

# An Audiovisual-FM system for students with hearing loss

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# Premises underlying the development of AudiSee

- Classrooms are not ideal learning environments --
  - overall noise levels
  - the level of the teachers voice re: background noise (i.e., poor SNR)
  - reverberation
  - poor lighting and/or visual environment

# Premises underlying the development of AudiSee

- Children with hearing loss are especially at risk in regular classrooms
- Amplification, especially auditory-FM systems, constitute one way of improving speech-perception in the classroom

# Premises underlying the development of AudiSee

- The use of visual cues (speechreading) is another important way to optimize speech perception
- The visual-speech cues provided by the teacher may not always be available to the student

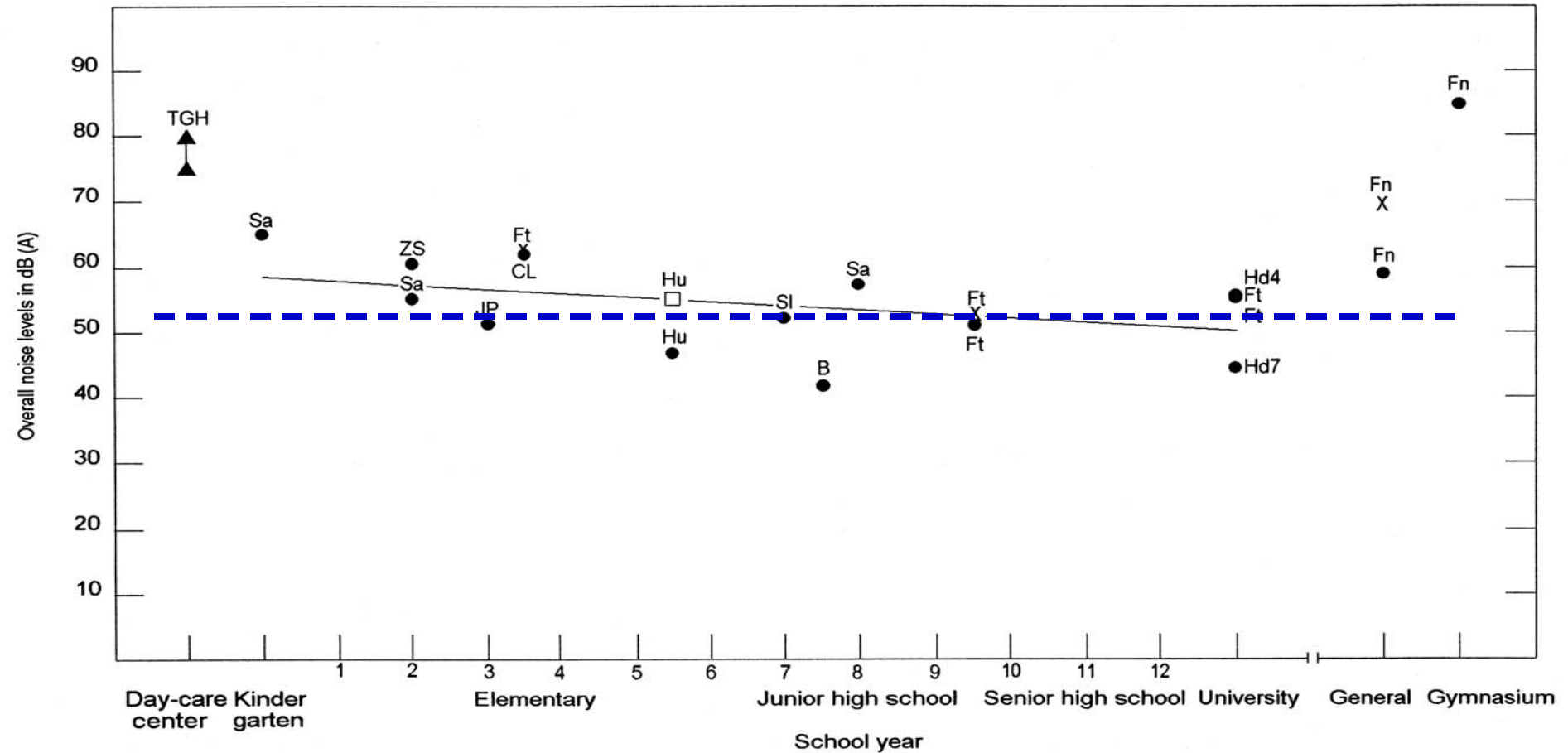
# Premises underlying the development of AudiSee

- Recently an assistive device that allows a student to speechread the teacher at all times was developed
- I have been involved in evaluating the potential benefits provided by the AV-FM system

