

# The impact of a theater performance on the vocal quality of actors

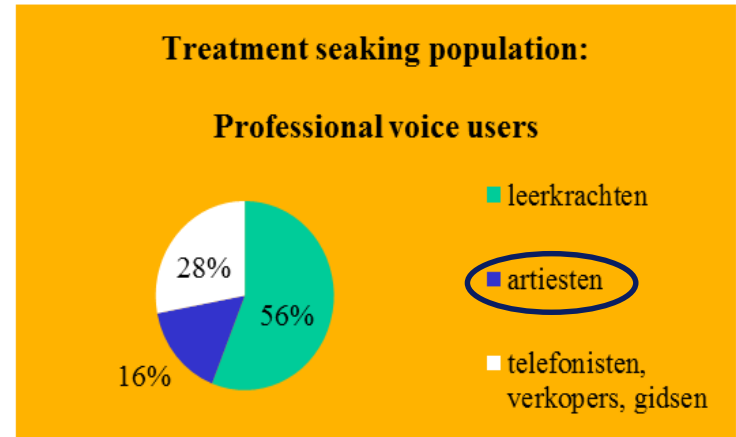
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# Dysphonia in theater actors

- Elite vocal performers
- Vocal symptoms?
  - Vocal fatigue (*Novak et al., 1999*)
  - Laryngeal hyperfunction (*Novak et al., 1999*)
  - Dehydration (*Hoffman-Ruddy et al., 2001*)
  - Chronic laryngitis (*Hoffman-Ruddy et al., 2001*)
  - Chronic laryngeal muscle tension (*Hoffman-Ruddy et al., 2001*)

## Dysphonia in theater actors

- No clear prevalence data
- Risk population
  - Intensive vocal load
  - Poor vocal hygiene  
(*Timmermans et al., 2002*)
  - “Vocally violent behavior”  
(*Roy et al., 2000*)
  - Taboo?



*Van Houtte et al., 2009*

## Purpose

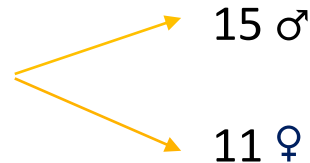
The purpose of this study was to investigate **vocal quality**, **vocal complaints** and **risk factors** for developing voice disorders in theater actors.

Secondly, the **impact** of one vocal performance on the voice was investigated by comparing objective and subjective **vocal quality** immediately before and after a **theater performance** of one and a half hour.

# Methods

## Subjects

n = 26 professional theater actors



- mean age: 41.9 years (range: 23 to 69 years)
- Leading roll

	Mean	SD
Acting (hours in a week)	10.5	6.8
Rehearsals (hours in a week)	19.9	13.1
Duration of the performance (minutes)	96	25
Speech duration during performance (minutes)	70.45	29.36
Experience (years)	20.4	11.9

## Speech samples

- Before and after theater performance of 1.5 hours (SD: 25 min)
- Speech
  - Sustained vowel /a:/
  - Continuous speech (reading)
- Perceptual evaluation
  - GRBASI scale (*Hirano, 1981; Dejonckere et al., 1996*)
- Acoustic Analysis
  - Acoustic Voice Quality index (*Maryn et al., 2010*)
  - CPPS, HNR, SL, SLdB, slope spectrum, tilt of the regression line through the spectrum,  $F_0$

} PRAAT, Samson C01U USB  
condensator microphone,  
sampling rate of 44.1kHz

## Questionnaires

- Patient history, voice symptoms, risk factors
- Voice Handicap Index (*Jacobson et al., 1997*)
  - Dutch version (*De Bodt et al. 2000*)
- $\left( \begin{array}{l} \text{Vocal Tract Discomfort Scale (*Mathieson et al., 2009*)} \\ \text{- Dutch version (*Luyten et al., 2015*)} \end{array} \right)$

