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# Design and Implementation of a Workplace Vocal Health Promotion Action. The Experience of 10 Public Schools in Bogota D.C., Colombia (no. 34)

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- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Other

## Purpose

To design a workplace vocal health promotion (WVHP) action planned in a way to answer to voice needs among school workers of 12 schools in Bogotá D.C., Colombia.

## Methods

Occurrence of voice disorders among teachers compared with other occupations is high (ranging from 9% to 94%), but limited evidence on implementation of workplace vocal health promotion actions among Colombian teachers exists. Therefore, we conducted a (WVHP) action among 369 Colombian school workers. Design of the action was based on three sources: Literature search, previous experience on these actions and previous results on voice symptoms among the participants. A systematic review of the available scientific literature was conducted on the application of (WVHP) actions. Previous material used in similar actions was assessed and taken into account to design the (WVHP) action. Finally, previous results on self-reported voice symptoms among the participants were analysed; the three most often reported symptoms by school were selected to take into account in the (WVHP) action design. Satisfaction levels among participants were assessed at the end of the implementation of the (WVHP) action on each school.

## Results

The (WVHP) action was implemented on 10 out of 12 participant schools. Systematic review showed that good quality studies assessing interventions of voice disorders among teachers have been developed; however, most of the studies had small samples sizes, and satisfaction levels have not been investigated. The principal topics in the (WVHP) action were: Vocal Hygiene and Voice Projection Techniques. Vocal hygiene information was addressed by the prospectus. Voice projection techniques were the focus of the workshop. Participants were instructed on some techniques to breath, produce and project their voices. Satisfaction levels on the workplace vocal health promotion action were high among the participants.

## Conclusion

Workplace vocal health promotion actions could be a good tool to approach voice disorders at work. Future research including big sample sizes is needed in order to assess the impact of these actions in the prevention of occurrence of voice disorders at work.

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# Vocal Loading Among Primary and Secondary Classroom Teachers with Self-reported Voice Problems: The Relationship Between Voice Production and Background Noise Over the Teaching Day *(no. 35)*

S. Leão, J. Oates, S. Purdy, R. Morton, G. Dodd, D. Scott

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Occupational Voice

Studies involving practical and objective measures in field conditions are needed to better characterise teachers' daily voice use, to identify potential causal factors for voice problems and to examine the effects of vocal load on teachers' voices. In this study, primary and secondary classroom teachers (males and females) with self-reported voice problems and matched-controls (by gender, age and ethnicity) without self-reported voice problems had their vocal dose assessed during two typical teaching days using the Kay Pentax Ambulatory Phonation Monitor (APM). Self-assessment questionnaires, auditory perceptual and acoustic analyses of voice, endoscopic evaluation of the larynx, and environmental measures of background noise during the teaching day (using a dosimeter attached to teacher's shoulder), reverberation time and room dimensions were completed. Teachers also answered a self-assessment questionnaire before and after classes, and filled in a voice diary. For this presentation, data related to vocal load, background noise and voice self-ratings (before and after using the APM) will be presented. Preliminary data from six teachers with self-reported voice problems have shown that female teachers phonated approximately 22% of teaching day, with speech levels averaging 80 dB SPL. The day's recordings were divided into three parts of equal time to examine change in voice and dosimeter values over the day. Overall F0 and voice SPL increased from the start to mid and end of the day. Teachers' voice levels increased over the day despite the dosimeter levels (LAeq and peak levels) indicating a drop in classroom noise levels over the same period. The change in voice self-ratings (comparing the beginning and end of the day) was correlated with middle ( $R_s=0.94$ ) and end of day ( $R_s=0.83$ ) F0 values (Spearman's,  $p<.05$ ). Additional teachers will have been assessed by the time of the conference, so the full data set will be presented and discussed in this presentation.

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# Occupational and Personal Factors Associated with Voice Problems in Teachers – Potential Predictors? (no. 36)

S. Leão, J. Oates, S. Purdy, D. Scott, H. Cooper-Thomas, R. Morton

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Occupational Voice

Although risk factors for voice problems in teachers have been the focus of many studies, associations between some personal and occupational factors and voice problems remain equivocal. Teaching environments, teaching approaches and cultural/genetic factors differ across countries and so risk factors may also differ between countries. This study investigated potential occupational and personal predictors of voice problems in New Zealand teachers using a self-report questionnaire. This research constitutes the second phase of an epidemiological study involving a large sample of primary and secondary teachers. Responses from 634 teachers with complete data were analysed (response rate of 77.7%). The survey investigated a range of risk factors previously described in the literature as well as several novel factors: voice use patterns, teaching subjects and style, acoustic and air quality features of the teaching environment, and personal aspects. Standardized questionnaires were used to evaluate psychological factors such as stress, anxiety, depression, personality, coping style, engagement, self-efficacy, and voice-related quality of life. Health conditions were also assessed (e.g. reflux, sinus infections, and hearing problems). Four voice outcome measures were investigated: frequency of voice problems (considering a voice problem as an impairment), voice quality self-rating, voice-related quality of life scores (V-RQOL) and frequency and severity of voice symptoms. Females ( $p=.007$ ) and primary teachers ( $p=.035$ ) reported more voice problems. There was a trend for teachers of Languages/ESOL (English as a Second or Other Language) and the National Curriculum ( $p=0.09$ ) to report voice problems. Teachers with self-reported voice problems presented with significantly higher mean scores for harmful vocal patterns during teaching ( $p<0.001$ ), stress ( $p=.013$ ), depression ( $p<0.001$ ), and anxiety ( $p<0.001$ ) and lower scores on emotional stability ( $p=.020$ ). The teachers with voice problems rated their classrooms as having poor acoustics (e.g. poor sound absorption and background noise) ( $p<0.001$ ) and poor air quality (e.g. cold/draughty, dust, humid) ( $p<0.001$ ). Voice problems were also associated with colds, sinus infections, throat and sinus infections and hearing problems. Results from regression models used to elucidate possible predictors will be presented and discussed.

