

# Do Only Hearing Impaired People Benefit From Subtitling?



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# Understanding a Foreign Language

- My TV experience in Texas
- People with no hearing loss can understand a TV programme in a foreign language better with subtitling
- For hearing impaired people subtitling is even essential

# What does it mean to be hearing impaired?

- Deaf people (in German “gehörlos”)
- Hard of hearing people (in German “schwerhörig”, in Italian “audiolese”?)
- Deafened (or Late Deafened) People (in German “ertaubt” or “spätertaubt”)

# Statistics of hearing impairment

- Switzerland: 700'000 hard of hearing people, 10'000 deafened people, 8'000 Deaf people
- Austria: 1'520'000 hard of hearing people (age 14 and older), 10'000 Deaf people ([www.schwerhoerigen-netz.at](http://www.schwerhoerigen-netz.at))

# Deaf people

- Deaf people are born without hearing or have lost their hearing before speech acquisition
- They generally communicate through sign language (in German “Gebärdensprache”)

# Hard of Hearing People

- Hard of Hearing People -
- are born with a hearing impairment
- or have lost part of their hearing -
- through a genetic predisposition, an accident (acoustic trauma), or as a result of ototoxic medicine
- or most often as a result of aging

# Deafened people

- Deafened people are hard of hearing people who have communicated through speech all their lives and whose hearing loss was progressive until the stage they do not understand anything anymore
- They do not know nor use sign language

# Cochlear Implants

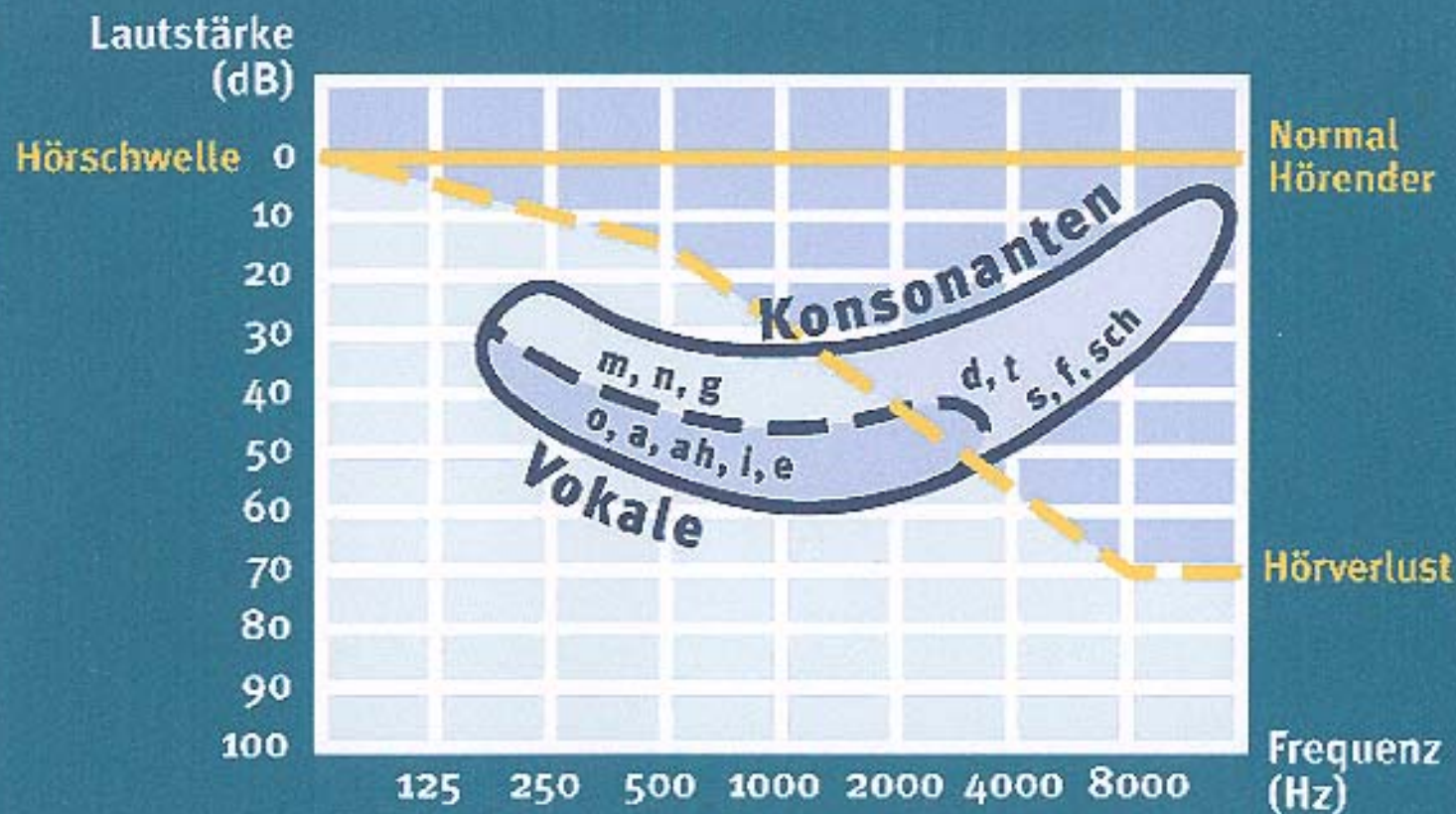
- Cochlear implants help deafened people to understand again
- But people with cochlear implants are still hard of hearing people



