

# Supershoes have transformed competitive distance running, but they remain controversial

July 17 2024, by Bryce Dyer

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On the face of it, competitive distance running appears not to have changed much since the Olympic Games were revived in 1896. However, even the relative simplicity of racing from gun to tape has radically altered in recent years due to the rise of advanced running

footwear known colloquially as "supershoes."

A few years ago, the Nike Vaporfly shoe kicked off [a storm of controversy](#) in athletics. It became a focus for claims about whether it provided some athletes with an unfair advantage over those not equipped [with the shoes](#).

In 2019, Kenyan distance runner Eliud Kipchoge wore prototype Vaporfly shoes when he became the first athlete to run the marathon distance in under two hours as part of the Ineos 1:59 [challenge in Vienna](#). Ultimately, the shoes avoided a ban just in time for the [2020 Tokyo Olympics](#).

Several years on, what more do we understand about these shoes and how they work? My recent paper attempts to review and answer ten key [questions about supershoes](#) as the Paris Olympics now loom on the horizon.

First, we need to understand what supershoes are and how they differ from traditional running footwear. Initially, supershoes used a sole that saw a combination of material called a polyamide block elastomer (known by its tradename Pebax) coupled with the use of a carbon fiber plate.

At the height of the controversy, much was made of this plate, leading to claims that they were essentially springs propelling runners along. However, scientists now understand that, generally speaking, it's the combination of all of [the soles' components](#) working together harmoniously that's behind the shoes' success.

This broad effect has helped topple a raft of world records in the marathon and half-marathon distances. The shoes have [improved times](#) by roughly 1.4%–2.8% or 0.6%–2.2% in the men's and women's

marathon events respectively over the last seven to eight years.

Today, other brands such as Adidas and Saucony have their own designs and use different components in different ways. But the harmonious principle in the sole design is inherently the same.

## Teeter-totter effect

Beyond the observation that all components are working in unison, a more detailed explanation of how the shoes work remains elusive because so many different influences can contribute to athletic performance. Among factors credited with the shoes' enhanced performance are the thickness of the midsole and what's been termed the ["teeter-totter" effect](#), an upwards reaction force that passively enhances the propulsive stance of the runner. There's also [evidence against](#) both of these ideas.

However, there is now strong evidence that supershoes [reduce a runners' oxygen consumption](#) when compared to traditional running shoes. However, the [scientific community](#) isn't in agreement as to how that is achieved.

Most studies [focus on well-trained runners](#) so it's plausible that a recreational runner or those of a different age could see wildly different levels of performance enhancement than the elite runners we'll see in Paris this summer. It's also conceivable that the [placebo effect](#) could mean that simply knowing that you are wearing an advanced shoe makes you perform better in a race, regardless of whether the shoe helps or not.

As to the shoes' acceptability, that is ultimately decided by the [sport's stakeholders and you](#), the spectator. Whether they are fair or not, new technology can either prompt people to use it or provide cost barriers that [reduce peoples' participation](#).

Furthermore, consumers can now purchase supershoe technology themselves. Whether they really want to or are happy to do so for something that may only be effective for [a few hundred miles of running](#) before the sole materials could begin to lose their potent mechanical properties remains equally contentious.

The use of supershoes has not been unchecked or challenged. In 2020, World Athletics, the international governing body for the sport, [moved to limit this technology](#) by implementing regulations that countered what it felt was contributing to the magnitude and frequency of records being broken.

In this case, the governing body's rules centered on limiting the sole thickness, the number and complexity of any internal rigid structures (such as the carbon fiber plates) and the prevention of shoes that were one-offs and would therefore not be accessible for the consumer to buy.

Most leading running shoe brands have now released their own supershoes. The technology will undoubtedly evolve, so perpetual vigilance will be required by the World Athletics. Ultimately, supershoes have sometimes courted controversy, but they don't seem to be going away and will remain an important part of distance running for the foreseeable future.

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Provided by The Conversation

Citation: Supershoes have transformed competitive distance running, but they remain controversial (2024, July 17) retrieved 17 July 2024 from <https://medicalxpress.com/news/2024-07-supershoes-competitive-distance-controversial.html>

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