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# Voice Assessment and Laryngeal Findings Among Kindergarten Teachers

(no. 37)

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- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Occupational Voice

Kindergarten teachers received less attention in comparison to school teachers with respect to their voice problems. This is despite the fact that kindergartens are expected to have high noise levels and usually part of the day activities are carried outdoors. This study aimed to investigate the voice problems among kindergarten teachers and working conditions affecting them negatively. It also aimed to carry out laryngeal examination for them in their places of work. We studied 119 teachers through internet questionnaire that covered voice habits, voice symptoms and working conditions affecting negatively their voices. In addition, laryngeal examination was carried for the teachers in their places of work. Results showed that 71% reported monthly or more often strain on the voice. In addition, 56% reported hoarseness without infection. Noise at work stood as most detrimental to the voice. Laryngeal examination revealed organic findings among 11% of the examined teachers. Such findings did not correlate with the subjective voice symptoms reported by them. The results point to kindergarten teachers being a risk group that suffer remarkably from voice problems. Noise in their work environment is most harmful to their voices. Still the diagnosis and management on their voice disorders should be based on their self-assessment of voice rather than only findings of organic lesions in their larynges that do not correlated with their voice problems.

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# Influence of the Voice Pitch in the Credibility of the Broadcast Radio News

(no. 38)

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- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Occupational Voice

## Introduction

The voice is the vehicle for the transmission of news by radio. The speaker uses his voice to make give sense to of the news. The speaker intends the audience to believe in the information.

The voice pitch has an influence on the attraction and seduction and in the authority conveyed by the speaker (1, 2, 3, 4, 5, 6, 7). In general, these studies show that low voices of men are valued by women as attractive, seductive voices that convey authority. These perceptions are related to the inference of the action of hormones on growth and muscle power.

Also, in the same way, Klofstad et al (8), show that voices with lower frequencies transmit greater leadership skills. In terms of radio news, De Meo et al (9) studied the influence of accent and intonation in the credibility. In his work, they report that the voices with less tonal inflections show more credibility.

The aim of our study is to determine the influence of the speaker's pitch voice on the credibility of the news. We hope to see the broadcast of radio news with a more low vocal frequency are considered more credible than those issued with high pitch voices.

## Subjects and methodology

A professional speaker issued six news written for this study and had been considered, by a group of twenty readers, as ambiguous news. The announcer spoke with a spontaneous tone. The voice samples were modified with the program Praat (10) following the procedures submitted Klofstad et al (8). The samples were modified increasing 0.5 ERB and decreasing 0.5 and 1 ERB. These modifications allowed us to obtain 4 different versions of each story.

The 24 news were presented randomly to a total of 69 journalism students from the Universitat Ramon Llull (Barcelona, Spain). The students evaluated the credibility of the story on a scale of 5 stretches, as well as other parameters which are not showed in this research.

## Results

Our results show that the news showed a high pitch (between 146 and 167 Hz.) were less credible than that presented a pitch between 106 and 145 Hz. ( $t = 3,822$ ,  $P < 0.01$ ). Moreover, it was observed that the news had a lower pitch to 106 Hz. were rated as less credible than those of 106 and 145 Hz. ( $t = 10,838$ ,  $p < 0.01$ ).

Our research allows us to state that low voices are considered more credible by listeners than high voices or extremely low voices.

## References

- (1) Collins S. Men's voices and women's choices. *Anim Behav* 2000 DEC;60:773-780.
- (2) Feinberg D, Jones B, Little A, Burt D, Perrett D. Manipulations of fundamental and formant frequencies influence the attractiveness of human male voices. *Anim Behav* 2005 MAR;69:561-568.
- (3) Jones BC, Feinberg DR, DeBruine LM, Little AC, Vukovic J. Integrating cues of social interest and voice pitch in men's preferences for women's voices. *Biology Letters* 2008 APR 23;4(2):192-194.
- (4) Hodges-Simeon CR, Gaulin SJC, Puts DA. Different Vocal Parameters Predict Perceptions of Dominance and Attractiveness. *Human Nature-an Interdisciplinary Biosocial Perspective* 2010 DEC 2010;21(4):406-427.
- (5) Feinberg DR, Jones BC, DeBruine LM, O'Connor JJM, Tigue CC, Borak DJ. Integrating fundamental and formant frequencies in women's preferences for men's voices. *Behav Ecol* 2011 NOV-DEC 2011;22(6):1320-1325.
- (6) Re DE, O'Connor JJM, Bennett PJ, Feinberg DR. Preferences for Very Low and Very High Voice Pitch in Humans. *Plos One* 2012 MAR 5 2012;7(3):e32719.
- (7) Fraccaro PJ, O'Connor JJM, Re DE, Jones BC, DeBruine LM, Feinberg DR. Faking it: deliberately altered voice pitch and vocal attractiveness. *Anim Behav* 2013 JAN 2013;85(1):127-136.
- (8) Klofstad CA, Anderson RC, Peters S. Sounds like a winner: voice pitch influences perception of leadership capacity in both men and women. *Proceedings of the Royal Society B-Biological Sciences* 2012 JUL 7;279(1738):2698-2704.
- (9) De Meo A, Vitale M, Pettorino M, Martin, P. Acoustic-perceptual credibility correlates of news reading by native and chinese speakers of italian. *The 17th International Congress of Phonetic Sciences (ICPhS XVII)*; 17-21 August 2011; Hong Kong; 2011.
- (10) Boersma, P. & Weenink, D. PRAAT: doing phonetics by computer, v. 5.1.04. <http://www.praat.org>. 2009.

# Vocal Fold Morphology Reflects the Acoustic Needs in Mammalian Vocalization (no. 62)

I.R. Titze

- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Animal Bioacoustics
- Invited Lecture

The layered tissue structure of vocal folds develops in stages. The fully developed human system consists of an epithelium, three layers of a lamina propria (superficial, intermediate, and deep), and the thyroarytenoid muscle (Hirano, 1975; Hirano and Sato, 1993). A layered structure is present in all mammals, but the depth and ordering of the layers are species specific. For example, in some mammalian species (e.g., lions), a layer of fat is present where ligament and muscle resides in other species (Klemuk et al., 2011). Deer and elk have an extensive ligament that occupies most of the lamina propria space (Riede and Titze, 2008; Frey and Riede, 2013). Dogs have a continued superficial layer in place of a ligament (Alipour and Titze, 1991). It is assumed that the organization of the tissue layers is genetically determined for survival of a species, but can perhaps be modified in a life span by vocal demands of an individual from birth to death. In order to understand the evolutionary or life-span changes in the morphology of the vocal folds, it is important to determine the acoustic requirement for vocal communication. Is the vocal priority a wide range of loudness, a wide range of pitch, the ability to create melodic tonality or rhythmic bursts (e.g. birds), to sound a rescue call (e.g. lambs), to create a unique call recognizable only to family members (e.g. penguins), or to make the sound production efficient with a low cost if vocalization continues over extended durations (e.g., elk in the mating season)? In humans, the ideal morphology for an infant cry may be different from that required for adult speech, for calling for help in an emergency, or for long durations of vocalization among professional voice users. If precise and rapid intonation patterns are needed, as in bird vocalization or human singing, the ideal morphology may again be different. Thus, a systematic description of morphological variations and the corresponding acoustic output may lead to a better understanding of vocal capability and limitation.

