

Perceiving isn't only hearing: The role of speech production in the development of lexical tone perception

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It is generally accepted that speech production is guided by speech perception. However among profoundly hearing-impaired children, improvements in speech perception scores over time are overwhelmingly attributable to improvements in language and speech production (Blamey et al., 2001). These improvements mask the negative effects on perception due to deteriorating hearing.

Lexical tone has an important contrastive role to play in Cantonese and to achieve full communicative competence it is important to be able to perceive and produce the six tones in the language. Pre-linguistically deafened implant users perform poorly at tone perception tasks suggesting the implant is minimally successful in aiding tone perception. By contrast, post-linguistically deafened adult users perform better at these tasks and it may be that linguistic experience plays an important role in aiding in perception.

In this paper, we report on a study investigating the relationship between tone production and tone perception in young pre-linguistically deafened Cantonese-speaking children. The study comprised were two groups of children aged 4-11years, one group of implant users and one group of normally-hearing children. The tone production task involved naming 90 black-and-white line drawings of items which are familiar to children aged 4 years. Responses were recorded and analysed acoustically and results were summarized as 'size of tonal space'. For the tone identification task, children were shown two pictures presented side-by-side from the production task. These represented minimal pairs of different tone contrasts. One of the words illustrated on the picture card was presented through a speaker and the child was required to point to the corresponding picture.

A positive correlation ($p < 0.05$) was found between tonal space area and mean number of tones correctly identified. Most implant users had reduced tonal spaces relative to the normally-hearing children and performed poorly at the tone identification task. A few implant users however identified tones as successfully as their normally-hearing peers. They also had tonal areas that matched those used by the normally-hearing children. Since the implant does not provide much useable information about tone to users, it suggests that acquisition of tone production skills

has helped these children develop reasonable tone perception abilities. These results suggest that to compensate for shortcomings in current cochlear implant technology, tone production training should be emphasised in speech habilitation programs.