## Comparison pre and post theater performance

- Paired sample t-test

# Results

## 1. Vocal quality and vocal symptoms theater actors

- AVQI

- Mean: 3.48 (SD: 1.14)

- Mild Dysphonia

- $F_0$

- Women: 178Hz (SD: 21)

- Men: 123Hz (SD: 21)

- Perceptual evaluations

- Mean: G 0.5, R 0.4, B 0.3, A 0, S 0.1, I 0

- Subtle dysphonia





- Vocal habits, risk factors

		n	%
Vocal warm up before performance	no	13	50,0%
	sometimes	6	23,1%
	regularly	7	26,9%
Vocal Cool-down after performance	no	23	88,5%
	sometimes	1	3,8%
	regularly	2	7,7%
Vocal complaints after performing	no	13	50,0%
	sometimes	12	46,2%
	regularly	1	3,8%
Vocal complaints	no	17	65,4%
	yes	9	34,6%
Followed voice training/therapy	no	17	65,4%
	yes	7	26,9%
Vocal fatigue	no	18	69,2%
	yes	6	23,1%

Yelling and screaming

no	6	23,1%
sometimes	11	42,3%
frequently	9	34,6%

Throat clearing

no	5	19,2%
sometimes	14	53,8%
frequently	7	26,9%

Imitation of voices

no	3	11,5%
sometimes	10	38,5%
frequently	13	50,0%

Using a forced or tensed voice on the set

no	9	34,6%
yes	16	61,5%

Using a forced or tensed voice in general

no	19	73,1%
yes	6	23,1%

Smoking

no	15	57,7%
past	6	23,1%

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Frequent colds	average	22	84,6%
	more than average	2	7,7%
	none	2	7,7%
GER	no	23	88,5%
	yes	1	3,8%
Drinking enough water	yes	18	69,2%
	no	7	26,9%
Allergy	no	15	57,7%
	yes	11	42,3%
Stress	no	9	34,6%
	yes	15	57,7%

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## - Results of the VHI

	Mean	Median	Min	Max	SD
Voice Handicap Index - Total score	10	10	0	42	8
Functional scale	2	2	0	7	2
Physical scale	6	6	0	19	4
Emotional scale	2	0	0	16	3

## 2. Impact of a theater performance on vocal quality

- AVQI
  - Mean: pre: 3.48 → post: 3.43
  - No significant differences
- $F_0$ 
  - Women: mean pre: 178Hz → 186Hz
  - Men: mean pre: 123Hz → 125Hz
  - No significant differences
- Perceptual evaluation
  - Mean G pre: 0.5 → post: 0.2
  - Significant decrease in overall grade of dysphonia (G)

## Discussion

- Acoustic analysis and perceptual evaluation of the voice  
→ Mild dysphonia

- Psychosocial impact
  - According to the VHI negligible



- Vocal complaints
  - 35%: current vocal complaint
  - 50%: vocal complaints after a performance
  - 23%: vocal fatigue

Vocal fatigue most frequently reported symptom  
*Kitch et al. 1994; Novak et al., 1991*

- Vocal care ??
  - Vocal warm up
    - Literature: effective (*McHenry et al., 2009, Van Lierde et al., 2010, Ragan, 2015*)
    - Not an established habit
  - Vocal cool down
    - Less the norm (*Ragan, 2015*)
    - Efficacy not clear yet
    - Only 11.5% in this study
- Vocal abuse
  - Yelling and screaming (76.9%), imitation of voices (88.5%), using a forced or tensed voice on the set (61.5%), throat clearing (80.7%), smoking (19.2%) and stress (57.7%)

Vocal hygiene



- Impact of a theater performance?
  - 50% reported vocal complaints, regularly
  - No effect on the objective vocal quality (AVQI)
  - A better perceptual evaluation of the vocal quality
- Shortcomings
  - Videolaryngostroboscopy
  - Possible effects of stress, anxiety, decompensation on the voice
  - Control group
- Long-term effect??





Thank you for your attention

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