

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)
 - 1st session: 60-65 dB @ 40cm
 - 2nd 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

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- 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) Hyperadduction
 - Breathiness (GRBAS - Hirano) Hypoadduction
- **Method:** pairwise comparisons (Kacha et al., 2005)

Methods: Perceptual analysis

The screenshot shows a software interface for pairwise comparison. At the top is an 'Initialize' button. Below it is the 'Compare' section, which contains two sound icons labeled 'Sound 1' and 'Sound 2'. A text box below the sounds contains the question: 'In your opinion, which voice is breathier?'. Underneath the text box are two radio buttons, one for 'Sound 1' and one for 'Sound 2'. Below the radio buttons is a 'Next' button. At the bottom of the interface are two input fields labeled 'Remaining' and 'Total', and a 'Save' button.

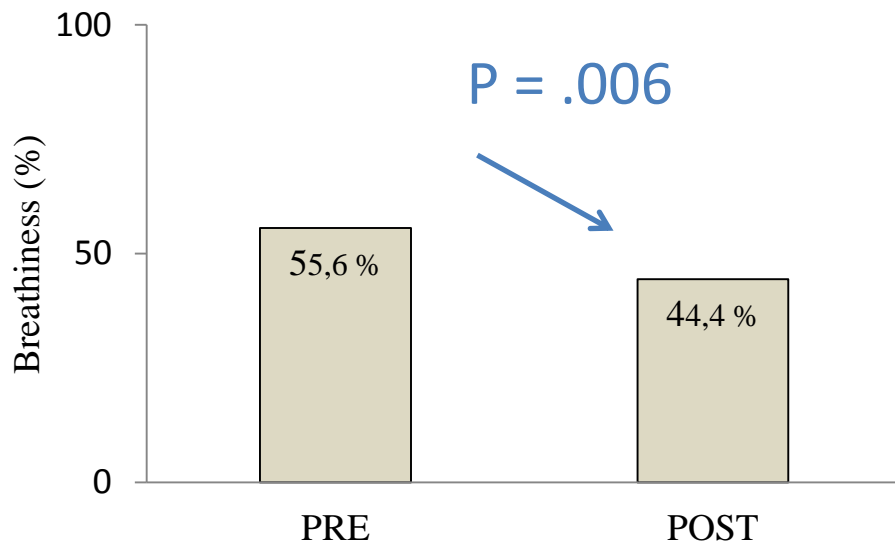
- Pairwise software , developed by Ali Alpan, University of Brussels
- 1st listening session: breathiness
- 2nd listening session: pressedness

Methods: Judges' reliability

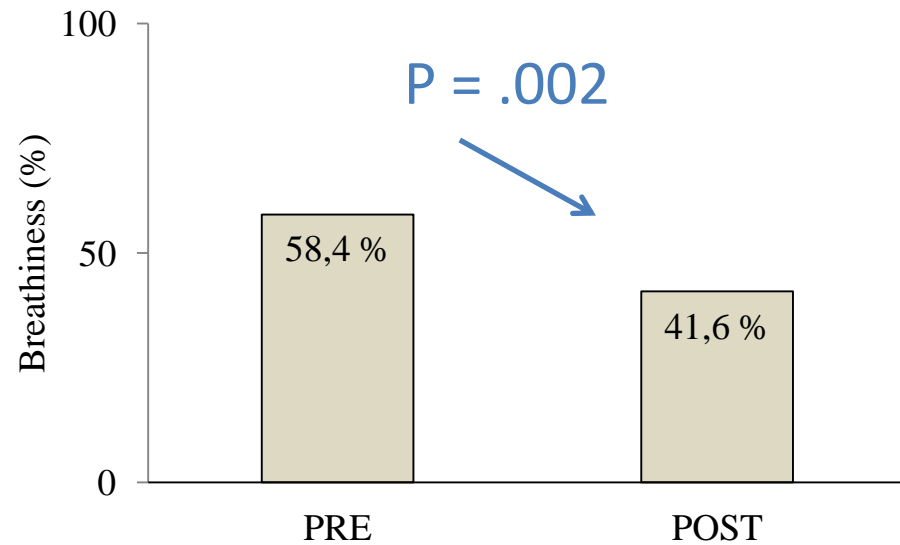
Intrarater reliability	Test – retest (7-14 days)	Cohen's kappa : poor to fair
Interrater reliability	judges' ability to make coherent judgments	Fleiss's Kappa : fair

