from 65 to 28 percent. And only 22 percent of those participating were active for more than 20 minutes.14,15 By 2004, almost 40 percent of U.S. public school districts had eliminated recess entirely. And many others had outlawed the most vigorous games: running, tag, kickball, and touch football.16

Even recreational sports no longer guarantee vigorous activity for children. Though participation in youth sports increased during the past two decades, actual activity during these events decreased. Unlike the games of tag and dodge ball—which involve continuous involvement from all participants—many structured sports have most players on the sidelines, sedentary during much of the time.17 Whether warming the bench every week or jogging twice a year, most young athletes are less active than their sporty counterparts 20 years ago.18

**Percentage of Elementary Schools with Recess**

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>1989</td>
<td>90%</td>
</tr>
<tr>
<td>1999</td>
<td>60%</td>
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</tbody>
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This means that 40% of elementary schools don’t allow recess.

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DID YOU KNOW?

School officials are outlawing everything from cartwheels to duck, duck, goose.12 While many parents agree that dodge ball may be too violent or damaging to self-esteem to stay in the schoolyard, many seemingly benign activities are also falling in its wake. The games on some schools’ banned lists include tag; walking up the slide; twisting the swing’s chains and spinning; gymnastics; rope climbing; duck; duck, goose; and musical chairs. This means that—in addition to missing out on a lot of fun—students at these schools will be missing out on about 272 calories burned per hour.

—The New York Times, 2005

“Organized sports carry much of the burden of children’s and young people’s sporting activities. Spontaneous sports, especially traditional team sports, have decreased. Few people take regular physical exercise on their own initiative as their only form of training, and most people who engage in athletics outside the auspices of an organization are also active members in associations.”13

—Scandinavian Journal of Nutrition, 2004

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01 TELEVISION

02 CHILD’S PLAY

03 NEAT

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12

13

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Even the home has become a culprit. In recent decades, trends in urban construction have seen larger homes built on smaller lots, practically eliminating backyards. Between 1981 and 1997, the number of children participating in outdoor activities declined 50 percent. Other reports suggest that the availability of electronics and the perceived safety of neighborhoods also factor into the increasingly sedentary play-style of American youth.

One study estimates that modern children fall short of the amount of energy they need to burn by 110 to 165 calories each day. Researchers estimate that as few as five hours of PE per week could diminish obesity risks by 9.2 percent. Another study finds that activities as simple as playing outdoors are strongly tied to a child’s BMI. All things considered, the engineering of spontaneous activity out of childhood over the last half of the century has clearly contributed to our children’s weight gain.
NEAT

Without a microscope, ruler, or test tube, most people can observe changes in the American way of life during the 21st century. Black-and-white photographs clearly show the absence of televisions in the early 1900s, and school records detail declining participation in PE classes over recent decades. But some changes that have contributed to weight gain are much more subtle.

“Basal metabolism” describes the amount of energy needed by your body to complete biological functions. “Physical activity” includes

DID YOU KNOW?

Based on the average 1.8 to 2.0 pounds gained per year by 20-40-year-olds, a 2003 study published in Science determined that the recent increase in Americans’ weight has been caused by an energy surplus of 15 to 50 calories per day. Because of the way the human body stores energy, the average person would need to burn just 100 calories more per day to offset this energy gap. And that amounts to as little as a 10-minute investment.

Burning 100 Calories:
• Brisk walking 10–15 min.
• Dancing 20 min.
• Gardening 30 min.
• Housework 20–30 min.
• Biking 10 min.
• Standing 50 min.

—Science, 2003
exercises such as running or playing sports that we pointedly schedule into our day. All of the other little movements and activities that burn calories fall under one umbrella term: NEAT (Non-Exercise Activity Thermogenesis).

NEAT represents the energy used for largely overlooked day-to-day activities. Sitting up straight, vacuuming the house, kissing your sweetie, chewing gum, washing the car, and tapping your fingers are all tasks that require little thought but a lot of energy. For instance, consistently improving postural habits can burn an extra 350 calories per day. Chewing or fidgeting can increase the body’s energy expenditure 20 to 40 percent above resting level. And even a good laugh with friends can boost metabolism. Researchers estimate that NEAT varies by as much as 2,000 calories from one person to the next.

Just as these tasks can subconsciously punctuate the day, they can also be removed with little notice. The mechanization of society—replacing physical tasks with machines—has contributed to a decline in NEAT. In a single day, replacing manual chores (washing dishes, mowing the lawn, etc.) with their automated versions can add a 100-200 calorie surplus. These variations may separately seem small, but collectively, their impact on body fat can be significant.

“The potential variance in NEAT is substantial and can vary for a given person by as much as 2000 [calories per day]. NEAT could therefore be important in obesity. In fact several authors argue that a consistent energetic imbalance of only 100 [calories per day] is sufficient to account for obesity.”

—Acta Physiologica Scandinavica, 2005

“For instance, did you know if the average woman spent 30 minutes trimming shrubs she would burn the same amount of calories as she would if she spent 17 minutes playing tennis? Other everyday ways to get active are washing the car by hand, vacuuming the house and mowing the lawn.”

—Daily Post, 2007

“People with obesity are tremendously efficient. Any opportunity not to waste energy, they take. If you think about it that way, it all makes sense. As soon as they have an opportunity to sit down and not waste those calories, they do.”

—New York Times, 2005

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PERSONAL AND MENTAL HEALTH

The second half of the 20th century witnessed dramatic changes in Americans’ approach to personal and mental health:

- Innovations in health care and research boosted the availability of pharmaceuticals.

- Emerging scientific and social stigmatization drove millions of smokers to kick the habit.

- The ubiquity of electricity allowed for distractions such as TV and video games that disrupted the sleep habits of children and adults.

- Changing standards of beauty and growing nutritional knowledge generated an entire industry devoted to weight loss.

At a glance, trends in personal and mental health appear to be independent of one another. However, a closer inspection reveals one common denominator: weight gain. As an unprecedented number of Americans were starting diets, quitting cigarettes, losing sleep, and taking medications, they started packing on the pounds. This was more than coincidence. Recent scientific studies explain how changing health habits are linked to expanding waistlines.
PHARMACEUTICALS

Herbs, roots, minerals, and oils have played medicinal roles in human cultures throughout the ages. In the 19th century, alchemy gave way to chemistry as the Industrial Revolution drove all sorts of scientific developments, including the advent of pharmaceutical drugs. But not until the 1940s and 1950s were pharmaceuticals widely consumed.