## References

- Alipour-Haghighi, F., & Titze, I.R. (1991). Elastic models of vocal fold tissues. *J. Acoust. Soc. Amer.* 90(3), 1326-1331.
- Frey, R. and Riede, T. (2013). The Anatomy of Vocal Divergence in North American Elk and European Red Deer. *J. Morphology* 274: 307–319.
- Hirano, M. (1975). Phonosurgery: Basic and clinical investigations. *Otologia Fukuoka*, 21(1), 239-262.
- Hirano, M., and Sato, K. (1993). *Histological Color Atlas of the Human Larynx*. (Singular Publishing Group, Inc., San Diego, CA), Chap., AC1, pp. 36-46; Chap., AH9, p.20.
- Klemuk, S.A., Riede, T., Walsh, E.J., and Titze, I.R. (2011). Adapted to roar: functional morphology of tiger and lion vocal folds. *PLoS One* 6(11): e27029 [www.plosone.org](http://www.plosone.org)
- Riede, T., and Titze, I.R. (2008). Vocal fold elasticity of the Rocky Mountain elk (*Cervuselaphusnelsoni*) – producing high fundamental frequency vocalization with a very long vocal fold. *J. of Experimental Biology* 211, 2144-2154. Includes commentary: Elks Scale Vocal Heights, Inside JEB.

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# Phonatory Characteristics of the Excised Human Larynx in Comparison to other Species (no. 63)

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- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Acoustics
- Invited Lecture

## Objective

The purpose of this study was:

1. To determine the conditions needed to elicit phonation (i.e. phonation threshold pressure and subglottic pressure) from excised human larynges and the resultant range of phonations produced (i.e. F0 and SPL)
2. To compare that with similar information previously obtained from canine, pig, sheep and cow and then
3. To relate those findings to previously reported information about viscoelastic properties of the vocal fold tissue (i.e. stress strain curves and Young's Modulus).

## Methods

Six human larynges of the geriatric group (age ranges 70-89) were mounted on the bench without supraglottic structures and phonation was achieved with the flow of heated and humidified air through the tracheal tube. Using various sutures to mimic the function of the laryngeal muscles, the larynges were put into a series of sustained oscillations with adduction as a control parameter. During oscillations, subglottal pressure, flow rate, electroglottograph, and microphone signals were recorded on digital media for later analysis.

## Results

The human larynges oscillated with an average frequency that was close to the canine larynges, but the oscillation behavior and wide frequency range were similar to those of pig larynges. The similarity of the wide vibration frequency ranges of human and pig larynges may be due to the nonlinear behavior of their elasticity which is related to their vocal folds high collagen content. On the contrary, other species that show almost linear stress-strain curves due to the higher elastin and lower collagen contents had limited frequency ranges.

## Conclusions

The physiological differences in the linearity and ranges of oscillation of excised larynges reported in this study and previous studies are reflective of the tissue composition and mechanics.

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## Super Size Me! – Vibratory Characteristics of an Elephant Larynx (no. 64)

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- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Animal Bioacoustics
- Invited Lecture

Elephants are the largest land-based mammals. Their low-frequency vocalizations in the infrasonic range (fundamentals below 20 Hz) have been hypothesized to be produced by either of two fundamentally different sound production mechanisms: (a) by a regular pattern of successive EMG bursts (e.g. 20-30 Hz for cat purrs) resulting in consecutive active muscle contractions (AMC); or (b) by flow-induced self-sustaining oscillations in accordance with the myoelastic-aerodynamic (MEAD) theory of sound production.

In a recent publication [1] the author and collaborators have documented self-sustaining, flow-induced vocal fold oscillations in an excised elephant larynx (*Loxodonta africana*), thus rejecting the AMC mechanism as a plausible cause for elephant infrasound vocal production. Rather, sounds were produced in a manner directly paralleling human speech or song.

Here, a more detailed analysis of the vibratory phenomena seen in the excised elephant larynx is presented [2]. Vocal fold oscillation occurred with a wide variety of vibratory modes, including periodic and complex subharmonic regimes, as well as irregular patterns typically seen in deterministic chaos. Phase delays along the inferior-superior and anterior-posterior (A-P) dimension were commonly observed, as well as travelling wave patterns along the A-P dimension, as yet not documented in the literature. These phenomena might have been facilitated by the large dimensions of the elephant vocal folds (length: 104 mm, thickness: 32 mm). The vestibular folds, when adducted, participated in the tissue vibration, effectively increasing the generated sound pressure level by 12 dB.

In conclusion, the same basic physical principles of voice production apply to mammals of various sizes (i.e. bats, humans, elephants), suggesting that the myoelastic-aerodynamic theory extends across a remarkably wide range of body sizes and vocal frequencies (more than four orders of magnitude). The elephant larynx is, however, not simply a linearly scaled version of the human model, thus giving rise to a range of vibratory phenomena not regularly seen in non-pathologic human phonation.

### References

- [1] Herbst, C. T., Stoeger, A. S., Frey, R., Lohscheller, J., Titze, I. R., Gumpenberger, M., Fitch, W. T. (2012). *How Low Can You Go? Physical Production Mechanism of Elephant Infrasonic Vocalizations*. *Science*, 337(6094), 595-599
- [2] Herbst, C. T., Švec, J. G., Lohscheller, J., Frey, R., Gumpenberger, M., Stoeger, A. S., Fitch, W. T. (in review). *Complex vibratory patterns in an elephant larynx*.

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# The Quest for Speed: Unraveling the Evolution of Superfast Muscles Used in Sound Production and Control *(no. 65)*

C.P.H. Elemans

- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Animal Bioacoustics
- Invited Lecture

Superfast muscles are the fastest vertebrate muscles known that can produce power at cycle rates over 100 Hz. Until recent, superfast muscle fibers were considered rare adaptations and only found in the rattlesnake tail shaker muscle and the toadfish swimbladder muscle.

