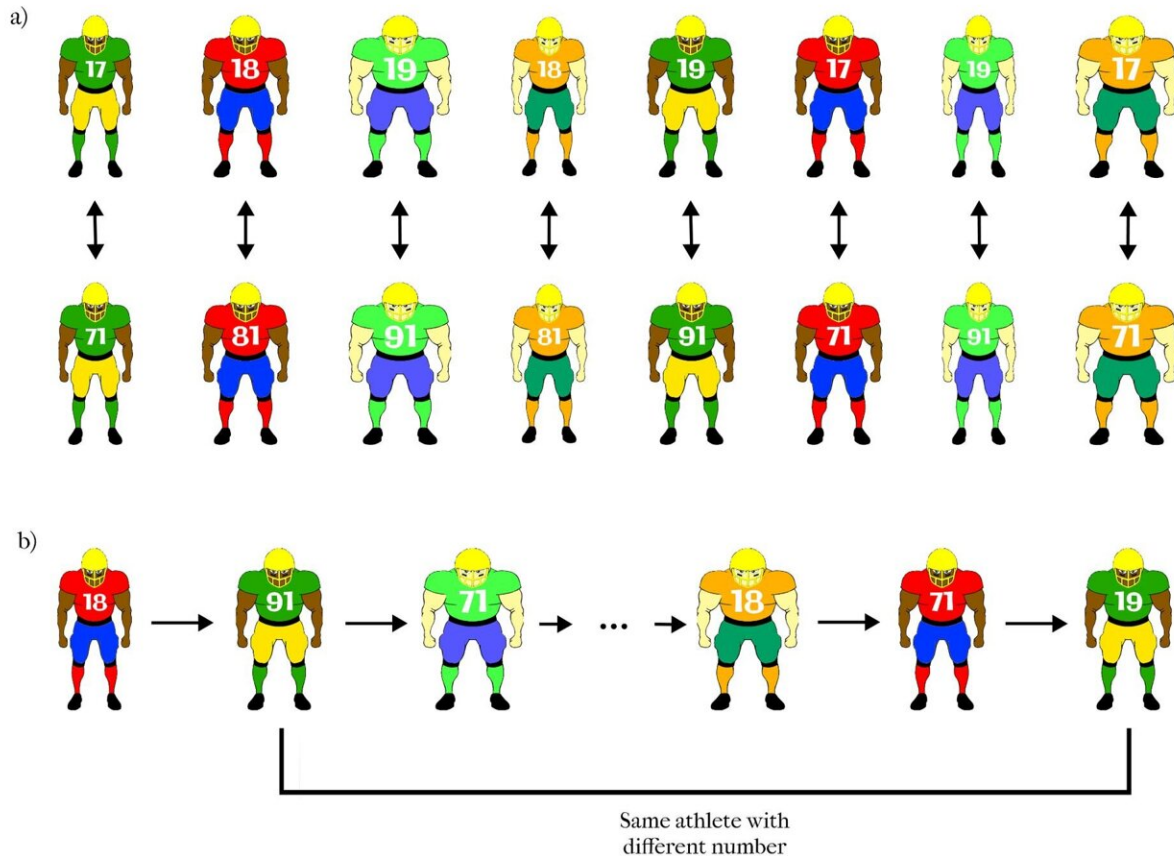


# Statistical association influences perception that lower numbers on jerseys make players appear thinner and faster

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Research subjects consistently said that images of players in jerseys numbered from 10 to 19 looked thinner than those in jerseys numbered from 80 to 89.  
Credit: Multisensory Processing Lab/UCLA, PLOS One

In 2019, an ESPN report explored the reasons so many football wide receivers prefer to wear jersey numbers between 10 and 19. The story found that many of the athletes simply believed the lower numbers made them look faster and slimmer than the higher numbers traditionally assigned to their position.

Ladan Shams, a UCLA professor of psychology and neuroscience, was quoted in the story and offered a psychological explanation for the phenomenon. But she emphasized that there was no [scientific research](#) on the topic.

Now there is.

A new UCLA study published in the journal [PLOS ONE](#) reveals that those wide receivers were onto something.

In two experiments, subjects consistently said that images of players in jerseys numbered from 10 to 19 looked thinner than those in jerseys numbered from 80 to 89, even when the body sizes were the same. The finding suggests that previously learned statistical associations between numbers and sizes influence the perception of body size.

"How we perceive the world is highly influenced by our [prior knowledge](#)," said Shams, the paper's senior author. "In our daily lives, numbers written on objects—on a bag of sugar in the supermarket or weights in the gym—usually represent the magnitude of the objects. The higher the number, the bigger or more massive the object generally is.

"Previous research has established that our brains are very good at detecting and storing statistical associations and regularities, unbeknownst to us, and those associations can shape future perception."

A longtime NFL rule required wide receivers to wear uniform numbers

between 80 and 89, but the league changed the restriction in 2004, opening the door for pass-catchers who preferred lower numbers on their uniforms. By 2019, when ESPN published its story, nearly 80% of wide receivers wore a jersey number between 10 and 19.

Shams is a specialist in the science of perception, and when her other work ground to a halt during the COVID-19 pandemic, she returned to the question about jersey numbers. With her research group, she devised an online study to test her suppositions about the popularity of lower numbers.

Respondents were shown computer-generated images of players in identical poses—but with different body sizes and skin and jersey colors—and were asked to judge their slenderness. Subjects saw each player twice—once each in jerseys with high and low numbers. In general, the players in jerseys numbered from 10 to 19 were perceived as thinner than players in jerseys numbered 80 to 89, regardless of their body size and their skin or jersey colors.

After pandemic restrictions eased, the researchers repeated the experiment in person.

This time, they addressed concerns that because the numeral 8 is wider than 1, simply the amount of jersey space occupied by numbers from 80 to 89 could make players look larger. So they chose number combinations that used the same numerals but varied only in which digit came first: 17 and 71, 18 and 81, 19 and 91.

In this second experiment, subjects still perceived the players with higher numbers to be huskier than players with lower numbers, although the effect was somewhat smaller than in the first iteration.

Shams said the results strongly support the hypothesis that when

processing perception of body size, the brain leans on learned associations between numbers and objects' size attributes. That finding is consistent with previous research showing that statistical learning is a fundamental and universal learning mechanism.

Those learned associations, Shams said, generally help the brain interpret sensory input—the pattern of light receptor responses in the eye, for example—because [sensory input](#) can be noisy, unreliable and ambiguous. The ability to perceive the world faster and more correctly is critical for survival, she said.

How viewers perceive football players' body size likely has little effect on the athletes' performance. But in other areas of life, such perceptual and [cognitive biases](#) can be more harmful—for example, when they influence judgment, decisions and behavior toward people or [social groups](#), a phenomenon often referred to as implicit bias. If a group is frequently associated with negative qualities, others are much more likely to treat people in that group accordingly, whether they realize it or not.

"Our work highlights the importance of representation," Shams said. "We need to see all kinds of people doing the full diversity of things people can do. We can use the statistical learning power of our brains to reduce implicit bias."

**More information:** *PLOS ONE* (2023). [journals.plos.org/plosone/article?id=10.1371/journal.pone.0287474](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0287474)

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