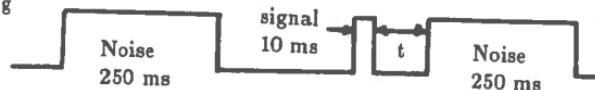


## Demonstration 10. Backward and Forward Masking (4:18)

Masking can occur even when the tone and the masker are not simultaneous. *Forward* masking refers to the masking of a tone by a sound that ends a short time (up to about 20 or 30 ms) before the tone begins. Forward masking suggests that recently stimulated sensors are not as sensitive as fully-rested sensors. *Backward* masking refers to the masking of a tone by a sound that begins a few milliseconds after the tone has ended. A tone can be masked by noise that begins up to 10 ms later, although the amount of masking decreases as the time interval increases (Elliot, 1962). Backward masking apparently occurs at higher centers of processing in the nervous system where the neural correlates of the later-occurring stimulus of greater intensity overtake and interfere with those of the weaker stimulus.

First the signal (10-ms bursts of a 2000-Hz sinusoid) is presented in 10 decreasing steps of -4 dB without a masker. Next, the 2000-Hz signal is followed after a time gap  $t$  by 250-ms bursts of noise (1900–2100 Hz). The time gap  $t$  is successively 100 ms, 20 ms, and 0. The sequence is repeated.

Backward  
Masking



Finally, the masker is presented before the tone, again with  $t = 100$  ms, 20 ms, and 0.

Forward  
Masking



## Commentary

"First you will hear a brief sinusoidal tone, decreasing in 10 steps of 4 decibels each."

"Now the same signal is followed by a noise burst with a brief time gap in between. It is heard alternating with the noise burst alone. For three decreasing time-gap values, you will hear two staircases. Count the number of steps for which you can hear the brief signal preceding the noise."

"Now the noise burst precedes the signal. Again two staircases are heard for each of the same three time-gap values. Count the number of steps that you can hear the signal following the noise."

## References

- H.Duifhuis (1973), "Consequences of peripheral frequency selectivity for nonsimultaneous masking," *J. Acoust. Soc. Am.* *54*, 1471-88.
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- J.H.Patterson (1971), "Additivity of forward and backward masking as a function of signal frequency," *J. Acoust. Soc. Am.* *50*, 1123-25.