

Current Voice Assessment : devices and techniques

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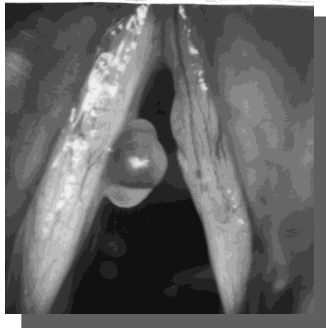


UMR 6057 CNRS
PAROLE ET
LANGAGE

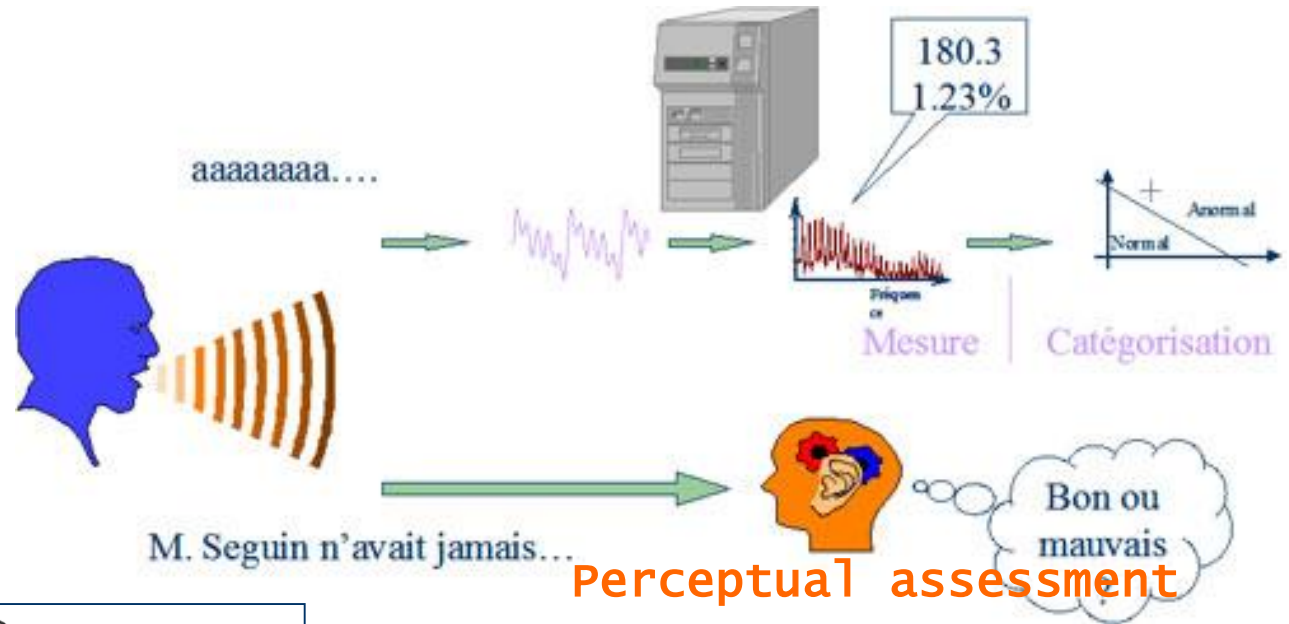
Voice assessment ?



Imaging



Instrumental assessment



Questionnaire

UPMC University of Pittsburgh Medical Center
 University of Pittsburgh School of Medicine
 Department of Speech-Language Pathology and Audiology

I used active use of my speaking voice primarily for:

| | | |
|--|---------------------------------|-------------------------------|
| <input type="checkbox"/> My profession (sales, service, teacher, etc.) | <input type="checkbox"/> P sign | <input type="checkbox"/> VIII |
| <input type="checkbox"/> Activities outside of work (coaching, community organization, etc.) | <input type="checkbox"/> NPV | <input type="checkbox"/> VII |
| <input type="checkbox"/> Normal energy conversation. | <input type="checkbox"/> NPV | <input type="checkbox"/> IV |