In the ’50s, the discovery of antipsychotics revolutionized the treatment of mental health disorders. A decade later, the FDA approved “the pill” as an oral contraceptive. As the floodgates opened, a multitude of anticonvulsants, antidepressants, and other therapeutic agents filled the American market. Prescription drug use reached unprecedented heights between 1992 and 2004, growing by 253 percent.

Increased Obesity Risk from Medications

Patients receiving multiple insulin injections have a 73 percent greater risk of obesity. People taking certain mood stabilizers stand to gain between five and 40 pounds. With almost half of the population taking at least one prescription, the nation’s medicine cabinets are more crowded than ever—and that surplus can be seen on the scale, too. Many commonly used medications promote weight gain as a side effect. And their rise in popularity mirrors the increase in obesity rates over the past 30 years.

“By prescribing frequency, frequency of weight gain, and importance to treatment, steroid hormones and psychoactive medications are probably the greatest contributors to medication-associated weight gain.”

—Southern Medical Journal, 1999
Unfortunately, clozapine and some of these other AAPDs (atypical antipsychotic drugs), including olanzapine and quetiapine, also stimulate appetite and cause weight gain in patients. Weight gain elicited by AAPDs can be significant; one [patient] quickly gained 100 pounds when taking one of these drugs.\textsuperscript{11}

—Journal of the American Medical Association, 2007

Several medications for the treatment of mental and physiological disorders induce significant weight gain. Studies have documented weight gain in patients on antipsychotics exceeding ideal body weight by 20 percent or more.\textsuperscript{9} In one study, diabetics treated with multiple injections of insulin experienced 73 percent increased risk of becoming overweight.\textsuperscript{10} As the use of these medications has escalated, their effects have also materialized on patients’ waistlines.

As a result of long-term treatment with antipsychotic drugs, a four-fold rise of clinically relevant adiposity compared to the general population was found in a sample of 226 out-patients ... Since the first psychotropic agents [were] discovered in the 1950s, promotion of appetite and weight gain have been known side effects of many of these drugs. Weight gain can be caused by compounds from every major class such as antidepressants, antipsychotics and mood stabilizers, and it is frequent and of prominent clinical relevance.\textsuperscript{13}


Medication Sales/Number per Person

“From 1993 to 2003, the number of prescriptions purchased increased 70% (from 2.0 billion to 3.4 billion), compared to a U.S. population growth of 13%; the average number of prescriptions per capita increased from 7.8 to 11.8.”\textsuperscript{12}

—Kaiser Family Foundation, 2004

“A majority of currently prescribed psychotropics will cause 2.3–18.2 kg of weight gain over the course of clinical treatment. Most psychotropic drugs (antipsychotics, mood stabilizers and antidepressants) are associated with weight gain.”\textsuperscript{14}

—Obesity Reviews, 2004
SMOKING CESSATION

Most people know that smoking is unhealthy. As this knowledge spread through the population over the last half-century, many smokers were motivated to kick the habit—a great success in public health. But—for all of the benefits to health associated with smoking cessation, there is one drawback. As Americans put out their cigarettes, they put on additional pounds. Between 1972 and 2004, the number of American smokers decreased by 18.2 percent in men and 12.2 percent in women. Over the same time period, the prevalence of overweight and obese Americans—as measured by the Body Mass Index (BMI)—grew by 19.3 percent in men and 21.5 percent in women. Researchers soon discovered that the relationship between these trends wasn’t coincidental. Scientists first published studies linking tobacco to cancer in 1950. At the time of these reports, approximately half of the U.S. adult

"N[icotine is already being used as an effective, albeit erroneous, treatment for controlling body weight in at least some smokers ... Persons who quit smoking have been found to gain more weight than non-smokers."16

—Current Topics in Medicinal Chemistry, 2003

Percentage of Adults Who Smoke

“Rates of cigarette smoking among US adults steadily declined during the past several decades. Center for Disease Control and Prevention scientists estimated that between 1978 and 1990, smoking cessation was responsible for about one-quarter (2.3 of 9.6 percentage points) of the increase in the prevalence [of] overweight in men and for about one-sixth (1.3 of 8.0 percentage points) of the increase in women.”23

—United States Department of Health and Human Services, 2006
population smoked cigarettes. By the 1960s, the Surgeon General labeled smoking a “health hazard,” and Congress mandated written warnings on cigarette packages. By the 1980s and '90s, federal and social pressure pushed smoking out of airplanes, commercial buildings, and bars. The result? As of 2004, the proportion of American smokers had dropped to one in five adults.\(^\text{18}\)

Smoking cessation promotes weight gain, so much so that people who stop smoking are twice as likely to become obese as people who have never smoked.\(^\text{19}\) When an individual stops smoking, multiple physiological changes result in spontaneous weight gain. The nicotine in cigarette smoke increases metabolism and suppresses appetite.\(^\text{20}\) After quitting, the absence of nicotine causes a person’s metabolism and physical activity levels to drop. Additionally, the nicotine removal disrupts the hormones that control appetite, making former smokers feel hungry.\(^\text{21}\) These cumulative changes can contribute to an overall weight gain of up to 10 percent of original weight.\(^\text{22}\)

"Large declines in smoking prevalence have occurred in the United States, a result of both smoking cessation and lower smoking-initiation rates. The prevalence of obesity has also increased markedly over the same time period. Smoking is associated with lower body weights and with a lower prevalence of obesity. Thus it is reasonable to assume that part of the increase in obesity may be because of decreases in smoking prevalence."\(^\text{24}\)


"Post-cessation weight gain stems primarily from increased caloric intake, but also partly from removal of the smoking-associated increase in metabolic rate ... Post-cessation weight gain is a complex, multifactorial problem that combines the formidable challenges of both cigarette smoking cessation and weight control."\(^\text{25}\)

—Preventive Medicine, 2007
As Americans try to eat less, they end up weighing more. Despite innovations in research and technology that provide recent generations more access to health and nutrition information than ever before, children of today’s more informed generations are fatter than their less knowledgeable ancestors.

The last half of the 20th century witnessed a dramatic rise in the availability of diet books, commercial programs, athletic clubs, and weight-loss programs.

