Vocal Impact of a Prolonged Reading Task at Two Intensity Levels: Perceptual Analysis

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Background

• **Vocal load**
  Acoustic vocal power integrated over time (Titze, 2001)

• **Loading factors**
  – Duration
  – Intensity level
  – Frequency

• **Goals**
  – Duration effect ?
  – Intensity level effect ?
Methods

• Participants:
  – 50 normophonic ♀ (mean age = 25 years, SD = 5)
  – VLS examination excluding pathologies

• 2 sessions of loading (reading a novel for 2 h)
  – 1<sup>st</sup> session: 60-65 dB @ 40cm
  – 2<sup>nd</sup> session: 70-75 dB @ 40cm
Methods

• **Questions:**
  – Does the voice vary during vocal loading?
  – Differences between the two vocal load sessions?

• **Previous study**
  – Objective measurements
  – Subjective self-ratings


• **Present study**
  – Perceptual analysis
Methods: Perceptual analysis

- **Judges:** 10 experts in voice (mean age = 37 years)

- **Phonetic material:** reading of 1 sentence
  
  “Quand René périt, un chat esseulé grogna fort”

- **Parameters evaluated:**
  - Pressedness (stridency)
  - Breathiness (GRBAS - Hirano)

- **Method:** pairwise comparisons (Kacha et al., 2005)
Methods: Perceptual analysis

- Pairwise software, developed by Ali Alpan, University of Brussels
- 1st listening session: breathiness
- 2nd listening session: pressedness
Methods: Judges’ reliability

<table>
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<th>Intrarater reliability</th>
<th>Test – retest (7-14 days)</th>
<th>Cohen’s kappa: poor to fair</th>
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<td>Interrater reliability</td>
<td>judges’ ability to make coherent judgments</td>
<td>Fleiss’s Kappa: fair</td>
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</table>
Results

- Effect of vocal load duration on breathiness

1\textsuperscript{st} session: 60-65 dB

2\textsuperscript{nd} session: 70-75 dB
Results

- Effect of vocal load duration on pressedness

1\textsuperscript{st} session: 60-65 dB

2\textsuperscript{nd} session: 70-75 dB
Results

• Effect of vocal load intensity on breathiness

![Breathiness Graph](graph.png)

- POST 60-65dB: 52.2%
- POST 70-75dB: 47.8%

N.S.
Results

- Effect of vocal load intensity on pressedness

![Bar chart showing compared pressedness percentages]
Discussion: reliability

- Lack of Inter- & intra-judges reliability due to
  - Task design: restrictive response possibilities
  - Judges basing their judgments of a particular aspect on different acoustic indices
  - Small differences between the stimuli to compare
Discussion: Duration effect

• ↓ breathiness after 2 h
  – ↑ glottal closure
  – ↑ hyperfunction
    (Lauri et al., 1997; Vilkman et al., 1999; Vintturi et al., 2001)
  – Voice improvement
  – Adaptation to loading?

• No modification of pressedness
  – Difficult to distinguish perceptually
### Discussion: Intensity level effect

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<th>Participants</th>
<th>Loading task</th>
<th>Results</th>
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<tr>
<td>Present study</td>
<td>50 ♀ with normal voices</td>
<td>2 h of reading -2 intensity levels</td>
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<td>Stone &amp; Sharf (1973)</td>
<td>10 males with normal voices</td>
<td>producing vowel lists for 20 min -3 intensity levels</td>
<td>No intensity level effect</td>
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<td>Neils &amp; Yairi (1987)</td>
<td>6 ♀ with normal voices</td>
<td>45 min of reading -3 background noise conditions</td>
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Conclusion

• Does the voice vary during vocal loading?
  – ↘ breathiness
  – No modification of pressedness

• Differences between the two vocal loading sessions?
  • No difference for breathiness and pressedness

• Duration of vocal load > intensity
References


