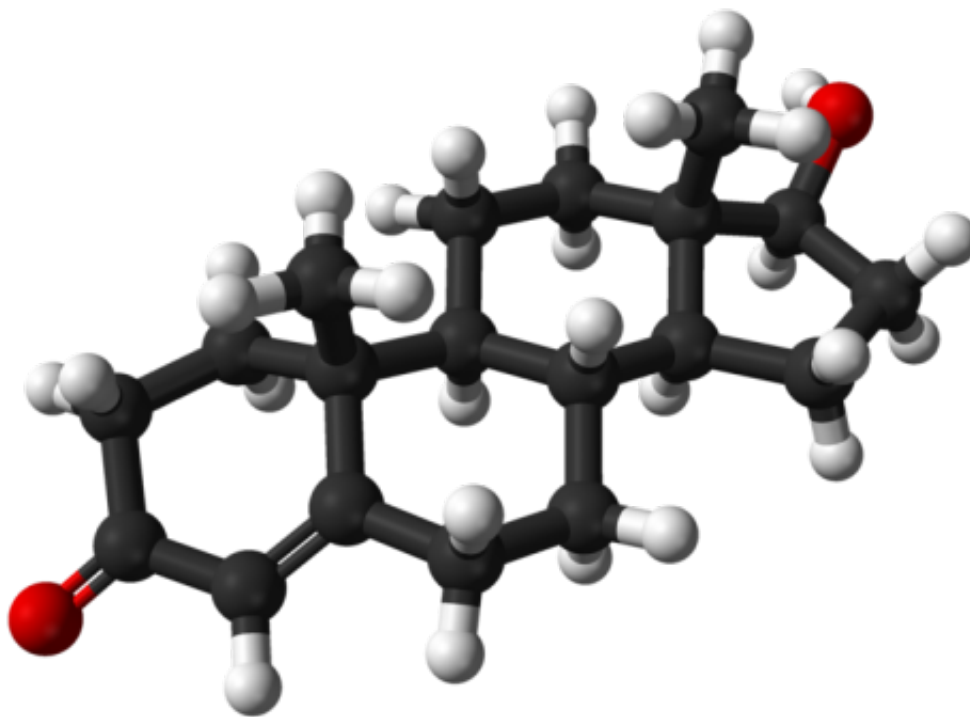


Does testosterone influence success? Not much, research suggests

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Ball-and-stick model of the testosterone molecule, $C_{19}H_{28}O_2$, as found in the crystal structure of testosterone monohydrate. Credit: Ben Mills/Wikipedia

With the Olympics underway, higher testosterone has often been linked to sporting success, and other kinds of success too. But beyond sport, new research has found little evidence that testosterone meaningfully influences life chances for men or women. In fact, the study suggests

that despite the social myths surrounding testosterone, it could be much less important than previously thought.

It is already known that in men testosterone is linked with socioeconomic position, such as income or educational qualifications. Researchers from the University of Bristol's Population Health Sciences (PHS) and MRC Integrated Epidemiology Unit (IEU) wanted to find out whether this is because testosterone actually affects socioeconomic position, as opposed to socioeconomic circumstances affecting testosterone, or health affecting both. The findings are published today [28 July] in *Science Advances*.

To isolate effects of testosterone itself, the research team applied an approach called Mendelian randomization in a sample of 306,248 UK adults from UK Biobank. They explored testosterone's influence on socioeconomic position, including income, employment status, neighborhood-level deprivation, and educational qualifications; on health, including self-rated health and BMI, and on risk-taking behavior.

Dr Amanda Hughes, Senior Research Associate in Epidemiology in Bristol Medical School: Population Health Sciences (PHS), said: "There's a widespread belief that a person's testosterone can affect where they end up in life. Our results suggest that, despite a lot of mythology surrounding testosterone, its [social implications](#) may have been overstated."

First, the team identified genetic variants linked to higher testosterone levels and then investigated how these variants were related to the outcomes. A person's genetic code is determined before birth, and generally does not change during their lifetime (there are rare exceptions, such as changes that occur with cancer). This makes it very unlikely that these variants are affected by socioeconomic

circumstances, health, or other environmental factors during a person's lifetime. Consequently, any association of an outcome with variants linked to testosterone would strongly suggest an influence of testosterone on the outcome.

Similar to previous studies the research found that men with higher testosterone had higher household income, lived in less deprived areas, and were more likely to have a university degree and a skilled job. In women, higher testosterone was linked to lower socioeconomic position, including lower household income, living in a more deprived area, and lower chance of having a university degree. Consistent with previous evidence, higher testosterone was associated with better health for men and poorer health for women, and greater risk-taking behavior for men.

In contrast, there was little evidence that the testosterone-linked genetic variants were associated with any outcome for men or women. The research team concluded that there is little evidence that testosterone meaningfully affected [socioeconomic position](#), health, or risk-taking in men or women. The study suggests that - despite the mythology surrounding testosterone - it might be much less important than previously claimed.

Results for women were less precise than results for men, so the influence of testosterone in women could be studied in more detail in the future using larger samples.

Dr Hughes added: "Higher testosterone in men has previously been linked to various kinds of social success. A study of male executives found that testosterone was higher for those who had more subordinates. A study of male financial traders found that higher testosterone correlated with greater daily profits. Other studies have reported that testosterone is higher for more highly educated men, and among self-employed men, suggesting a link with entrepreneurship.

"Such research has supported the widespread idea that testosterone can influence success by affecting behavior. There is evidence from experiments that testosterone can make a person more assertive or more likely to take risks - traits which can be rewarded in the labor market, for instance during wage negotiations. But there are other explanations. For example, a link between higher testosterone and success might simply reflect an influence of good health on both. Alternatively, socioeconomic circumstances could affect testosterone levels. A person's perception of their own success could influence testosterone: in studies of sports matches, [testosterone](#) has been found to rise in the winner compared to the loser."

More information: Testosterone and socioeconomic position: Mendelian Randomization in 306,248 men and women in UK Biobank', *Science Advances* (2021). [advances.sciencemag.org/lookup ...
.1126/sciadv.abf8257](https://advances.sciencemag.org/lookup...1126/sciadv.abf8257)

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