**The Dieter’s Paradox**

Dieting frequency is actually a strong predictor of weight gain. Why? Though non-dieters usually base their food decisions on internal hunger cues, dieters tend to select their food based on external cues: restrictive eating regimens or forbidden “bad” foods. In studies when given a small, medium, or large milkshake before a meal, non-dieters eat less food in proportion to the size of milkshake. Dieters, on the other hand, eat more of their meal as the size of the milkshake grows. This paradoxical behavior stems from a “good” food/“bad” food mentality. If dieters eat something on the “bad” food list—like the milkshake in the study—they feel that they “blew it,” so they might as well go ahead and eat enough to “make it count.” This habit is often cited as the root of yo-yo dieting.

— *Journal of Behavioral Medicine, 1988*

**The Dieters**

Dieters ate **152 calories more** at lunch when given a milkshake before lunch.

**The Non-dieters**

Non-dieters ate **395 calories less** at lunch when given a milkshake before lunch.

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*DID YOU KNOW?*

Many diets recommend eating less than 1,200 calories per day—the same intake used by health organizations to define starvation. The human body interprets a severe drop in energy intake as starvation. On a 1,200-calorie “diet,” bodily functions will slow down to conserve energy and work to store fat. Consequently, extremely low calorie regimens physiologically encourage weight gain.

pills. Relatively unknown in the 1960s, groups such as Weight Watchers enrolled approximately 8 million adults per year less than four decades later. Between 1984 and 2004, the number of Americans purchasing diet foods and beverages more than doubled. And by 2003, diet products and services constituted a $40 billion industry. Currently, more than half of U.S. consumers are trying to lose weight, but many studies show that most dieting actually results in weight gain.

With fad diets, strict regimes, and lofty promises, the weight-loss industry often perpetuates the problem the industry claims to solve. Food deprivation lowers the body’s basal metabolic rate (BMR) to promote fat storage and energy conservation. Food restriction encourages cravings and leads to binge eating. Seemingly unattainable ideals promote depression among participants and cycle dieters back toward overeating. These physiological and psychological mechanisms fight so effectively against weight loss that researchers estimate that the failure rate among dieters is greater than 95 percent.

Consumer Use of Low-calorie, Sugar-free Foods and Beverages

“In a nationwide study of 15,015 Americans conducted in January 2004 by American Sports Data, Inc. (ASD), nearly half the population (49%) said that at some point during 2003, they attempted to lose at least five pounds; another 16% indicated they had made an effort to maintain their weight.”

1984  
68 million consumers buying “diet” foods  
2004  
180 million consumers buying “diet” foods  
That’s a 180% increase

“The most striking finding was that elevated dieting and radical weight-loss efforts predicted greater subsequent growth in relative weight and an elevated hazard for onset of obesity.”

—Journal of Consulting and Clinical Psychology, 1999

“Global reports of dieting for weight loss were not associated with changes in body weight or behaviours related to energy balance. By contrast, reported duration of engaging in specific behaviours related to energy balance and weight control were consistently associated with weight change.”

—International Journal of Obesity and Related Metabolic Disorders, 1999

“How ironic if a discontinuation of weight loss efforts might actually help solve the so-called obesity epidemic. Eat more, weigh less?”

—Health at Every Size, 2004

“Dieting is associated with negative mood and depression, binge behavior, and the onset of eating disorders. Dieting also precipitates preoccupation with food and eating.”

—Journal of Social Issues, 1999
SLEEP DEPRIVATION

Americans are sleeping less and weighing more. Over the past century, changing trends in general habits (longer work hours, greater coffee consumption, and more television viewing) contributed to a disruption in sleep patterns. National data indicate that children and adults spend less and less time asleep every year. In 1910, we slept on average nine hours per night. By 2002, that figure had fallen to seven hours, with many Americans getting less than five hours per night. And these declining sleep rates are showing up in the nation’s girth.

“Intriguingly, sleep may be a factor that alters both sides of the energy balance equation ... Sleep is probably not the only answer to the obesity pandemic, but its effect should be taken seriously, as even small changes in energy balance are beneficial.”

— Archives of Disease in Childhood, 2006

DID YOU KNOW?

Recent studies have given credence to the recommended eight hours of sleep per night. In one study, people who slept less than 7.7 hours showed a proportional increase in Body Mass Index (BMI). Additional research has found that less sleep leads to heightened stress levels. And stress, as we all know, is one more mechanism that packs on the pounds.

— Public Library of Science Medicine, 2004

Average Hours Slept per Night

1900

9 Hours

2000

6.9 Hours
Numerous studies correlate the effects of sleep on weight. One study found that sleep deprivation increases levels of certain proteins that alter metabolism and hunger cues. And another report concluded that lack of sleep also disrupts hormones that control appetite. The direct impact of a good night’s rest on the body’s ability to regulate hunger outlines the clear relationship between sleep and body weight.

“Sleep duration seems to be important in the regulation of body weight and metabolism by the modulation of key hormones … These findings might have important clinical implications for the prevention and treatment of obesity.”

—Annals of Internal Medicine, 2005

“[S]leep duration in America has decreased by one to two [hours] during the second half of the 20th century. Over the same time period, the incidence of obesity has nearly doubled … Chronic partial sleep loss is associated with decreased glucose tolerance, decreased leptin levels, increases in evening cortisol levels, and adverse cardiovascular effects.”

—Journal of Clinical Endocrinology and Metabolism, 2004

“Obesity may be linked to sleep deprivation … While other factors could be causing both sleepiness and obesity, more convincing evidence comes from studies showing that people who are sleep deprived experience hormonal disruptions that result in increased hunger and appetite.”

—International Journal of Obesity, 2006

In the early parts of the 20th century, most of the American workforce could be found in factories or fields. With little machinery or technology, manual laborers performed most tasks themselves. Even clerical tasks such as researching and filing required a great deal of physical movement. Since that time, technology has introduced faster, easier ways to do the jobs that once demanded a great deal of time and energy. Accordingly, the work of modern Americans differs from earlier generations in two ways:

- The types of jobs held by today’s employees are primarily in the service sector, as opposed to the high percentage of mining, manufacturing, and farming positions of the past.

- Technology has eliminated most physical exertion from day-to-day tasks performed at work.

The absence of physical activity in the nation’s labor force is best illustrated by the size of the average American worker.
**TYPES OF JOBS**

Agricultural workers accounted for 43.5 percent of the American workforce in 1900.\(^4\) Farm work was grueling, physically demanding labor. Horses and mules offered little assistance, so the industry needed a great deal of manpower to generate the desired volume. In the following decades, gasoline-powered farm equipment replaced beasts of burden. New pesticides, fertilizers, and irrigation systems produced a higher yield. Innovations in mechanized farming required fewer workers to cultivate more crops.