We have discovered the first superfast muscles in two large group of vertebrates: mammals and birds. We show that bats have evolved superfast laryngeal muscles that allow them accurately control their echolocation calls. These calls consist of rapid downward sweeps of fundamental frequency from 45 - 20 kHz in <0.5 ms, and are produced up to 160 times/sec during aerial pursuit of prey. We also discovered that songbirds have superfast muscles in their vocal organ, the syrinx. Syringeal muscles are even faster and can modulate the position and tension of the sound producing membranes up to 250 times/sec. This extreme performance allows songbirds to actuate the submillisecond temporal precision observed in premotor brain areas. Superfast muscles can no longer be considered a rare adaptation, and occur in most vertebrate lineages.

However, the extreme performance of superfast muscles comes at a cost. Space constraints at the muscle ultra-structural level and the kinetics of muscle proteins dictate a trade-off between force production and maximal attainable frequency at which positive work can be produced.

Because extreme function involves extreme modifications, superfast muscles provide unique opportunities to study regular muscle function. We are currently trying to understand the cellular and molecular mechanisms that underlie the extreme superfast muscle performance, and to elucidate the evolutionary origin of this rare muscle type.

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# Singing in a Jar: The Neuromuscular Control of the Songbird Syrinx in Vitro

(no. 66)

C.P.H. Elemans

- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Animal Bioacoustics
- Invited Lecture

Song behavior depends on the integrated action of neural systems for auditory perception, song production, song learning and the processing of social information. In songbirds, many components of these specialized and interacting neural circuits have been identified but mechanistic insights into their function remain incomplete. To understand the neural basis of birdsong we need a more detailed knowledge of how neural motor patterns are translated into sound in the peripheral sound producing system.

The accessibility and small size of the uniquely avian vocal organ, the syrinx, make it difficult to visualize modulation of syringeal parameters in undisturbed freely singing birds in vivo. This experimental setback constrains progress in understanding how neural signals translate into the acoustic output for vocal communication. A quantitative understanding of how syringeal structure relates to function is still lacking.

Here, I present a novel experimental setup that allows for studying the syrinx in vitro under experimentally controlled conditions. The setup combines independent and accurate control of air pressure and flow downstream (bronchial), upstream (tracheal), and in the air sac system surrounding the syrinx, with synchronized high-speed visualization of labial movement from different orientations. These data allow for the exploration of the pressure-flow parameter space in which vocalizations occur. Furthermore, the syrinx and its associated musculature can be kept alive for several hours using micro-perfusion techniques. This addition allows for quantitative study of controlled muscle recruitment on 1) the biomechanical/kinematic effects of the modulation of structural elements and 2) the control of the syringeal pressure parameter space with its associated acoustic modulations. Sound parameters, such as amplitude and fundamental frequency, can now be mapped on either single or synergistic muscle recruitment patterns and their corresponding neural activity. This setup is useful to study basic sound production physiology and opens the way to comparative studies of sound production in a variety of (small) birds, mammals and frogs.

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# Call Classification Design of the Wild Boar (*Sus Scrofa*) Complex Vocalization System (no. 67)

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- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Animal Bioacoustics
- Invited Lecture

Wild boars live in complex social systems in which individuals interact intensively using multicomponent communication signals such as olfactory and acoustic cues.

Possibly related to their complex vocal tract anatomy, characterized by two pairs of vocal folds, wild boar vocalizations are very diversified, and their heterogeneity was reported in an empirical study led by Klingholz et al. (1979). This analysis had however no statistical support and relied mainly on visual inspections and manual measurements of the parameters generally used in bioacoustics studies at the time. Due to technical advances and deeper knowledge of the physical properties of sounds nowadays, this classification could potentially be validated, or improved, based on a more objective, "hands-off" signal analysis and statistical approach.

Here, following a primary visual inspection and computer - aided extraction of acoustical parameters, we applied on the resulting dataset several multivariate analysis approaches, which have proven useful in the identification of vocal repertoires in various species. We attempted to establish, by a comparative means, which classification method is the most appropriate, based on objectivity and repeatability of the measurements.

Quantification and structural characterization of wild boar vocal repertoire is crucial to a better understanding of this species' acoustic communication. This study can provide a solid foundation for further investigation on the production mechanisms (Excised Larynx Experiments), functionality (Playback Experiments), geographical variation, as well as social relevance and transmission of these acoustic signals. Eventually this will help identifying the context and selection pressures that drove the emergence of such vocal displays.

## References

Klingholz, F., Siegert, C. & Meynhardt, H. 1979. *Die akustische Kommunikation des Europäischen Wildschweines (Sus scrofa L.)*. Zool. Garten N. F. 49: 277–303.

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## Lax Vox Voice Therapy Technique (no. 94)

I. Denizoglu, M. Sihvo

- **Form:** Workshop
- **Category:** Voice Therapy
- **Topic:** Voice Therapy

Voice therapy is not only the behavioral way of changing the human voice for treatment of voice disorders but also the best way to understand it. The aim of voice therapy is to help the patient to obtain the best possible voice within the patient's anatomic and physiologic capabilities. Among numerous methods, Lax Vox Voice Therapy Technique with the combination of a silicone tube and water resistance works as an easy tool for healing the voice production apparatus and improving its function. It is a direct technique for general use which is adapted easily both by the patient and the therapist. The procedure automatically balances the functions included in voice production. It also gives a multichannel biofeedback and creates holistic cognition of the complex vocalizing process.

The Lax Vox Voice Therapy Technique suits all speakers and singers desiring to learn vocal ergonomics and voice care. In Pedagogical Vocology, it is useful for the singers for specific demands such as blending the registers, vocal warm-up and cool down as well as for the professional voice users for developing a resonant and an effective voice. In Clinical Vocology, it is an effective treatment method for various functional and organic voice disorders. Lax Vox is also useful for pre- and post-operative voice therapy which can be applied by otolaryngologists who are interested in Clinical Vocology.

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Ilter Denizoglu MD is a laryngologist, phonosurgeon and director of Voice Clinic in Katip Celebi University Ataturk Education and Research Hospital, Izmir, Turkey. Near the Clinical Vocology practice, he is interested in Pedagogical Vocology as a university lecturer of Vocology in three different universities' conservatories. He is now studying biophysics in order to form the whole picture of human voice with Basic Vocology.



