

Title: A multi-subsystem approach to predicting speech intelligibility in older adults

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The aims of the study were to (1) determine age-related changes to the respiratory, phonatory, and articulatory subsystems comparing healthy older and younger adults and (2) investigate whether speech intelligibility decline is observed in older adults and if so, to determine which variables from each subsystem are predictive of intelligibility decline. Fifteen healthy, older adults and 15 younger adults participated in assessments of the respiratory (aerodynamic), phonatory (acoustic, aerodynamic), and articulatory (kinematic) subsystems. Speech intelligibility was determined by naïve listeners during multi-talker babble. ANOVAs revealed significant between-group differences in phonatory (maximum phonation time) and articulatory (maximum speed of tongue movements) subsystem measures, which presumably contributed to the intelligibility differences between the older and younger groups. Significant multiple regression models for each subsystem accounted for 83% (phonatory) and 15% (articulatory) of speech intelligibility variance in older adults. These findings suggest that age-related speech declines such as breathy vocal quality and articulatory slowing contribute to intelligibility decline. Further, subsystem measures were found to be more sensitive to age-related speech changes than intelligibility in older adults.