

why learning may become more difficult as people age: They learn more than they need to. Researchers call this the "plasticity and stability dilemma." The new study suggests older people may indeed be facing it.

"Plasticity may be kept OK, in contrast with the view of many researchers on aging who have said that the degree of plasticity of older people gets lower," said Takeo Watanabe, the Fred M. Seed Professor at Brown University, corresponding author of the study in *Current Biology*. "However, we have found that the stability is problematic. Our learning and memory capability is limited. You don't want older, existing important information that is already stored to be replaced with trivial information."

Numerals, not dots

To conduct the study, Watanabe and his team enrolled a group of 10 people between 67 and 79 years old and another group of 10 people ages 19 to 30 for an experiment. Over a nine-day period, they trained on a simple visual exercise: Shown a quick sequence of six symbols - four letters and two numerals - volunteers were asked to report the numerals they saw. Their performance on a test at the end of training was compared to their score on a pre-test.

The volunteers were explicitly instructed to only bother with spotting the two numerals, but each symbol they saw had a background of moving dots. Unbeknownst to the subjects, those dots would move with varying degrees of cohesiveness of direction. In the pre- and post-tests the researchers also asked the volunteers to report the direction of dot movement when they saw the numerals.

The results of the testing were telling. Older people improved as much as younger people on the relevant task of identifying the two numerals.

"These results indicate that older subjects as well as younger subjects showed significant amounts of task-relevant learning," the authors wrote. "No evidence was obtained that indicates that older individuals have a problem with plasticity."

Last week, in fact, Watanabe and colleagues published a [study](#) showing that plasticity during visual learning occurs in older people as well as younger ones, but it is manifest differently in the brains of the different groups.

But in this study when it came to the irrelevant skill of discerning the prevailing direction of dot movement, older people learned that, too, even when it was at its most obvious. Younger people, meanwhile, only showed improvement on discerning movement when it was insidiously subtle. If it was clear, they recognized it and filtered it out.

The idea that the most obvious signals were the most easily filtered, suggested that the difference between older and younger learners was a matter of attention.

The researchers therefore subjected the volunteers to another test for the ability to find a relevant stimulus amid a number of distractors. Older people did notably worse than younger ones, adding evidence that the attentional systems for filtering out irrelevant stimuli were indeed weaker in older learners. Importantly, the poorer an older subject was at the ability to filter out irrelevant stimuli, the more irrelevant stimuli the subject learned.

Watanabe said the finding is not necessarily discouraging news. Perhaps filtering can be improved with some kind of training.

"The hope is that maybe what older people need to do is to learn a skill to avoid learning what is not necessary," he said.

More information: *Current Biology*, Chang et al.: "Age-related declines of stability in visual perceptual learning" [www.cell.com/current-biology/a ... 0960-9822\(14\)01350-5](http://www.cell.com/current-biology/a ... 0960-9822(14)01350-5)

Provided by Brown University

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