During the last century, changes in technology and market demands have adjusted the type of work Americans perform and, consequently, the physical demands of that work. Between 1910 and 2000, the workforce shifted from a high percentage of manual laborers (declining by 96 percent) to a large proportion of professional employees (increasing more than fourfold).\(^5\) As low-activity jobs in the professional and service sectors grew, opportunities in the most physically demanding fields—mining, agriculture, construction, manufacturing, and transportation—diminished.

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**Average Time Spent Sitting During Work**

“The current findings present the sedentary workplace as a potentially hostile environment in terms of overweight and obesity. The proclivity of the modern workplace for labor-saving technology reduces incidental physical activity, and with it the caloric expenditure needed to maintain healthy body weight.”\(^7\)

—*American Journal of Preventive Medicine, 2005*

---

**DID YOU KNOW?**

The average person takes 3,000 to 5,000 steps a day (a stark contrast to the 10,000 recommended by the American Council on Exercise).\(^1\) Considering that most Americans spend a considerable amount of their waking hours at work, the amount workers move at their jobs largely influences their total physical activity.\(^2\)

- **Nurses**
  - 8,648 Steps
- **Police Officers**
  - 5,336 Steps
- **Lawyers**
  - 5,062 Steps
- **Teachers**
  - 4,726 Steps
- **Secretaries**
  - 4,327 Steps
“It appears that a physically active occupation has a protective effect on the likelihood of being obese for the disease-free adult population above 20 years of age employed in high and low activity... For those individuals who engage in no [leisure time physical activity] or irregular [leisure time physical activity], the likelihood of being obese can be reduced by as much as one-half with a physically active occupation.”

—International Journal of Obesity, 2001

“[I]t has been estimated that each 2-hour increment in sitting time at work is associated with a 5% and 7% increase in obesity and Type 2 diabetes, respectively, in a large cohort of U.S. women.”

—International Journal of Behavioral Medicine, 2004

“The importance of population sedentariness is well illustrated by studies of physical activity levels for individuals moving from agricultural communities to urban environments or of the effects of industrialization. In many populations where this has occurred, urbanization has been associated with decreased physical activity and increased obesity.”

—“Handbook of Obesity,” 2001

From blue-collar to white-collar, the shift in labor demographics resonates in workers’ waistlines. An administrative assistant needs only 102 calories per hour to complete office work, while a farmer burns approximately 544 calories in the same amount of time shoveling hay. Because of the prevalence of low-energy jobs, today’s employees expend, on average, less energy than workers 50 years ago. And, unfortunately, less physically demanding occupations translate to more “well-rounded” workers.
"[T]here is probably 300-500 calories less unmeasured low-intensity activity now than there was 30-50 years ago … [T]here has been a pervasive shift toward labor-saving devices, such as snowblowers and other devices that reduce effort in yardwork as well as the use of e-mail and desktop printers that eliminate walks down the hall in the office or other job-related physical activity."

—Medicine and Science in Sports and Exercise, 2006

DID YOU KNOW?
A group of Australian researchers recently studied the activity of men living in a simulated “historical” lifestyle and men working in a “modern” lifestyle. The participants in the historical re-enactment of “Old Sydney Town” were as much as three times more active than their desk-jockey counterparts. The modern workers, like taxi drivers and accountants, walked between 5 to 10 miles less than men living the old-fashioned lifestyle (a difference of 600 to 1,200 calories per day).

—The Medical Journal of Australia, 2001

TASK EFFICIENCY
At the turn of the 20th century, telegrams and typewriters dominated communication in the business world. Workers performed tasks manually, and productivity levels were low. Mechanized and electrical technologies gradually replaced these manual methods. Telephones took the place of telegraphs. Surveillance cameras displaced patrolling watchmen. Computerized barcodes eliminated the need for physical inventories. One hundred years of new technologies made the American workforce faster, more efficient—and heavier.

Computers, fax machines, intercoms, copiers, and printers enable the modern worker to accomplish in 20 minutes what would have taken two weeks in the early 1900s. Even in the last 50 years, business output has increased threefold per business hour. Improved productivity has reduced the time and energy spent by the average employee on everyday

Ways Modern Occupations Contribute to Inactivity

Delivering on Bike (563 cal./hr) vs. Driving Truck (136 cal./hr)

Controlling Robot (122 cal./hr) vs. Working Assembly Line (204 cal./hr)
Sedentary occupation reflected by long hours of sitting or standing at work was significantly associated with risk of obesity. In contrast, even light activities such as standing or walking around at home (which probably reflects household work) and brisk walking were associated with a significantly lower risk of obesity and diabetes. Our study suggests that 30% of obesity cases and 43% of type 2 diabetes cases can be potentially prevented by following a relatively active lifestyle.

—Journal of the American Medical Association, 2003

“[S]pending minutes an hour sending e-mail rather than minutes walking down the hall to speak to a colleague results in a 5-kg weight gain in 0 years.”

—Mayo Clinic Proceedings, 2007

“Computers and communication technology (cellular phones, faxes, electronic mail, etc.) have reduced the need for people to commute from home to work and to walk from one place to another at the worksite ... when considered over months or years these small reductions in energy expenditure could significantly contribute to the increase in obesity as seen in Americans over the past 20 years.”

—Journal of Women in Culture and Society, 2006
Characterized by an unprecedented shift in gender dynamics, historians often refer to the ’60s and ’70s as the “sexual revolution.”

• The shifting family dynamics of the sexual revolution led more women into the workforce.

• Women born after the Baby Boom generation had fewer children.

• Innovations in reproductive technology allowed women to postpone childbirth until a later age.

• Arguably the most pivotal moment for this movement occurred on May 11, 1960, when the FDA approved Enovid, the first hormonal birth control drug.

While recent studies have dismissed the notion that oral contraceptives are directly responsible for weight gain, “the pill” has had a domino effect on American family life and—through those changes—has influenced the nation’s weight. The typical nuclear family of the 1950s (male breadwinner, young bride, and 3.5 children) is no longer the norm today. Instead, changing family dynamics have ushered in a more heterogeneous and noticeably heavier family for the new century.
FEMALE EMPLOYMENT

In 1900, less than one woman for every five men had a job in the American labor market. A century later, that ratio had narrowed considerably, with women comprising almost half of the labor force.² Many historians attribute this change in sex roles to the availability of effective birth control.³ By postponing child-rearing, more American women in the second half of the 20th century could finish degrees and embark on careers. The average weekly hours worked per woman rose 82 percent between 1950 and 2000.⁴ More hours spent in the classroom and in the boardroom meant less time for the domestic duties traditionally assigned to women in earlier generations.

