

Guesstosterone

Testosterone makes men less likely to question their first impulse.



By Emily Velasco

H

theaded, impulsive men who shoot first and ask questions later are a staple of westerns and 1970s cop films, but research conducted at Caltech is showing there might be truth to the trope.

A study by researchers from Caltech, the Wharton School, Western University, and ZRT Laboratory suggests that higher levels of testosterone make men more likely to rely on snap judgments and less likely to realize when they're wrong.

Caltech's Colin Camerer, the Robert Kirby Professor of Behavioral Economics, T&C Chen Center for Social and Decision Neuroscience Leadership Chair, and study co-author, says the topic is of particular importance because of the growing testosterone-replacement-therapy industry, which is primarily aimed at reversing the decline in sex drive many middle-aged men experience.

"If men want more testosterone to increase sex drive, are there other effects? Do these men become too mentally bold, thinking they know things they don't?" Camerer asked.

Bats, Balls, and Brain Teasers

To investigate, researchers measured cognitive reflection—a decision-making process by which people stop to consider whether their gut reaction to something makes sense.

They gathered 243 male participants (making the study one of the largest of its type ever conducted) and randomly selected half of the group to receive a dose of testosterone gel, while the other half received a placebo gel. After waiting a few hours for the testosterone to be fully absorbed, the participants returned to the lab to perform a series of tasks, including a basic math test to control for participant engagement, motivation level, and math skills.

Then they took a cognitive-reflection test, essentially a series of brain teasers designed so they appear to have an obvious answer that is actually wrong. The idea is that someone with reduced



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A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost?

cognitive reflection will stick with the first—usually incorrect—answer that pops into their head while someone who ponders it longer will come up with the correct answer.

The questions included on the test are exemplified by the following:

A bat and a ball cost \$1.10 in total. The bat costs \$1 more than the ball.

How much does the ball cost?

For many people, the first answer that comes to mind is that the ball costs 10 cents, but that's incorrect because then the bat costs only 90 cents more than the ball. The correct answer is that the ball costs 5 cents and the bat costs \$1.05. An individual prone to relying on their gut instincts would be more likely to accept their first answer of 10 cents. However, another person might realize their initial error through cognitive reflection and come up with the correct answer.

Participants were not limited on time while taking the test and were offered \$1 for each correct answer and an additional \$2 if they answered all the questions correctly.

Wrong More Quickly, Right More Slowly

The results showed that the group that received testosterone scored significantly lower than the group that received the placebo, on average answering 20 percent fewer questions correctly.

The testosterone group also “gave incorrect answers more quickly, and correct answers more slowly than the

placebo group,” the authors wrote in the paper describing their results. The same effect was not seen in the results of the basic math tests administered to both groups, they also noted, concluding that the results “demonstrate a clear and robust causal effect of [testosterone] on human cognition and decision-making.”

“The testosterone group was quicker to make snap judgments on the brain teasers,” says Camerer. “The testosterone is either inhibiting the process of mentally checking your work or increasing the intuitive feeling that ‘I’m definitely right.’”

Confidence, aka Mental Aggression

The researchers believe that the phenomena they’ve observed can be linked to testosterone’s biological role in the male drive for increasing and protecting social status. In animals, status is often attained and maintained through physical aggression, which has a well-documented connection to testosterone. In human males, confidence—a sort of mental aggression, as Camerer puts it, is one of the primary drivers of social status, and it, too, is linked to testosterone.

“If a person acts a bit overconfident, there’s a status that comes with that,” he says. “As a side effect, you’ll feel like you’re right and will not have enough self-doubt to correct your mistakes.”

What’s Next?

Researchers at Nipissing University in Ontario have been replicating the Caltech study, and their preliminary results may be released in the near future.

Testosterone might also have other behavioral effects that Camerer says warrant further exploration. During the cognitive-reflection study, the researchers also looked at how testosterone could influence bidding behavior in auctions, but they did not get clear results.

Camerer and his colleagues are now looking at how testosterone affects the desire for status symbols among men. A paper on that research has yet to be published, but their initial results suggest that men with higher testosterone levels gravitate toward the luxury goods, preferring Calvin Klein jeans over Levi’s, for example.

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If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

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In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

“It’s like peacocks showing off their tails,” says Gidi Nave (PhD ’16), a former graduate student in Camerer’s lab, who was a coauthor of the paper and is now an assistant professor at the Wharton School of the University of Pennsylvania. “In many ways, buying something expensive is allowing me to signal to others my status and wealth.”

Other coauthors of the paper, titled “Single dose testosterone administration impairs cognitive reflection in men,” were Amos Nadler of Western University in Canada and David Zava of ZRT Laboratory. Funding for the study came from the MacArthur Foundation, Ivey Business School, International Foundation for Research in Experimental Economics, Russell Sage Foundation, USC, INSEAD, and the Stockholm School of Economics. 

[Answers]

5 cents

Here’s why:

It’s easy to assume that the ball would cost 10 cents, but if that’s the case and the bat costs a dollar more, the bat would cost \$1.10. Together, the bat and ball would cost \$1.20 rather than \$1.10. However, if the ball costs 5 cents, the bat would cost \$1.05. Together, those add up to \$1.10.

5 minutes

Here’s why:

In the above statement, there are five machines and they make five widgets, which means each machine takes five minutes to make one widget. No matter how many machines there are, it still takes each machine five minutes to make a widget. So, if there are 100 machines and each takes five minutes to make a widget, they’ll have made 100 widgets after five minutes.

47 days

Here’s why:

The doubling of the lily-patch can be described mathematically, but common sense will also get you the answer to this problem. If the patch covered half the lake on day 47 and then it doubled in size on day 48, it would cover the lake, since doubling a half makes a whole.

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