WINTERLIGHT

CAMBRIDGE COGNITION

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Introduction

- Changes across different domains of speech and language occur in neurodegenerative diseases such as Alzheimer's Disease.¹⁻⁵
- We can differentiate between healthy older speakers and speakers with primary progressive aphasia, Alzheimer's disease, and post-stroke aphasia.

How do speech changes in patients with neurodegenerative diseases relate to clinical outcomes?

Methods

N = 130 patients diagnosed with various neurodegenerative diseases including Alzheimer's Disease and Frontotemporal dementia variants

Speech recorded from Picture **Description Task:**



Figure 1.Stimulus in picture description

Speech Processing Pipeline

Linguistic features

Recorded speech

Look and and me I'm doing like this

Acoustic features

Figure 2. Speech processing pipeline.

• Linear models with age, sex and education covariates were fit to speech data to predict clinical outcomes

Demographics	# or Me
Sex	59 Ferr
Age	72.84 +
Years of education	15 +/- 3
MMSE	22.05 +



Speech Changes in Neurodegenerative Diseases Relate to Clinical Outcomes

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Figure 6. Example distribution of a speech feature.

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Diagnosis Iabels	Diagnosis	Number of participants
1	AD; FAD	39
4	VCIND, VCI	6
5	AD+CVD	13
6	bvFTD, FTD+MND	8
7	IvFTD: NFPA; FTD-SD; LPA	13
9	CBS/ CBD	4
21	AtypAD, AD(lang). AD(fr)	11
55	AD+VaD	5

Speech Patterns Differentiate Patients from Healthy Older Adults

Total speech duration



Mean pause duration



adults

Conclusion

- patients with more severe clinical symptoms.
- and spending more time pausing.



References

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Figure 7. Principal component analysis on speech timing features separates patients from healthy controls.

• Dementia patients speak less and pause more than healthy older

• Linguistic differences in word types and characteristics differentiate

• Patients with neurodegenerative disease show distinct timing features in speech in comparison to healthy older adults, generating less speech

Patients with more severe neurodegenerative disease symptoms use shorter words, fewer prepositions, and fewer nouns.

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