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Marketta Sihvo graduated in Turku and later in Helsinki and Tampere universities in logopedics and vocology (Ph.D.1997). For twenty years she worked in voice therapy and lecturer at the phoniatic department of Tampere University Hospital. There she started by implementing instrumental voice measurement to the clinical setting. Her research, targeting to prevention of occupational dysphonia, is focused to the effects of working conditions on speech production. She is one of the authors of Voice Ergonomics (in Finnish and Swedish) and of a handbook for evaluation of professional speakers working conditions. Her book Healthy Voice is ABC for voice care (in Finnish and in Estonian). - She developed "the first-aid for voice patients" in which the LAX VOX - tube inserted in water is used. The method serves as diagnostic short term voice therapy. The tool gives multi-channel biofeedback to the vocalist. - She has presented her work in numerous international voice congresses. Marketta Sihvo retired from work in 2009.

# Voice Therapy: From the Past to the Present (no. 113)

J. Wendler

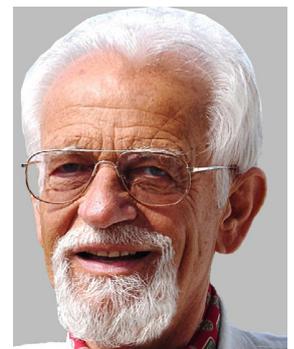
- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Voice Therapy
- Invited Keynote Lecture

The roots of voice therapy can be traced back to the professional use of the voice. In antiquity, so-called phonasci, voice coaches, were training and monitoring their clients with regard to public speaking, in particular keeping an appropriate physiologic mean speaking pitch. During the times of Baroque, aspects of the singers' voice came to the fore and can, still, be found as wide spread elements of several training procedures, with quite a lot of irrational, metaphoric dimensions of imagination. In the beginning of the 20th century, vocal hygiene was established as an obligate part in Prussian teacher education, and with Hermann Gutzmann's public lectures on health care for voice and speech in Berlin at the same time, physiologic and medical perspectives concentrating on the peripheral areas of respiration, phonation, and articulation were introduced as basic references of therapeutic measures. In parallel, holistic approaches stressed psychological and behavioral conditions (Froeschels) and, finally, arrived at a communicative way of looking at the phonatory process with interindividual and sociocultural interrelations forming the basis as well as the targets of voice therapy. This philosophy also implies that, obviously, what we, the voice specialists, use to call a physiologic, healthy and pleasant sound is going to be more and more replaced in the public perception by hoarse and harsh professional voices (in singing as well as in speaking), be they really pathologic or arbitrarily maltreated. We have to realize that these voices are not only generally accepted, but, even are attracting special interest, and therapy may, primarily, aim at a resilient and effective voice instead of a perfect sound. Thus, all in all, a vast amount of specific methods and strategies has been developed, in parts scientifically based, others intuitively emerging from personal experiences, and some of them even extremely contradictory. In spite of the availability and, increasingly, the application of recently recommended rating criteria (basic protocol of the European Laryngological Society, Dysphonia Severity Index, Voice Handicap Index a. o.), no evidence based comparing evaluation of the efficacy of the various approaches could be found in the literature, and it seems, indeed, rather unrealistic to hope for such an appraisal due to overwhelming methodological problems. And in addition, as it is true always if several methods are in use for the same purpose, it is mostly not the method that makes the difference, but the person who uses it. Consequently, it is, now as before, the personal decision of the experienced, competent clinician to responsibly make the choice of an appropriate approach from a large arsenal of tools in optimal accordance with the patient's individual requirements, with always the Hippocratic imperative in mind: primum nil nocere - first do no harm.

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- Born 1930 in Dresden,
- Reopening and direction of the Phoniatic Department at the ENT-Clinic of the Charité University Hospital Berlin, 1969 - 1995,
- Scientific work mainly on voice,
- Numerous lectures and workshops in Germany and abroad
- On the Boards of several national and international scientific and professional associations



## Voice Science Vision: Where Are We Going? (no. 149)

I.R. Titze

- **Form:** Oral Presentation
- **Category:** Basic Science
- **Topic:** Voice Science Overview

Voice Science, or Vocology in its broader definition, has grown from a small focus of describing the “sound source for speech” to a much larger scope of describing “sound production in airways.” Sound production in airways includes all primal and learned sounds produced across species, gender, age, and disorders. It includes skilled sound making (singing) as well as undesirable sound making (snoring or wheezing). The theoretical underpinnings for such a broad description include fluid structure interaction, nonlinear dynamics of couple oscillators, biomechanics of muscular and connective tissues, and acoustic wave propagation in soft-walled air ducts. The science is both empirical and theoretical. Basic physical laws of momentum, energy, and mass conservation have been successfully applied to air and tissue movement, but airway and tissue morphology must be determined experimentally. Furthermore, control of the physical plant with variables that relate to perception and cognition is a huge challenge for the future. Simulation can become an important virtual laboratory in this venture. Incomplete or fragmentary measurements obtained from glottography and visual imaging can be interconnected for cause-effect studies. Huge questions remain, however, about the “learning capabilities” of these simulators to mimic human or animal vocalization. The challenge is to discover and embed biological constraints so that hundreds of physical parameters can be controlled with a few simple inputs, all the while retaining the great variety of sounds that the physical plant can offer.

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Ingo R. Titze is Distinguished Professor of Speech Science and Voice at the University of Iowa and Executive Director of the National Center for Voice and Speech at the University of Utah. His formal education is in physics and electrical engineering, but he has devoted much of his studies to vocal music and speech. Dr. Titze has published more than 400 articles in scientific and educational journals, coedited two books titled *Vocal Fold Physiology*, and now has three books in print: *Principles of Voice Production*, *The Myoelastic Aerodynamic Theory of Phonation*, and *Fascinations with the Human Voice*. He has lectured throughout the world and has appeared on such educational television series as *Innovation*, *Quantum*, and *Beyond 2000*. He is a recipient of the William and Harriott Gould Award for laryngeal physiology, the Jacob Javits Neuroscience Investigation Award, the Claude Pepper Award, the Quintana Award, and the American Laryngological Association Award. He is a Fellow and a Silver Medalist of the Acoustical Society of America, and a Fellow of the American Speech-language-Hearing Association. Dr. Titze has served on a number of national advisory boards and scientific review groups, including the Scientific Advisory Board of the Voice Foundation and the Division of Research Grants of the National Institutes of Health. In addition to his scientific endeavors, Dr. Titze continues to be active as a singer. He is married to Kathy Titze and has four children and eight grandchildren.

