

Unreliable food supplies may lead to obesity

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Obesity could result from not always having enough food rather than always having too much, our [latest research shows](#). And understanding the evolutionary logic governing our guts helps explain global patterns of obesity and offers clues for tackling it.

Social scientists have written hundreds of papers showing that [obesity](#) goes [hand in hand](#) with poverty and [food insecurity](#). This is viewed by the profession as paradoxical. But, from an evolutionary point of view, being fat when food-insecure makes good sense. Experiments with [birds](#) and [mice](#) show that evolution has shaped animals to store fat when food supplies are uncertain. This helps them buffer against starvation in case of food shortfalls.

This survival benefit of carrying more fat is balanced against the disadvantages of reduced athleticism. So only if an animal faces sufficient risk of food scarcity does it pay to be fatter. Inspired by this evolutionary reasoning, we wanted to know if the logic of insuring against starvation by carrying more fat also applied to humans facing unreliable food supplies.

Our meta-analysis of 125 epidemiological studies, published in [Behavioural and Brain Sciences](#), showed a link between people's perceptions of being food insecure and having higher [body weight](#). Food-insecure people were 21% more likely to be fat compared with those who had regular access to food.

Caveman brains aren't wholly to blame

This is not the first time evolutionary biologists have thought about fat. An influential idea is that obesity stems from an [evolutionary mismatch](#) between the environment humans evolved in and the one we now inhabit. The idea is that people's eating decisions were adapted to help our ancestors survive in environments where calories were usually scarce and activity levels high.

Today, these same eating decisions lead to over-consumption – especially of high-calorie foods. According to this view, obesity in modern society is a byproduct of a mind evolved to deal with frequent

scarcity, yet is now living in constant abundance. Consistent with this, average body weight and [rates of obesity](#) increase as a population's lifestyle comes to resemble that of the urban developed world.

The problem with the mismatch reasoning, however, is that it struggles to explain why [most well-off people are not fat](#). Even in the US, where [obesity rates](#) are very high, around a third of American adults are [not overweight](#).

Widespread obesity is concentrated in countries with relatively high levels of economic inequality. For example, [obesity is more common in the unequal US than it is in Japan or Switzerland](#), even though fatty foods are easy to come by in all three nations. Within countries, obesity is [most common among poor people](#). The problem is that the mismatch idea predicts the opposite pattern. The financially better off should be the most able to satisfy their "caveman" desires and so become fattest. But the reverse is true. Poverty and obesity go together. This is where the "insurance" idea gains the upper hand because it potentially explains why poverty, which often leads to food insecurity, is linked to obesity.

According to the insurance idea, it is not simply the cheaper cost per calorie of cakes over carrots responsible for altering the diets of poorer, food-insecure people. Instead we may be evolved to opt for calorific foods that allow us to store fat when worried about future food supplies.

Piecing the paunchy puzzle together

On close inspection of the data, the insurance idea helps to explain patterns of obesity only among women in developed countries. The link between food insecurity and obesity is much weaker among men and children, and in developing countries. Children may be protected from going hungry when food is short, if others in the family go without.

A possible explanation for the lesser influence on men could be that our male hunter-gatherer ancestors paid a greater penalty for big bellies. Fat might have once hampered men in their roles chasing prey or fighting, tipping the balance in favour of agility over insuring against starvation.

In poor countries, even when food is available, it may not be sufficiently calorie-rich for people to put on much weight before the next episode of scarcity strikes. But waistbands can expand as fast as access to high calorie foods in developing countries, even if periods of food insecurity remain. Extreme obesity among Pacific islanders could be case in point – consumption of locally-produced foods [is being replaced](#) by imported fast food, sugary drinks and fatty meats, leading to both greater vulnerability to food insecurity and record rates of obesity.

A combination of mismatch and insurance ideas helps to explain why some waistlines widen while others remain waspy. The constellation of historically unprecedented availability of [high calorie foods](#) in a society, combined with periodic food scarcity among its poorest, helps account for contemporary patterns of obesity. Such a synthesis makes sense of why widespread obesity is an epidemic of affluent countries, but particularly of affluent countries with high levels of inequality or economic insecurity.

If this theory is correct, we should prepare for rapid increases in obesity as unequal developing countries transition to industrialised [food supplies](#). The insurance idea could explain why restrictive dieting is rarely effective for losing weight and is often [counterproductive](#). Periodic dieters may unintentionally send signals of food insecurity to the evolved mechanisms regulating body weight, leading to them putting on more fat as soon as food is made readily available again.

Attempts to combat obesity by dieting, public health messages or food labelling, may prove no match for our evolved weight-regulating

mechanisms in the face of food insecurity. It might be wiser to shift our focus on global obesity away from people's eating decisions and onto society's inequalities over reliable access to [food](#).

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