I used active use of my singing voice primarily for:

| | | |
|---|---------------------------------|--------------------------------|
| <input type="checkbox"/> My profession (singer-primary income, student of voice) | <input type="checkbox"/> P Sing | <input type="checkbox"/> Tenor |
| <input type="checkbox"/> Activities outside of work (choir, chorus, stage band, amateur/secondary income) | <input type="checkbox"/> R Sing | <input type="checkbox"/> Bass |
| <input type="checkbox"/> None of the above. I do not sing. | Talker/voice: _____ | |

I would rate my degree of tallentness on the following: (circle response)

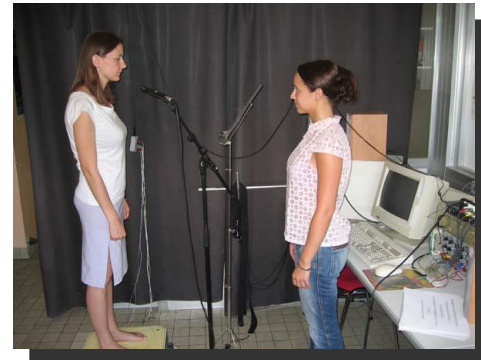
| | | | | | | |
|---------------|-----------------|-------------------|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Quiet learner | Average learner | Extremely tallent | | | | |

VOICE HANDICAP INDEX
 These are statements that many people have used to describe their voices and the effects of their voices on their lives. Circle the response that indicates how frequently you have the same experience.

0 = never 1 = almost never 2 = sometimes 3 = almost always 4 = always

Part I-E

| | |
|--|-----------|
| 1) My voice makes it difficult for people to hear me. | 0 1 2 3 4 |
| 2) People have difficulty understanding me in a noisy room. | 0 1 2 3 4 |
| 3) My family has difficulty hearing me when I call them throughout the house. | 0 1 2 3 4 |
| 4) I use the phone less often than I would like to. | 0 1 2 3 4 |
| 5) I tend to avoid groups of people because of my voice. | 0 1 2 3 4 |
| 6) I speak with friends, neighbors, or relatives less often because of my voice. | 0 1 2 3 4 |
| 7) People ask me to repeat myself when speaking face-to-face. | 0 1 2 3 4 |
| 8) My voice affects my personal and social life. | 0 1 2 3 4 |
| 9) I feel left out of conversations because of my voice. | 0 1 2 3 4 |
| 10) My voice problem causes me to lose income. | 0 1 2 3 4 |



Postural assessment

Instrumental voice assessment

- Old antagonism between perceptual vs. instrumental voice assessment

Kent et al., 2000, "Voice quality measurement", Singular

p1. "Some would argue that voice quality can be described and assessed only by auditory-perceptual means... "

p1. "Still others might claim that auditory-perceptual methods are prone to various source of error..."

p117. "It is generally accepted in current research that the impressionistic nature of perceptual description should be augmented by more objective nature of instrumental analysis where possible."

p117. "It is important however not to assume that instrumental approaches are somehow correct and infallible. Limits on accuracy exist with all techniques and the interpretation of results is not always straightforward"