# Voice Handicap and Psychosomatic Well-being in Vocal Fold Lesions vs. Functional Lesions (no. 165)

F. de Jong, R. Smits

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Clinical Issues

## Introduction

It has been demonstrated that a voice handicap and impaired general well-being are positively correlated. Voice disorders have a multifactorial genesis and may be present in various ways. Vocal fold lesions often are more concrete than functional disturbances. Therefore, vocal fold lesions are more likely to be handled as criterion of a voice disorder, and various health insurance institutions apply the presence of a vocal fold lesion as a norm for indemnity or alimony. The aim of this study is to assess whether vocal fold lesions have a greater impact on voice handicap and psychosomatic well-being, compared with pure functional lesions. Furthermore, the relation between the quality of voice and the appraisal of the patient's voice handicap and psychosomatic well-being was assessed.

## Methods

Eighty-two female voice patients, aged 18–65 years were assessed. Laryngostroboscopic examination and acoustic voice analysis were carried out, and the patients were asked to fill in the Voice Handicap Index (VHI) and Symptom Check List-90 questionnaires.

## Results

In 43 patients (52.4%), a vocal fold lesion was observed. The VHI and psychosomatic well-being did not differ significantly between patients with and without a vocal fold lesion. The patients with a vocal fold lesion showed lower scores on the Dysphonia Severity Index (DSI) compared with those without a vocal fold lesion. However, the DSI was not correlated with voice handicap and psychosomatic well-being, except for the VHI physical subscale.

## Conclusions

The results of this study underline the importance of functional aspects in voice problems and their influence on quality of life. Objective measurement does not necessarily correlate with the subjective appraisal of the patient's voice handicap and psychosomatic well-being. Besides organic lesions, functional aspects are important features in the design of diagnosis, treatment, and prevention of voice problems. The individual personal perception of the voice problem holds a high place in voice care. Moreover, various criteria on which health insurance departments base their indemnity and alimony should be questioned.

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# The Ability of the Norwegian Voice Handicap Index (VHI-30N) to Differentiate Between Voice-related Diseases *(no. 166)*

T. Karlsen, A.R.H. Grieg, J.-H. Heimdal, H.J. Aarstad

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Measurement

## Aims

To study the ability of the Norwegian version of the Voice Handicap Index (VHI)-30 to discriminate between voice-diagnoses dependent on disease origin, as well as to study the psychometrics of the VHI based on specific laryngeal diseases. Abbreviated scales as published by Nawka et al. and Rosen et al. were also tested.

## Method

126 healthy subjects and 355 laryngeal diseased patients answered the VHI-30(N), a visual analogue scale where the subjects were asked to rate their voice disease, as well as a seven-level scale where the subjects rated their degree of voice use. The different laryngeal diseases were allocated to disease groups according to commonly used standard criteria. The disease groups with the most included patients were: Paresis of the recurrence nerve (n=40), functional disease (n=76), Reincke's oedema (N=24), laryngitis (n=20) and laryngeal cancer (n=81).

## Results

The VHI score of the above specifically mentioned patient groups were psychometrically examined. The VHI scores showed e.g. high Cronbach's alphas when studied with the patients of individual disease groups included only. A visual analogue scale where the subjects were asked to rate their voice disease correlated well with the VHI-30(N) scores within the different patient groups. When studied by an ANOVA analysis with VHI scores as dependent variable a highly significant dependence of disease group was obtained. By post hoc analyses the above mentioned laryngeal patients groups scored all differently from each other except cancer versus Reincke oedema patients, and the functional versus laryngitis patients. The Reincke oedema patients had the highest VHI scores and laryngeal cancer patients scored lowest of the above mentioned disease groups. Furthermore, the two highest scoring patient groups among all groups were the aphonic and spastic dysphonic patients. All patient groups scored differently from the controls. Closely parallel results were obtained with the total VHI, the subscales of VHI and the abbreviated scales.

## Conclusion

This Norwegian version of the VHI questionnaire was psychometrically well functioning also when specifically studied among different laryngeal disease patients. When deploying large groups of patients, the VHI-30(N) had the capability to discriminate between voice-diagnoses dependent on disease origin.

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# On the Accuracy of Adult's Perception of Normophonic and Dysphonic Children's Personality on the Basis of Vocal Cues (no. 167)

I. Verduyck, D. Morsomme, M. Remacle

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Child's Voice

## Context

The link between personality and dysphonia has traditionally been studied from two separate angles. On the one hand, studies have sought to identify personality profiles specific to patients with vocal fold nodules or functional dysphonia. On the other hand, studies have studied the impact of dysphonic voice quality on perception of speaker personality; generally assuming that negative attributions are the result of negative stereotyping and as such forcedly erroneous. The possible accuracy of personality judgments of dysphonic speaker on the basis of their voice has never been studied. In this work where we set out to compare the actual personality profiles of normophonic children (NP) and children with vocal fold nodules (VN) with the evaluation of their personality made by external raters having only heard their voices.

## Methodology

Actual personality was defined as the profiles of the children such as evaluated by their mother on a scale measuring the personality dimensions Openness (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Emotional Stability (ES). Maternal ratings were gathered for 36 VN and 36 age and gender matched NP children.

48 external raters later estimated the personality of 6 VN children and 4 NP children on the basis of their voice only with the same scale used by the mothers. Separate ratings were obtained for sustained vowels and continuous speech.

Group differences for VN and DP children were analyzed and the pooled personality profiles of VN and NP children such as rated by mothers or external raters were then compared.

## Results

Mother's ratings.

Statistically significant group differences were found for the E dimension, VN children were rated as moderately more extroverted than NP children ( $t(70)=2,567$ ;  $p=0,012$ ;  $d=0,61$ ). Clinically relevant differences were found for the A and O dimensions (A:  $t(70)=1,922$ ;  $p=0,059$ ;  $d=0,47$ , and O:  $t(70)=1,899$ ;  $p=0,062$ ;  $d=0,46$ ); VN children were rated as being more agreeable and more open than their NP peers. The ES and C dimensions revealed no difference between child groups.

External judges' ratings on the basis of vowels.

