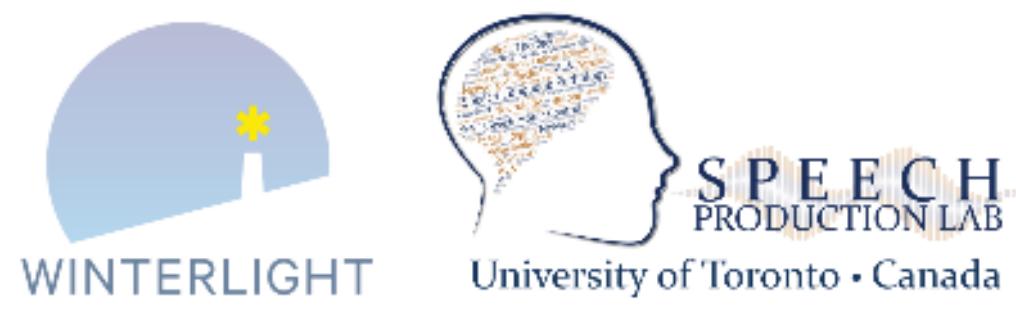


Analytical validity of the Winterlight assessment app in ALS



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Background

ALS frequently causes speech impairments [1]

Acoustic speech features are valuable for detecting and tracking ALS [2,3]

Lab-based assessment is time-consuming

Winterlight's speech assessment has been validated in multiple neurodegenerative disorders [4,5], and could be a valuable tool in ALS clinical research

Research questions

1. Do acoustic features from Speech/Pause Analysis (SPA) and Winterlight correlate?

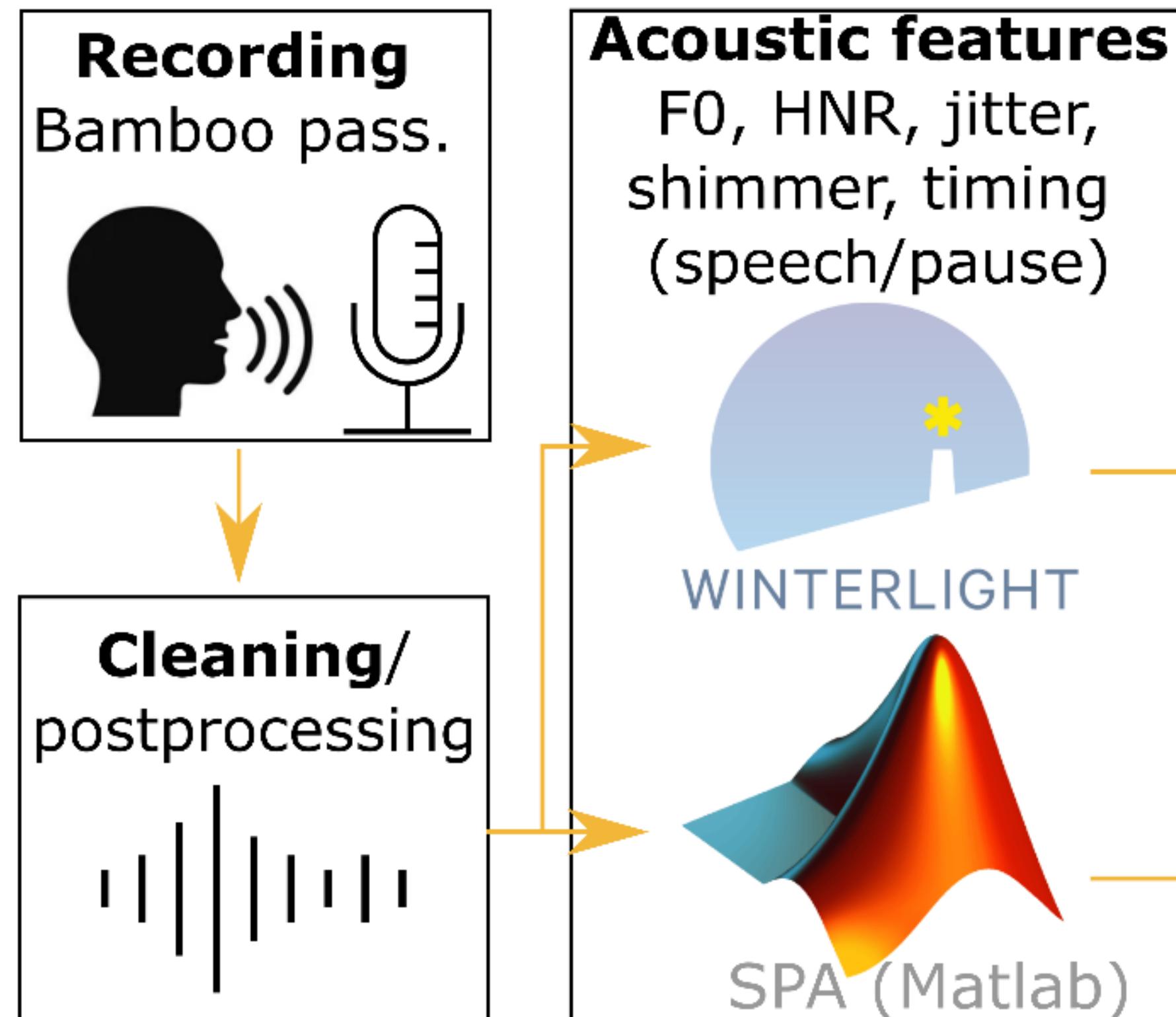
2. Do similar acoustic features from SPA and Winterlight group together?

