Effect of Background Noise and Uncertainty of the Auditory Environment on Localization in Adults with Cochlear Implants

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**RESULTS**

**Table 1: Hearing History of ID Subjects**

<table>
<thead>
<tr>
<th>Age at Onset</th>
<th>Clinical Characteristics</th>
<th>Time (msecs)</th>
<th>IAF</th>
<th>IAW</th>
<th>IAP</th>
<th>IAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 yrs</td>
<td>Left ear</td>
<td>2.5 yrs</td>
<td>12-12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 yrs</td>
<td>Left ear</td>
<td>2.5 yrs</td>
<td>12-12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 yrs</td>
<td>Left ear</td>
<td>2.5 yrs</td>
<td>12-12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 yrs</td>
<td>Left ear</td>
<td>2.5 yrs</td>
<td>12-12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 3:** Temporal features of signals in Experiment 1. (For electrode locations of signals see Fig. 2.)

**Fig. 4:** Temporal features of signals in Experiment 2. (For electrode locations of signals see Fig. 2.)

**Fig. 5:** Temporal features of signals in Experiment 3. (For electrode locations of signals see Fig. 2.)

**Expt. 1: Common ITD**

Hypothesis: ITD sensitivity will be reduced at small electrode separations. With decreasing level of the added signal baseline ITD sensitivity will be reduced. With increasing electrode separation baseline ITD sensitivity will be reduced or even enhanced.

**Expt. 2: Conflicting ITD (mid-line)**

Hypothesis: ITD sensitivity will be reduced when conflicting ITDs are presented to two nearly pitch-matched pairs of electrodes. With increasing electrode separation or decreasing level of the added signal this reduction in sensitivity may be attenuated or eliminated.

**Expt. 3: Conflicting ITD (side)**

Hypothesis: ITD sensitivity will be reduced when conflicting ITDs are presented to two nearly pitch-matched pairs of electrodes. With increasing electrode separation or decreasing level of the added signal this reduction in sensitivity may be attenuated or eliminated.

**Expt. 1 vs Expt. 2 at 90% DR**

In the following graphs, ITD JNDS with the added signal at 90% DR are compared for experiment 1, with increasing electrode separation or decreasing level of the added signal along each electrode pair.

**REFERENCES**


**ACKNOWLEDGEMENTS**

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**CONCLUSIONS**

1. Activation of multiple channels does not necessarily result in decreased ITD sensitivity.
2. When conflicting ITDs occur on one or both ears, performance is typically degraded.
3. The effect of the electrode separation on ITD sensitivity remains uncertain. In some cases, ITD sensitivity is reduced even when the added signal is located eight electrodes away. This indicates that electrode interaction effects on binaural performance may be complex.
4. The type of competing ITD used affects the sensitivity to the ITD of the probe. However, individual subjects vary with regard to which type (center or side) is more disruptive of ITD sensitivity.
5. Effect of interaction is reduced with increasing signal-to-noise ratio.
6. In the common ITD and conflicting ITD experiments the JNDs vs. place functions followed approximately linear trajectories (see Figures 6). This pattern suggests that perhaps responses on these conditions might be predicted from a simple mechanism. Both the JNDs and the slopes can be explored in future work.