

Effects of Selective Binaural Intensity Variations
on Auditory Processing in Aphasia

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Abstract

The ipsilateral pathways appear to be inoperative above the level of the thalamus under dichotic or diotic stimulus conditions. Intensity can be traded for time in the nervous system. Both temporal and intensity processing have been shown defective in persons with aphasia. Given these factors, a neurological extinction model was applied to the auditory processing disorders evidenced in persons with aphasia. This model suggests that messages travel faster to the intact hemisphere, where they are more differentiated and articulated, than the slower messages arriving at the affected hemisphere. This leads to extinction and interference of the message in the damaged hemisphere.

In order to overcome this extinction, the intensity of the stimulus was selectively raised by 15 or 30 dB to one ear at a time. The stimuli represented four different levels of auditory processing and included a cortical auditory evoked response measure (AER), a nonverbal intensity sequencing test (NVIST), a minimally varied phoneme in word discrimination and sequencing test (MVPT), and a semantic syntactic level test (RTT).

The results of this study suggest that speech intensity can be traded for time in quantities large enough to overcome the extinction-interference of auditory stimuli. Although some statistically significant results as well as some meaningful trends toward improved performance were evident on the NVIST and the MVPT, a unilateral increase of stimulus intensity did not prove to be a very potent mechanism for improving auditory comprehension in the 10 aphasic patients tested. Sentence length material was not affected in either direction by selective binaural amplification.

Although not a potent tool for treating aphasic patients, the role of the left ear/right hemisphere as a facilitator of processing for linguistic and non-linguistic material was suggested by the results of this study.