Study finds that aging warps our perception of time

WATERLOO, Ont. (Tuesday, December 15, 2015) – Much like trying to watch a video with the audio out of synch, older adults may have difficulty combining the stimuli they see and hear, and it could have implications for rapid decision-making tasks such as driving, according to new research.

A recent study from the University of Waterloo, found that seniors have a harder time distinguishing the order of events than younger adults. When researchers presented them with both a light and sound at the same or different times, they found that young and older adults could determine whether they occurred simultaneously with similar accuracy. But when asked to determine which appeared first, the light or the sound, older adults performed much worse.

“To make sense of the world around us, the brain has to rapidly decide whether to combine different sources of information,” said Michael Barnett-Cowan, a professor in the Department of Kinesiology at the University of Waterloo and senior author on the paper. “Older adults often experience problems processing multisensory information, which in turn can affect everyday tasks from following conversations, to driving, to maintaining balance.”

In another test, researchers showed the study participants two lights travelling towards one another. Usually the lights appear to stream past each other, but when a sound occurs close to when the lights touch, they seem to bounce off each other. In this test, older adults continued to perceive the lights as bouncing even when the sound occurred well before or after the lights touched, suggesting that older adults combine sensory information that should not belong together.

This is the first study to test multiple ways in which younger and older people combine sensory information in time. The findings provide new hope that by strengthening the link between these brain processes as people age, the impairments in distinguishing the order of events and perceived collisions could reduce. Possible solutions for improving impaired perceptions of time in the older adults could come from training using video games or brain stimulation.

“Health professionals are able to address many changes in our vision and hearing as we age using corrective lenses and hearing aids, for example. But these interventions don't help with changes in the brain's ability to combine sensory information," said Barnett-Cowan. "If we can identify and address impaired timing of events in the elderly, we could potentially improve the quality of life, safety and independence for many older people."

Seniors are the fastest growing segment of the driving population. According to the National Blueprint for Injury Prevention In Older Drivers, driving-related deaths are the leading cause of accidental deaths for Canadians aged 65 to 75 years of age. The number of older drivers in Canada is expected to double by 2040. Barnett-Cowan says it is possible that the tests that made up this study could one day be part of driver examinations required for older drivers.

The study appears in Experimental Brain Research. Gillian Bedard, now in medical school, was the lead author of the study when she was an undergraduate student at Waterloo.

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