

Comments

Comment by Lütkenhöner:

The auditory brainstem response (ABR) to a binaural stimulus usually differs not very much from the sum of the ABRs to the monaural stimuli. Thus, the question arises as to what extent the effects shown in Figs 2 and 3 can be explained on the basis of the monaural responses.

Another point of concern is that the ABR data were analyzed using relatively simple models, which probably do not provide a *perfect* explanation of the measured data. Thus, the fact that certain model aspects (like the moment trajectories shown in Fig. 2) are similar for two conditions does not guarantee that the differences between the underlying ABR responses are insignificant. A model-independent comparison between conditions (for example, based on difference waveforms for all channels) would allow stronger conclusions. Figure 3 is, by the way, not completely compatible with the supposition that, for conditions perceptually yielding the same lateralization, the ABR responses are basically identical: The bold curves corresponding to the conditions R0+ and R+0, for example, appear to exhibit a significant latency difference.

Reply:

The binaural difference potential, i.e., the difference between binaural and summed monaural responses ($BD = B - (L+R)$), was analyzed by the authors (Riedel and Kollmeier, 2002a, cited in the chapter) for the same set of stimuli on the level of the waveforms. Both wave-V amplitude of the binaural potentials and the peak-to-peak amplitude DP1-DN1 of the BD showed the same dependence on stimulus lateralization. Largest amplitudes were found for the centrally perceived stimuli (diotic and antagonistic conditions), smallest amplitudes for the most laterally perceived (synergistic) stimuli.

In Fig. 3 there is a significant latency difference between R0+ and R+0 for both dipoles. For the ITD-condition R0+ the maximal dipole moments are reached about 0.2 ms (ITD/2) later compared to the ILD-condition R+0. Latency was measured from the leading click. The latency difference vanishes if one measures latency from the temporal center of both clicks. The ILD-conditions were symmetrical. To present a dichotic click with an ILD of 12 dB the left click was attenuated by 6 dB and the right click amplified by 6 dB. We do not want to claim for a *perfect* trading of ITD and ILD, but ABRs to corresponding ITDs and ILDs appear to be very similar.