

Elderly can be as fast as young in some brain tasks, study shows

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Both children and the elderly have slower response times when they have to make quick decisions in some settings.

But recent research suggests that much of that slower response is a conscious choice to emphasize accuracy over speed.

In fact, healthy [older people](#) can be trained to respond faster in some decision-making tasks without hurting their accuracy – meaning their cognitive skills in this area aren't so different from younger adults.

"Many people think that it is just natural for older people's brains to slow down as they age, but we're finding that isn't always true," said Roger Ratcliff, professor of psychology at Ohio State University and co-author of the studies.

"At least in some situations, 70-year-olds may have response times similar to those of 25-year olds."

Ratcliff and his colleagues have been studying cognitive processes and aging in their lab for about a decade. In a new study published online this month in the journal [Child Development](#), they extended their work to children.

Ratcliff said their results in children are what most scientists would have expected: very young children have slower response times and poorer accuracy compared to adults, and these improve as the children mature.

But the more interesting finding is that older adults don't necessarily have slower brain processing than younger people, said Gail McKoon, professor of psychology at Ohio State and co-author of the studies.

"Older people don't want to make any errors at all, and that causes them to slow down. We found that it is difficult to get them out of the habit, but they can with practice," McKoon said.

Researchers uncovered this surprising finding by using a model developed by Ratcliff that considers both the reaction time and the accuracy shown by participants in speeded tasks. Most models only consider one of these variables.

"If you look at aging research, you find some studies that show older people are not impaired in accuracy, but other studies that show that older people do suffer when it comes to speed. What this model does is look at both together to reconcile the results," Ratcliff said.

Ratcliff, McKoon and their colleagues have used several of the same experiments in children, young adults and the elderly.

In one experiment, participants are seated in front of a computer screen. Asterisks appear on the screen and the participants have to decide as quickly as possible whether there is a "small" number (31-50) or a "large" number (51-70) of asterisks. They press one of two keys on the keyboard, depending on their answer.

In another experiment, participants are again seated in front of a computer screen and are shown a string of letters. They have to decide whether those letters are a word in English or not. Some strings are easy (the nonwords are a random string of letters) and some are hard (the nonwords are pronounceable, such as "nerse").

In the *Child Development* study, the researchers used the asterisk test on second and third graders, fourth and fifth graders, ninth and tenth graders, and college-aged adults. Third graders and college-aged adults participated in the word/nonword test.

The results showed that there was a rise in accuracy and decrease in response time on both tasks from the second and third-graders to the college-age adults.

The younger children took longer than older children and adults to respond in the experiment, Ratcliff said. They, like the elderly, were taking longer to make up their mind. But the younger children were also less accurate than younger adults in this study.

"Younger children are not able to make as good of use of the information they are presented, so they are less accurate," Ratcliff said. "That improves as they mature."

Older adults show a different pattern. In a study published in the journal *Cognitive Psychology*, Ratcliff and colleagues compared college-age subjects, older adults aged 60-74, and older adults aged 75-90. They used the same asterisk and word/nonword tests that were in the Child Development study. They found that there was little difference in accuracy among the groups, even the oldest of participants.

However, the college students had faster response times than did the 60-74 year olds, who were faster than the 75-90 year olds.

But the slower response times are not all the result of a decline in skills among older adults. In a previous study, the researchers encouraged [older adults](#) to go faster on these same tests. When they did, the difference in their [response times](#) compared to college-age students decreased significantly.

"For these simple tasks, decision-making speed and accuracy is intact even up to 85 and 90 years old," McKoon said.

That doesn't mean there are no effects of aging on decision-making speed and accuracy, Ratcliff said. In a study in the *Journal of Experimental Psychology: General*, Ratcliff, McKoon and another colleague found (like in studies from other laboratories) that [accuracy](#) for "associative memory" does decline as people age. For example, older people were much less likely to remember if they had studied a pair of words together than did younger adults.

But Ratcliff said that, overall, their research suggests there should be greater optimism about the cognitive skills of seniors.

"The older view was that all cognitive processes decline at the same rate as people age," Ratcliff said.

"We're finding that there isn't such a uniform decline. There are some things that older people do nearly as well as young people."

Ratcliff co-authored the Child Development paper with Jessica Love and John Opfer of Ohio State and Clarissa Thompson of the University of Oklahoma. Ratcliff and McKoon co-authored the *Cognitive Psychology* and *Journal of Experimental Psychology: General* papers with Anjali Thapar of Bryn Mawr College.

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