

New study reconciles conflicting data on mental aging

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A new look at tests of mental aging reveals a good news-bad news situation. The bad news is all mental abilities appear to decline with age, to varying degrees. The good news is the drops are not as steep as some research showed, according to a study published by the American Psychological Association.

"There is now convincing evidence that even vocabulary knowledge and what's called crystallized intelligence decline at older ages," said study author Timothy Salthouse, PhD.

Longitudinal test scores look good in part because repeat test-takers grow familiar with tests or testing strategies, said the University of Virginia psychologist. Factoring out these "practice effects" showed a truer picture of actual mental aging, according to Salthouse.

Still, the declines, although pervasive, are smaller than thought, according to the report in the July issue of [Neuropsychology](#). That finding contradicts data gathered by the other major research approach to aging, cross-sectional studies, which compare the performance of different age groups at the same time.

With both methods subject to bias, "It remains important to recognize the limitations of each type of study design when interpreting results," Salthouse said.

To learn what really happens as people age, Salthouse tackled how

different research methods have led to different findings. Cross-sectional studies that compared the abilities of younger and older adults showed big drops in key areas. Longitudinal studies suggested that, until about age 60, abilities are stable or even improve. Which type of study, if either, was right?

To find out, Salthouse analyzed data on five key [cognitive abilities](#) from the longitudinal Virginia Cognitive Aging Project. Scores were available for 1,616 adults age 18 to more than 80 on tests of reasoning, spatial visualization, [episodic memory](#), perceptual speed and vocabulary. The data were collected over an average test-retest interval of two-and-a-half years.

First, Salthouse sorted participants into age brackets by decade, each with well more than 100 participants, except for the 80-89 bracket, with 87 participants. Second, he estimated the size of practice effects by comparing scores earned on the second test by the longitudinal participants with scores on a first test by another group of participants. He also used statistical methods to adjust for the chance that weaker performers dropped out between the first and second tests.

Practice effects were evident across the board, allowing test-takers to score higher the second time around not because they truly were more able, but because they knew the test - an unavoidable byproduct of repeated testing. Although the numbers varied by ability and age, practice effects were found to be as large as or larger than the annual cross-sectional differences.

Numbers in hand, Salthouse removed the practice-related "bonus points." Stripping them out generated a new set of cognitive scores that could be expected to reflect more accurately normal mental aging in healthy adults.

With practice effects taken into account, the age trends in the longitudinal data became more similar to results from cross-sectional studies in the places where they had diverged. The different methods now agreed on the downward direction of change. However, the increments were smaller. In other words, the mental abilities of younger adults still rose over time, but not nearly as much. And the [mental abilities](#) of older adults still fell over time, but not quite as much.

Knowing how practice effects, selective attrition and actual maturation affect how people change over time will put psychologists in a better position "to evaluate true age changes, and how they might relate to late-life pathology and everyday functioning," Salthouse said.

Salthouse also found that practice effects played a bigger role in younger than [older adults](#), possibly because younger people learn better.

"Longitudinal comparisons in people of different ages may be even more complicated because the amount of longitudinal change may be partially determined by the individual's learning ability at a given age," he noted.

More information: "Influence of Age on Practice Effects in Longitudinal Neurocognitive Change," Timothy A. Salthouse, PhD, University of Virginia; *Neuropsychology*, Vol. 24, No. 5.

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