

# False starts can sneak by in women's sprinting

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Olympic timing procedures don't accurately detect false starts by female sprinters, according to a new analysis by University of Michigan researchers.

Under the current rules, a woman can purposely anticipate the gun by up to 20 milliseconds, or one-fiftieth of a second, without getting called for a false start, the researchers say.

"This is unfair to the other women in the race because a medal can be won or lost in 20 milliseconds," said James Ashton-Miller, the Albert Schultz Collegiate Research Professor in the College of Engineering, the Institute of [Gerontology](#) and the School of Kinesiology.

The findings, published in the Oct. 19 edition of [PLoS One](#) (Public Library of Science), have implications beyond competitive sports. They provide insights into the fastest whole-body reaction times humans are capable of, and they could possibly inform automobile brake engineering, the researchers say.

Olympic officials use the same criteria to disqualify both male and female sprinters for jumping the gun. A "false start" occurs if an athlete applies an estimated 25 kilogram force to the starting blocks within a tenth of a second (100 milliseconds) of the gun. Why 100 milliseconds? That was thought to be the fastest possible human reaction time. It's a threshold largely based on a 1990 study of eight Finnish sprinters, none of whom were Olympians and none of whom were women.

Ashton-Miller and his colleagues set out to examine: the fastest possible reaction time of an Olympic athlete; whether elite male and female sprinters had similar reaction times; and whether the procedure used to measure reaction time was appropriate for both sexes.

The researchers analyzed the fastest reaction times of the 425 male and female sprinters who competed in the 2008 Beijing Olympics. They coupled this with previous studies in which they measured how rapidly men and women can push on a pedal using ankle extensor [muscle strength](#).

It turns out that the threshold of 100 milliseconds is appropriate, the researchers found. Using statistical methods, they calculated that it is highly unlikely that a man can react faster than 109 milliseconds or a woman faster than 121 milliseconds at the Olympics. These numbers appear, at first, to show that men react faster than women. But Ashton-Miller and his colleagues don't believe that's the case.

Because men have more powerful leg muscles, they can more quickly develop the amount of force necessary for their movement to register. By requiring women to develop the same force as men on the start blocks, the current method makes women appear to have slower reaction times, Ashton-Miller said.

"This study suggests that the method used in the Olympic Games to detect a false start is male-oriented," Ashton-Miller said. "A woman who gets into the 100- to 120-millisecond window is really false starting, but under the present measurement method she wouldn't get penalized for that false start."

The researchers are calling for changes to be made in timing procedures before the London 2012 summer games.

"In terms of the Olympics, it's important for races to be fair. One way to address this would be to lower the force threshold for females," said David Lipps, a Ph.D. student in the Department of Biomedical Engineering.

Male sprinters have 21 percent greater ankle extensor strength than female sprinters. As such, the researchers recommend reducing the allowable increase in force on the starting block for women to a 19.4 kilogram force.

And, Ashton-Miller suggests, perhaps future automobiles with brake-assist features should be notified whether the driver is male or female.

"The study suggests that in the future, automobiles should "know" whether it is a man or a woman that gets into the driver's seat," Ashton-Miller said. "If the auto "knows" a woman is driving, the sensitivity of the braking system should be adjusted to be greater so that women can react as fast as men as men can in an emergency."

Provided by University of Michigan

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