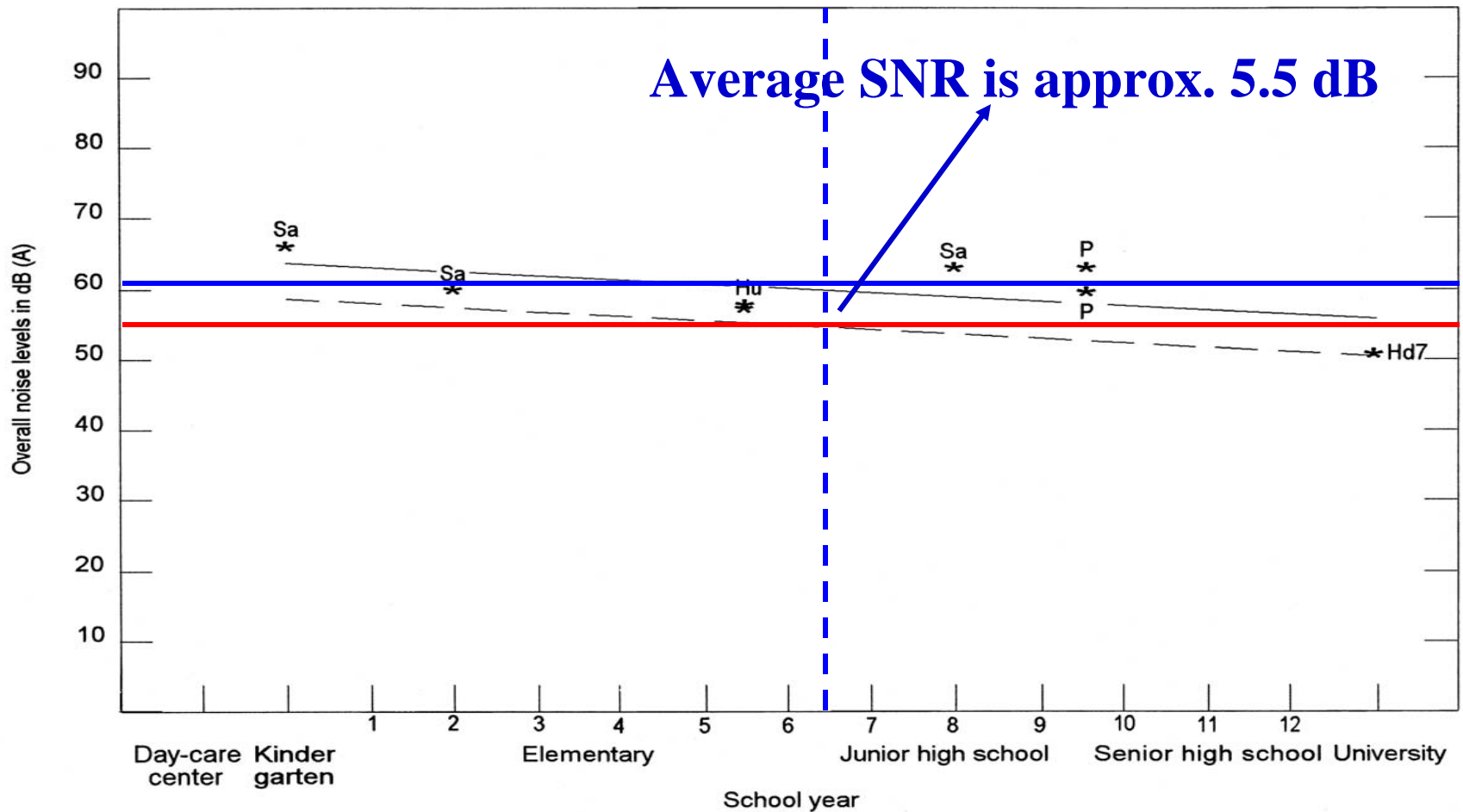
# Completed Investigations

- Effects of distance
- Effects of illumination
- Effect of head movements
- Observations from a field study

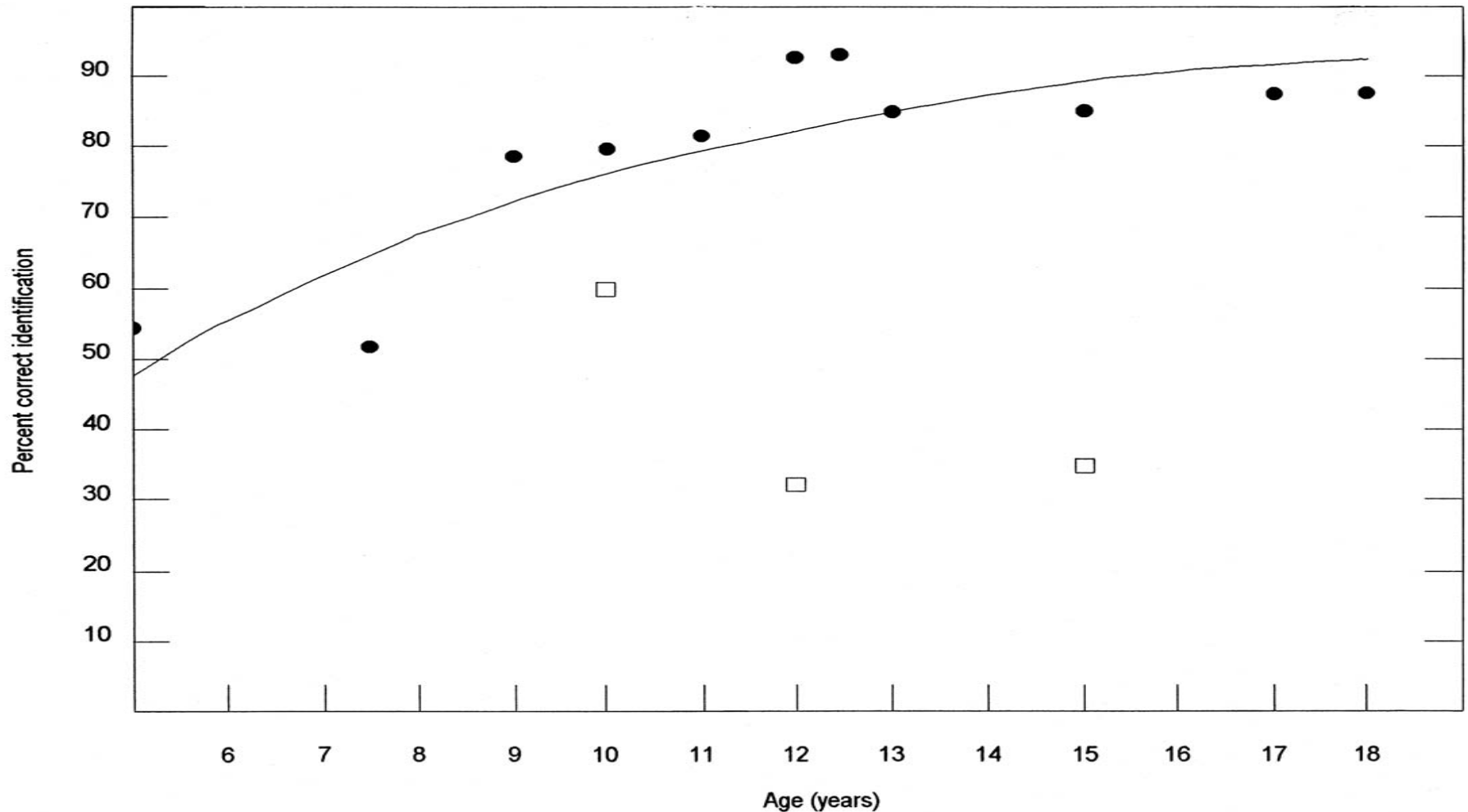
# Noise levels in classrooms: Summary of published data



