ENVIRONMENTAL SOUND PERCEPTION OF COCHLEAR IMPLANT USERS

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Introduction
Most current adult cochlear implant (CI) users achieve higher open-set speech perception scores post-surgery than pre-surgery, a factor which greatly improves their overall quality of life. There is little published research assessing the ability of CI users to identify environmental sounds, an important skill which also impacts upon a patient’s quality of life. This study compared adult CI users to normally hearing (NH) listeners in their ability to identify various environmental sounds.

The Environmental Sounds Perception Test (ESPT) developed for this study was more difficult and more comprehensive than those used in current studies, in order to reduce the likelihood of any potential ceiling effect affecting the results. It was hypothesised that the CI users would score lower than similarly-aged NH listeners on the ESPT.

Method – The Environmental Sounds Perception Test (ESPT)

Method – Subjects
Stimuli were presented through a loudspeaker: 0.24 normally hearing (NH) adults. Age: 23-72 years (M=47.0).

Results

Table 1: Environmental Sounds Perception Test Stimuli

<table>
<thead>
<tr>
<th>Category</th>
<th>NH Group</th>
<th>CI Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human &amp; office</td>
<td>R: 67%-100%</td>
<td>R: 83%-100%</td>
</tr>
<tr>
<td>Human &amp; household appliances</td>
<td>R: 83%-100%</td>
<td>R: 75%-88%</td>
</tr>
<tr>
<td>Transport &amp; human</td>
<td>R: 95%-100%</td>
<td>R: 94%-97%</td>
</tr>
<tr>
<td>Other</td>
<td>R: 94%-100%</td>
<td>R: 92%-98%</td>
</tr>
</tbody>
</table>

Discussion & Conclusions
Along with improved speech perception, the recognition of environmental sounds is one of the most frequently cited benefits obtained post-implantation. However, this study found that there was still a significant difference between similarly-aged NH adults & CI users in their ability to identify environmental sounds.

The best-recognised category for CI group was “Arriving home”. All 4 sounds in this category were continuous waveforms with distinctive temporal patterns – e.g. door bell, knocking on door.

The least-recognised category for CI group was “Transport”. Except for the car horn, the sounds in this category were continuous waveforms (e.g. traffic noise, train, helicopter), with no distinctive temporal pattern.

The importance of temporal cues for identifying environmental sounds has also been highlighted in other studies.

The results also suggest that this environmental sounds test had an appropriate range of stimuli and difficulty levels for further use as a CI assessment tool.

The study is currently being extended to test HA users who meet the CI criteria. Initial findings suggest that HA users with equivalent levels of hearing loss score worse than the CI users on the environmental sounds test (M = 39.73% correct; n=4).

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References