An old story

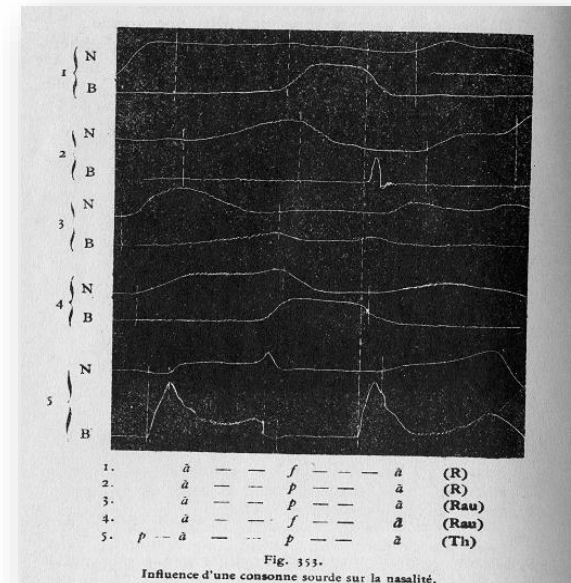
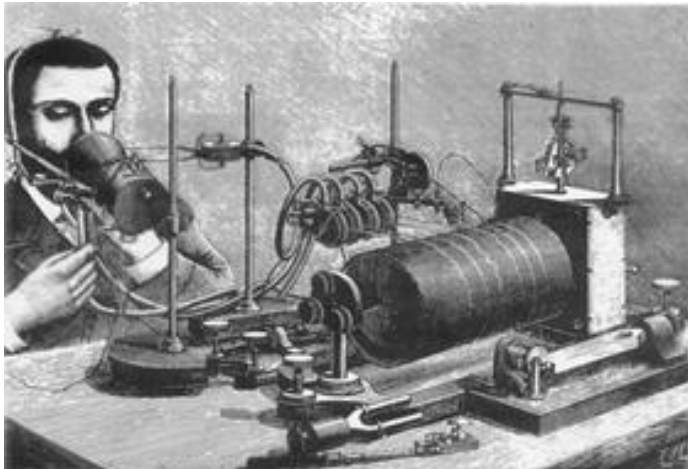


- 1875 : Société de Linguistique de Paris consults Etienne-Jules Marey (French physiologist who studied movements of animals and humans) in order to...

« d'appliquer la méthode graphique à l'étude des mouvements si complexes et si variés qui se produisent dans la parole [...] pour obtenir une trace objective des mouvements des organes articulateurs, cage thoracique, larynx, langue, lèvres, voile du palais, au cours de l'articulation des différentes unités phonétiques »

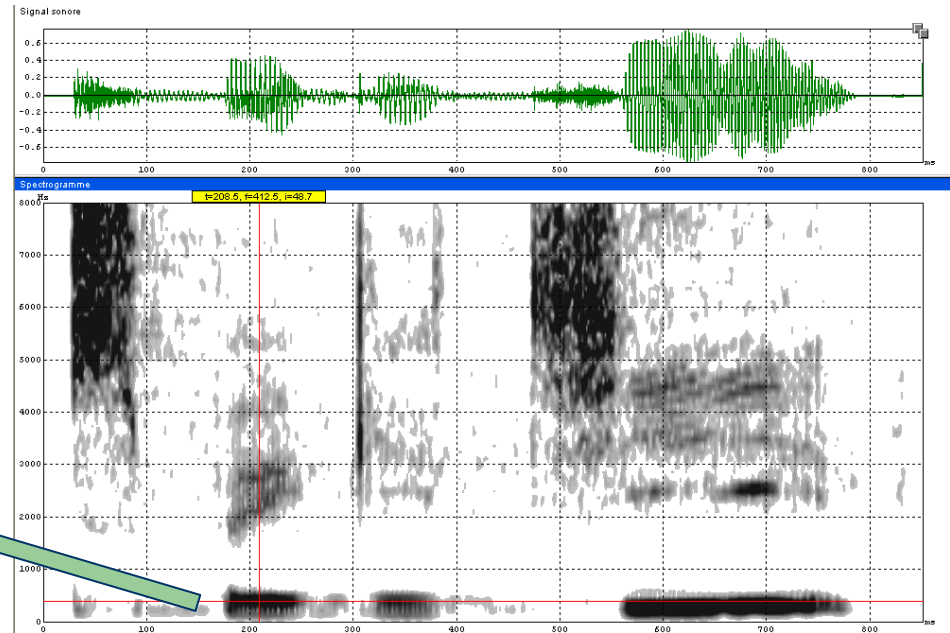
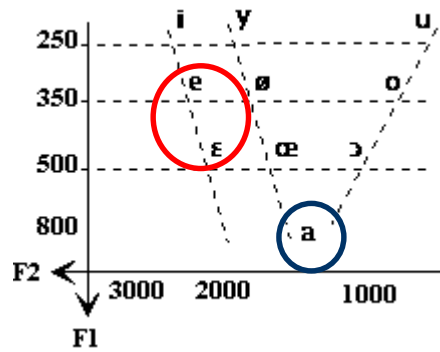
Because « L'oreille, la vue et la palpation ne sont pas suffisants pour appréhender les mouvements successifs et simultanés nécessaires à la réalisation d'un phonème »