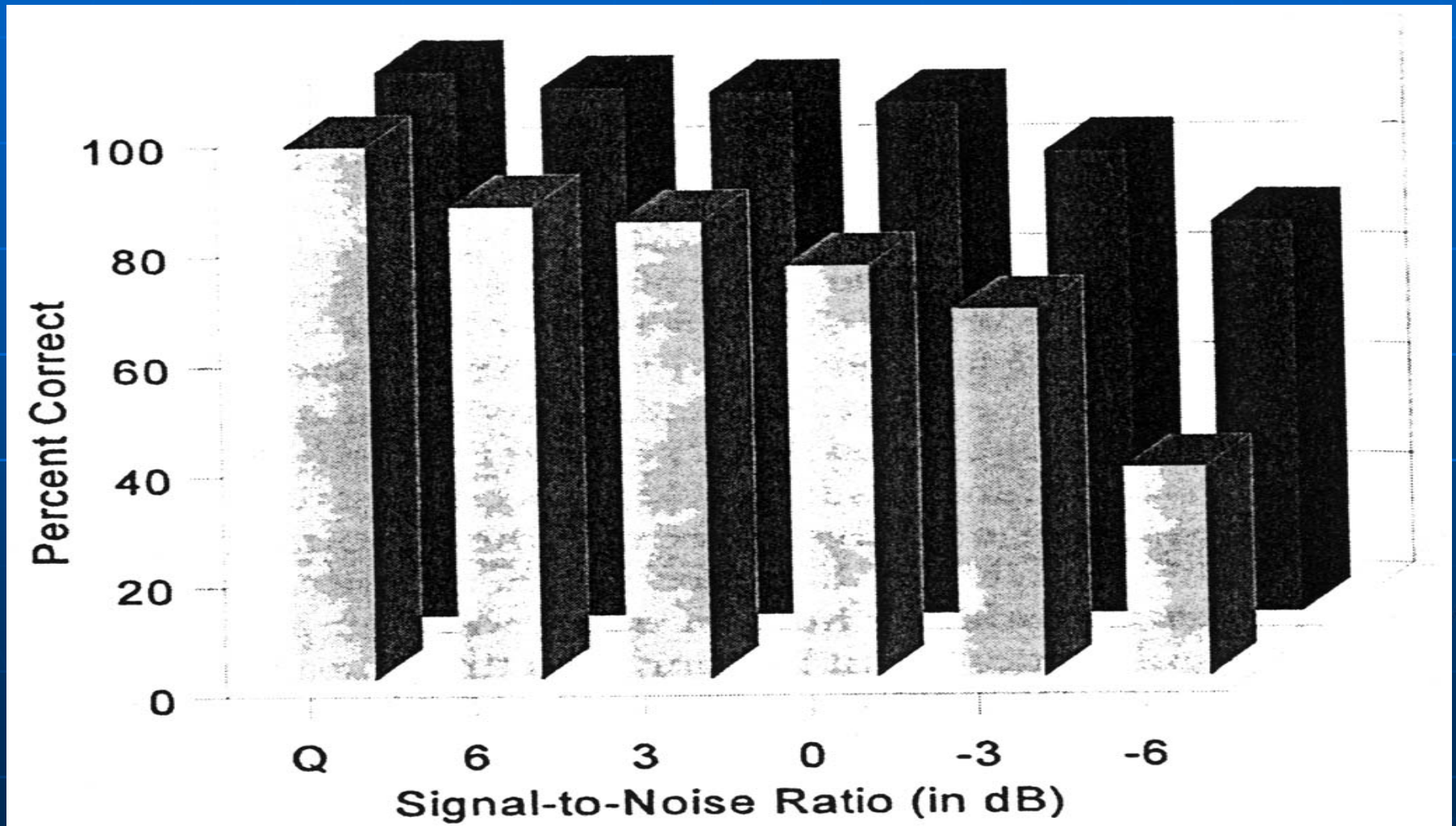
# Noise levels & SNR: Summary of published data



