Masking

- The process by which the threshold of audibility for one sound is raised by the presence of another (masking) sound

- The amount (usually in dB) by which the threshold of audibility of a sound is raised by the presence of another (masking) sound.

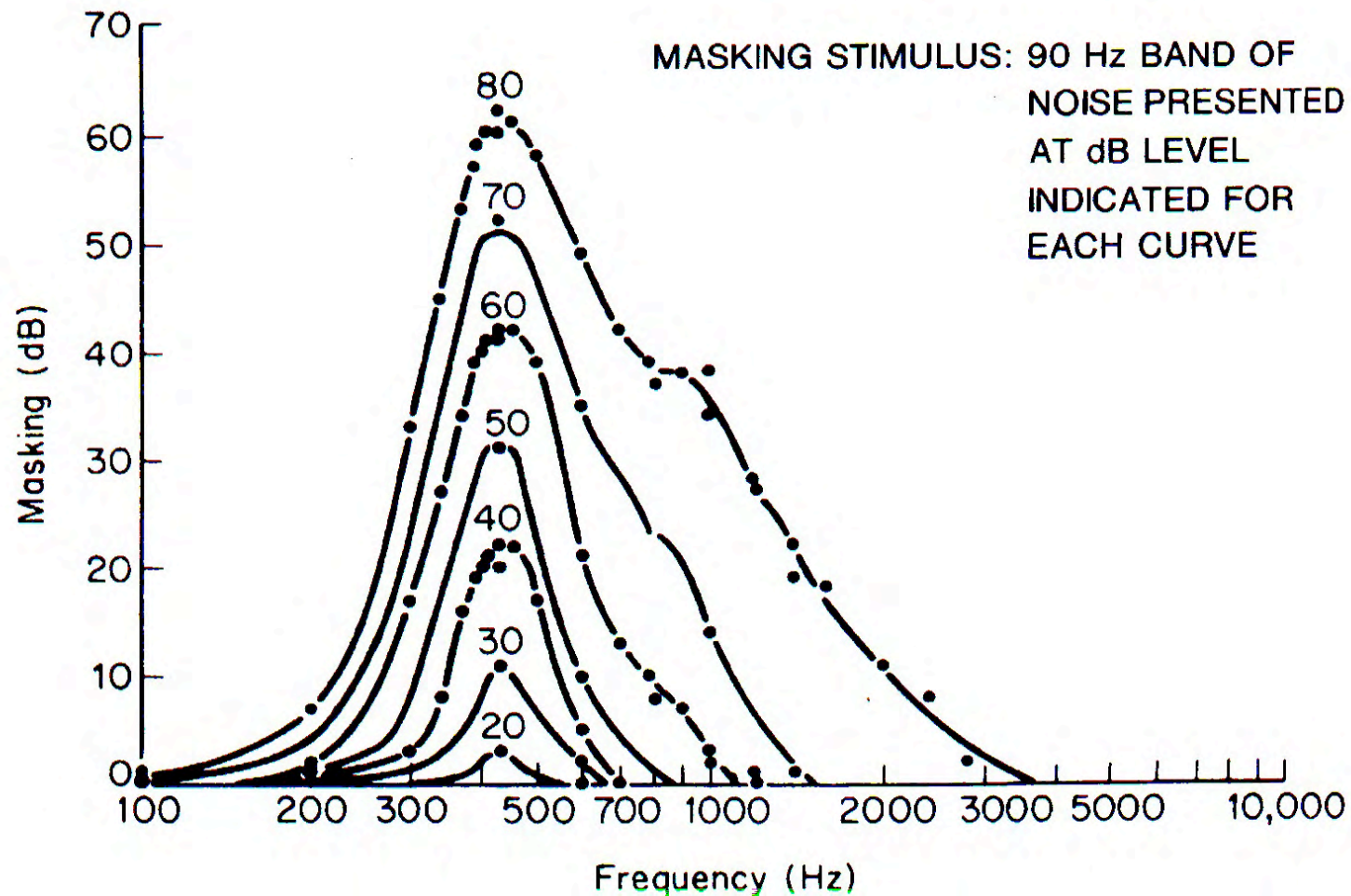American Standards Association 1960

Masking

- Masking of two tones
  - Masker: The tone or signal which causes the masking
  - Maskee or Signal: Tone which is masked
- Possible explanation: masking occurs because the threshold of hearing of the signal is shifted when in presence of the masker.