- Devices developed by Abbé Rousselot



Perception and instruments

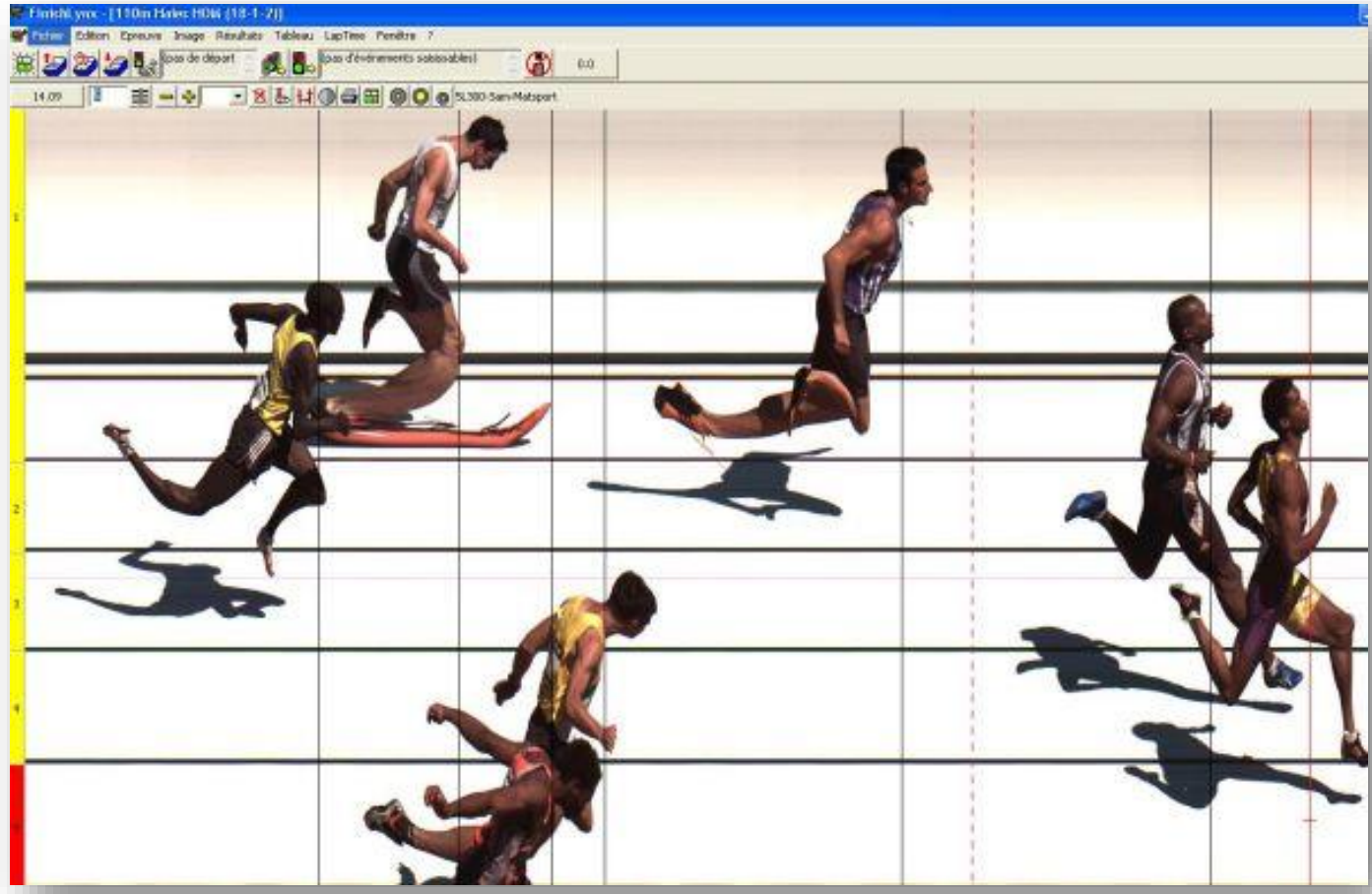
-  spaghetti /sp~~a~~geti/ produced by a French speaker in spontaneous speech