# Speech perception in noise (Children): Monosyllabic words @ +6 dB

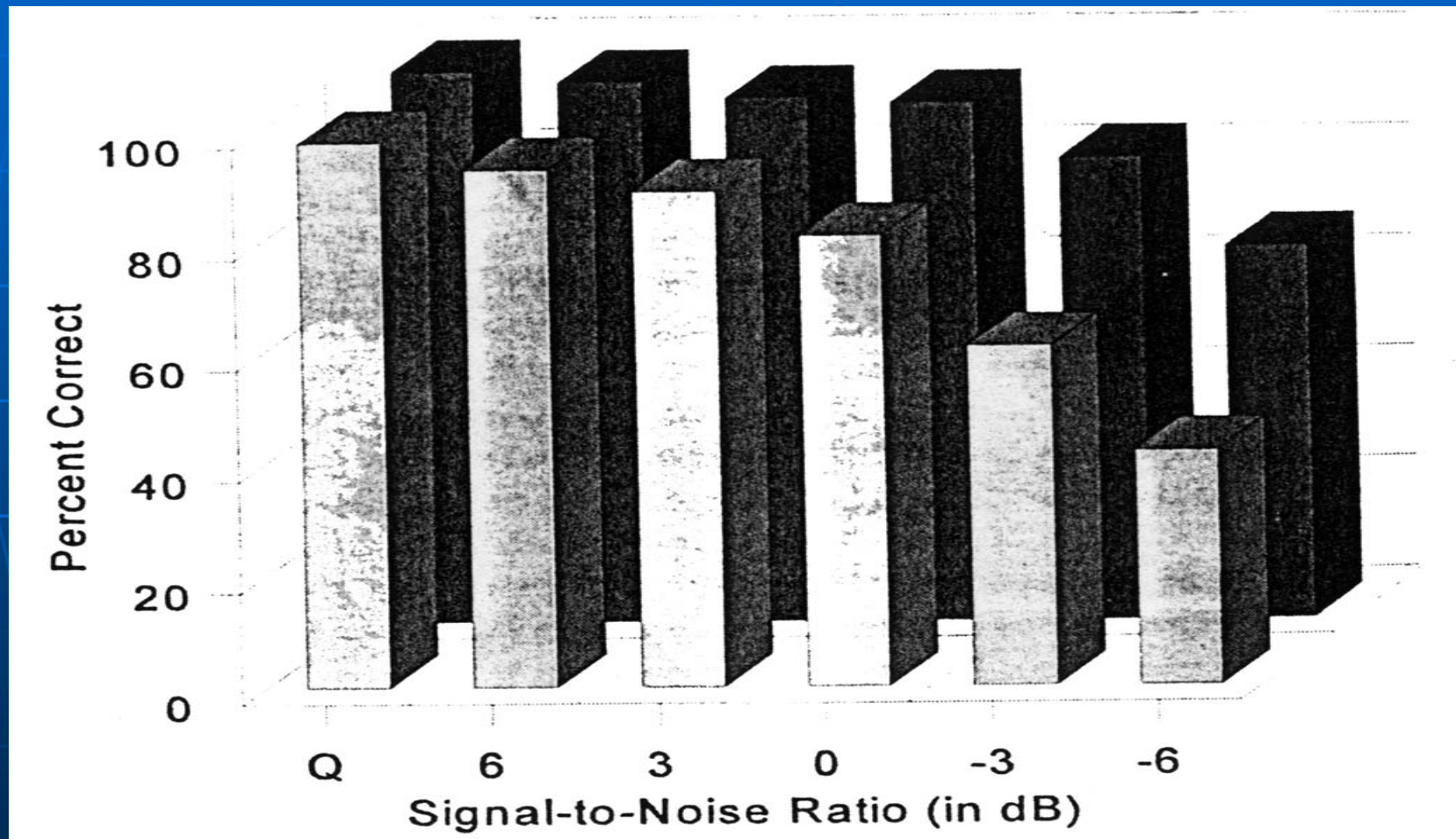


# Speech perception in noise (Children): Normal-hg vs. Minimal hg loss

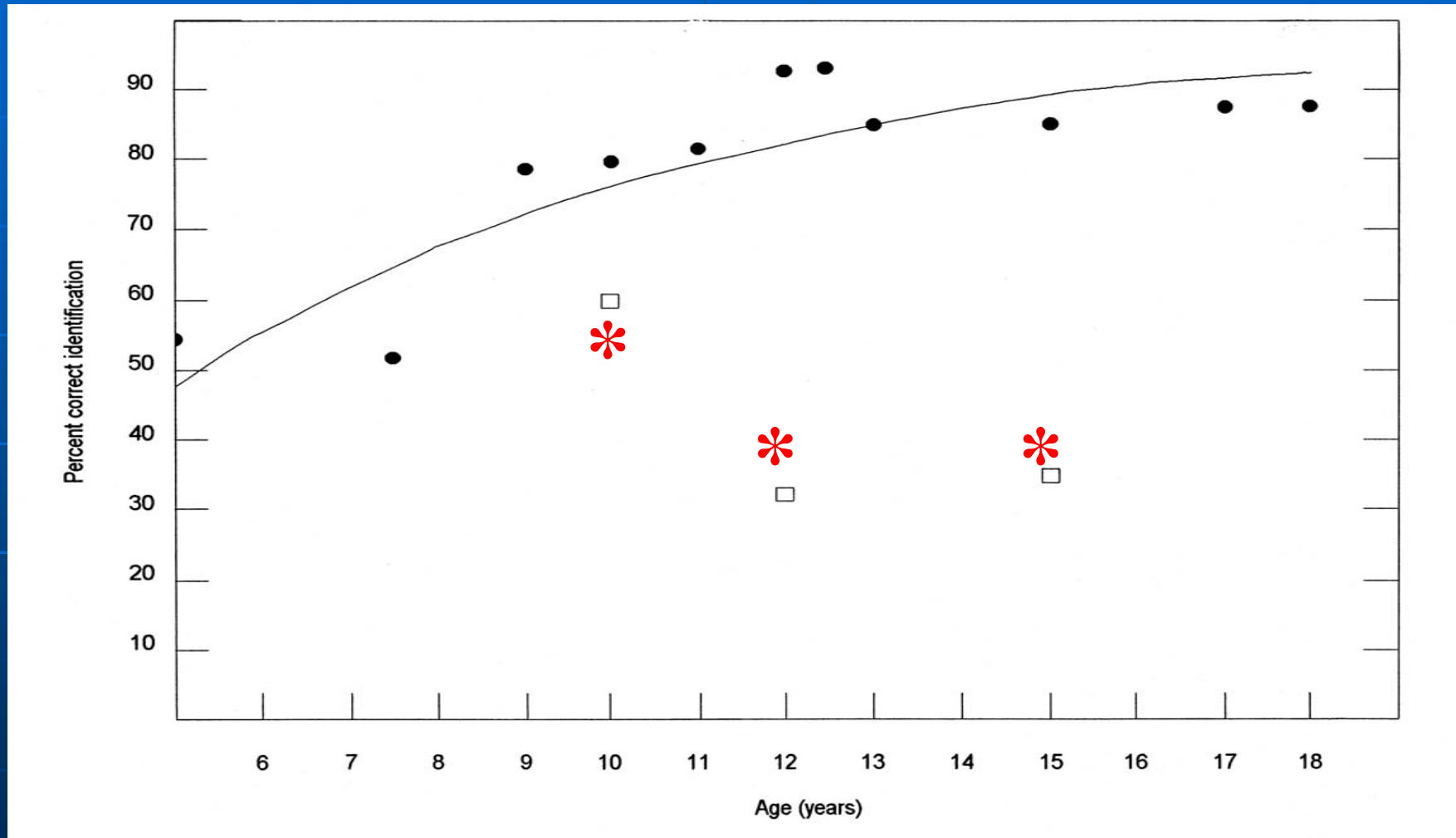


Taken from Crandell et al., 1995

# Effect of noise in nonnative children

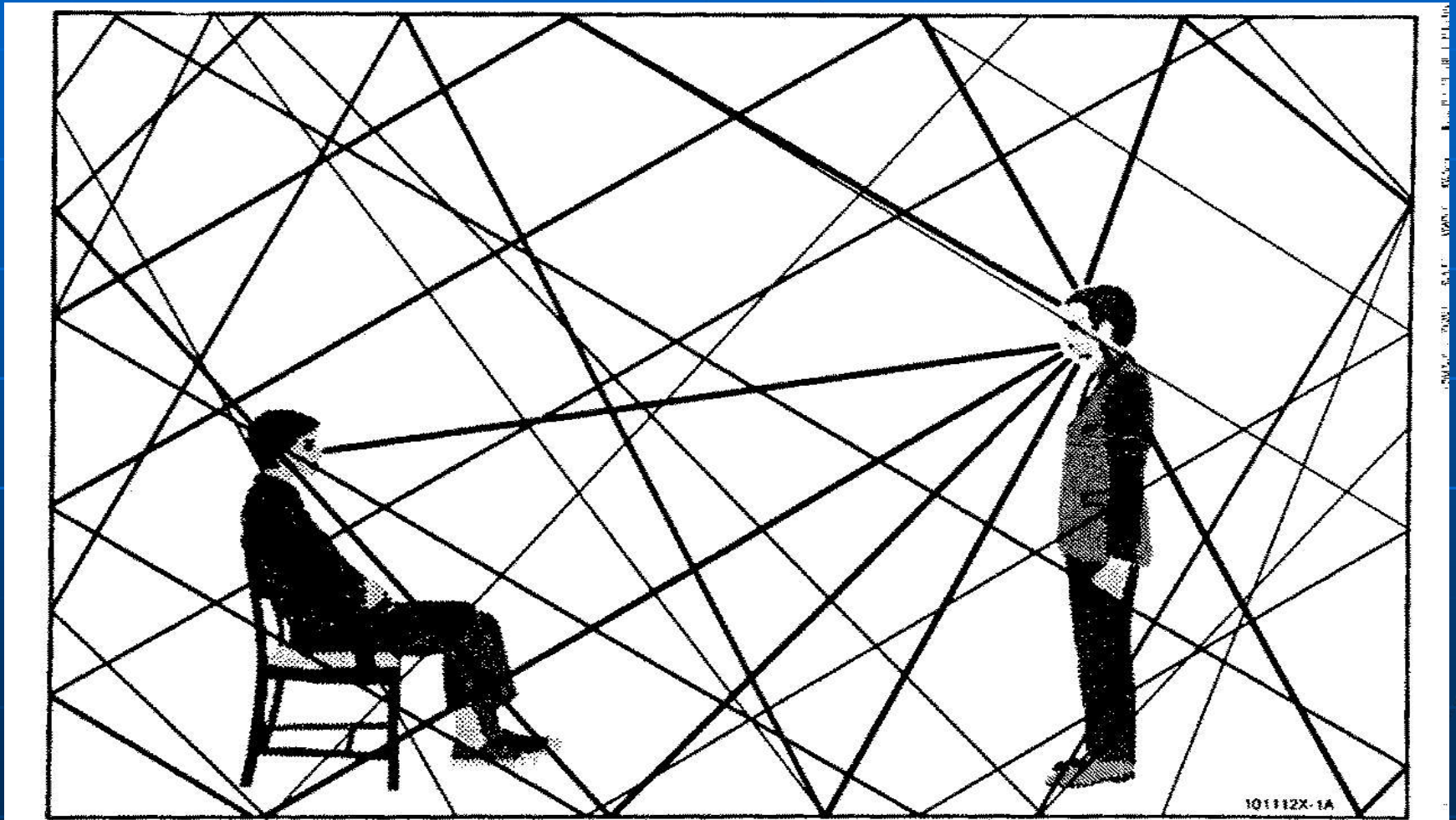