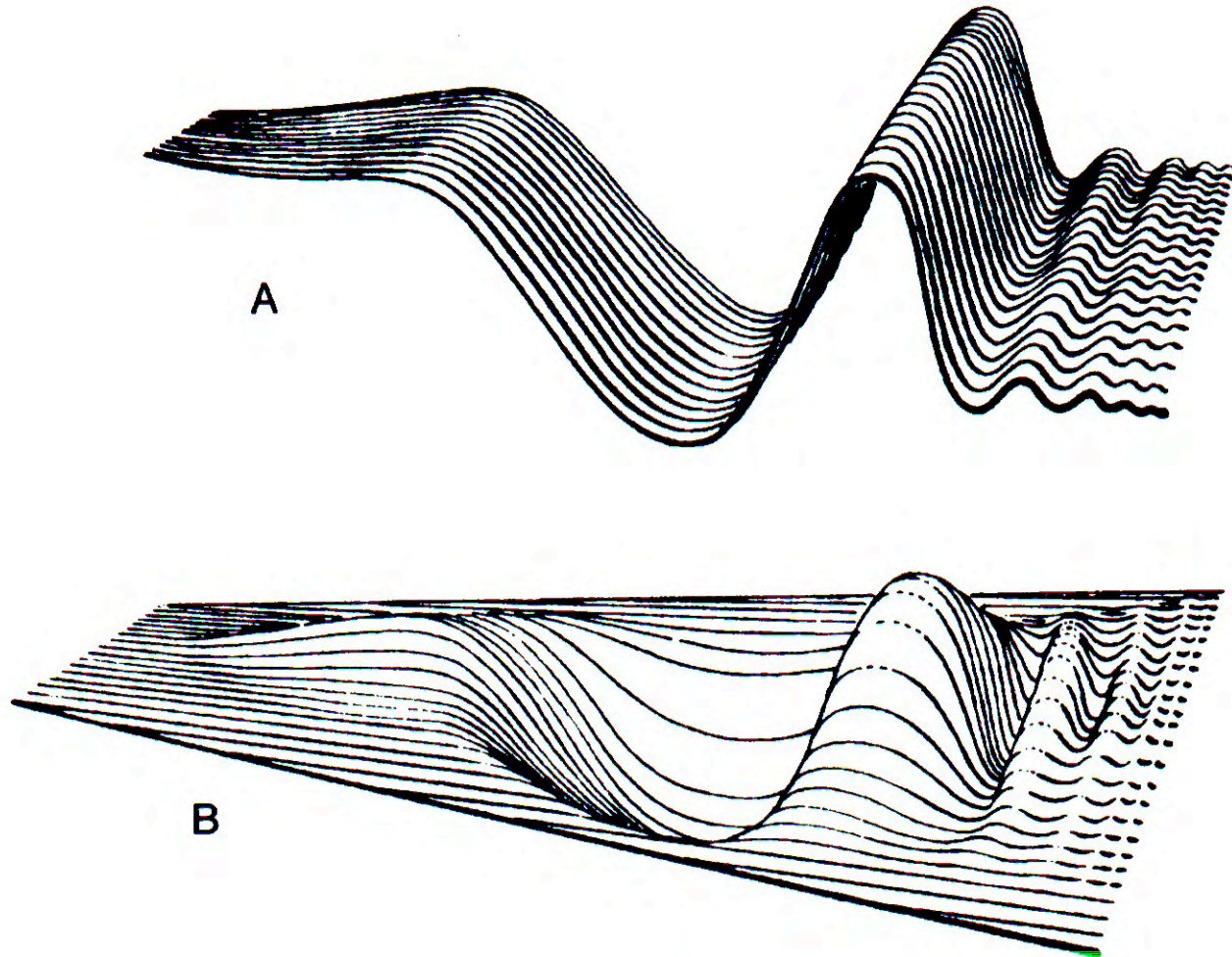# Simultaneous Masking Curves

From Egan and Haske, 1950

Assymetry of Masking

- A pure tone masks tones of higher