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## Introduction

- Lewy Body Spectrum Disorders (LBSD) are a group of phenotypically-diverse neurodegenerative diseases characterized by misfolded  $\alpha$ -synuclein protein inclusions. Up to 50% of LBSD autopsy cases have co-occurring Alzheimer's Disease (AD) which is associated with worse antemortem cognitivelinguistic impairments and shorter survival [1-3].
- In vivo identification of AD co-pathology is crucial for delivering targeted clinical care and to improve patient recruitment for protein-targeted therapeutic trials. This is currently supported through invasive cerebrospinal fluid (CSF) AD biomarkers and/or molecular PET imaging; there remains a need for robust, non-invasive, inexpensive measures that can serve as screening tools for AD co-pathology.
- In this study, we compare acoustic and lexical-semantic properties of a short natural speech task derived using objective, reproducible, fully automated methods between LBSD patients with biologically-confirmed AD (LBSD+AD) versus those without (LBSD). We contrast findings with phenotypic comparisons between Parkinson's disease with dementia (PDD) and dementia with Lewy bodies (DLB), latter of which has been linked to greater AD co-pathology [4].

Methods		
Subjects		
Characteristic, Mean (1SD)	LBSD	LBSD+AD
N (%Male)	39 (69%)	28 (79%)
Age (y)*	67.62 (7.26)	71.07 (7.24)
Education (y)	15.77 (2.43)	15.21 (2.47)
Disease duration (m)	101.64 (57.16)	87.85 (80.13)
UPDRS P3 total	28.06 (11.64)	29.25 (7.74)
UPDRS P3 speech	1.21 (0.86)	1.62 (0.77)
MoCA total	24.45 (3.27)	20.86 (6.83)
MoCA memory recall total [5]	2.25 (1.86)	1.57 (1.65)
BNT [5]	24.68 (4.48)	26.58 (4.31)
F letter fluency (# correct)	14.25 (6.04)	10.28 (5.83)
Rey figure copy	10.04 (3.42)	9.44 (4.32)
%PDD; %DLB	13%; 36%	21%; 43%
Neuropsych. comparisons covaried for age; $* = sig group difference, p < .05.$		

### Procedures

- Speech data: ~1-min. Cookie Theft picture description
- AD co-pathology was confirmed using neuropathological diagnosis or autopsy-validated CSF AD biomarker cut-point: t-tau:A $\beta$ 42 ratio>0.3 [6].



# Automatic analysis of natural speech in Lewy body spectrum disorders with Alzheimer's disease co-pathology



![](_page_0_Figure_25.jpeg)

![](_page_0_Figure_27.jpeg)