# Speech perception in noise: Children with SNHL @ SNR of +6dB

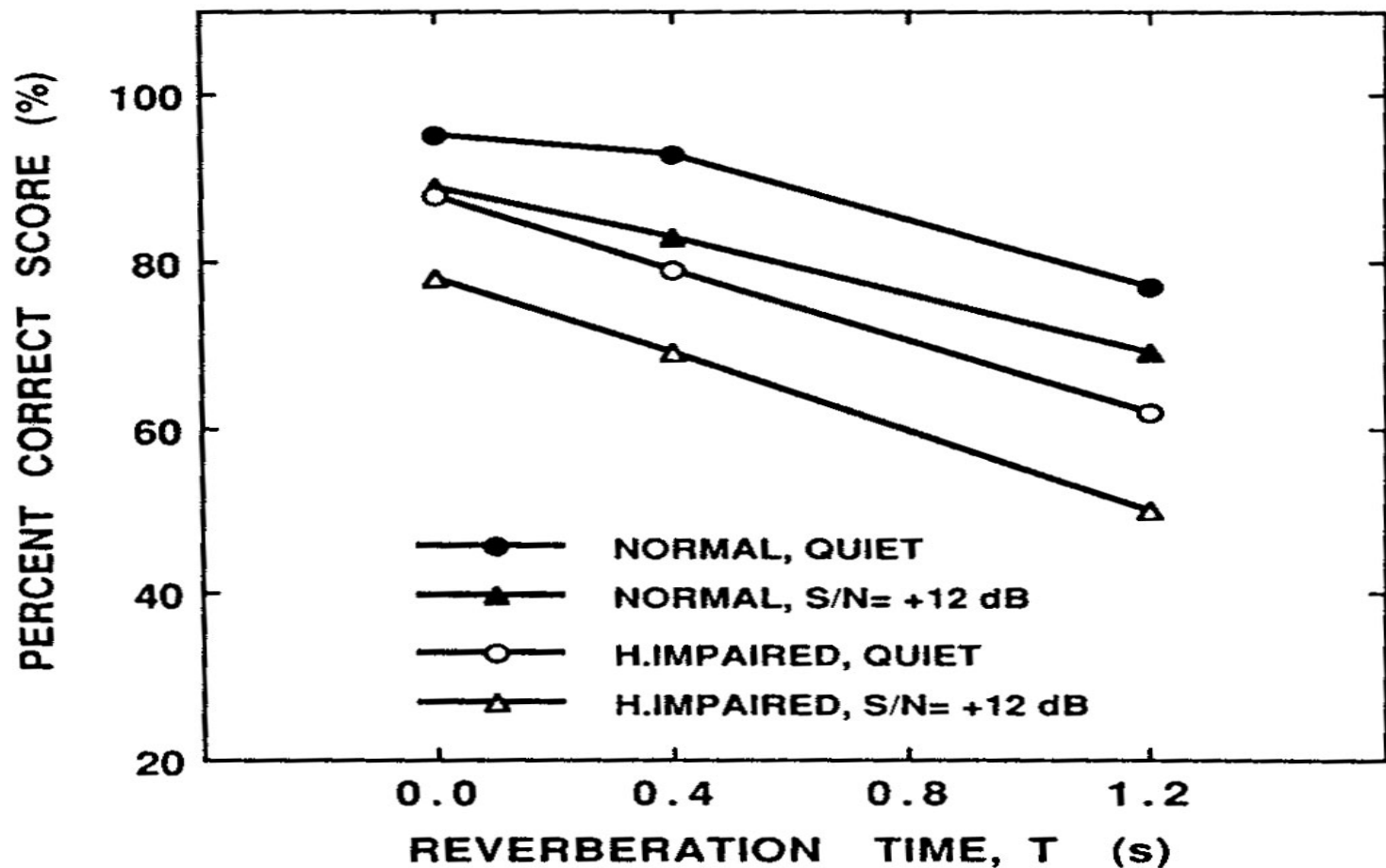


(Taken from Picard & Bradley,) Open squares are from 3 studies who tested children with hg loss (Gagne, J.-P., NASLPA, October 2007; Finitzo-Heiber et al., 1978; Ross and Golas, 1971; Gengel, 1971).