Energy Used at Home vs. at the Office

<table>
<thead>
<tr>
<th>Activity</th>
<th>Calories Burned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td>170 cal./hour</td>
</tr>
<tr>
<td>Office Work</td>
<td>102 cal./hour</td>
</tr>
<tr>
<td>Patient Care</td>
<td>204 cal./hour</td>
</tr>
<tr>
<td>Hauling Debris</td>
<td>408 cal./hour</td>
</tr>
<tr>
<td>Shoveling Coal</td>
<td>476 cal./hour</td>
</tr>
<tr>
<td>Playing with Children</td>
<td>272 cal./hour</td>
</tr>
<tr>
<td>Composting</td>
<td>340 cal./hour</td>
</tr>
<tr>
<td>Sitting at the Office</td>
<td>102 cal./hour</td>
</tr>
</tbody>
</table>

Source: www.Calorie-Count.com

“Those who believe that dual-career families may be contributing to changes in children’s diet and exercise habits have a compelling prima facie case. The rise in women working outside the home coincides with the rise in childhood weight problems.”¹¹

—Journal of Health Economics, 2003

Did you know?

Jobs considered “traditional” female occupations (nurses, teachers, and administrative assistants) are some of the most sedentary positions. But jobs regarded as masculine occupations (construction workers and miners) are some of the most physically intense.

Calories Burned:
• Teaching 170 cal./hour
• Office Work 102 cal./hour
• Patient Care 204 cal./hour
• Hauling Debris 408 cal./hour
• Shoveling Coal 476 cal./hour

This reallocation of time inspired major changes. The demographic of America’s workforce shifted from men to women, from old to young, and from single-person households to married-person households.⁵ As young, married women spent more time outside of the home, men generally did not fill the void. Consequently, Americans overall dedicated less time to physically demanding household chores.⁶ In 1950, more than 60 percent of households consisted of a male breadwinner.
“The results of this study indicated that ‘workers’ spend significantly more time (about 6 h/day) sitting in connection with travel, work, and recreation than mothers of young children … [W]omen in part-time work and full-time home duties reported significantly lower sitting times for travel, work, and recreation.”


“Over the past fifty years, the proportion of wives in the labor force has nearly tripled, from 3 percent in 1950 to 62 percent in 2000. Of the nation’s 3.7 million women with infants under the age of one, almost 60 percent were in the labor force. This was a record high and almost doubled the 30 percent participation rate of mothers twenty-five years ago. Of these 3.7 million women with infants, 36 percent were working full-time, 17 percent were working part-time, and 6 percent were actively seeking employment.”

—“Families in America,” 2002

and female housewife, but by 1998 only 24 percent still met the defining criteria of the ‘traditional’ Norman Rockwell family. Women’s entrance into the workforce redefined the labor market, the domestic sphere, and the family.

Impacting both women and children, weight gain is one of the most surprising effects of female employment on the transformation of the American family. The suggested connection between working women and their obesity stems from occupational inactivity. During the period from 1950 to 2000—when adult female employment jumped from 28 percent to 53 percent—occupational energy expenditures fell an estimated 300 to 500 calories per day. The net effect of these trends was more women burning fewer calories, and the energy imbalance fueled rising obesity statistics.

Carefully noting that maternal employment is a small part of a big picture, studies also link childhood obesity trends to the growing female workforce. Researchers propose several mechanisms: nutritional shortcomings of childcare providers, poor food choices by unsupervised children, and less time engaged in outdoor activities. The strongest correlation exists between mothers’ work time and children’s BMI in wealthy households. For these families, the increase in hours worked between 1975 and 1994 accounted for as much as a 35 percent increase in likelihood of excess childhood body weight.
Influenced by population trends, social factors, and medical technology, the average age of an American woman’s first childbirth jumped by 3.7 years between 1968 and 2002. U.S. Census data from 1970 documented approximately 15 million and 12 million women giving birth in their twenties and thirties, respectively. At the turn of the century, the population of women giving birth in their twenties had grown by less than 3 million, while the number of first-time mothers in their thirties had swelled by more than 9 million.

**Catch-up Growth**

“Different kids grow at different rates. But the greatest variation in children’s weight gain occurs in the first two years after birth. Studies have shown that premature or low birth weight babies go through an accelerated period of weight gain called ‘catch-up’ growth during this time. This speedy growth ‘may result in an acceleration of growth postnatally that overshoots the genetic trajectory’ and leads to obesity later in life.”

—British Medical Journal, 2000

Additional surveys reported that this growing demographic used reliable birth control, delayed commitment to marriage, and worked outside of the home more than any prior generation. These trends—in tandem with innovations in reproductive technology—allow modern women to wait longer to start a family than their mothers or grandmothers. But these opportunities are not without consequence.
The increase in maternal age between 1970 and 2000 brought an increase in population weight through multiple births and low birth weights. Women older than 30 have more multiple births (twins, triplets, etc.) than younger mothers. And women older than 40 display the highest rates of multiple births. Infants involved in a multiple birth are typically underweight. These small infants exhibit rapid weight gain called “catch-up growth,” which programs an infant’s body early on for an excessive appetite, insulin resistance, and slow metabolism later in life. Due to these factors, every five-year increase in maternal age results in a 14 percent greater risk for childhood obesity.

“Epidemiological studies have suggested that people who had low birth weight or whose growth faltered during infancy and childhood, but who subsequently showed catch-up growth have higher susceptibility for the development of obesity, type 2 diabetes and cardiovascular diseases later in life.”

—International Journal of Obesity, 2006

“The intrauterine experience appears to ‘program’ the fetus in ways that may lead to risk of obesity later in life … The combination of low birth weight [LBW] with subsequent rapid weight gain during childhood is associated with increased BMI, increased central obesity, and increased risk of chronic disease in adulthood.”

—Obesity, 2006

“Between 1990 and 1996, the number of births to women 35 years of age and older increased from 8.4% to 12.6%. Among these women, preterm deliveries increased by 14%, and multiple birth rates increased by 15% for twins, and 14% for triplets. When compared with younger women, those of advancing maternal age were 40% more likely to deliver preterm.”