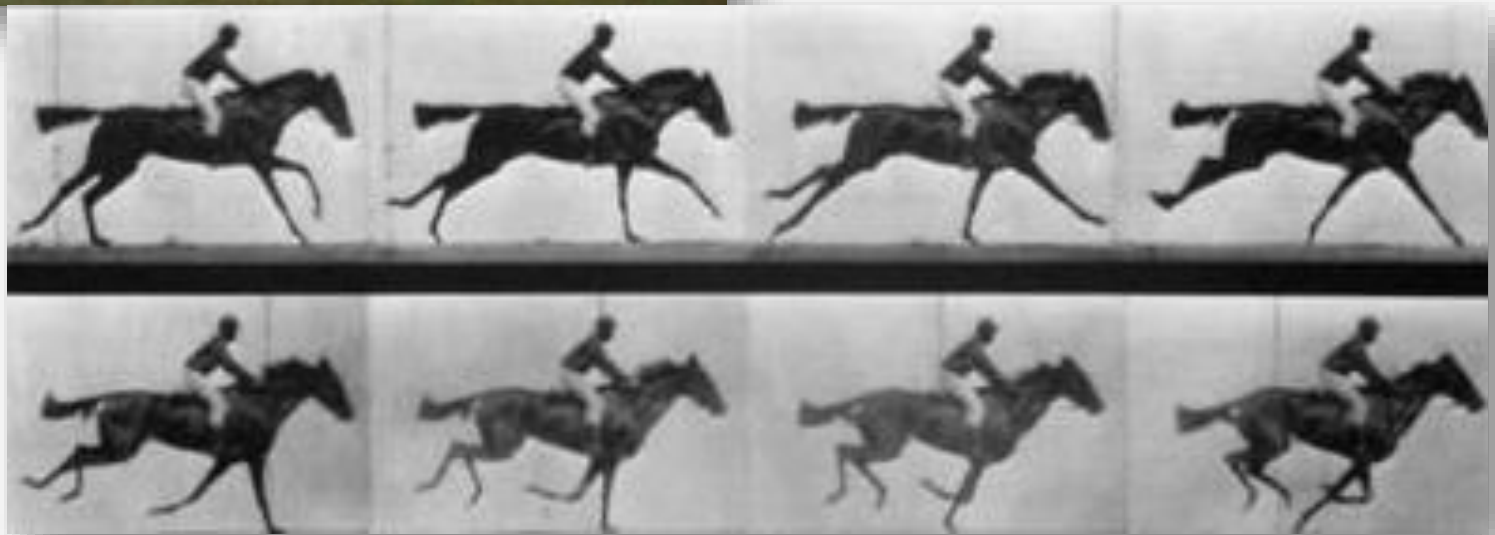
- F1 = 400 Hz
- Instrument is inaccurate ?
- No !!
-  spaghetti  spaghetti

Meunier C., Floccia, C. (1999) "Syllabe ou mot : quelle unité permet d'identifier les catégories phonétiques?", Actes des 2èmes Journées d'Etudes Linguistiques, "Syllabes", Nantes, pp. 87-92.

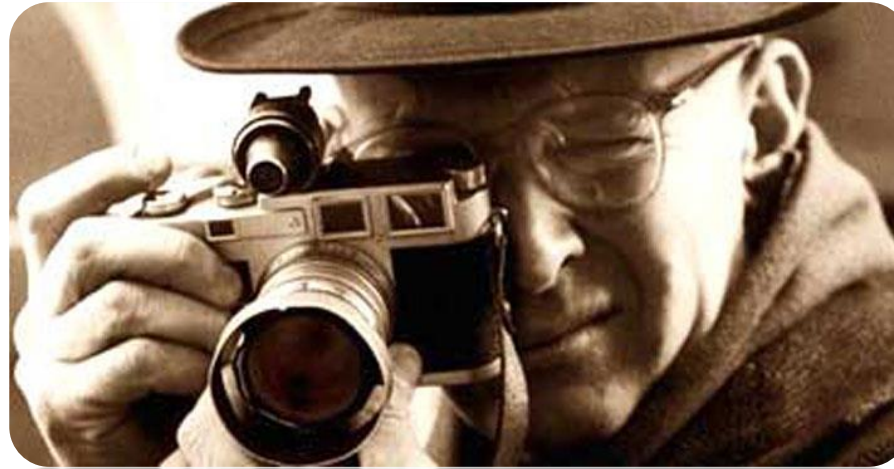
When instrument is better than perception