# REVERBERATION



# The effects of Noise and reverberation on speech-perception



# ASHA's (1995) Recommended acoustic criteria for classrooms

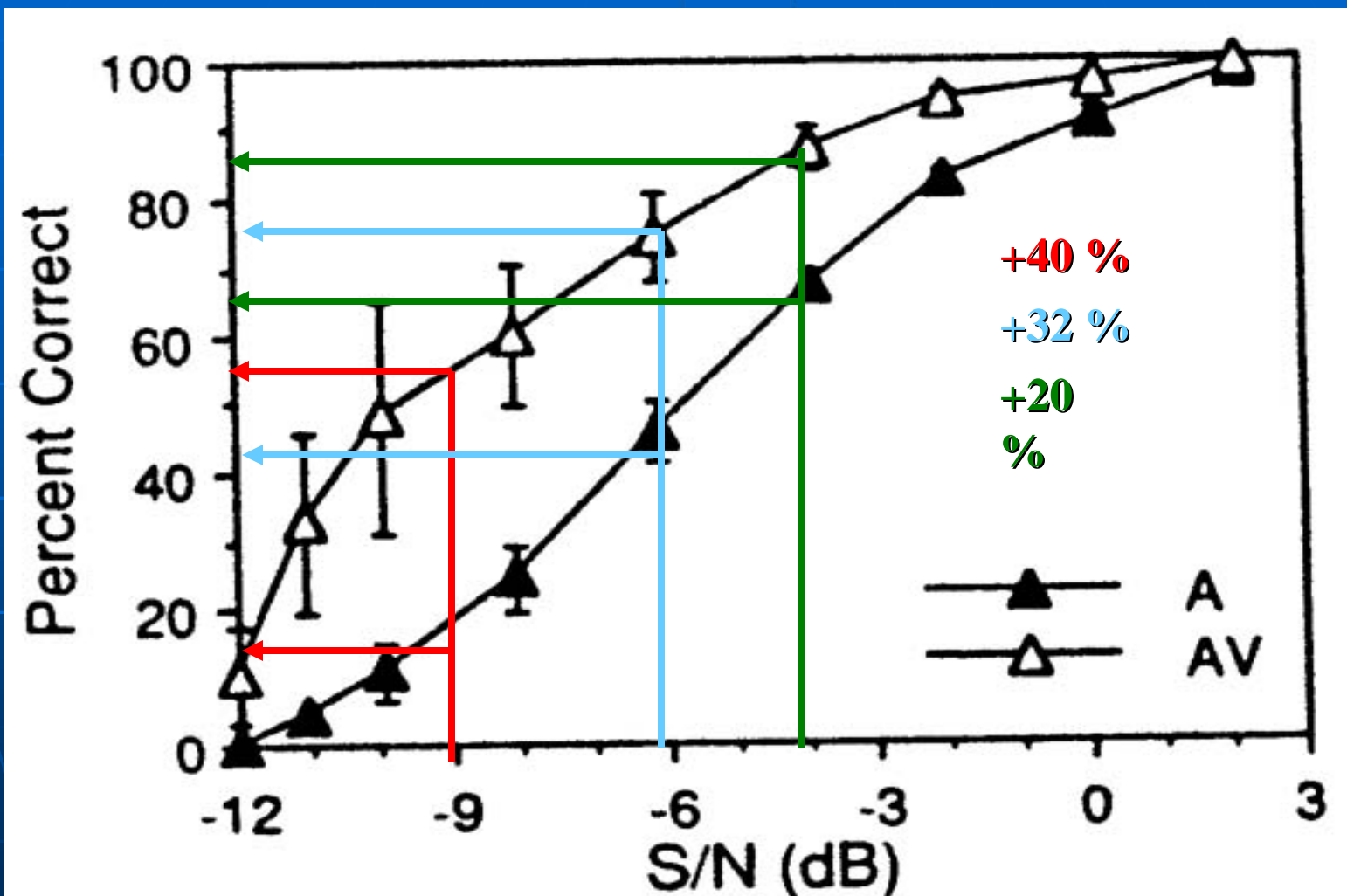
- Children with normal-hearing
- Children with hearing loss

⇒ Noise levels:  $\leq 30$  dB(A)