Methods

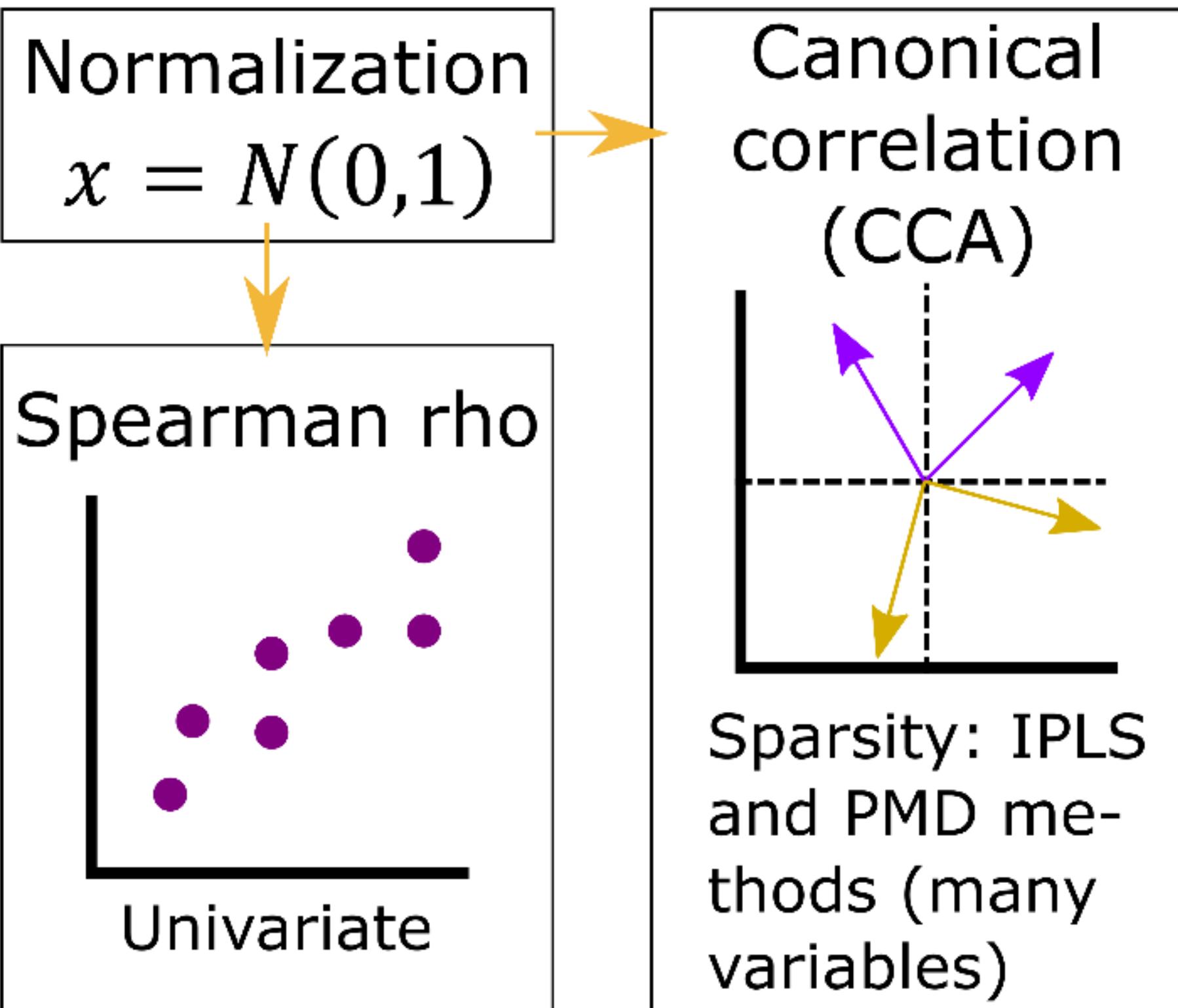
Demographics

	min/med/max
N	121
Age	41/59/88
Sex (F)	47
Yrs. since onset	0.6/3.0/19.0
SiteOnset (bulbar)	13
ALSFRS-R	
Total	14/34/48
Bulbar	4/11/12
Resp.	2/10/12
SIT	
Rate	67/146/240
Intel.	6/99/100
%FVC	23/75/126