# Louder does not mean clearer

- It is a big misconception to think that you have to speak only louder to hard of hearing people
- For more speech intelligibility on TV turn the “bass” sound down and the “treble” sound up
- The high frequencies are more important for speech intelligibility

# Hörfeld: mit Hörverlust



# The importance of treble sounds for speech intelligibility

- “Treble sounds give 95% of the information used in understanding speech. Bass sounds, while they account for 95% of the volume of speech, provide only 5% of the information used for comprehension.”

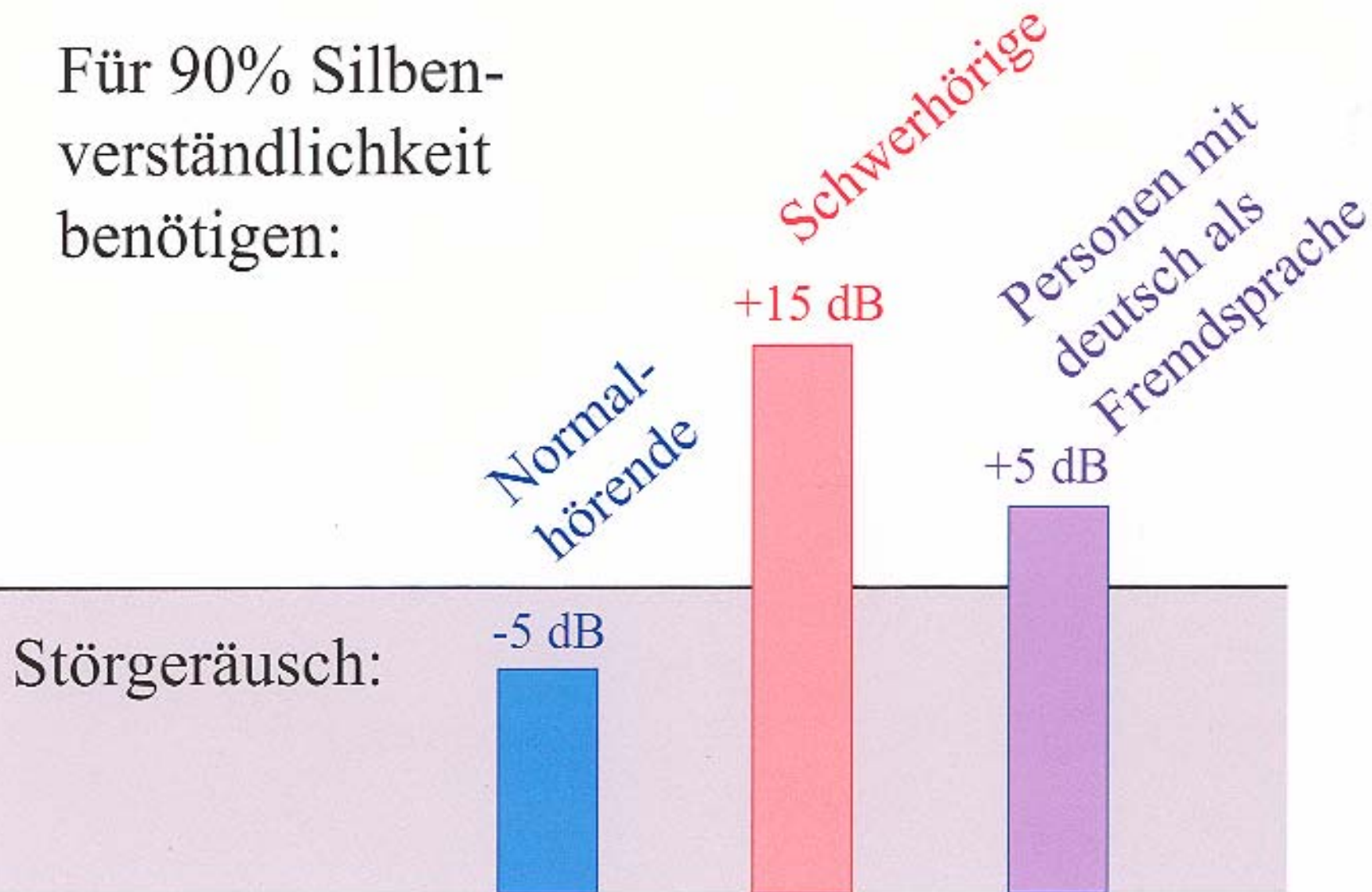
Beverly Bidermann, *Wired for Sound*, Toronto 1998, p. 12.

