

# Lines on the Road are Longer Than You Think

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Most people believe that the dashed lines painted down the middle of a road are about 24 inches in length. And they're off by about 8 feet.

US federal guidelines dictate that the dashed lines separating traffic lanes or indicating where passing is allowed run 10 feet in length. But a recent study showed that people grossly underestimate the length of those lines, and thus could be misjudging distances as they drive. That means they could be driving too fast.

Psychological scientist Dennis Shaffer began heading up this research as a graduate student in the 1990s and continued it while on the faculty at Arizona State University and finally at The Ohio State University, where he serves as an assistant professor. The series of experiments involved a collective 400 college students over the years.

In the first experiment, he and his colleagues gave participants a written test in which they were asked how long they believed the lines and the spaces in-between lanes to be. In a second experiment, the researchers took a piece of paper that was the exact size and shape of a dashed line and taped it to the ground. Participants stood either 60 or 120 feet from the line, and looked at it at an angle close to their line of sight, as they would see it if they were driving down a road. In the third experiment, participants sat in the front or rear passenger seat of a car, and were asked to study the lines and spaces while a researcher drove down an actual road at either 25 or 60 miles per hour.

In all three experiments, most of the students, when asked to guess the length of the lines, answered 2 feet.

At each university, he and his colleagues measured lines on a variety of nearby roads. Over those years,

the federal guideline for line size shrank from 15 feet to 10 feet. Wherever the researchers went, they found all lines to be close to the federal guidelines of the time. In Arizona in 2000, for instance, some lines were 16 feet long instead of the expected 15.

But even back then — when the federal guideline was 15 feet — people still thought of lines as measuring only 2 feet.

Why are these erroneous estimates for consistent? Shaffer suspects that the miscalculations have something to do with how our brains perceive geometry. Engineers design roads, buildings, and public spaces using Euclidian geometry — the system of lines and angles first described by the ancient Greek mathematician Euclid. But this study and previous ones suggest that our brains perceive objects in a non-Euclidian way.

As a possible explanation for this misperception, Shaffer pointed to the concept of “size constancy”— in which we see an object as being the same size, no matter how close or far away it is. Scientists have demonstrated this phenomenon in a number of contexts. [In a study published in \*Psychological Science\*](#), for example, researchers found that people tend to perceive their dominant hand as staying relatively the same size even when its magnified.

Even though lines appear to expand as a car passes by, drivers can’t safely notice that effect. Rather, the first line we can comfortably look at while driving safely is some 120 feet ahead — the fourth line ahead on the road. So perhaps we think that all lines are as small in reality as that one faraway line appears to be.

These line misperceptions have real implications for traffic safety. The empty spaces between each line measure 30 feet. So every time a car passes a new dashed line, it has traveled 40 feet. But in this study, people consistently judged the lines and the empty spaces to be the same size — 2 feet. This means drivers are covering more ground than they perceive, and are thus underestimating their speed. The study appeared in the journal *Attention, Perception & Psychophysics*.