Current work indicates that many children using cochlear implants are able to hear fine differences between speech sounds but are not progressing as well as expected in receptive language ability. There is anecdotal evidence from teachers that some children using cochlear implants have poor short-term auditory memory ability, which may be impeding their language development. Temporal ordering and short-term memory storage capacity involve higher order processing. Severe auditory deprivation prior to implantation may have caused auditory processing deficits at a cortical level. This study aims to assess short-term, sequential, auditory memory ability in children using cochlear implants and to determine the relationship between this ability and receptive language ability. Short-term auditory memory ability has not been previously investigated in profoundly deaf children using hearing aids and/or cochlear implants.

Twenty-four children using the 22-electrode cochlear implant were tested on five short-term sequential memory tasks, three with auditory stimuli and two with visual stimuli. There were 8 children in each of the age groups; 5–6 years, 7–8 years, and 9–11 years. Twenty-four age-matched, normally hearing children served as a control group. All children were also assessed on the receptive subtests of the CELF (Clinical Evaluation of Language Fundamentals) and on the nonverbal scale of the Kaufman Assessment Battery for Children (K-ABC) which measures nonverbal intelligence. This study assessed short-term auditory memory with tasks that required minimal language ability. Prior to the memory tasks, the child had to demonstrate accurate identification of the stimuli with a similar reaction time to the normally hearing controls.

As expected there is a significant effect of age on memory performance for the 24 normally hearing children, with older children performing better than the younger children. The memory performance of the children using cochlear implants is therefore described in terms of its deviation from expected performance for a given chronological age. Preliminary results suggest that it is unlikely that auditory deprivation causes a memory deficit specific to the auditory modality. Performance on visual memory tasks is very similar to performance on analogous auditory memory tasks for a group of implant users. The performance of children using cochlear implants on a variety of memory tasks does not appear to be significantly different to that of normally hearing children who are of similar age and nonverbal intelligence. In contrast their receptive language scores are substantially inferior.

The paper will also discuss the relationship between receptive language ability and short-term memory ability in children using cochlear implants.
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