

JAAA CEU Program

Volume 30, Number 8 (September 2019)

Questions refer to Zaleski-King et al, “Bimodal Cochlear Implant Listeners’ Ability to Perceive Minimal Audible Angle Differences,” 659–671.

Learner Outcomes:

Readers of this article should be able to:

- Summarize the literature describing bimodal access to interaural level and interaural timing difference cues.
- Discuss the limitations adversely affecting bimodal binaural integration.

CEU Questions:

1. The literature has shown that some bimodal listeners can take advantage of interaural cues when speech sources are spatially separated, based on:
 - a. the head shadow effect
 - b. binaural summation
 - c. interaural time difference (ITD) integration
2. Many of the documented binaural benefits of bimodal stimulation have been demonstrated in:
 - a. environments providing opportunities for “dip listening” during fluctuations in noise
 - b. optimized, directly controlled laboratory conditions
 - c. in comparison to patients with bilateral hearing aids
3. As high-frequency content increases, interaural level differences (ILDs) are:
 - a. more salient
 - b. less salient
 - c. unchanged
4. Hearing aid processing produces a(n) _____ timing delay in comparison to cochlear implant (CI) processors, resulting in _____.
 - a. smaller, difficulty for computation of neural cues
 - b. larger, difficulty for computation of neural cues
 - c. equivalent, optimized binaural computation
5. A broadband stimulus was used in the study to:
 - a. optimize ILD cues
 - b. improve access to overall loudness cues
 - c. provide an opportunity for acoustic and electric stimulation overlap
6. The interdevice delay (IDD) was used in this study to represent:
 - a. the difference in delay required for lateralization of the broadband stimulus
 - b. the delay between the hearing aid (HA) and CI processors required for the listener to achieve a percept of a centered, single stimulus
 - c. the loudness difference required for equal between-ear intensity percept
7. The results of this study generally showed that:
 - a. providing ITD access to bimodal listeners can be achieved through determining the IDD
 - b. providing localization information to bimodal listeners necessitates more substantial changes to device speech-processing algorithms and fitting procedures
 - c. providing access to ILDs requires monaural listening for bimodal patients
8. The authors hypothesized the Listener B6 demonstrated greater difficulty establishing differences in loudness cues because:
 - a. this listener could not identify ITDs
 - b. this listener had the most pronounced low-frequency hearing loss in the hearing aid ear
 - c. this listener had the least experience listening bimodally
9. One limitation identified by the authors that might have contributed to the variability in interaural loudness perception:
 - a. differences in compression ratios
 - b. differences in age of participants
 - c. differences in hearing aid manufacturer/model
10. In conclusion, the high variability and the general difficulty demonstrated in tasks requiring binaural comparisons supports the idea that:
 - a. CIs best preserve ILD cues used for the head shadow effect
 - b. listeners likely extracted monaural loudness cues to complete the task
 - c. listening experience determines the ability to compute binaural cues



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