

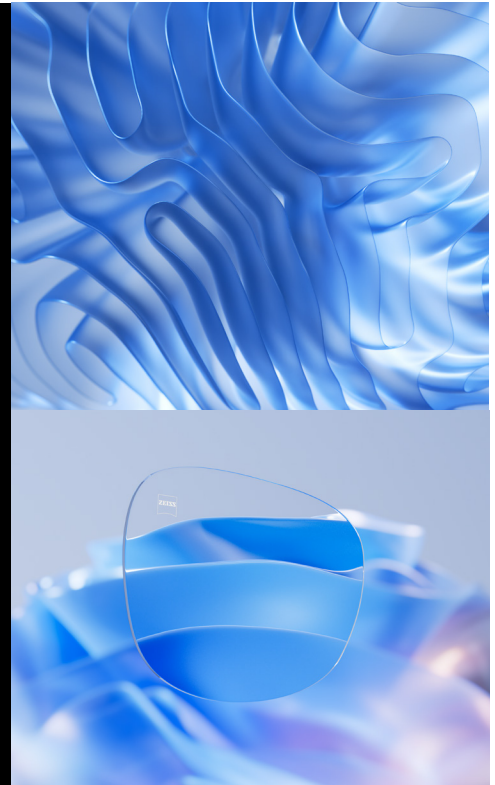


Scientifically proven: Lens induced blur impacts cognitive load

At the 2026 Annual Meeting of the Vision Sciences Society (VSS), researchers from the ZEISS Vision Science Lab presented data investigating how defocus blur induced by spectacle lenses affects cognitive load. Cognitive load was assessed subjectively via a validated questionnaire and objectively using electroencephalography (EEG).

With increasing levels of defocus blur, participants reported significantly higher cognitive load. Consistent with these subjective findings, EEG analyses indicated increased cognitive and attentional demand when visual quality was reduced.

This research contribution provides the first evidence that lens-induced blur can increase cognitive load—validating a key concept underpinning our new premium lens portfolio: ZEISS ClearMind lenses. ZEISS ClearMind lenses were developed with this insight in mind, with the aim of minimizing lens-induced blur to support comfortable, efficient vision – particularly in visually demanding, real world tasks relevant to all wearers.



Background and Context

Blurry vision affects billions of people worldwide. It impacts not only those with uncorrected refractive errors but also presbyopes, for whom peripheral lens aberrations are unavoidable. Many presbyopes report greater effort during visual and visuomotor tasks.

Together, this indicates that reduced visual quality can increase cognitive demand. At the **2026 Annual Meeting of the Vision Sciences Society (VSS)** – an international research society committed to progress in understanding vision, and its relation to cognition, action and the

brain – held May 15–19, 2026 in St. Pete Beach, Florida, ZEISS presented key findings showing that lens-induced blur impacts cognitive load – providing the scientific foundation for the ZEISS ClearMind lens portfolio.

Key Results

In a controlled task study (n=29), increasing spectacle lens-induced defocus blur was associated with higher cognitive demand and poorer performance. Participants completed a 3-minute pegboard task under best-corrected vision and two increasing blur levels (randomized, 3 repeats per condition).

- Task performance significantly decreased as defocus blur increased.
- Subjective cognitive load (assessed via the scientifically validated NASA-TLX questionnaire) significantly increased with higher blur levels, with an average increase in relative scores of 128% ($p < 0.001$).
- EEG showed blur-dependent changes consistently with greater attentional demand (occipital theta/alpha decreased; prefrontal theta increased).

References

Sauer, Y., Agarwala, R., Witten, J.L., Roth, A., Michel, P., Ungewiss, J., Wahl, S. (2026, May 15–19). EEG Evidence for Increased Cognitive Demand from Defocus Blur. [Conference presentation abstract]. Vision Sciences Society, St. Pete Beach, Florida, United States.