Aging and Sequence Learning

What do tying shoelaces, hitting a golf ball, and square dancing have in common? Each can be learned by imitation, a major way that people of all ages acquire and master important skills. Imitation has been widely studied in infants, children and young adults, but until now, not in older adults. In fact, imitation learning is especially important in the everyday activities of older adults as they strive to achieve or preserve an independent lifestyle.

Jessica Maryott, a graduate student supported by the NSF-funded CELEST Science of Learning Center, and Robert Sekuler, a CELEST faculty member, devised a sequence-learning task that enabled them to characterize not only how much learning older adults were capable of, but also the strategies and tradeoffs that older adults made in order to learn.

In a trio of experiments, Maryott and Sekuler investigated age-related changes in visual imitation. Young and older adults viewed sequences of quasi-random movements and then had to reproduce from memory what they had seen.

As the researchers predicted, older adults made more errors in imitation than did their younger counterparts. However, a careful analysis of those errors revealed something quite unexpected: perhaps because their working memory could not hold every detail of the complex movement sequences, older adults jettisoned many of those details. Instead, the older adults supplemented their limited memory by constructing an abstracted, coarse representation of each movement sequence. In other words, the older adults abandoned a fine-grain, detailed representation, opting instead to remember and reproduce just the gist of what they had seen.

Along the way, Maryott and Sekuler demonstrated that that limitation on the older adults' performance was not related to any impairment in motor performance. Freed from the burden of having to remember details of movement sequences, their older adults performed just as accurately as their younger counterparts did.

Guided by these surprising results, Maryott and Sekuler proposed some strategies that could be used to enhance older adults' ability to imitate what they see. In fact, it is likely that similar strategies would assist young adults as well.