Recording and feature extraction

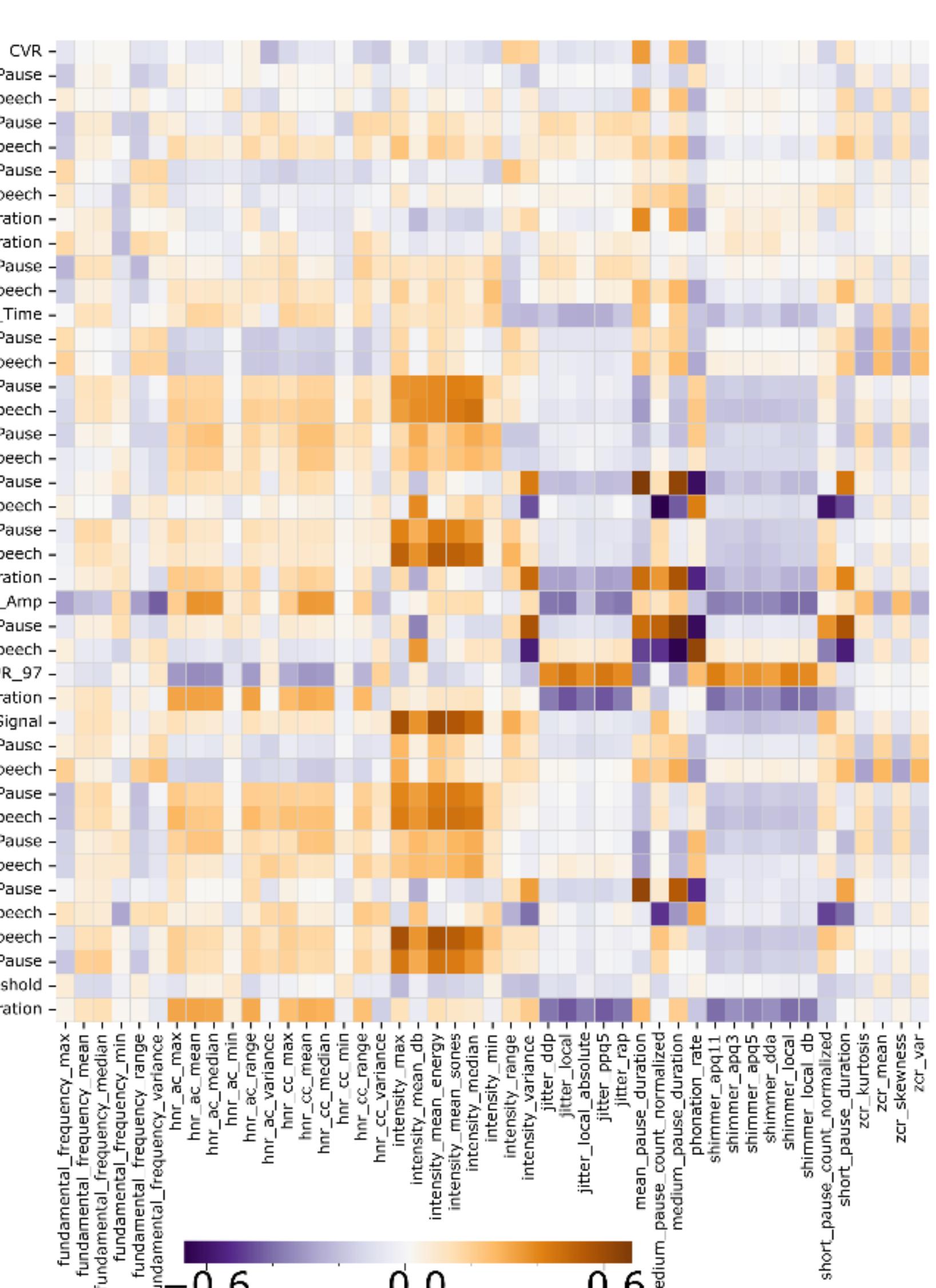


Statistical analysis Winterlight vs SPA features



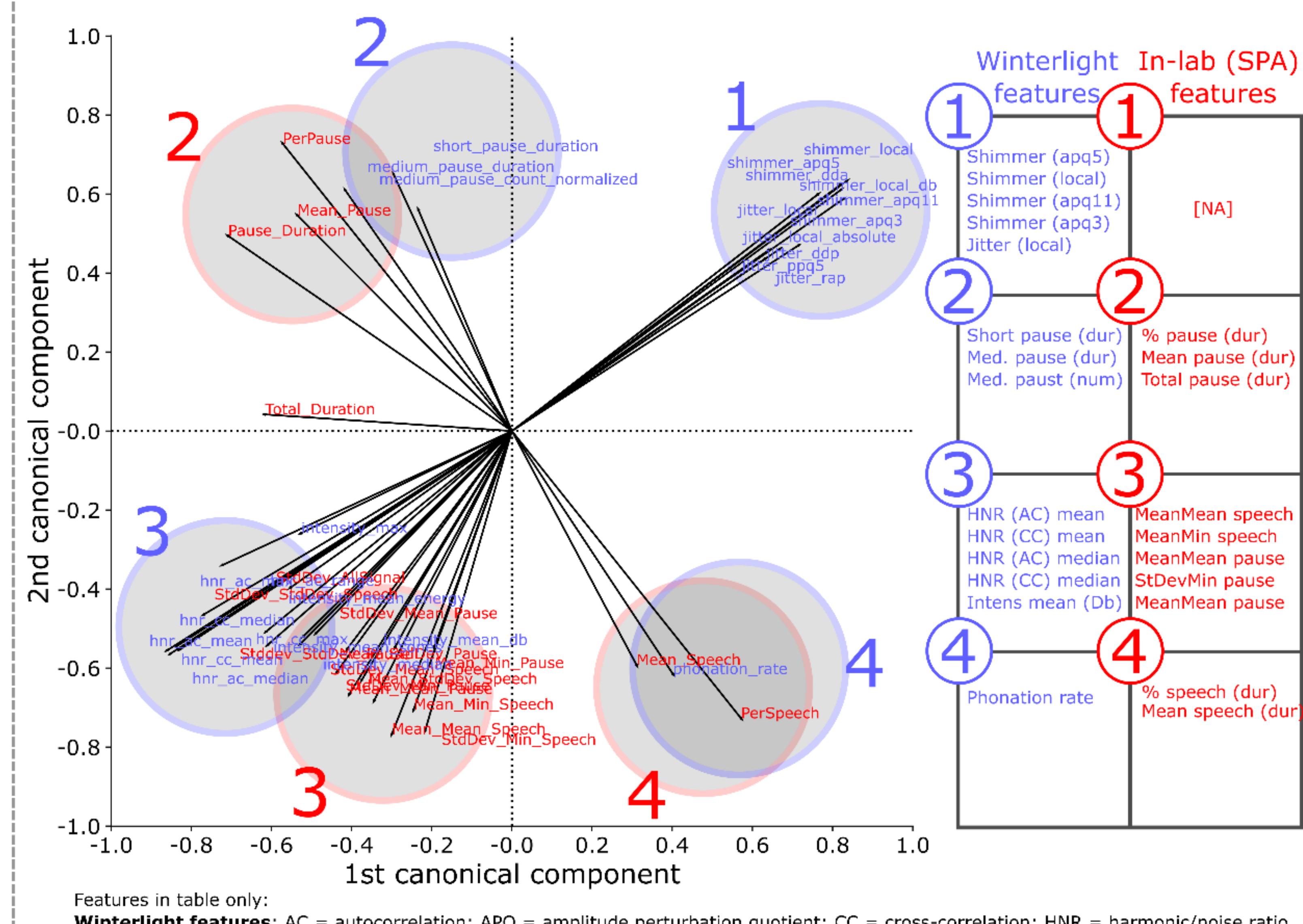
Results

Strong correlations between features from Winterlight and SPA analyses



Top-10 correlations		p
WINTERLIGHT	SPA (Matlab)	
Mean pause duration	Mean pause	0.68
Medium pause ct. normalized	Mean speech	-0.67
Medium pause dur.	% speech	-0.65
Medium pause dur.	% pause	0.65
Medium pause dur.	Mean pause	0.64
Mean pause dur.	SD pause	0.63
Phonation rate	% speech	0.63
Phonation rate	% pause	-0.63
Phonation rate	Mean pause	-0.62
Short pause ct. normalized	Mean speech	-0.59

Corresponding groups of features from Winterlight and SPA analyses overlap



Features in table only:
Winterlight features: AC = autocorrelation; APQ = amplitude perturbation quotient; CC = cross-correlation; HNR = harmonic/noise ratio

In-lab features: Features not labelled with measures (e.g., "dur") refer to amplitude, e.g., MeanMeanSpeech

Conclusions

Largest correlations between Winterlight and SPA features were interpretable

Feature groupings captured similarities between feature sets

SPA features identified in univariate and multivariate analyses were previously validated [6]

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Acknowledgements

We would like to sincerely thank Dr. Madhura Kulkarni for her assistance compiling data for this project, as well as the research teams that previously collected the data analyzed here