—Healthcare for Women International, 2005
FAMILY STRUCTURE

In the final decades of the 20th century, the characteristics of the American family changed dramatically. Social trends in divorce, fertility, and employment rates impacted the number of parents, children, and incomes in the average household. These structural changes influenced the everyday activities of family members.

Between 1970 and 1996, the number of divorced Americans rose from 4.3 million to 18.3 million. The declining fertility rate increased the number of “only child” households. The rising employment rates—especially among working mothers—expanded the number of dual-income families and latchkey children. With more single parents, fewer siblings, and more time away from home, families eat fewer meals together and participate less in physical activity.

“He’s using my crayons.”
“She’s touching my stuff.”
Sibling quarrels are exhausting for parents to referee. But these dynamics also provide a workout for the kids involved. From fights in the car to games in the backyard, the interaction between brothers and sisters is a constant source of activity.

DID YOU KNOW?
A 2001 study by the John Tung Foundation found that children without brothers and sisters are 25 percent more likely to become overweight. According to the researchers, boredom in the absence of siblings or playmates forces an only child to develop sedentary habits—such as watching TV and playing video games.

More active games such as four-square, dodge ball, and tetherball burn more than 300 calories per hour but require a partner.
Since the family environment is a significant predictor of health risk factors, changes to the family’s structure alter the health of its members. Between 1970 and 2000, shifts in three family variables (marital status, shared meals, and number of siblings) contributed to the rise of childhood obesity. Children of dual-parent families are more physically active and spend less time watching TV. But the rise in divorce rates over the last several decades has significantly decreased the number of two-parent households, with almost three out of every 10 children now living in a single-parent home.

Nutritional research shows that kids who regularly eat breakfast are more likely to have ideal body weight. But between 1965 and 1991, breakfast consumption declined by almost 20 percent in certain age groups. Children with siblings participate in more active playtime compared to an only child. However, declines in fertility rates in the last half of the 20th century contributed to a decline in average family size. These cumulative changes may have made wide waistlines the most notable distinction of the modern American family.

“Children who did not eat cereals for breakfast were found to be significantly more likely to snack mid-morning. Obese children were significantly less likely to have cereal for breakfast, but significantly more likely to add sugar to their cereal than normal or overweight children.”


“Sibship size (number of children in the family) has a strong influence on height and weight, and in turn the BMI.”

—Internal Journal of Obesity, 2006

“Only-children seemed somewhat disadvantaged, as there was ‘no one else to play with.’ Having others around in the same age seemed to be important for providing spontaneous play. An only child with no one their age living in the neighborhood does not have the kids close by to play with. Consequently, they tended to spend more time alone, watching television, talking with friends on the phone and playing on the computer.”

—United States Department of Health and Human Services, 2003
Effective family planning is a concept unique in recent history. In the early 20th century, American couples rarely practiced birth control, and the methods available were often unreliable. However, the introduction of “the pill” in the 1960s all but guaranteed women the opportunity to plan their pregnancies. In 1959—before the drug was even officially released to the public—half a million American women took Enovid. And by the 1960s that number multiplied more than tenfold. Companies created and improved other methods to compete in the birth control market; consequently, by 2003 more than 38 million women in their childbearing years used some form of contraception.

In the years immediately preceding Enovid’s debut, the total fertility rate in the U.S. was 3.45 average births per childbearing woman. A decade later, that figure dropped to 3.31. And, by the turn of the century, the fertility rate had fallen to 2.04. Though the decline in fertility rates was an anticipated effect of reliable birth control, the decline indirectly impacted obesity through a shift in social standards: increased women’s employment, older maternal age, and smaller family size.

**Effectiveness of Different Types of Birth Control**

The effectiveness of modern birth control enabled women to better plan or postpone childbirth.
There were about five people for every horse in the average U.S. household of the early 1900s. Set in the sprawling countryside, the archetypal American home had no toilet, no electricity, and no central heating. A predominantly agricultural workforce exemplified the rural households and active lifestyles of the early 20th century. But as manufacturing transformed America’s economy, the country’s landscape changed as well.

Declines in farming and a rise in manufacturing sparked an exodus from rural to major metropolitan areas. Companies and urban planners rushed to meet the changing needs of a newly urbanized population:

- Henry Ford’s assembly line energized the automotive industry, making the car a common fixture in most households.
- Technological innovations brought central air conditioning and heating units to office buildings, schools, and homes.
- Developers lured families from inner cities to surrounding suburban areas.
- Successive economic booms boosted the number of households with enough discretionary income to afford labor-saving appliances.

By the end of the century, Americans saw the cumulative shifts in housing and transportation on their thermostats, in their driveways, and on their bathroom scales.
TRANSPORTATION

At the beginning of the 20th century, distances that people could not cover on foot were traveled primarily by horse, bicycle, or train. Motorized conveyances were relatively new and owned only by the wealthiest segment of the population. Inventions such as the escalator, the airplane, and the assembly line were in their infancy. Gradually, roadways improved and highways developed. One hundred years later, the car is king—dominating all other transportation choices for U.S. travel near and far.

The modern American’s travel behavior parallels the automotive industry’s growth over the past century—most notably in recent decades. In 1969, the average household had 1.2 vehicles for its 1.6 licensed drivers. And these motorists traveled only about 7,100 miles annually. But by 2001, the average number of household vehicles (1.9) exceeded the number of drivers (1.8). Americans averaged 14,500 miles per year, and three out of four trips of less than one mile were taken by car.1,2

The growing popularity of the automobile corresponded to diminished use of other forms of transportation. In 1960, workers on foot and in public transit accounted for 22.9 percent of

DID YOU KNOW?
The gradual disappearance of walking from day-to-day life is a dominant factor in the growth of obesity. According to one 2007 report, walking is “the most widely available form of physical activity.” But in recent decades travel by foot has largely been replaced by cars. The researchers claim that—by walking one hour each week (the difference between an average driver and a pedestrian)—an individual could lose 28 pounds over a decade.1

—Institute for European Environmental Policy, 2007

Risk of Obesity per Hour of Driving Each Day

“An urban space characterized by over dependence on automobile transportation for work, school, shopping and leisure activities, is considered a crucial ecological factor of physical inactivity and obesity.”2

—Environmental Health Perspectives, 2004

“As expected, respondents reporting higher levels of auto use also reported higher BMIs.”2

—Health and Place, 2007
many experts believe that obesity is primarily caused by a lack of exercise and too great a reliance on driving cars to work and other places rather than walking to their destinations.”

