



Olympic Start Gun Gives Inside Runners an Edge

By **BOB HOLMES**

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When Olympic sprinters dash down the track in Beijing this August, the fastest athlete may not take home the gold medal. Current start-gun technology gives athletes on the inside lanes an unfair advantage right off the blocks.

Although officials are aware of the problem, they have no plans to correct it before the Beijing games this summer.

Sound from the starter's gun is known to take longer to reach athletes who start from the outside lanes than their competitors on the inside. Now a new study suggests that competitors nearest the gun have another advantage — the loudness of the bang shocks them into starting more quickly.

Together, these extra boosts may amount to more than a tenth of a second in some races, which is easily enough to make the difference between gold and silver.

Unfair Advantage?

It can take 150 milliseconds longer for sound to travel from the starter's gun to runners in the outside lanes in races such as the 4 x 100 metre relay, where the runners' starting positions are staggered.

To correct for this unfairness, many major athletics events broadcast a start tone through loudspeakers set just behind each runner's starting blocks, so that every runner should hear the start at exactly the same time.

Most major meets also use a "silent gun" where the starter's gun serves only to trigger the start tone. The Olympics, however, still also uses a "loud gun" which also makes the traditional bang.

Several studies show that this bang gives some runners an unfair advantage. At both the 1996 Atlanta Olympics and the 2004 Athens games, runners in the outside lanes of relay races were slower out of the blocks than runners on inner lanes.

In fact, each lane's delay in starting was exactly what you would predict if the runners were responding to the sound of the gun, says Jesus Dapena, a biomechanist at Indiana University in Bloomington who began studying the problem three years ago.

Tense Runners

Runners in lane eight got off the mark on average about 150 milliseconds after runners in lane one, Dapena found. A time delay of that magnitude translates to about a metre's difference at the finish line.

"That's a big handicap for an athlete that can't afford to be giving any handicaps out," says Kevin Tyler, director of the Canadian Athletics Coaching Centre at the University of Alberta in Edmonton, who coaches some of Canada's Olympic sprinters.

In fact, Tyler notes, the effect may be bigger than that because sprinters often tense up and run more poorly when they perceive they have had a bad start.

The loudness of the gun is a second problem. David Collins, a neuroscientist at the University of Alberta, and his colleagues recently found that both trained sprinters and untrained volunteers burst out of the starting blocks about 18

milliseconds more quickly in response to start signals of 120 decibels than to signals of 80 decibels.

Startle Response

The louder sound was also more likely to provoke a startle response, which increased reaction time by a further 18 milliseconds, they found. This should give a further edge to runners in the inside lanes, who will hear a louder gunshot. "They should get rid of the loud gun," says Collins. "Then everything would be all right."

Olympic officials are aware that runners in outside lanes get slower starts, says Imre Matrahazi, technical manager for the International Association of Athletics Federations (IAAF) in Monaco, the international body that oversees athletics.

The IAAF is developing new standards that will correct the problem, he says, but they see no need to make emergency changes before the Beijing Olympics.

In fact, Peter Huerzeler, who recently retired as head of athletics timing for Swiss Timing, the consortium of companies that handles starts and timing for the Olympics, blames the runners for their slow starts. "They are not listening to the signal from the starting blocks," he says.

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