frequency more efficiently than tones of lower frequency
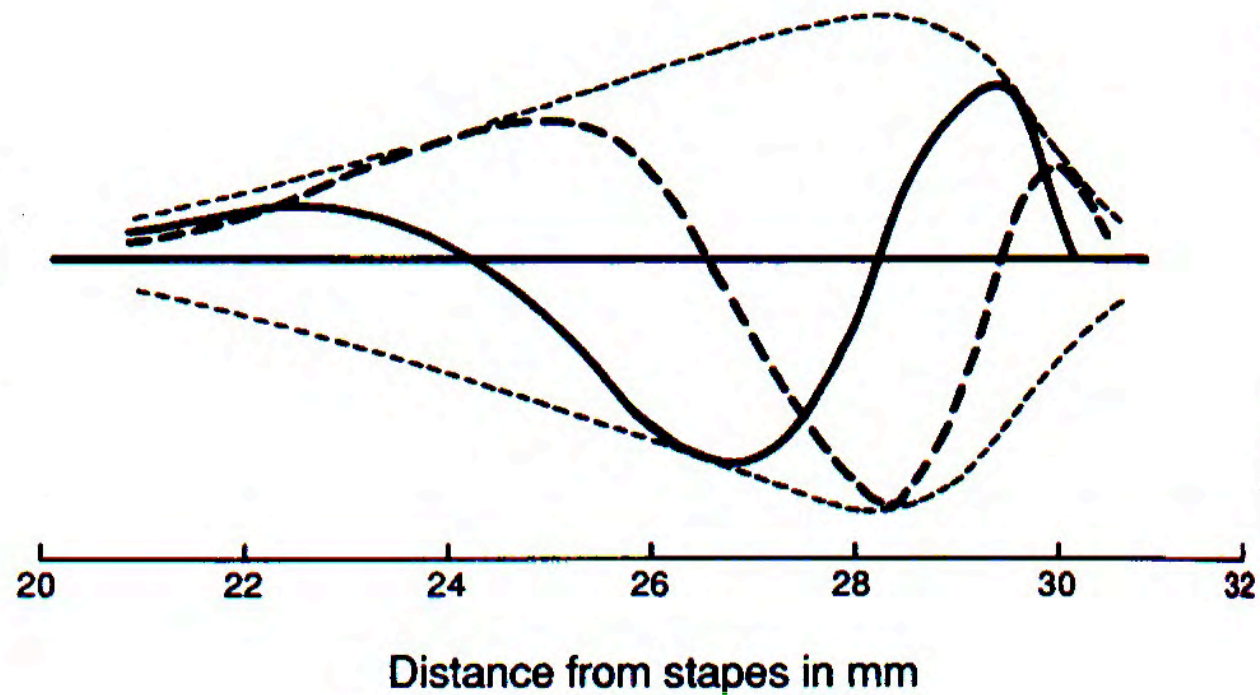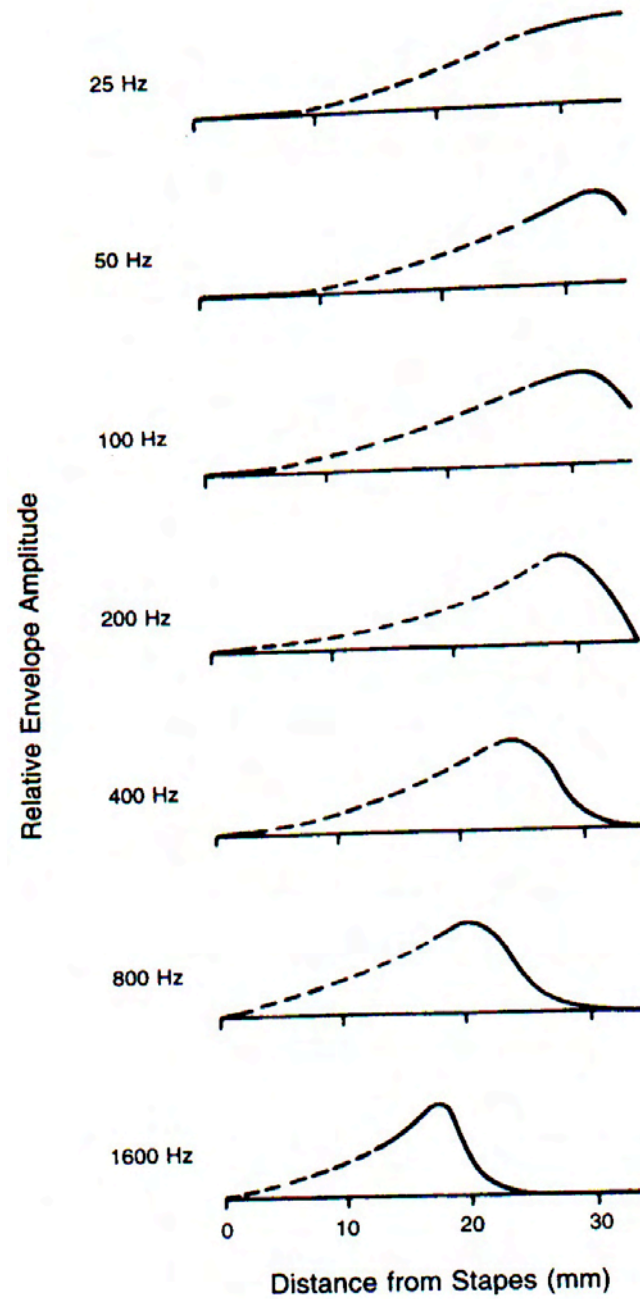
Basilar Membrane