“The predominant US suburban housing form, with its over dependence on the private automobile, developed over six decades of sprawling urban growth, as did the obesity epidemic.”

“We found that after controlling for potential confounders, there was a significant association between commuting to work by car and overweight or obesity compared with active transport to work such as walking, cycling or public transport.”

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“The growing prevalence of automotive travel contributes to the increase in the sedentary nature of American lives. One 2005 study found that car commuters were 13 percent more likely to be obese or overweight compared to those who walked or cycled to work. Another calculated that every 60 minutes per day in a car added 6 percent to a person’s odds of being obese, while those odds decreased by 4.8 percent for every kilometer walked. One hour spent walking briskly or cycling quickly can burn 325 or 720 calories, respectively, while sitting in a car uses only about 80 calories per hour.

Means of Transportation to Work

Drive 64% 88%
Public Transportation 12% 5%
Walk 10% 3%
No Travel 7% 3%
Other 7% 1%

Some evidence suggests that indoor comfort standards (but not the physiology that underpins them) have systematically changed over the past several decades. U.S. indoor thermal standards for winter comfort have risen from 64°F (18°C) in 193 to 76°F (24.6°C) in 1986. In the 1920s, 90 percent of workers in a U.S. light industrial plant rated 70°F to 72.5°F (21°C to 22.5°C) ‘too warm’... these changes may also be related to increasingly sedentary lifestyles.”

—Nutritional Needs in Hot Environments, 1993

Did you know?

Many of this report’s lifestyle factors overlap in their impact on body weight. Psychologist Steve Ilardi studies a phenomenon known as “Therapeutic Lifestyle Change” that focuses on elements of the hunter-gatherer lifestyle to treat obesity, depression, and other modern maladies. One component of the therapy recommends “lowering the thermostat an hour before bedtime.” The benefits are twofold: better sleep and higher metabolism.

—The Kansas City Star, 2007

CLIMATE CONTROL

In the beginning of the 20th century, Americans had few tools to control their indoor environments. But gradually, air-conditioning units have replaced open windows and wide verandas. Between 1978 and 2001, the number of U.S. households with air conditioning increased by 40.2 million. Similarly, the availability of heating systems has increased in the past several decades, moving with it the average indoor temperature. In 1923 Americans considered 64°F to be a comfortable household temperature in the winter. But 63 years later, homeowners had turned up the thermostat to an average of 76°F. These trends gradually narrowed the range of ambient temperatures in homes, schools, and offices.

A more narrow range in ambient temperature results in a lower metabolic rate. A contributing factor to human metabolism, shivering burns a considerable amount of calories. This mechanism helps regulate the human body’s core temperature (between 98°F and 100°F). The amount of energy expended correlates to the degree of differ-

Thermostat Troubles

This could lower an individual’s metabolism as much as 239 calories a day.

Several studies suggest that raising the indoor temperature 12°F during the winter months can reduce individual metabolism by as much as 239 calories per day.
Subtle perturbations in energy balance can lead to obesity. To put it another way, long-term constancy of body weight can only be achieved if the matching between energy intake and energy expenditure is extremely precise, since an error of only 1% between input and output of energy, if persistent, will lead to a gain or loss of 1 kg per year or some 40 kg between the age of 20 to 60 years. Yet, a difference of 5% between energy intake and energy expenditure is hardly measurable with available techniques.

Short-term (60 h) exposure to 6°C (6 °F) of normal weight men who were acclimatized to an ambient temperature of °C (7 °F), caused a significant increase in [energy expenditure]… thus, the increased [energy expenditure] at the lower ambient temperature, while executing the same daily activities protocol and wearing the same clothing, indicates that energy requirements are higher at this temperature.

It is now widely believed that body weight or body fat or some associated variable is also regulated. Moreover, there is reason to believe that the level at which body weight/fat is regulated may shift in response to various inputs, perhaps including environmental temperature.

Percentage of U.S. Homes with Air Conditioning (Units or Systems)

"Appliances in U.S. Households, Selected Years, 1980-2001."

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Short-term (60 h) exposure to 16°C (61°F) of normal weight men who were acclimatized to an ambient temperature of 22°C (72°F), caused a significant increase in [energy expenditure]... Thus, the increased [energy expenditure] at the lower ambient temperature, while executing the same daily activities protocol and wearing the same clothing, indicates that energy requirements are higher at this temperature.

"It is now widely believed that body weight or body fat or some associated variable is also regulated. Moreover, there is reason to believe that the level at which body weight/fat is regulated may shift in response to various inputs, perhaps including environmental temperature."—Nutritional Needs in Hot Environments, 1993

"Percentage between a person’s body temperature and that of the surrounding environment. The amount of energy burned by basal metabolism—the amount of energy required at rest—can increase between 30 and 60 percent in severe cold exposure.

Without exposure to a wide range of temperatures, occupants of modern homes burn fewer calories than their grandparents. One study calculated the energy difference between a climate-controlled and a mildly cold environment to be between 36 and 347 calories per day. That means resisting adjustments to the thermostat could roughly equate to a three mile jog every day. Given the impact on metabolism, the rising ubiquity of air-conditioned environments since 1970 may have contributed to the growing rates of obesity.

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URBAN SPRAWL

Without convenient means of traveling long distances regularly, most Americans in the early 20th century lived in small agricultural communities. Growing rates of industrialization and automotive travel led people from rural to urban areas. This rush to major cities created a unique spatial arrangement called “urban sprawl”: a pattern of development where large portions of the population live around a city in low-density residential areas. Compared to the rural towns of the early 1900s, modern sprawl meant greater distances between Americans’ homes and their destinations.

Some researchers link the rise of the suburbs to a rise in obesity. Urban sprawl increases our dependency on non-active travel, and increases the sedentary lifestyle of suburbanites. One study calculated a 12.2 percent decline in obesity for every 25 percent increase in mixed-use real estate planning (which puts residents closer to their working and shopping destinations). Thus, people who live in mixed-use communities engage more often in physical activity.

DID YOU KNOW?