When instrument increase knowledge on physiology



But a photographer is needed....



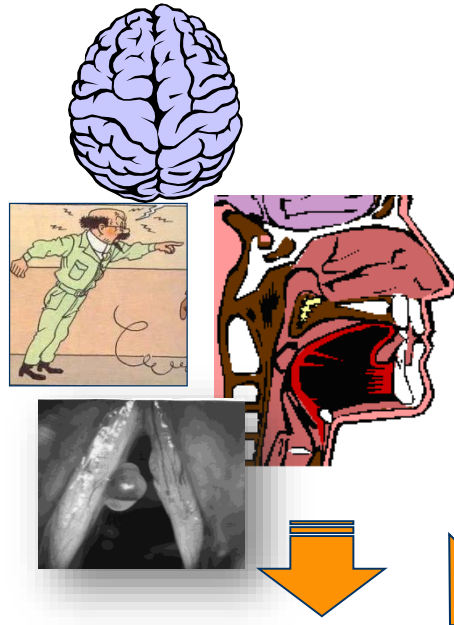
Kent et al., 2000, "Voice quality measurement", Singular

p1. "Perceptual and instrumental approaches are complementary and the central task is to bring them into a unified picture."

- Instruments are not hearing machine

Where ?

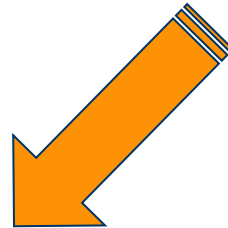
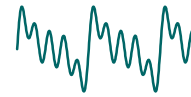
Speech Production



Instrumental assessment



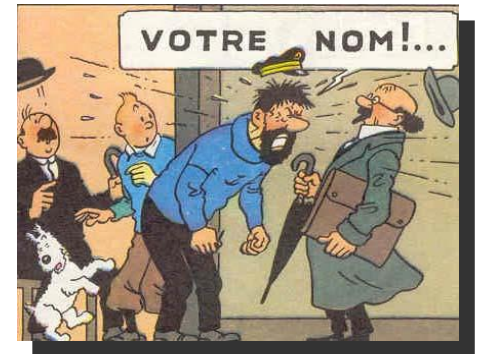
Speech Perception



Perceptual assessment



Interaction



Questionnaire

UPMC | University of Pittsburgh
 School of Medicine | The Speech Science Center

Rated active use of my speaking voice primarily due to:

- My profession makes excessive voice use necessary due to:
 - Activity outside of work (teaching, community organizations, etc.)
 - Normal everyday conversation.
- My profession makes primary use of my voice (teacher, model of voice).
- Activities outside of work (lectures, singing, loud music, secondary location).
- None of the above. I do not sing.

To be filled out by voice user:

F light 100° VSD

F 30° P: _____

F 15° P: _____

F Sing R Sing Total = _____

Task/setting: _____

I would rate my degree of satisfaction as the following (circle number):

| Quite Dissatisfied | Average Satisf. | Extremely Satisf. | | | | |
|--------------------|-----------------|-------------------|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

VOICE HANDICAP INDEX
 These are statements that many people have used to describe their voices and the effects of those voices on their lives. Circle the response that indicates how frequently you have the same experience.

