Cognitive training effects differ by older adult's education level

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The first study to investigate the effects of cognitive training on the cognitive functioning of older adults by education level has found that individuals with fewer than 12 years of schooling benefit more from cognitive training than their more highly educated counterparts.

While the effects of reasoning and memory training did not differ by educational attainment, the effect of speed of information processing training differed significantly. Cognitively normal older adults with less than a complete high school education experienced a 50 percent greater effect from speed of information processing training than college graduates.

The advantage gained from speed of information processing training for those with fewer than 12 years of education was maintained for three years after the end of the training.

Ten trainings over six weeks on auditory and visual tasks, conveyed through specially designed computerized exercises, taught individuals to process information more quickly, and make connections in the world around them. Driving, for example, typically improves in those who have had speed of information processing training.

"Individuals who have had less education may have less cognitive reserve to overcome pathologies in the brain and may exhibit functional limitations earlier in the pathological process" said Daniel O. Clark, Ph.D., the social epidemiologist who led the new study. "Those starting

out at lower education levels had more room for improvement."

Dr. Clark is an Indiana University Center for Aging Research and Regenstrief Institute investigator, director of research and development at Sandra Eskenazi Center for Brain Care Innovation at Eskenazi Health, and an IU School of Medicine associate professor of medicine.

Evidence suggests that one-third to one-half of Alzheimer's disease cases worldwide may be attributed to potentially modifiable risk factors. Recent estimates of these population-attributable risks for Alzheimer's disease identify low educational attainment as one of the most significant of seven modifiable risk factors that also include depression, physical inactivity and smoking.

"Although not achieving early life education beyond secondary school creates a risk for earlier onset of Alzheimer's disease or other dementias, it may not be associated with a faster rate of cognitive decline," Dr. Clark said.

Data for the study led by Dr. Clark was obtained from the approximately 2,800 cognitively normal individuals age 65 and older of all education levels who participated in the multi-center Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) study, which explored whether cognitive training in memory, reasoning, and speed of information processing affected cognitively based measures of daily functioning. The ACTIVE study found that reasoning and information processing speed training, but not memory training, resulted in improved targeted cognitive abilities for 10 years.

Less educated study participants were slightly older, less likely to be married, and more likely to be African-American. The less educated also were more likely to have hypertension or diabetes as well as heart disease than the more educated older adults.

"If you practice some cognitive skills, you certainly will improve on those skills you are practicing," Dr. Clark said. "The question remains open, however, as to how much will those practiced and improved skills transfer to daily cognitive function. And the big question is whether they will delay the onset of dementia."

"There is tremendous interest in nonpharmacological and self-help approaches that well older adults can engage in to help modify - that is reduce - their risk for later onset of cognitive decline and even dementia," said Frederick W. Unverzagt, Ph.D., professor of psychiatry at IU School of Medicine and principal investigator of the Indianapolis field site of the ACTIVE study. "This paper takes an important step toward identifying subgroups of people who may stand to benefit most from these types of interventions."

Dr. Clark, whose research interests include modification of disease risk factors, hopes to conduct a future study of older adults with little education randomized to cognitive training or no training to confirm that speed of processing training is as effective as it appears to be for those with less than a high school degree.

More information: The new study "Does Targeted Cognitive Training Reduce Educational Disparities in Cognitive Function Among Cognitively Normal Older Adults?" appears online ahead of publication in the *International Journal of Geriatric Psychiatry*.

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