

How's your 'twilight vision'? Study suggests new standardized test

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A simple method of testing "twilight vision" gives reliable results in identifying people who have decreased visual acuity under low light conditions, according to a study in the May issue of *Optometry and Vision Science*, official journal of the American Academy of Optometry.

Using filters to test at a light level 100 times lower than for daylight [visual acuity](#) testing, vision care professionals can obtain "reliable and repeatable" measurements of twilight vision, report Jason S. Ng, OD, PhD, and colleagues of Southern California College of Optometry at Marshall B. Ketchum University in Fullerton, Calif.

Testing Twilight Vision—Looking for a Standard Method

The researchers sought to develop a standardized approach to testing vision at low light levels. "Typically, eye chart visual acuity is measured at light levels that approximate daylight (photopic) vision conditions," explains Anthony Adams, OD, PhD, Editor-in-Chief of *Optometry and Vision Science*. "However, twilight vision, or vision at dusk (mesopic vision) can be noticeably worse for some people and especially for some patients with eye problems."

In 43 healthy subjects, Dr. Ng and colleagues tested visual acuity at daylight level and, using light filters, at three different mesopic light

levels. They made detailed assessments to determine how vision was affected not only by lower light levels, but also by other potential explanatory factors—including the normal increase in pupil size at lower light levels.

With each progressive reduction in illumination, visual acuity decreased significantly. In the young group of study volunteers (average age 25 years), vision decreased from normal (approximately 20/20) in daylight to almost 3 eye chart lines worse at the darkest level tested. Vision at the recommended test light level for twilight vision was closer to 1.5 lines worse than normal.

"The light level itself was found to explain the vast majority of the variance" in vision with decreased illumination, Dr. Ng and coauthors write. The change in pupil size at lower light levels was unrelated to the change in visual acuity, while the "focus posture" of the eyes (accommodative error) had only a small effect.

The middle of the three mesopic levels tested provided a "significant and repeatable" decrease in visual acuity. The researchers recommended this light level—equivalent to a 100-times decrease from daylight illumination—for routine testing.

Sometimes called "night myopia," decreased twilight vision is a significant functional problem for many young adults who have a slight shift toward myopia. Older adults can also have poor twilight vision for other reasons that relate more to the decreased clarity of the eyes' contents (such as the internal lens of the eye) with age. Still others may have retinal eye diseases that cause decreased vision at lower light levels.

But there has been no standardized approach to testing twilight vision, and there are continued questions about the factors contributing to it.

The new study provides a simple and reliable approach to testing twilight vision, and shows that the light level itself is the major factor explaining the decrease in visual acuity.

Dr. Ng and colleagues note that the average vision reduction in their young adult group of volunteers was small. But especially with further studies in older age groups, mesopic vision testing could be an important means of testing or screening of various conditions—especially for patients with conditions known to affect night vision. Dr. Ng and colleagues hope their standardized testing method "will allow for more focused research on applying mesopic [vision](#) function findings to patient care."

More information: "Determinants and Standardization of Mesopic Visual Acuity" [DOI: 10.1097/OPX.0000000000000584](https://doi.org/10.1097/OPX.0000000000000584)

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