Results

- Effect of vocal load duration on breathiness



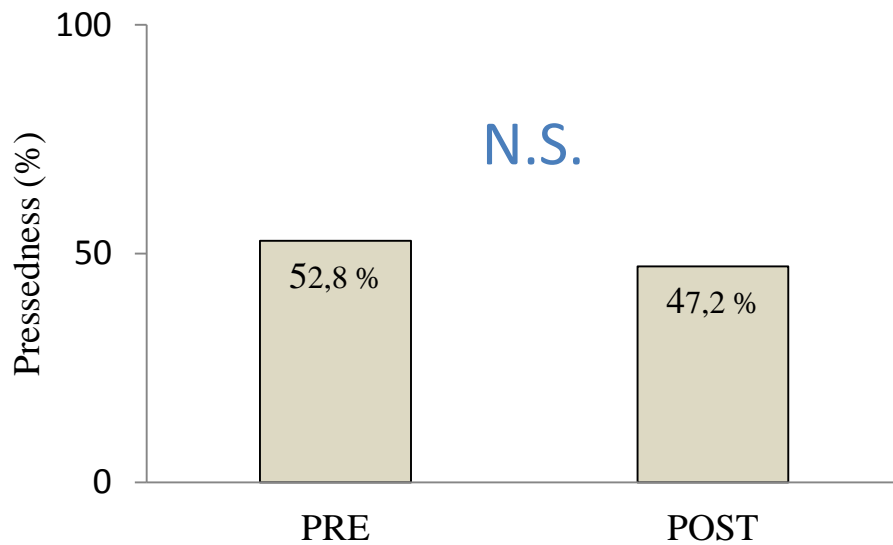
1st session: 60-65 dB



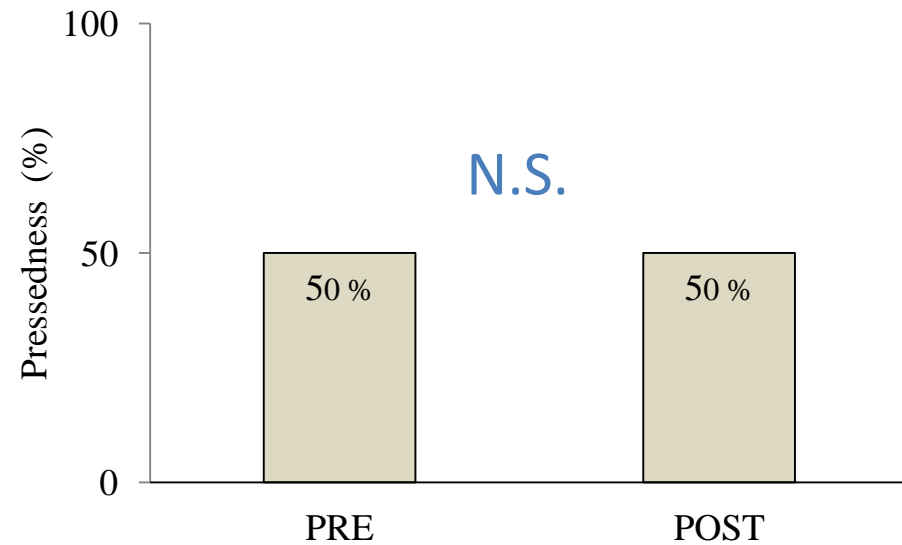
2nd session: 70-75 dB

Results

- Effect of vocal load duration on pressedness



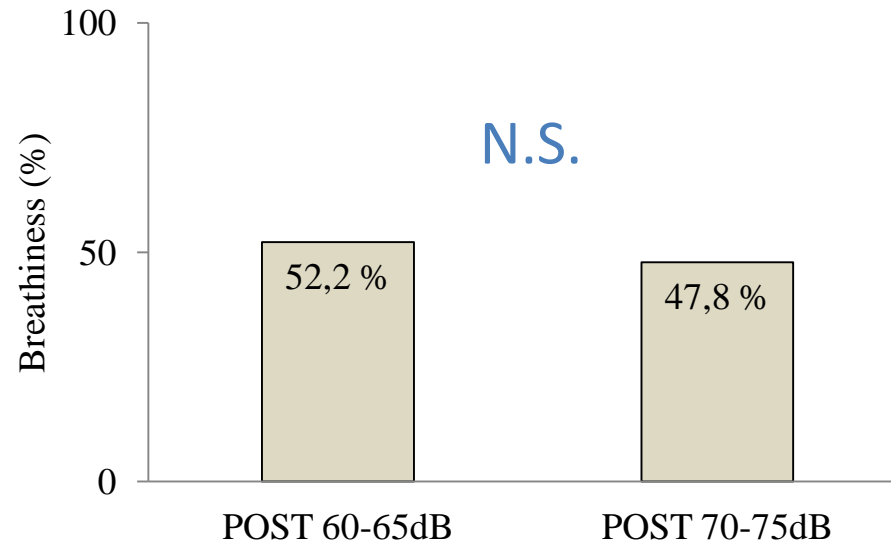
1st session: 60-65 dB



2nd session: 70-75 dB

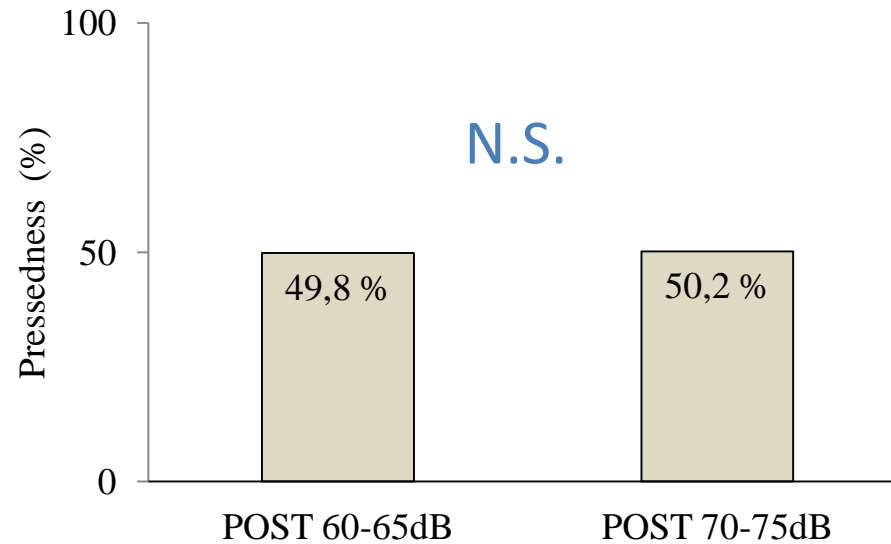
Results

- Effect of vocal load intensity on breathiness



Results

- Effect of vocal load intensity on pressedness



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; Vilkmán et al., 1999; Vintturi et al., 2001)
 - Voice improvement
 - Adaptation to loading?
- No modification of pressedness
 - Difficult to distinguish perceptually

Discussion: Intensity level effect

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

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

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