Basilar Membrane

Basilar membrane displacement

Distance from stapes in mm

Basilar Membrane

Upward Spread

Swamping or Suppression in Simultaneous Masking?

- "Swamping"
  - The masker produces a significant amount of activity in the auditory filters which swamps the information making the signal undetectable

- "Suppression"
  - When signal is well above or below the masker, the neural response to a tone may be suppressed by a tone that does not excite that particular neuron.

Forward and Backward Masking

- Masking can also occur when the tone (signal) and the masker are not simultaneous.

- Forward Masking

  – Masking of a tone by a sound that ends a short time (e.g. 20-30ms) before the tone begins

- Backward Masking

  – Masking of a tone by a sound that begins sometime later (e.g. 10ms later)
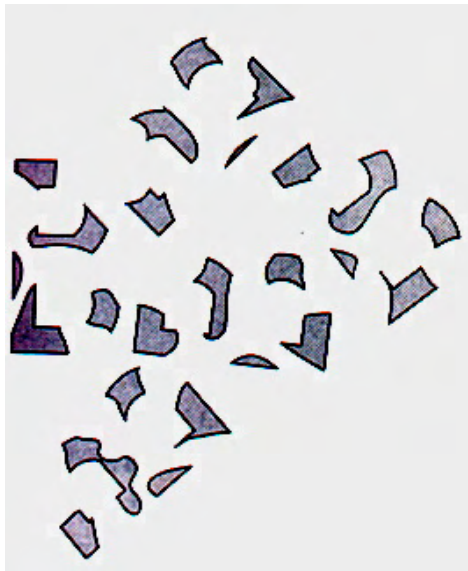
Forward and Backward masking

- Forward masking suggests that recently stimulated sensors are not as sensitive as fully-rested ones

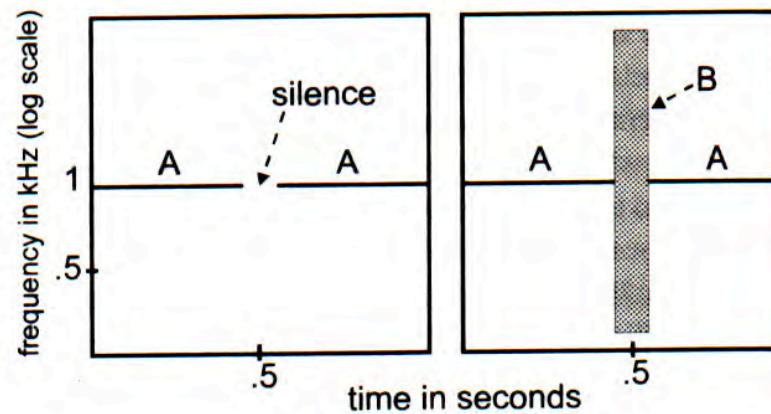- Backward masking may occur at higher levels of processing

Apparent Continuity

- Vision

Apparent Continuity

- Auditory

Other masking characteristics

- Forward masking is greater the smaller the delay between the two signals

- The rate of recovery from forward masking is greater for higher masker levels. Decays to zero in all cases, after 100 - 200 ms

- Forward masking increases with increased masker duration… until about 50ms.

- Forward masking depends on the signals used.