Genetic study shows men's height and women's weight drive earning power

For every 2.5 inches in height resulting from a man’s genetics, his annual income increases by nearly £1600, while heavier women lose out on £3000 a year

Taller men and slimmer women earn more than those who are shorter and overweight, scientists say.

Researchers who have studied the genetics of people who are short or overweight have found that they earn less than their taller and slimmer colleagues.

Studies have previously shown a link between height, BMI and socioeconomic status, with research suggesting that higher levels of poverty could lead to a shorter stature and higher BMI, possibly as a result of factors such as a poorer diet.

However, until now, it was not clear if the reverse effect was also true - that height and BMI could themselves influence outcomes such as income, job prospects and education levels.

Now researchers from Exeter University have revealed that for every 2.5 inches in height resulting purely from a man’s genetics, his annual income increases by nearly £1600. When a woman, however, has a genetically predicted weight that is two stone heavier than another woman of the same height, she is set to lose out on nearly £3000 in annual income.

“This is the strongest evidence by far that there is a causal link from being a bit overweight as a women, being a bit shorter as man, to doing worse in life,” says Professor Timothy Frayling of Exeter University, who co-authored the paper.

“This won’t apply in every case. Many shorter men and overweight women are very successful, but science must now ask why we are seeing this pattern. Is this down to factors such as low self-esteem or depression, or is it more to do with discrimination?

“In a world where we are obsessed with body image, are employers biased? That would be bad both for the individuals involved and for society.”

Frayling gave examples of how a difference in height and weight might affect income. He said: “If you could take the same woman – same intellect, same CV, same background – and send her through life a stone heavier, she would be about £1,500 per year worse off.

“And if you took the same man - say a 5ft 10in man and make him 5ft 7in – and sent him through life, he would be about £1,500 worse off per year.”

In the largest study of its kind, the new research, [published in the British Medical Journal](http://www.bmj.com/cgi/doi/10.1136/bmj.i582), used an approach known Mendelian randomisation to explore the link. “It’s like doing a randomised control trial,” says Frayling. Using data from the [UK Biobank](https://www.theguardian.com/science/2012/mar/30/uk-biobank-medical-records-britons-online), scientists looked at both measured observations and genetic variants relating to height and BMI in 119,669 white British men and women aged between 40 and 70, in order to tease apart the influence of the traits on five socio-economic markers: annual household income, job class, the chance of getting a degree, duration of education and a metric known as the [Townsend deprivation index](http://www.theguardian.com/society/2015/apr/02/fast-food-takeaway-shops-grow-more-rapidly-in-deprived-areas-of-uk) - a measure of the level of deprivation for a given postcode.

“The authors are not trying to say that the many genes that relate to height [and BMI] also have gene-specific biological effects on educational outcome, or income or whatever - just that through their influence on height or BMI they have social effects,” explains Professor George Davey Smith, of the University of Bristol who was not involved in the study.

Particularly striking was the influence of height on annual household income. The scientists revealed that for every 6.3 cm (2.5 inches) of height - as estimated from genetics - the annual household income for men increased by around £1580. A smaller effect was seen for women.

For BMI, annual household income and level of deprivation were both found to be influenced by the trait - but only in women. An increase in BMI of 4.6kg/m2 (around two stone for a woman of average height), as predicted by genetics, led to the reduction of a woman’s annual household income by around £2940.

However, other results showed a weaker relationship. While height showed some impact on job type for both men and women, and a small influence on educational outcomes for men, BMI was found to play a small role - if any - in affecting such outcomes.

“I think the results are really interesting,” says Dr Neil Davies, also from the University of Bristol. “These results are consistent with small causal effects of height and BMI for some of the outcomes, but actually for others there is really quite compelling evidence that the associations that we see in the population are unlikely to be driven by height and BMI.”

Frayling, however, believes that might be down to the smaller number of genetic variants for BMI compared to height, and limitations in measuring socio-economic outcomes. “We can’t say too much about the negative findings because that might just be a lack of data,” he says.

While the research did not explain how height and BMI might drive socio-economic status, the authors suggest there could be many social processes at work, from issues of self-esteem to discrimination.

However, the study had limitations. As experts point out, the participants in the study were from a limited range of backgrounds, while the effects of inherited social circumstances could also have had an influence. What’s more, they say, social perceptions can vary from place to place, meaning that height and BMI might play different roles in socio-economic outcomes in different societies. “In past populations and some populations today being heavier was actually positively valued,” says Davey Smith.