Boosting Older Adults' Vision Through Training

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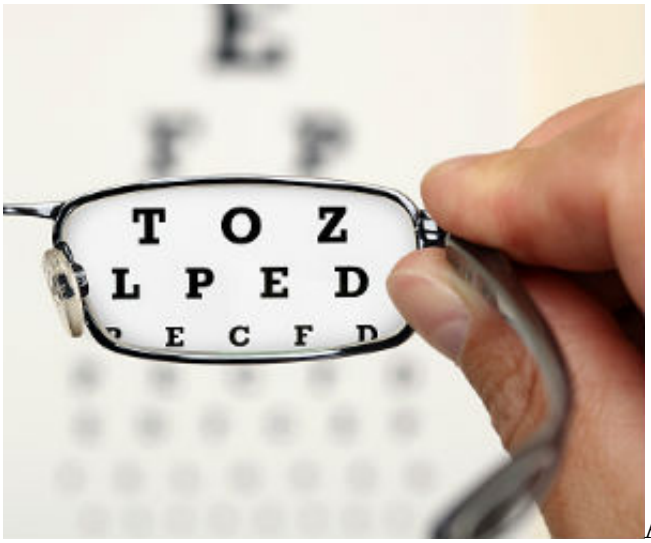
Just a weeks' worth of training can improve vision in older adults, according to new research in *Psychological Science*, a journal of the Association for Psychological Science. The findings show that training boosted older adults' sensitivity to contrast and also their ability to see things clearly at close distances.

"Our research indicates that the visual system of older adults maintains a high degree of plasticity and demonstrates that training methods can be used to improve visual function," explains psychological scientist G. John Andersen of the University of California, Riverside who co-authored the study with graduate student Denton DeLoss and colleague Takeo Watanabe of Brown University.



Age-related declines in vision and visual processing are common and they can have serious negative consequences for the health and well-being of older adults. Older adults are particularly likely to show declines in their ability to process low-contrast visual stimuli — for example, images that are grainy or not clearly defined. This decline hampers their ability to see visual detail, and can hinder their ability to process information that is important for both balance and driving.

While some age-related declines in vision can be traced to the eye itself, research suggests that decline in other aspects of vision are the result of changes in brain function, and DeLoss and colleagues wondered whether a training program that involved repeated exposure to specific stimuli might counteract these changes in brain function.

The researchers recruited 16 young adults (on average, about 22 years old) and 16 older adults (on average, about 71 years old) to participate in the study, all of whom were screened to ensure that they didn't show signs of cognitive decline or eye disease.

The participants came to the lab for 1.5-hour sessions over the course of 7 days. In general, each trial of

the experiment involved looking at a striped visual stimulus and determining whether it was rotated clockwise or counterclockwise from its original orientation. The researchers varied the contrast of the stimulus across trials, altering how grainy or clear the image was.

Each day, the contrast threshold of the trials was calibrated to the participants' previous performance so that they were training near the limit of what they could reliably detect. Participants were exposed to 750 trials on each training day, for a total of 3,750 training trials over the course of the study.

The data showed that visual training effectively eliminated the age deficit in contrast sensitivity. At the beginning of the experiment, younger adults outperformed older adults on the task; but the older adults improved with training, showing performance similar to that of their younger peers by the end of the 7 days.

Further analyses confirmed that these improvements stemmed from changes in visual processing in the brain and not changes in the eye.

"We found that the training effect was not due to factors such as dilating the pupils to let in more light to the retina," explains Andersen.

Even more remarkable, both younger and older adults showed improvements in visual acuity when they were tested using an eye chart similar to the one at your doctor's office. At the end of training, older adults showed improvement in near acuity, or the ability to see things clearly when they are near; younger adults, on the other hand, showed improved ability to see things clearly when they are far.

"Given the short training period, the degree of improvement is quite impressive, particularly in the cases of near and far acuity, in which subjects were able to read an average of two to three additional letters on acuity charts after training," the researchers write.

It's important to note that these findings don't shed light on visual function among adults suffering from age-related eye diseases, such as glaucoma or macular degeneration. Nonetheless, the findings could have broad relevance for the many millions of adults who experience age-related decline in visual processing.

The researchers hope to further explore the mechanisms involved in perceptual learning and whether the effects of visual training carry over to real-world tasks, such as driving.

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