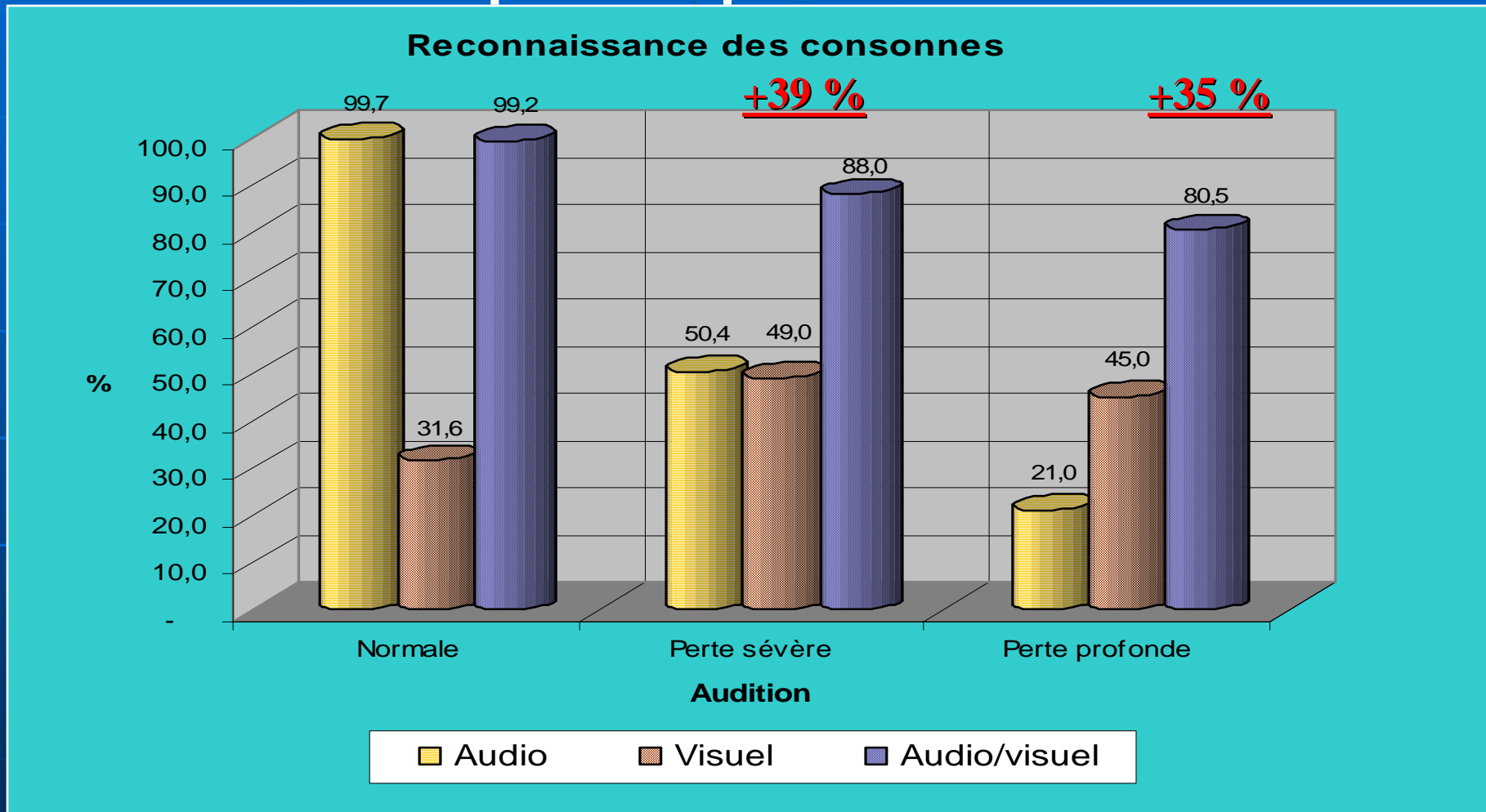
⇒ Reverberation:  $\leq .4$  sec

These conditions are seldom met!

