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Reading instead of reasoning? Predictors of arithmetic skills in children with cochlear implants

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Abstract

Objectives: The aim of the present study was to evaluate whether the arithmetic achievement of children with cochlear implants (CI) was lower or comparable to that of their normal hearing peers and to identify predictors of arithmetic achievement in children with CI. In particular we related the arithmetic achievement of children with CI to nonverbal IQ, reading skills and hearing variables.

Methods: 23 children with CI (onset of hearing loss in the first 24 months, cochlear implantation in the first 60 months of life, atleast 3 years of hearing experience with the first CI) and 23 normal hearing peers matched by age, gender, and social background participated in this case control study. All attended grades two to four in primary schools. To assess their arithmetic achievement, all children completed the "Arithmetic Operations" part of the "Heidelberger Rechentest" (HRT), a German arithmetic test. To assess reading skills and nonverbal intelligence as potential predictors of arithmetic achievement, all children completed the "Salzburger Lesetest" (SLS), a German reading screening, and the Culture Fair Intelligence Test (CFIT), a nonverbal intelligence test.

Results: Children with CI did not differ significantly from hearing children in their arithmetic achievement. Correlation and regression analyses revealed that in children with CI, arithmetic achievement was significantly (positively) related to reading skills, but not to nonverbal IQ. Reading skills and nonverbal IQ were not related to each other. In normal hearing children, arithmetic achievement was significantly (positively) related to nonverbal IQ, but not to reading skills. Reading skills and nonverbal IQ were positively correlated. Hearing variables were not related to arithmetic achievement.

Conclusions: Children with CI do not show lower performance in non-verbal arithmetic tasks, compared to normal hearing peers.