Toward a Characterization of Western Operatic Singing Voices

Pauline **Larrouy-Maestri***, David **Magis°**, Marion **Nowak***, & Dominique **Morsomme***

*Unit « Logopédie de la Voix », Department of Psychology: Cognition and Behaviour, University of Liège, Belgium

°Department of Education, University of Liège, Belgium

AIMS

Western operatic singing performances

- Easily recognizable
- Several acoustical parameters identified

However

- The number of parameters could be extended
- Effect of melody on these parameters remains unclear

➔ **Effects of melody and technique on acoustical and musical parameters**

➔ **Characterizing the Western operatic singing style**

METHODS

Participants

- 50 professional singers (38 women and 12 men)
- Age from 19 to 66 years (*M* = 36.94)
- Classical training started between 6 and 49 years of age (*M* = 20.18)
- Singing experience from 5 to 51 years (*M* = 19.86)
- Practice 13.68 h/week on average

Material

- Two contrasting melodies
  - popular song (Happy Birthday)
  - romantic melody
- With two vocal techniques
  - with operatic singing technique
  - without particular technique

200 performances

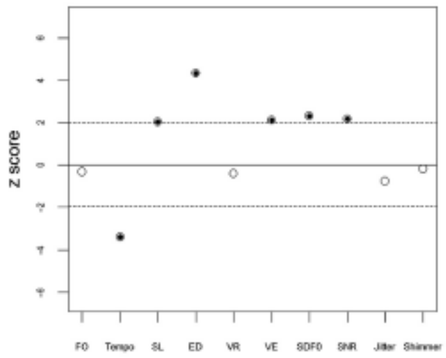
Database: http://sldr.org/sldr000792/en

PARAMETERS

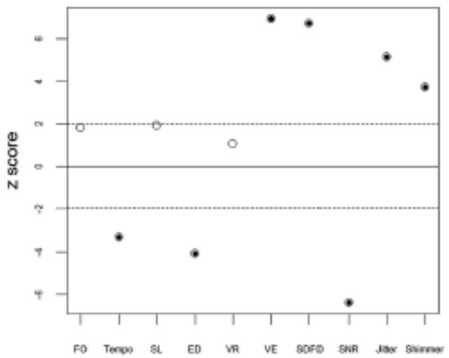
Acoustical	Musical	Perturbation
Energy distribution ***(ED)***	F0 of the starting note ***(F0)***	Standard Deviation of F0 ***(SDF0)***
Vibrato rate ***(VR)***	Average tempo ***(Tempo)***	Signal-to-noise ratio ***(SNR)***
Vibrato extent (***VE***)	Sound pressure level in dB ***(SL)***	Jitter % ***(Jitter)***
		Shimmer % ***(Shimmer)***

RESULTS

Effect of melody

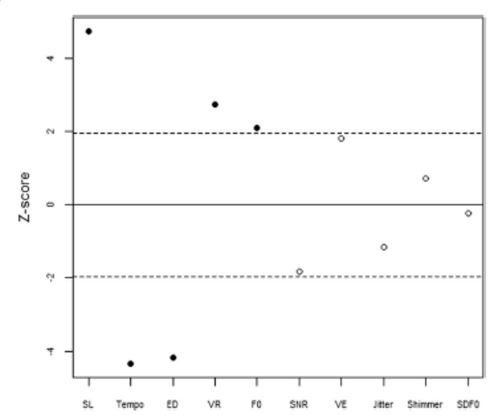


Effect of technique



z-scores for significant and non significant effects of melody (left) and technique (right) on the 10 parameters observed.
Positive z-scores for melody indicate a positive effect of the covariate on the romantic melody.
Positive z-scores for technique indicate a positive effect of the covariate on the operatic technique.
Dashed horizontal lines refer to the 5% significance levels for z-scores.

Theoretical model



z-scores for sig and nonsig effects of the parameters.
Positive z-scores indicate positive effects of the covariates on the operatic technique.

CONCLUSION

- Vocal technique affects most of the parameters examined
- The effect of melody is limited
- Preliminary theoretical model
  - A particular vocal profile appears depending on the vocal technique employed
  - Perturbation parameters don't seem to take part in the characterization of operatic singing voices
  - Vibrato rate, sound level, energy distribution, fundamental frequency of the starting note and tempo are relevant in describing the Western operatic singing technique.

For extensive explanation: Larrouy-Maestri, P., Magis, D., & Morsomme, D. (2014) Effects of melody and technique on acoustical and musical features of Western operatic singing voices. *Journal of Voice, 28(3), 332-340.*

Address for correspondence : pauline.larrouy@ulg.ac.be

43rd Annual Symposium Care of the Professional Voice, Philadelphia (28 May – 1 June 2014)