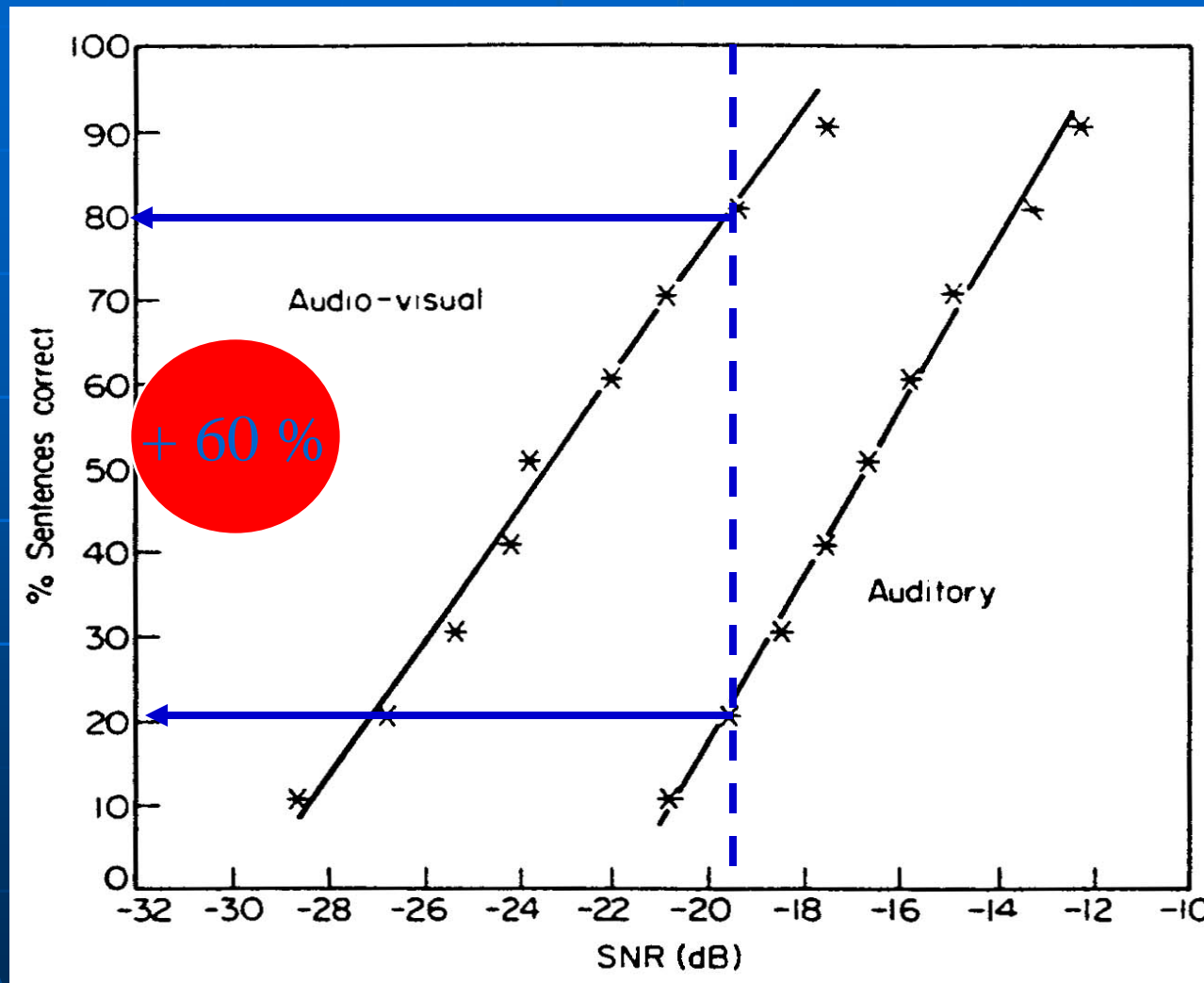
# Advantages of AV speech perception



# Advantages of AV speech-perception

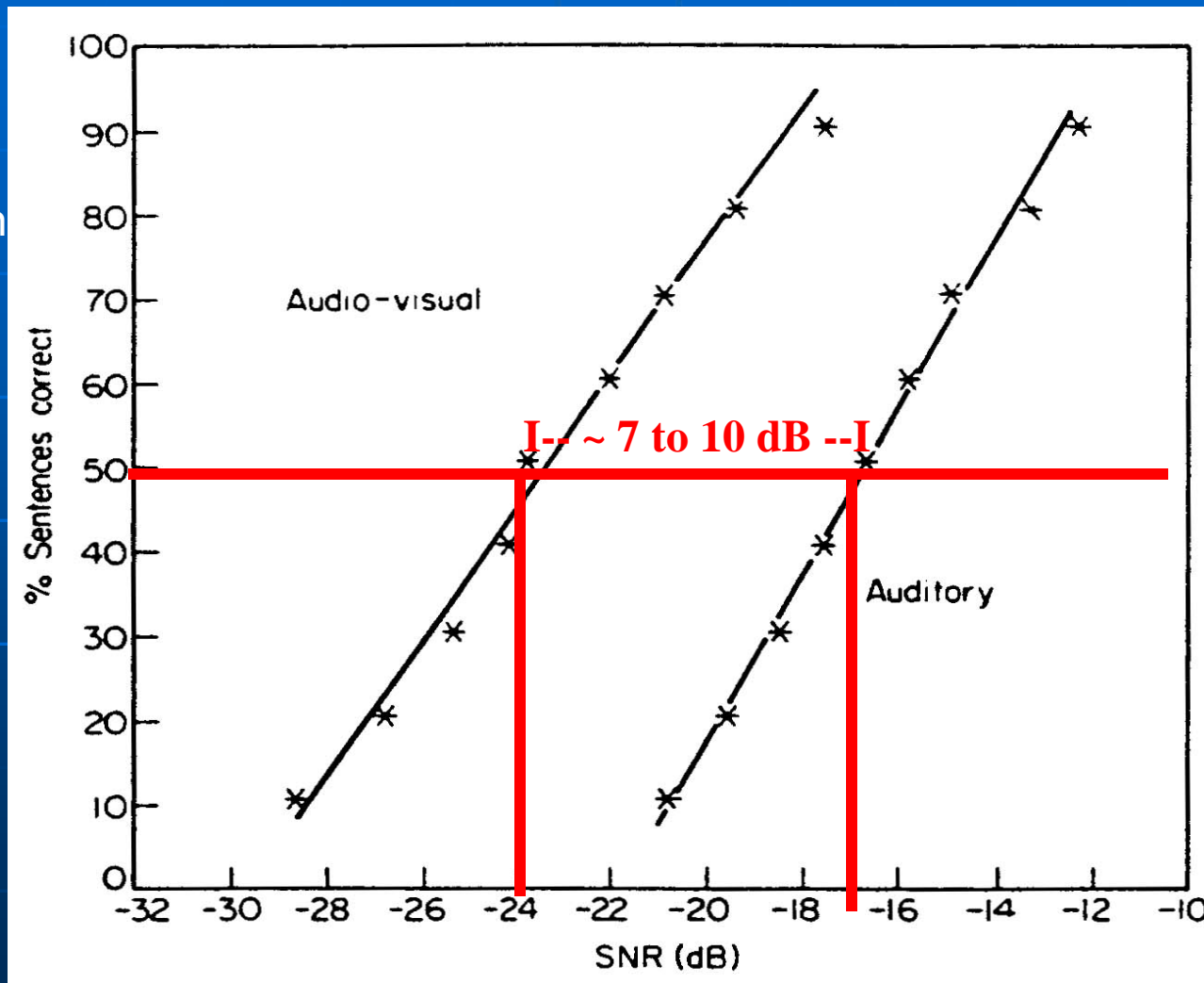


# Advantages of AV speech perception



# Advantages of AV speech perception

Providing Visual-speech cues is like improving the SNR by 7 to 10 dB!



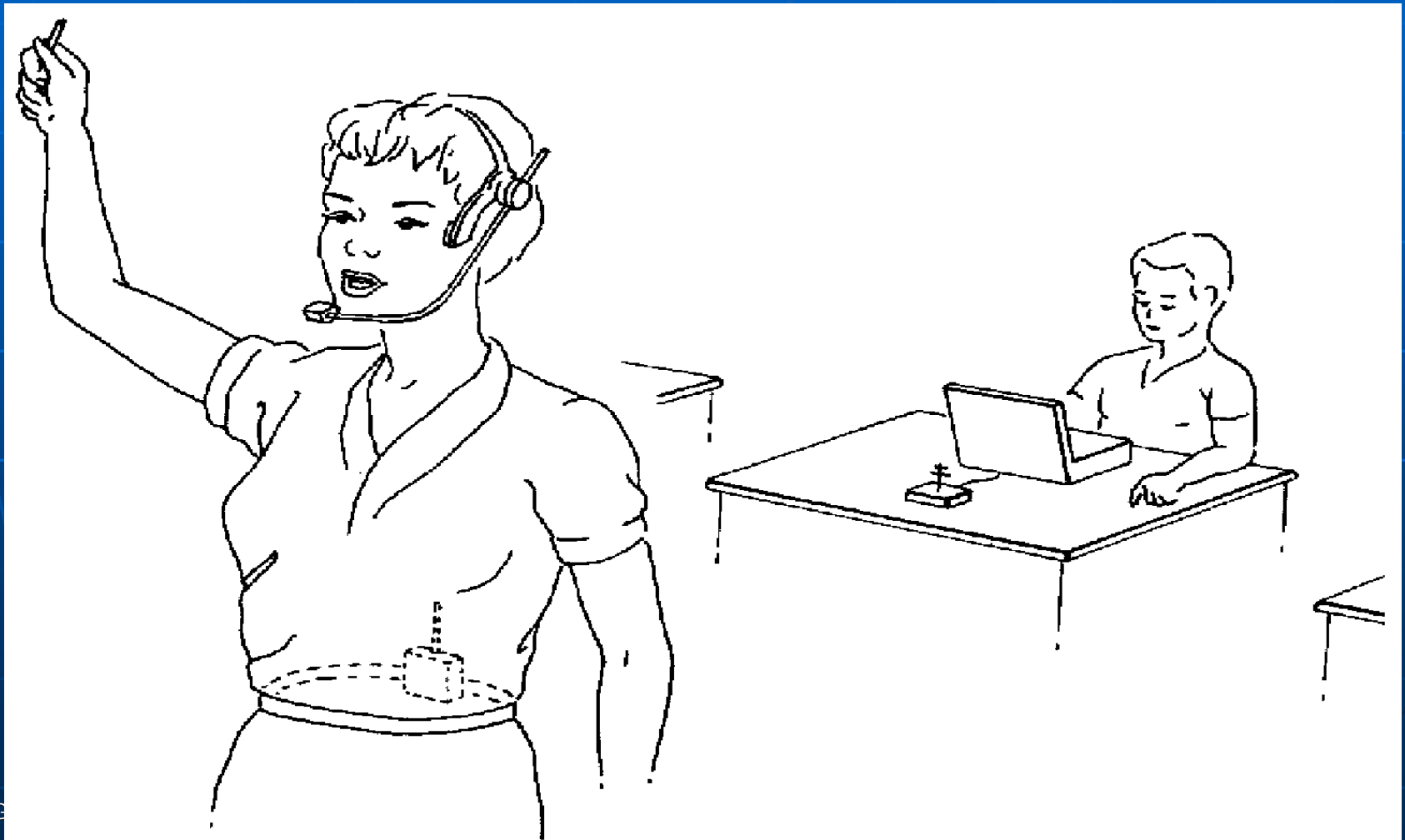
# To optimize speech-perception in classrooms

**Meeting acoustic guidelines in a room does not necessarily ensure high speech recognition for all listeners in that room.**

To ensure optimal speech recognition:

- reduce the speaker-listener distance (physically or through room amplification systems)
- provide ample visual information
- use clear speech

# Components of AudiSee



Thank you for  
your time  
and your  
attention

