

## The impact of background noise on speech output in people with aphasia

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**Background:** Individuals with aphasia report particular difficulties communicating in adverse conditions such as in the presence of background noise. While research has explored comprehension difficulties in noise, little is known about the effects of background noise on the acoustic-phonetic features of speech output in people with aphasia. Studies on speech production in neurotypical individuals have demonstrated that adverse conditions elicit adaptations, such as increased loudness, increased pitch and reduced speech rate, which benefit intelligibility – known collectively as ‘Lombard speech’.

**Purpose:** The aim of the study is to determine whether people with aphasia can make Lombard speech adaptations, and whether type of noise affects features of speech output.

**Method:** Speech produced by 20 people with aphasia and 20 neurotypical age- and gender-matched adults was recorded in three listening conditions: quiet, competing speech by a single speaker and cafeteria noise. A picture description task with a communicative incentive was used to elicit speech. The acoustic-phonetic correlates of loudness, pitch and speaking rate (intensity, F0 and articulation rate) were compared across the three conditions and between the two groups.

**Results:** Preliminary data analysis reveals that across intensity and F0, people with aphasia exhibited patterns of speech adaptations similar to those displayed by the neurotypical group: elevated intensity and F0 in the two noise conditions with adaptations greater in the cafeteria noise condition. The listening conditions did not have a significant effect on articulation rate in either group, though individual differences were evident for this measure. The aphasic group reported finding speaking and organizing their thoughts was most difficult in the competing speaker condition.

**Conclusions:** Preliminary findings provide initial evidence that individuals with aphasia can make Lombard speech adaptations in intensity and F0. Some individuals with aphasia can also make speech rate changes. Theoretical and clinical implications of these findings will be considered.