

## Tall people have built-in advantage when it comes to spatial relations, study finds

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Credit: BalticHurricanes/Wikipedia

Tall quarterbacks might have more going for them than a clear view over the offensive line.

New research shows that tall people are better than shorter people at correctly identifying the location of targets in their middle-distance vision - between three and 20 meters away. (In football, that would be

about three to 22 yards away.)

And that visual superiority holds true even when tall people sit down and their shorter counterparts stand on a box or stool, found a first-of-its-kind study.

The research supports the idea that with height comes better [spatial relations](#), said study author Teng Leng Ooi, a professor of optometry at The Ohio State University. The study appears today in the journal *Science Advances*.

The study could point to advantages for taller people in certain situations, Ooi said.

"Maybe taller athletes have advantages on the field, especially in sports such as tennis and football," she said.

Spatial relations are a person's ability to place something in relation to the other objects around it. Our eyes alone aren't sufficient to adequately assess the space around us. And researchers believe that the brain makes up for the eyes' deficits by applying built-in knowledge for determining where things are in that space, Ooi said. That becomes even more important in the dark, when we don't have as many visual clues.

To test participants' ability to judge the location of a target, the researchers had the 24 subjects (12 short, 12 tall) predict distance in three different settings: full light; a pitch-black room with a green LED "target" light at a distance; and in darkness with dimly lit red LED markers either on the floor or on the ceiling as a reference.

In the dark experiments, after a study participant saw the target, the researchers removed the green light and asked the subject to walk to and point out the target location.

The tall subjects weren't perfectly accurate, but they fared much better overall than the short participants when it came to assessing the location of targets that were farther away.

"That could be because they've spent a lifetime of looking at the ground from a higher vantage point," Ooi said.

Taller people have a better perspective of the ground: For example, if you're looking at two traffic cones (one directly in front of the other) about 50 feet away, the distance between the two will be more apparent from a 6-foot eye height than from a 4-foot eye height.

Because of this, Ooi and her collaborators predicted that taller people would more accurately perceive the space between themselves and a target in the distance. And they wondered if the tall people would outdo their shorter counterparts even in the dark, because of an implicit knowledge of where objects are in space.

Researchers have long favored the theory that people rely most heavily on the ground to help them determine the distance of an object in their intermediate vision, Ooi said, and this study supports that.

The ground is likely our preferred reference because it tends to have visual texture that helps us to perceive space, she said.

"To have accurate space perception, the ground surface is very important," Ooi said. "We are really reliant on the ground - we don't float, we don't fly, so maybe through evolution our brains have taken this factor into account."

To further test the theory that our brains are hard-wired for predicting the correct location of an object, the researchers switched up the eye height advantage of their test subjects.

When the tall people sat down and the short people stood on a box, the tall people still excelled at determining the distance of a visual target.

The researchers also found - as expected - that people both short and tall were more accurate when they had visual cues (those dimly lit red LED markers) on the floor as opposed to the ceiling.

The jury's out on whether a short person who always wears high heels or drivers who choose SUVs over compact cars gain visual benefit, Ooi said.

"It's possible we adapt. We aren't there scientifically, but that's a natural question."

**More information:** "Intrinsic spatial knowledge about terrestrial ecology favors the tall for judging distance," *Science Advances*, [advances.sciencemag.org/content/2/8/e1501070](https://advances.sciencemag.org/content/2/8/e1501070)

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