Expression and perception of emotion can be impaired in people with cognitive impairments such as dementia of the Alzheimer’s type (DAT) and mild cognitive impairments (MCI). Thus, prosodic analyses of speech may differentiate between neurotypical controls and people with mild dementia. The purpose of this study was to analyze various prosodic components of speech from utterances produced by age-matched neurotypical controls (CONTR), people with DAT, people with vascular dementia (VASC), and people with mild cognitive impairment.

We hypothesized that the prosodic analyses of speech may differentiate between people with VASC, and people with mild dementia and a matched neurotypical controls (CONTR), people with DAT, people with vascular dementia (VASC), and people with mild cognitive impairment.

Expression and perception of emotion can be impaired in people with vascular dementia (VASC), and people with mild cognitive impairments (MCI). The finding of speech acoustics differences between dementia types supports previous research findings, including the importance of fundamental frequency related features (Gonzalez-Moreira et al., 2015; Melián et al., 2012). The research overall illuminated collinear variables within each factor and their associations with each other across the dementia types. The factors from the principal component analysis were functional for differentiating among the speaker groups using the acoustic measures.

### Future Directions

Future work with better recordings, more participants, and fewer dementia types should help in determining the functionality of these factors for differentially diagnosing dementia types.

### References


### Funding

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**Introduction**

Expression and perception of emotion can be impaired in people with cognitive impairments such as dementia of the Alzheimer’s type (DAT) and mild cognitive impairments (MCI). Thus, prosodic analyses of speech may differentiate between neurotypical controls and people with mild dementia. The purpose of this study was to analyze various prosodic components of speech from utterances produced by age-matched neurotypical controls (CONTR), people with DAT, people with vascular dementia (VASC), and people with mild cognitive impairment.

We hypothesized that the prosodic analyses will provide patterns that differentiate among the speaker groups.

**Methods**

**Participants** – Prerecorded speech samples from the DementiaBank of people describing the Cookie Theft Picture provided the speech samples for this study. Included in this data set were 9 people DAT) 9 people with MCI, 5 people with VASC, and 10 CONTR.

**Procedures** – The files were divided into utterances with two researchers agreeing to the utterance divisions for all speakers.

The utterances were then analyzed using Praat software (Boersma & Weenink, 2017) using a set of measures that previous studies may reveal prosodic differences among the speaker groups.

**Analysis** – The acoustic measures were analyzed using a principal component analysis to determine the separate factors and grouping of the acoustic measures, a regression model to determine the acoustic measures representing unique aspect of the variance across the dementia types, and a Mahalanobis distance measure for multivariate ANOVA to determine how well the factors discriminated among the dementia types.

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigenvalues</td>
<td>5.542</td>
<td>4.322</td>
<td>3.409</td>
<td>2.143</td>
<td>1.090</td>
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<tr>
<td>Variance Percentage</td>
<td>23.030</td>
<td>18.009</td>
<td>10.289</td>
<td>6.936</td>
<td>7.024</td>
</tr>
</tbody>
</table>

**Results**

The factors accounted for 67% of the overall variance.

**Conclusions**

The finding of speech acoustics differences between dementia types supports previous research findings, including the importance of fundamental frequency related features (Gonzalez-Moreira et al., 2015; Melián et al., 2012).

The research overall illuminated collinear variables within each factor and their associations with each other across the dementia types.

The factors from the principal component analysis were functional for differentiating among the speaker groups using the acoustic measures.

**Future Directions**

Future work with better recordings, more participants, and fewer dementia types should help in determining the functionality of these factors for differentially diagnosing dementia types.