

ABSTRACT

Effect of Cognitive Load on Speech Motor Performance in Healthy Younger and Older Adults

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This study sought to determine the effect of cognitive load on the articulatory kinematics of healthy younger and older adults. Participants produced two stimulus sentences in three conditions. In Conditions 1 and 3, participants solved, remembered, and inserted answers to arithmetic problems into sentences. Answers in Condition 1 were bilabially loaded (for analysis) but were not for Condition 3 (to reduce answer predictability). In Condition 2, participants read sentences without completing an arithmetic task. Conditions 1 and 2 were analyzed; Condition 1 represented increased cognitive load relative to Condition 2. Movements of the upper lip, lower lip, and jaw were recorded with a 3D electromagnetic articulograph and were used to compute movement variability indices for uncoupled lower lip+jaw movements and lip aperture along with sentence duration. Results revealed significant main effects of age and articulator (lower lip+jaw vs lip aperture) for the movement variability index, with greater variability for older than younger adults and for lip aperture than lower lip+jaw. There was a main effect of condition for duration, which was greater in Condition 2 (no arithmetic task) than Condition 1 (arithmetic task). Results support the view that both age and cognitive load affect parameters of speech motor control.