The VN group was judged as slightly less extroverted and open than the NP group (E:  $t(568)2,637$ ;  $p=,009$ ,  $d=-,23$ ; A:  $t(568)2,267$ ;  $p=,024$ ,  $d=-,19$ ).

External judges' ratings on the basis of sentences.

The VN group was judged as much more extroverted and slightly more open than the NP group (E:  $t(568)-9,507$ ;  $p<,001$ ,  $d=,81$ ; O:  $t(568)2,605$ ;  $p=,009$ ,  $d=,22$ ). The VN children were also judged as slightly less agreeable than the NP children but this difference failed to reach significance level (A:  $t(568)1,720$ ;  $p=,086$ ,  $d=-,15$ ).

## Conclusion

External judgments made from the vowels lacked accuracy; VN children were judged as less extroverted and less agreeable than NP children but maternal ratings suggested that they actually are not only more extroverted and agreeable but also more open than NP children. Judgments made from the sentences were more accurate. In accordance with the maternal ratings, VN children were rated as more extroverted and open than the NP children. Although the difference went in the accurate direction for E and O, the magnitude was not accurate. Maternal ratings had suggested VN children to be moderately more extroverted and open but external judges rated VN children as much more extroverted and only slightly more open than NP children. Possible reasons for the discrepancy between vowel and sentence based ratings are discussed.

# Gender Differences in the Prevalence of Vocal Symptoms in Smokers (no. 168)

S. Simberg, H. Udd, P. Santtila

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Other

Smoking has generally been seen as a primary cause for voice disorders and it is well documented that it is a central factor in the etiology of laryngeal cancer and Reinke's edema. Smoking causes edema and erythema on the vocal folds, affects fundamental frequency and causes irregularity in the vibration of the vocal folds. Still, the results of several questionnaire studies do not seem to show any association between the prevalence of vocal symptoms and smoking.

Some smoking related diseases, such as stroke and coronary heart disease, seem to affect men and women who smoke in different ways. The purpose of the present study was to explore the prevalence of self-reported vocal symptoms among male and female smokers, occasional smokers and non-smokers.

1728 twins (555 men, 1173 women) born between 1961 and 1989 reported the occurrence of the symptoms throat clearing or coughing, a sensation of pain or lump in the throat, difficulty in being heard, the voice becomes low or hoarse, the voice becomes strained or tires and voice breaks while talking by indicating the frequency of these symptoms occurring during the past years as "daily," "weekly," "less often," and "not at all". Symptoms occurring daily or weekly were considered as frequently occurring symptoms. Alternatives for smoking habits were regular smoker, occasional smoker and non-smoker.

The results showed that 20% of the women and 19% of the men were regular smokers. Overall, women reported significantly more often occurring vocal symptoms than men. Also, when analyzing women and men combined, smokers reported significantly more often occurring symptoms than non-smokers. There was no significant difference in the prevalence of any of the symptoms between male smokers, occasional smokers and regular smokers. As to the women, there were significant differences for four of the symptoms. These were throat clearing or coughing, the voice becomes low or hoarse, the voice becomes strained or tires and voice breaks while talking. These symptoms were significantly more common for female smokers than non-smokers.

The results showed that female smokers reported significantly more vocal symptoms than female non-smokers whereas this was not the case for men. It is possible that smokers ignore vocal symptoms and understate their voice problems and this could be the case to a larger extent for men compared to women. One reason for overlooking symptoms may be that persons adapt to worsening of voice quality such as hoarseness. It is also possible that the vocal folds in men are better protected from the adverse effects of smoking because they have a higher concentration of hyaluronic acid in their vocal folds. Since the female voice seems to be more vulnerable to the exposure of tobacco smoke it is of outmost importance to inform female smokers of the effects that smoking has on their voice.

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## Dysphonia is Beautiful! (no. 169)

M. Barkat-Defradas, F. Hirsch, J. Revis, B. Amy de la Breteque, C. Fauth, O. Chauvy, C. Busseuil

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Analysis of Voice and Speech

The evaluation of vocal quality and its perceived decline through various acoustic indexes is a major concern for voice professionals implicated in the process of vocal rehabilitation. Accordingly, it is appropriate to give particular attention to all indexes likely to yield pertinent information for the purposes of both diagnosis and the evaluation of the effects of proposed programs for vocal rehabilitation. Hence, the contribution of experimental phonetics to clinical practice is a well-known fact. Though the analysis we are proposing is about the perceptual evaluation of vocal quality, our concern is more directed towards the aesthetic dimension of voices in the specific context of vocal pathologies.

This study, connecting phonetics and logopedic sciences, deals with the aesthetic quality of dysphonic voices. The aim of this work is to evaluate if women can perceive masculine dysphonic voices as attractive. Results show that masculine voices that are slightly rough (i.e. R1 on GRBAS scale) are evaluated as the most pleasant ones among a number of normal and dysphonic voices. From there on, an acoustic study was undertaken on the basis of spontaneous speech and sustained vowels (1) to quantify the acoustic characteristics of each type of pathological voices and (2) to examine the acoustic correlates of voices that have been perceived as the most attractive.

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# The Dutch Pediatric Voice Handicap Index: A Self-report Instrument for Children Aged 7-12 to Measure Impact of Dysphonia (no. 170)

M. Schouwerwou, D. Dautzenberg, M. Fris, M. Bosma, M. Aprea, E. de Haan

- **Form:** Oral Presentation
- **Category:** Voice Therapy
- **Topic:** Child's Voice

The objective of this study was to develop a Dutch instrument to evaluate the effects of dysphonia on children. Instead of using parent-proxy reports, we set out to develop a self-report instrument suitable for children aged 7-12 years of age. Based on the Pediatric Voice Handicap Index (Zur et al., 2007), a questionnaire for parents, we constructed The Dutch Pediatric Voice Handicap Index for children (pVHI-k-NL), an instrument that quantifies the functional, physical and emotional consequences of dysphonia as experienced by the child him-/herself.

A pilot study was performed to review the usability of the pVHI-k-NL and to obtain an impression of its reliability, internal consistency and (clinical) validity. Seven children with dysphonia and eight healthy children completed the questionnaire. Parents completed a similar questionnaire regarding their child (i.e. parent-proxy report). Usability was reviewed by assessing children's comprehension of the questions, their ability to complete the questionnaire and the time they needed to complete it.

