Aging and Audio-Visual and Multi-Cue Integration in Motion

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The perception of naturalistic events relies integrating information from multiple sensory systems, an ability that may change with healthy aging. When two objects move toward and then past one another, their trajectories are perceptually ambiguous: the objects may seem to stream past one another or bounce off one another. Previous research showed that auditory or visual events that occur at the time of discs’ coincidence could bias the percept toward bouncing or streaming. We exploited this malleable percept to assay age-related changes in the integration of multiple inter- and intra-modal cues.

The discs’ relative luminances were manipulated to produce stimuli strongly favoring either bouncing or streaming, or to produce ambiguous motion (equal luminances). A sharp sound coincident with the discs’ overlap increased both groups’ perception of bouncing, but did so significantly less for older subjects. An occluder’s impact on motion perception varied with its duration: a long duration occluder promoted streaming in both groups; a brief occluder promoted bouncing in younger subjects, but not older ones.

Control experiments demonstrated that the observed differences between younger and older subjects resulted from neither age-related changes in retinal illuminance nor age-related changes in hearing, pointing to weakened inter- and intra-modal integration with aging. These changes could contribute to previously demonstrated age-related perceptual and memory deficits.

Research supported by grants MH068404, AFOSR 4-01748, CIHR, the Canada Research Chairs Program, and CELEST, a National Science Foundation Science of Learning Center.