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Predictors beyond the lesion: Health and demographic factors associated with aphasia severity, *Cortex*, <https://doi.org/10.1016/j.cortex.2022.06.013>

Background

Lesion-related factors are associated with severity of language impairment in persons with aphasia. The extent to which demographic and health factors predict language impairment beyond traditional cortical measures remains unknown. Identifying and understanding the contributions of factors to predictive models of severity constitutes critical knowledge for clinicians interested in charting the likely course of aphasia in their patients and designing effective treatment approaches in light of those predictions.

Methods

Utilizing neuroimaging and language testing from our cohort of 224 individuals in the chronic stage of recovery from a left-hemisphere stroke in a cross-sectional study, we first conducted a lesion symptom mapping (LSM) analysis to identify regions associated with aphasia severity scores. After controlling for lesion volume and damage to pre-identified areas, three models were created to predict severity scores: 1) Demographic Model (N = 147); 2) Health Model (N = 106); and 3) Overall Model (N = 106). Finally, all identified factors were entered into a Final Model to predict raw severity scores.

Results

Two areas were associated with aphasia severity—left posterior insula and left arcuate fasciculus. The results from the Demographic Model revealed non-linguistic cognitive ability, age at stroke, and time post-stroke as significant predictors of severity ($P = .005$; $P = .02$; $P = .001$, respectively), and results from the Health Model suggested the extent of leukoaraiosis is associated with severity ($P = .0004$). The Overall Model showed a relationship between aphasia severity and cognitive ability ($P = .01$), time post-stroke ($P = .002$), and leukoaraiosis ($P = .01$). In the Final Model, which aimed to predict raw severity scores, demographic, health, and lesion factors explained 55% of the variance in severity, with health and demographic factors uniquely explaining nearly half of performance variance.

Conclusions

Results from this study add to the literature suggesting patient-specific variables can shed light on individual differences in severity beyond lesion factors. Additionally, our results emphasize the importance of non-linguistic cognitive ability and brain health in aphasia recovery.