

Why Have Americans Become More Obese?

David M. Cutler, Edward L. Glaeser, and
Jesse M. Shapiro, Harvard University

Background

Over the past 20 years, the average weight of American men increased from 168 to nearly 180 pounds, while the average weight of American women grew from 142 to 152 pounds. This increase means that the amount of calories ingested must have grown faster than the calories expended. Individuals burn calories in three ways. The first is through basal metabolism, the energy cost associated with keeping the body alive and at rest. The energy cost of basal metabolism depends on weight, and the more a person weighs, the more energy required to sustain basic bodily functions. The second source of energy expenditure is the thermic effect of food—i.e., the energy required to process food that has been ingested. The third source is physical activity. Based on these biological relationships, one can derive the daily amount of calories that a person requires to maintain a given weight in the steady state. Specifically, the 10- to 12-point increase in median weight observed in recent decades implies that a typical person has a net caloric balance (that is, excess of caloric intake over expenditure) of about 100 to 150 calories per day.

Cutler, Glaeser, and Shapiro hypothesize that increase in caloric intake, not decline in physical activity, is the major factor behind increased obesity, which in turn, is related to technological innovations in food production and transportation that have reduced the real cost of prepared foods. The authors use several indirect measures of changes in intake and energy expenditure to support their hypothesis.

Methods and Findings

A comparison of the 1977-78 and 1994-96 food intake surveys conducted by the U.S. Department of Agriculture (USDA) reveals that reported consumption increased by 268 calories for men and 143 calories for women between the two periods. This increase is more than enough to explain the rise in the average weights of men and women over the same period.² Most of the increase in calories is attributable to more calories having been consumed as snacks, while dinnertime calories actually fell somewhat.

The fact that snacking accounts for most of the increased caloric intake leads the authors to reject the thesis that obesity is a result of increased portion sizes in restaurants. If this theory were true, calories at main meals, particularly dinner, would have increased. Similarly, the evidence also works against the view that fattening meals at fast food restaurants have caused the rise in obesity.

²Some of the increase in calories observed for this period could be due to changes in interviewing methods and other survey procedures.

Additional indirect evidence on caloric intake can be gleaned from data on total calories available for consumption that are published by USDA's Economic Research Service. The data are from production sources and are adjusted for exports, imports, and feedstock. In recent years, the data have also been adjusted for wastage. Since 1965, the food supply has increased markedly, particularly in the last two decades. In 1978, the food supply was 3,200 calories per person. By 1999, the food supply had risen to 3,900 calories per person. Adjusted for wastage, the increase is 418 calories, again more than required to explain the observed weight gain over the same period.

Trends in caloric expenditure can be inferred from time diaries. The authors use data from Robinson and Godbey (1997) for typical time use in 1965, 1975, and 1985, and provide their own calculations for 1995. An energy expenditure index can be computed as a weighted average of the different levels of energy expenditure associated with the various activity patterns recorded in the diaries. The estimated value of this index fell between 1965 and 1975, but has been quite stable since then.

An important component of caloric expenditure is the energy spent on the job and commuting to work. Between 1980 and 1990, the share of the population in highly active occupations declined from 45 to 42 percent. While it is true that over the past 100 years cars have replaced walking and public transportation as means of commuting, this change had largely run its course by 1980. In 1980, 84 percent of people drove to work, 6 percent walked, and 6 percent used public transportation. In 2000, 87 percent drove to work, 3 percent walked, and 5 percent used public transportation. From these observations the authors conclude that neither changes in the occupational structure of the economy nor commuting patterns can account for the recent increase in obesity.

Similarly, children do not work now, and they did not work in 1980. However, obesity has increased substantially among children and adolescents.

Discussion

In the authors' view, increased caloric intake better explains the rise in obesity than reduced caloric expenditure. As a primary cause for the increase, the authors identify the technological innovations that have given rise to the mass production and preparation of ready-to-eat meals, which in turn have supplanted food preparation at home. The advances in food preparation technology have allowed manufacturers to exploit economies of scale by producing ready-to-eat foods centrally, which has lowered average cost and eventually reduced the retail price of industrially prepared food.

In order to produce food in one location that will be nearly ready for consumption in another one, five main technological obstacles had to be overcome (Kelsey, 1989): controlling the atmosphere, preventing spoilage due to microorganisms, preserving flavor, preserving moisture, and controlling temperature. Innovations in food processing and packaging over the last three decades have improved food manufacturers' ability to address each of these issues.

As the primary cost of food may well have been the time spent in household preparation, rather than the cost of the ingredients, the substitution of “pre-prepared” foods for home-produced foods led to a decline in both the fixed and variable costs of preparing meals.

Reductions in the time cost of food preparation give rise to several predictions:

First, the lower costs of food preparation mean that individuals should eat a wider range of products more often during the day. The increasing frequency and importance of snacks, which are often preprepared, corroborate this prediction.

Second, the increase in food consumption should come mostly in foods that have had an improvement in mass preparation technology (along with complements to those foods). Indeed, food items with low farm value share—a low share of the retail price going to farmers instead of other food preparers—and branded foods, which are more likely to be preprocessed than unbranded foods, registered the largest growth rates over the past decades.

Third, individuals who have taken the most advantage of the new technologies should have had the biggest increase in obesity. Obesity prevalence rose most for married women, who reduced their time preparing food more than any other group.

Fourth, obesity rates should be higher in countries with greater access to technological changes in the food supply. Countries that regulate the food industry more heavily by imposing price controls, tariff and nontariff barriers to trade in agricultural products, and food laws, and that pose more delays to opening a new business, are found to exhibit lower obesity rates than less-regulated countries.

The lower time cost associated with food preparation increases consumers’ options and should therefore make them better off. An exception is consumers with self-control problems for whom the high cost of food preparation provided a device that helped them curb an urge to eat that they would later regret. The authors conclude that while the rise in obesity has significant health costs, those costs are likely offset by the dramatic savings in time of food preparation.

Future Research

Implicit in the technical change model is the notion that technology for food preparation has evolved and continues to evolve with sizable improvements in mass production. The switch from individual to mass preparation has lowered the time price of food consumption and led to increased quantity and variety of food eaten, while energy needs have remained stable. As a consequence, body weight increases.

The key idea is that consumers respond to changing costs both in cash and time. The increasing body weight is expected, given changes in economic conditions: the price of food fell, the cost of preparing foods fell, energy needs for work and home fell, and the value of women’s time rose.

Future research, will need to consider other economic factors that may affect weight increases, such as food stamps and other feeding programs, which reduce the cost of food for key population groups; reductions in smoking from increasing tobacco prices, and concomitantly, the rise in the cost of appetite control; the lower cost of illness (e.g., heart disease is less costly to the individuals over time); and the improved efficiency of grocery distribution and retailing.