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Using Auditory Evoked Potentials to Objectively Determine Backward Masking

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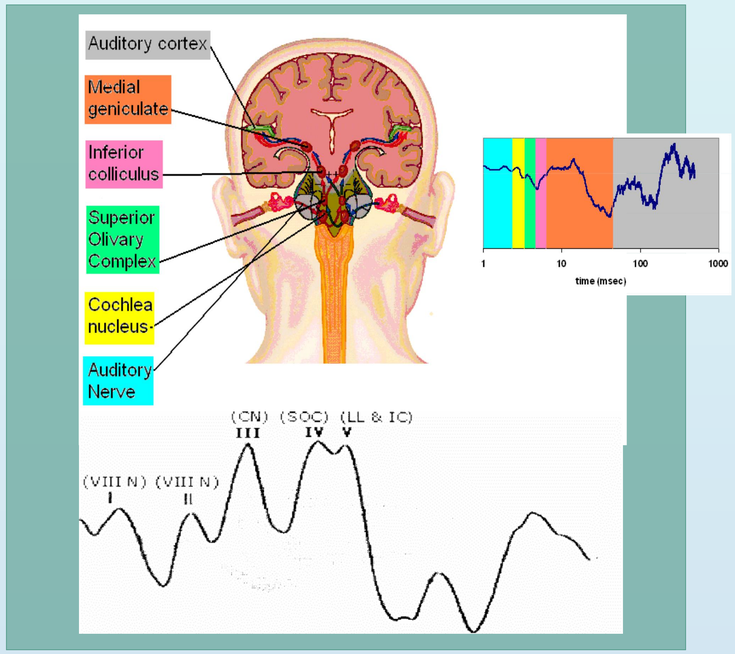
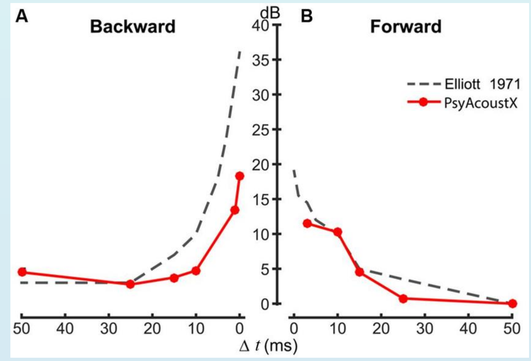
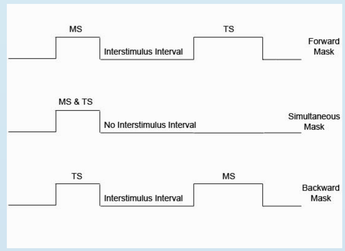
Abstract

Backward Masking (BM) functions have been shown to relate to age, lead toxicity, and how they differentiate in children with language disorders. A number of studies have been done that support BM related to auditory processing deficits. This has been shown in both animal models and human studies. This proposed study will be used to see if Evoked Potentials (EP) could be utilized to obtain BM functions. A tonal stimulus, followed by an inter-stimulus interval (ISI) and a noise masker were combined to make the EP stimulus. All segments were studied individually in the appropriate temporal alignment. ISI's of various durations (2, 4 and 8 msec) were used to derive the BM function for middle and late auditory evoked potentials. This study randomly presented four different stimulus conditions: 1) tone alone, 2) noise alone, 3) tone and noise, and 4) silence as a control. With a long inter-trial interval (1 sec) and high sample rate (31500 Hz) EP's were obtained for 1800 trials. The stimuli consisted of pure-tones at 1000 Hz with a 10 msec duration with a Blackman function and noise bursts of varying intensity. Comparisons will be made between the behavioral and electrophysiological task. It is expected that the amount of BM will increase as the ISI becomes smaller. This study will validate the use of EP's in a derived method that will arithmetically combine the stimulus conditions to observe the differential electrophysiological responses and neurologic loci of evoked potentials during the BM effect.



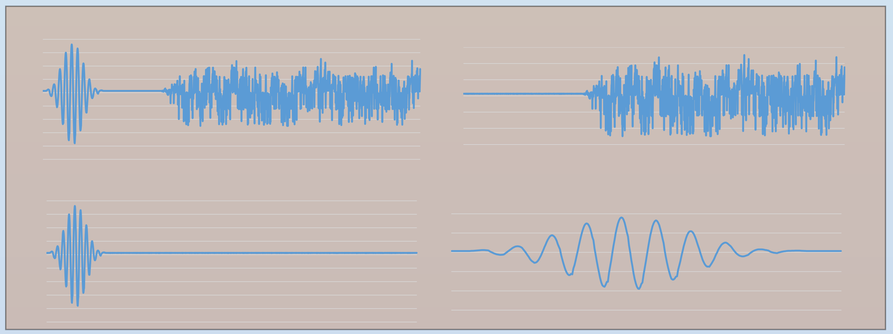
Backward Maskiing





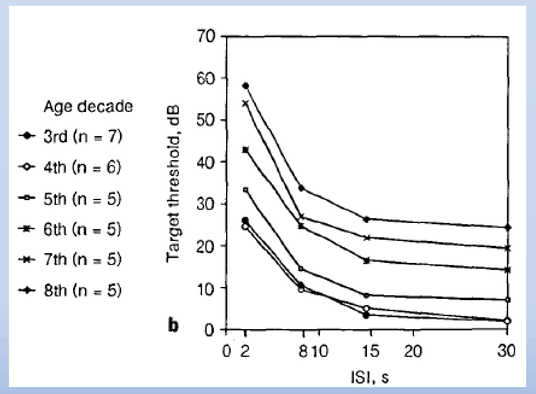
Methodology

Stimuli



River spill in Colorado
Lead Contamination

Aging



Research Focus and Methodology

The central focus of our research is to observe the waveform morphological changes of the whole auditory evoked potential during a BM procedure. This attempts to objectively measure the electrophysiological BM effect. The design of study allowed observation of the early (0-10 msec), middle (10-100 msec), and late (100-500 msec) auditory evoked potentials. This process allowed us to observe the differential electrophysiological responses of evoked potentials during the BM effect. There were 1000 randomized trials of each stimulus condition, including a no-stimulus control.

Results