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Introduction

Cochlear implants (CI) are more and more accessible at a younger age. The mismatch negativity (MMN), is a preattentive electrophysiological measure, known to assess auditory discrimination^{1,2,3}. The development of such measures is important to evaluate the benefits of the CI in infants, young children, and non-verbal adults.

AIM

To develop an efficient MMN paradigm, which will well identify good and poorer performers. To investigate the relationship between MMN measures and speech performance.

Methods

Participants

- 20 adults with a cochlear implant (CI)
 - 10 good performers (speech score > 65%)
 - 10 poorer performers (speech score < 65%)

11 individuals with normal hearing

Stimuli

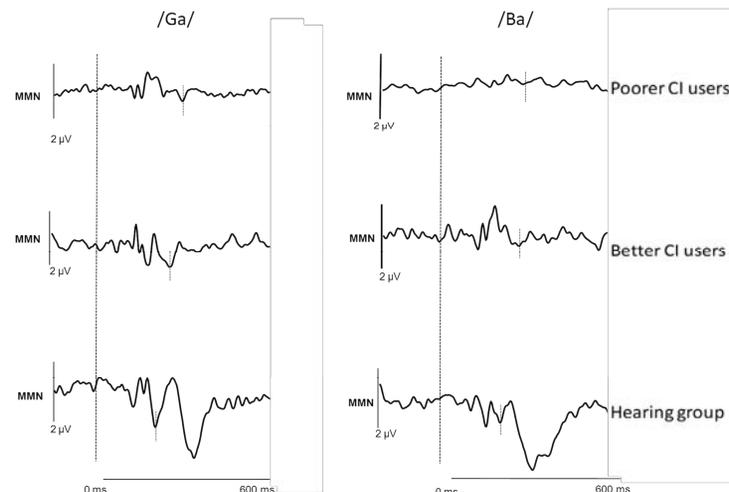
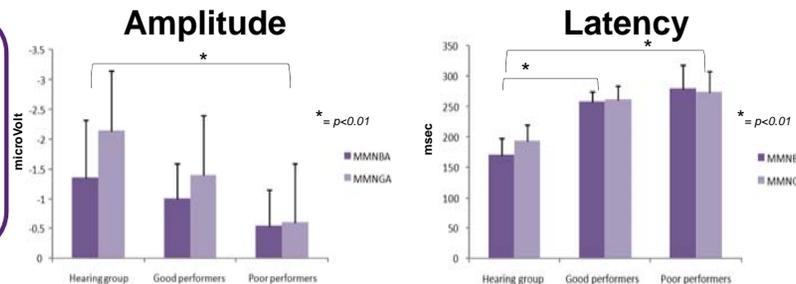
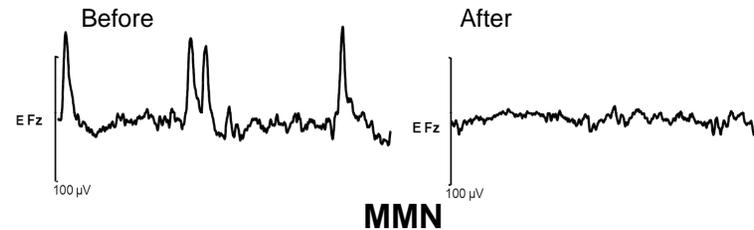
- > /Da/: standard (probability of occurrence= 80%)
- > /Ba/ and /Ga/: deviants (probability of occurrence= 10% each)

Paradigm

- > A MMN with two-deviant oddball paradigm
- > The electrodes AFz, Fz and FCz were used to investigate the MMN^{4,5}.
- > Independent Component Analysis (ICA) to remove EEG artefacts^{6,7}.
- > 50 phonetically balanced French words to assess speech perception

Results

Independent Component Analysis (ICA)



The analysis revealed a significant correlation between the speech score, and the amplitude of the electrode FCz ($r = -.0473$, $P = 0.035$), and Fz ($r = -.0451$, $P = 0.046$) in the condition with the deviant /GA/.

Conclusions

- Normal hearing participants and good CI users had MMN to both deviant stimuli.
- The MMN was not present in two poorer CI users for both deviants.
- CI users with poorer results on the speech test had a significant reduction in amplitude compared to the hearing group. However, both CI groups had significantly longer latencies.
- > These findings suggest that a MMN measure can be used to assess the integrity of the auditory system and speech discrimination in a population of CI users.
- > The relationship between the MMN and speech perception is likely to be beneficial for the evaluation and rehabilitation programs in CI users.

References

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