Based on this pilot study we conclude that the comprehensibility of the pVHI-k-NL is satisfactory: children are able to complete the questionnaire on their own and within twenty minutes. A detailed comparison of parent and child responses showed little difference between their scores. The internal consistency of the pVHI-k-NL as a whole appears to be good (Cronbach's alpha = 0.818). With regard to the subscales, only the physical scale shows good internal consistency (Cronbach's alpha= 0.804). Total scores were higher for children with dysphonia compared to healthy children (respectively 29 and 9 points on average), influenced mostly by the higher scores obtained by dysphonic children on the physical subscale.

Given the limited number of participants in this pilot study, the results regarding reliability and validity should only be considered as indicative. A study to validate this self-report instrument for dysphonic children is currently carried out in the Netherlands. Based on the present study, we believe that the pVHI-k-NL is a useful addition to the clinical practice of speech and language therapists and otorhinolaryngologists working with a pediatric population.

## Learning objectives

The Participant will be able to:

1. Understand why a self-report instrument is of value regarding clinical decision making in voice disordered patients aged 7-12
2. Understand what changes were made to adapt the pVHI to a self-report instrument for 7-12 year olds
3. Understand what parallel assessment of parent and child responses revealed

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# Voice in Relation to Coping and Personality in the Framework of Voice Ergonomics (no. 188)

F. de Jong, D. Deuster

- **Form:** Workshop
- **Category:** Voice Therapy
- **Topic:** Clinical Issues
- Invited Workshop

A voice problem is a dynamic process of causal and maintaining factors. Voice performance requires an effort not only physically but also in the psychosocial field, especially in professional voice users. Internal factors such as general condition, psychological factors and personality traits may influence the ability of the voice to withstand the demands of the profession. Persons with a combination of high negative affectivity and high social inhibition (type-D personality) have shown to have the tendency to underestimate their voice problem and to seek less care. Persons with a relative high voice handicap have shown to use more passive and less active general coping strategies. Furthermore, a dysfunctional way in shaping interpersonal relationships (e.g. in intrapsychic conflicts of autonomy, self-worth, or autarchy) can cause and maintain voice disorders.

Persistent voice problems are shown to be associated with externalizing and unawareness of the problem. Besides internal factors, external circumstances are involved, such as planning of the vocal demands, vocal load, acoustics, and psychological pressure. An adequate balance of internal and external factors is necessary for optimal vocal performance. All above mentioned factors are interconnected and have a mutual influence. The relation with man and his environment is the object of ergonomics. i.c. voice ergonomics. In the light of the above mentioned statements it is opportune to assess the biopsychosocial profile of the person with a voice problem. In this perspective, voice health care workers have to ask themselves with what person he has to do, how is the person's approach towards life and career? What are the person's ambitions? With what problem is the person faced with? On nonverbal and interpersonal level: what emotions are elicited by the patient? It is important to find out the timing: why occurs the voice problem now, at this very moment and why have the complaints specifically developed? There must be clarity of the context in which the complaints have developed in terms of exposure to stressors and what the consequences in a broad perspective are. The final question is: why does recovery not occur, what are the maintaining factors, does a morbid gain exist? Assessment and treatment of the factors that maintain the voice problem and the way in which the person copes with his problem may turn out to be of crucial importance in solving the voice problem. A broad approach has to be adopted in order to solve a persisting voice problem, especially if previous treatment has failed and the person finds himself in a deadlocked situation, likely sliding down into a chronic disease. In this workshop a holistic approach of voice problems is discussed and practical clues are supplied.

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# A Comprehensive Investigation of the Performance Strategies in a Professional Impersonator (no. 232)

J. Revis, C. De Looze, S. Dufour, J. Abitbol, A. Giovanni

- **Form:** Workshop
- **Category:** Basic Science
- **Topic:** Occupational Voice

We present a series of three experiments about the fascinating ability of vocal flexibility and perceptive skills of the most popular French impersonator:

## 1. Vocal flexibility

### Objective

The objective of this initial feasibility study was to describe vocal flexibility in one of the best French impersonator. Our hypothesis is that linguistic features such as melodic curve and rhythm are mandatory for a great imitation performance.

### Method

We used a political speech by our former President Jacques Chirac, who we have chosen for his specific and recognizable voice. After transcription, we asked the impersonator to do several readings in his natural voice and in a spontaneous imitation task. Using Praat, we have compared 3 recordings: Chirac's, the impersonator's natural voice and the imitation performance (pitch: F0, melodic curve; rhythm: duration, pauses).

### Results

Results showed significant modifications in the impersonator's prosody, especially concerning the duration of pauses ( $p < 0.001$ ).

### Conclusion

The professional impersonator's imitation strategy lies on the reproduction of linguistic features. He manages to get out of his own discursive habits by changing the intonation curve and flow of speech, up to be confused with the target.

## 2. Prosodic adaptation strategies during voice imitation

### Objective

Voice imitation lies on two strategies: the convergence is the ability to reproduce global characteristics and the synchrony is the ability to reproduce instant variations. Our hypothesis is that a professional impersonator uses both strategies whereas naive subjects limit themselves to convergence.

### Method

4 control subjects and a professional impersonator have produced several readings of a Jacques Chirac's political speech: natural voice and spontaneous imitation for all participants, and imitation after listening to Chirac's recording for control speakers. Using Praat, we have compared the different performances.

### Results

Results showed pitch and rhythm convergence in naive speakers, whereas professional impersonator used only rhythm convergence but also pitch and rhythm synchrony.

### Conclusion

The professional impersonator's uses both convergence and synchrony. He eliminates what seems negligible to him, and selects and reinforces what he considers as a fundamental characteristic of the target.

## 3. Perceptual skills

### Objective

Process of imitation includes not only an incredible ability to reproduce vocal characteristics of a target speaker, but also to select them. Our aim is to compare the perceptual abilities between a professional impersonator and control auditors. Our method was inspired by Dupoux's (1997), who showed that French native speakers are "deaf" to Spanish accent contrasts between words. Our hypothesis was that control auditors would show difficulties to discriminate Spanish accent, whereas the professional impersonator would be sensitive to any contrast.

### Method

40 French native speakers and 1 professional impersonator have been asked to listen to 576 triplets of Spanish non-words in an ABX discrimination task involving an accent contrast, a phoneme contrast, or a redundant contrast with both variations.

### Results

The professional impersonator's performance was not significantly different from the group, but one of the 2 bests.