Today’s youth have been dubbed the first generation of “indoor children.” Health officials believe that modern youths’ disconnection from nature is contributing to their weight gain. Even over a short period, from 1997 to 2003, researchers found a 50 percent drop in the number of pre-teens playing outside or engaging in activities like hiking, fishing, and walking.6

—The (Delaware), The News Journal, 2007

“With people spending more and more of their waking hours as drivers or passengers of automobiles, more and more hours of relative physical inactivity result … A national survey conducted to document personal energy expenditure found that although driving a car required little energy, it was the top-ranked category of personal energy expenditure, accounting for 10.9 percent of the daily total.”7

—Environmental Health, 2005

Distribution of Urban Households Between Central Cities and Suburbs

<table>
<thead>
<tr>
<th>Year</th>
<th>Central City</th>
<th>Suburb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>1997</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>75%</td>
<td></td>
</tr>
</tbody>
</table>

Residents Walking

25% Suburb

75% Central City
“Our analysis found obesity to be associated with urban transportation indicators related to automobile use. Recent research on obesity and urban housing patterns has reported greater levels of obesity in communities where the private automobile is the dominant means of transportation. Over dependence on the automobile has been in turn linked to urban sprawl where low residential density and lack of mixed land uses are common.”

—Environmental Health Perspectives, 2004

“Urban sprawl was associated with an increased risk for being overweight or obese when individual variables were controlled... This suggests [a] potential pathway of causality between urban sprawl and disease status: urban sprawl → increased automobile use → decreased physical activity → obesity → increased cardiovascular disease, diabetes, and other health problems.”

—American Journal of Public Health, 2004

Distance Between Residents and Shopping, Work, or School
The “walkability” of a person’s neighborhood can have a profound impact on his or her weight. People in the suburbs—as compared to their metropolitan counterparts—usually travel greater distances to get to work, school, or shopping destinations, so they depend more heavily on cars. As a community’s density increases (becoming more metropolitan), residents rely less on their cars and more on their feet. And their waistlines show the difference.

activity. A lack of this planning diversity also means fewer sidewalks, bike paths, and community parks. So children are more likely to stay indoors and watch TV than play outside. These changing factors of the built environment are conducive to physical inactivity and, thus, obesity.

LABOR-SAVING DEVICES

Early in the 1900s, leaders of the women’s rights movement sought to bring industrialization into the domestic sphere. Proponents of “domestic electrification” argued that the creation of electric machines could reduce the time women spent on housework.33 The gradual movement of women into the workforce during the 20th century increased consumer demand for these labor-saving appliances, and an economic boom in the 1950s boosted the number of households with discretionary income for these luxury products. With less time and more money, convenience devices such as microwave ovens, electric can openers,

“By taking a do-it-yourself approach to everyday tasks—that means saying no to drive-through car washes, remote controls, even interoffice e-mail—the average person stands to considerably increase her monthly energy expenditure, up from 1,700 calories the automated way to as much as 10,500 the active way, according to a commentary in the Mayo Clinic Proceedings. ‘I think that inactivity is the major public-health problem of this century,’ says study author Steven N. Blair, a researcher at the Cooper Institute in Dallas. ‘Physical activity has been engineered out of daily life.’”36

Energy Difference: Manual vs. Automated Tasks

“The emergence of industrialization and wealth has been associated with a variety of labor-saving machines. Because such machines are habitually used in high-income countries, the cumulative energetic impact on our energy expenditure is likely to be substantive and to have contributed to the obesity epidemic.”32

—The Journal Obesity, 2003

Energy Difference: Manual vs. Automated Tasks

“By taking a do-it-yourself approach to everyday tasks—that means saying no to drive-through car washes, remote controls, even interoffice e-mail—the average person stands to considerably increase her monthly energy expenditure, up from 1,700 calories the automated way to as much as 10,500 the active way, according to a commentary in the Mayo Clinic Proceedings. ‘I think that inactivity is the major public-health problem of this century,’ says study author Steven N. Blair, a researcher at the Cooper Institute in Dallas. ‘Physical activity has been engineered out of daily life.’”36

—Health magazine, 2002

Washing Dishes by Hand:
109.8 cal./hr

Using a Dishwasher:
78.6 cal./hr

Hand Washing Clothes:
124.2 cal./hr

Using a Washer/Dryer:
79.2 cal./hr
blenders, food processors, and dishwashers became common fixtures in American homes by the early '80s.  

Many reports link America’s increasingly sedentary home life with a rise in body weight. And labor-saving devices contribute to inactivity. Some health officials estimate that the energy discrepancy between automated tasks and active tasks can be as much as 8,800 calories per month. Though our accumulation of automated gadgets occurred gradually, over the course of several decades Americans have incrementally replaced their house chores with fat stores.

“In England, the use of labor-saving devices between the 1950s and 1990s reduced caloric expenditure by 65 percent.”

—“Syndrome X,” 2000

“Computers and communication technology (cellular phones, faxes, electronic mail, etc.) have reduced the need for people to commute from home to work and to walk from one place to another at the worksite … when considered over months or years these small reductions in energy expenditure could significantly contribute to the increase in obesity as seen in Americans over the past 20 years.”

—Signs: Journal of Women in Culture and Society, 2006
ENDNOTES

20TH CENTURY LIFESTYLE CHANGES TIMELINE

6. United States Census Bureau, Current Population Reports, P20-555; and earlier reports.
15. United States Department of Transportation, op. cit.
17. Steffen, op. cit.
19. United States Census Bureau, Current Population Reports, P20-555; and earlier reports.
20. United States Department of Agriculture, op.cit.

**CHANGES IN PHYSICAL ACTIVITY**

5. Cooper, op.cit.
17. Engström, op.cit.
30. Thompson, op.cit.

**PERSONAL AND MENTAL HEALTH**

7. National Hospital Ambulatory Medical Care Survey 1992 and 2004: Data collection in the National Hospital Ambulatory Medical Care Survey is from medical records rather than individuals. Medications that were prescribed or provided during the ED and OP visits were recorded on the patient record form. Generic as well as brand name drugs are included, as are nonprescription and prescription drugs.
23. Leavitt, op. cit.
30. ibid.


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46. Wilson, *op.cit*.


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2. *ibid*.


17. Yancey, op.cit.

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5. ibid.
20. Dulloo, op.cit.


27. *ibid*.

28. United States Census Bureau, *op.cit*.


35. Darnay, *op.cit*.


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29. Lopez, Russ. “Urban Sprawl and Risk for Being Overweight or Obese.” American Journal of
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