0 - never 1 - almost never 2 - sometimes 3 - almost always 4 - always

Point #

- My voice makes it difficult for people to hear me. 0 1 2 3 4
- People have difficulty understanding me in a noisy room. 0 1 2 3 4
- My family has difficulty hearing me when I talk from throughout the house. 0 1 2 3 4
- I use the phone less often than I would like to. 0 1 2 3 4
- I tend to avoid groups of people because of my voice. 0 1 2 3 4
- I speak with a shrill, hoarse, or raspy tone often because of my voice. 0 1 2 3 4
- People ask me to repeat myself when speaking face-to-face. 0 1 2 3 4
- My voice interferes with my personal and social life. 0 1 2 3 4
- I feel left out of conversations because of my voice. 0 1 2 3 4
- My voice problems cause me to lose income. 0 1 2 3 4

World Health Organisation

International classification of Impairments, Disabilities and Handicaps, a manual of classification relating to the consequences of disease



Impairment

- *loss or abnormality of body structure or of a physiological or psychological function*

Disability

- *any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being*

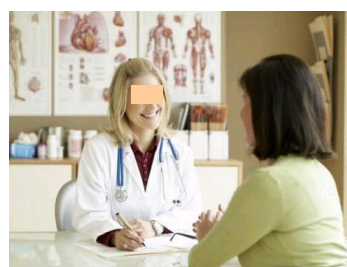
Handicap

- *disadvantage for a given individual that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual.*

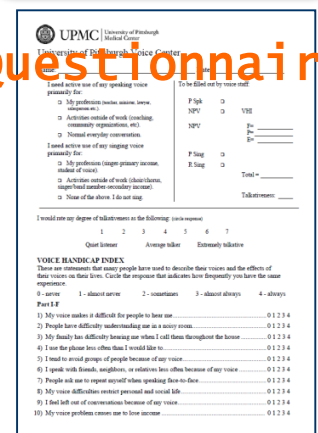
Instrumental assessment



Perceptual assessment



Questionnaire



UPMC | University of Pittsburgh Medical Center
Department of Speech-Language-Hearing Sciences

Rated voice use of my speaking voice primarily due to:

- My profession makes excessive voice use necessary
- Activities outside of work (coaching, community organizations, etc.)
- Normal everyday conversation

Rated voice use of my singing voice primarily due to:

- My profession (stage, primary teacher, model of voice)
- Activities outside of work (theatricals, singing, and/or other leisure activities)
- None of the above. I do not sing.

To be filled out by voice user:

F: High 100% VSD
 M: 50%
 L: 25%
 P: Sing
 S: Sing Total = _____
 Date/Time: _____

I would rate my degree of handicap as the following (voice use):

| Quasi Intense | Average Intense | Extremely Intensive |
|---------------|-----------------|---------------------|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | | |

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- I tend to avoid groups of people because of my voice..... 0 1 2 3 4
- I speak with friends, neighbors, or relatives less often because of my voice..... 0 1 2 3 4
- People ask me to repeat myself when speaking face-to-face..... 0 1 2 3 4
- My voice difficulties restrict personal and social life..... 0 1 2 3 4
- I feel left out of conversations because of my voice..... 0 1 2 3 4
- My voice problems cause me to lose income..... 0 1 2 3 4

- *Automatic assessment of pathological voice signals based on noise, cepstral and nonlinear features-*
 - ✓ JIGodino-Llorente, JD Arias-Londoño, N Sáenz-Lechón, V Osma-Ruiz, G Castellanos-Domínguez, JMa Gutiérrez-Arriola
- *On the use of grey zones in automatic voice pathology detection*
 - ✓ T Dubuisson, T Drugman, T Dutoit
- *Voice use measured during work and leisure using the new portable voice accumulator Voxlog: A methodological study*
 - ✓ M Thorsdotter, S Ternström, M Södersten
- *Vocal Posturometer: A New Device For Controlling Posture For Voice Disorders*
 - ✓ I Denizoglu, M Pehlivan
- *Laryngoaltilimeter: A New Ambulatory Device For Laryngeal Height Control*
 - ✓ I Denizoglu, M Pehlivan
- *High Speed Studio - a low cost high speed camera system*
 - ✓ H Larsson, S Hertegard
- *Normative spectral slope in the VRP*
 - ✓ P Pabon