# Signal-to-noise ratio

- The big problem for hard of hearing people is listening in a noisy environment
- With digital hearing aids speech intelligibility is better in noisy surroundings
- Reverberation, background noise or a long distance-to-the-signal-source is still a problem

# Erhöhte Anforderungen für Schwerhörige

Für 90% Silben-  
verständlichkeit  
benötigen:



# Assistive listening devices

- Audio Frequency Induction Loop Systems
- Infrared Systems
- Frequency Modulation (FM)-Systems

# Induction Loop Systems

- Cheap, user-friendly, psychologically best systems
- Can be used with practically all hearing aids with telecoils (and cochlear implants)





## Beschallungsanlagen, Höranlagen und Raumakustik

Kurt Eggenschwiler  
Siegfried Karg  
David Norman



Rund **150'000** Menschen tragen  
ein Hörgerät, **10'000** sind ertaubt.  
Gehörlose Menschen gibt es **8'000**  
in der Schweiz.

Schweizerische  
Fachstelle  
für  
behindertengerechter  
Bauen

Centre suisse  
pour  
la construction  
adaptée  
aux handicapés

Centro svizzero  
per  
la costruzione  
adatta  
agli handicappati



# Room acoustics

- Room acoustics has a big influence on speech intelligibility
- In class rooms or lecture halls the reverberation time should be very short
- Correlation between room acoustics and class achievement (Heriot-Watt University Edinburgh)

# Speech-to-text translation

- Specially trained speech-to-text translators, who are able to type the spoken language in real time and project it onto a screen with a video beamer (Palantype)
- Quite costly because highly skilled professionals

# VOICE Project

- I imagine that computers have similar problems in converting voice to text as hearing impaired people have listening to TV programs
- But I am eager to hear about the success of the research here in Ispra

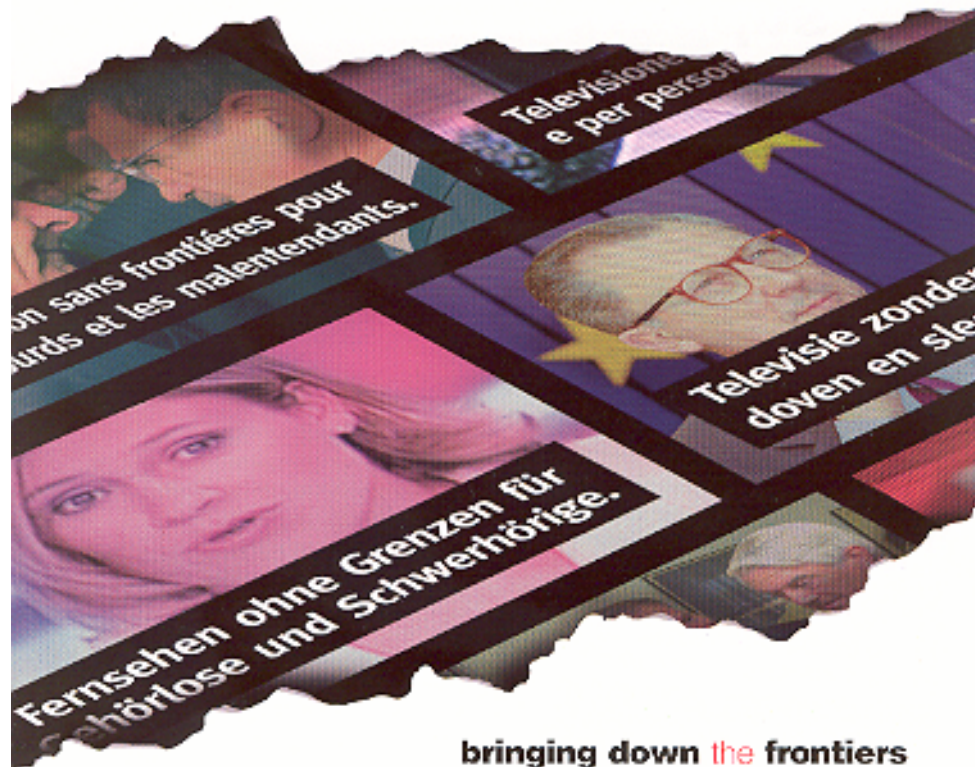
# Guidelines for TV producers

- Speakers have to articulate clearly
- There should be no background noise at all interfering with the spoken language
- The simultaneous translation of live interviews superimposed on the original voice of the speaker, cannot be understood by hearing impaired people

# Subtitling and Sign Language

- Subtitling is an absolute necessity for hard of hearing people
- Subtitling on TV helps all hard of hearing people and also Deaf people
- Subtitling on TV should not be neglected in favour of sign interpretation
- Sign interpretation is an addition but never a replacement for subtitling.

# Subtitling **and** Sign language



bringing down **the** frontiers  
for **deaf** **and** hard of hearing people



**RNID** •   
for deaf and hard of hearing people

# Conclusion

- Subtitling is a benefit to many of us:
- Those who are hearing impaired
- Those struggling to understand a foreign language
- Those to whom the visual representation simply makes it easier to comprehend the spoken word

Thank you  
for your attention



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