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Phonological skills in children with cochlear implants: Contribution of a Cued Speech education

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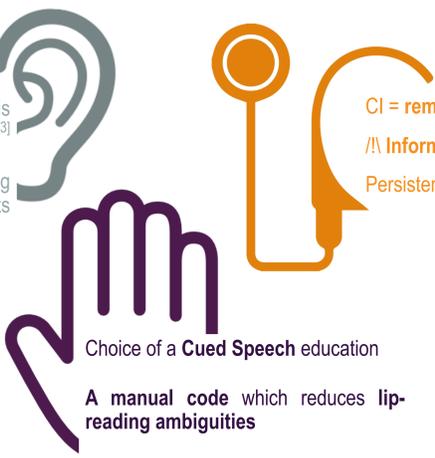
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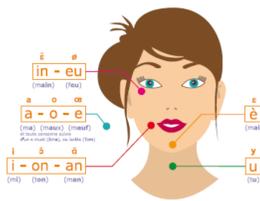
CONTEXT & AIMS

1/1000 child is born deaf^[3]
 95% to hearing parents

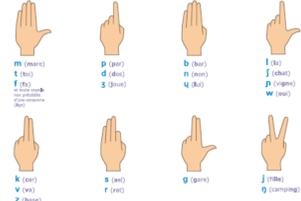
CI = remedial device proposed
 /! Information provided is limited^{[2][5]}
 Persistent language disorders^[4]



5 hand positions around the face for the vowels



8 handshapes for the consonants



Aims
 Assess the **phonological abilities** of children with Cochlear Implant(s) (CI) in production and perception
 Examine the **impact of a Cued Speech education** on these skills

Hypotheses
 Skills are improved by **device type** (CI > HA) and/or **communication mode** (CS > no CS)

METHOD & PARTICIPANTS

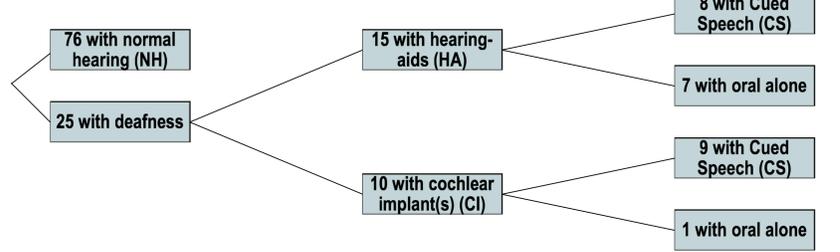
The EULALIES battery test^[6] (Meloni et al.)

Picture Naming	Diadochokinesis	Syllable Repetition	Pseudoword Repetition	Lexicality Judgement
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Screening : memory span, morphosyntactic level, audiometry, Cued Speech decoding level

45 minute session – Audio-visual stimuli with Cued Speech for deaf children

Double-blind data transcription with PHON (Hedlund & Rose, 2016)

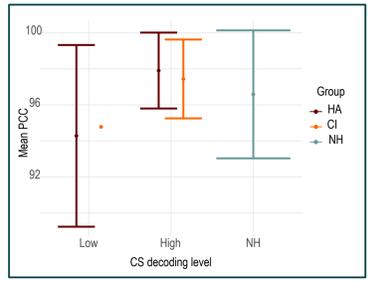
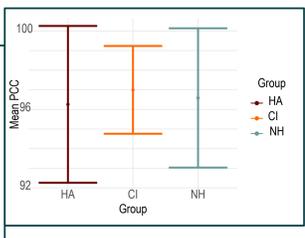
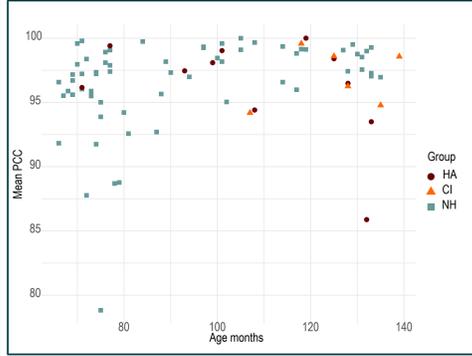


Acknowledgment
 All the children and their parents who participated in this study. Schools and teachers who welcomed us. The association ALPC for its support and assistance in the recruitment of deaf subjects. Clarisse Puissant for her help in collecting data.

References
 [1] Charlier, B. L., & Leybaert, J. (2000). The rhyming skills of deaf children educated with phonetically augmented speechreading. The Quarterly Journal of Experimental Psychology A: Human Experimental Psychology, 53A(2), 349-375. <http://dx.doi.org/10.1080/027249800390529>.
 [2] Colin, S., Ecalte, J., Truy, E., Lina-Granade, G., & Magnan, A. (2017). Effect of age at cochlear implantation and at exposure to Cued Speech on literacy skills in deaf children. Research in Developmental Disabilities, 71, 61-69. <http://dx.doi.org/10.1016/j.ridd.2017.09.014>.
 [3] French Health Department
 [4] Geers, A., Nicholas, J., Tobey, E., & Davidson, L. (2015). Persistent language delay versus late language emergence in children with early cochlear implantation. Journal of Speech, Language, and Hearing Research, Volume 59, 155-170.
 [5] Leybaert, J., & LaSasso, C. J. (2010). Cued Speech for Enhancing Speech Perception and First Language Development of Children With Cochlear Implants. Trends in Amplification, 14(2), 96-112. <https://doi.org/10.1177/1084713810375567>.
 [6] Meloni, G., Loevenbruck, H., Vilain, A., & Macleod, A. (2017). EULALIES, The France-Québec Speech Sound Disorders project. Poster présenté, IASCL, juillet 2017, Lyon, France.

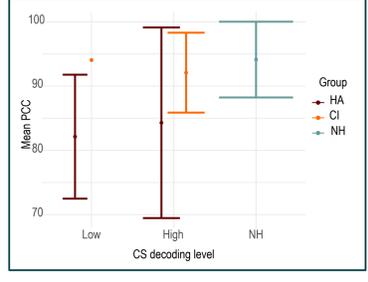
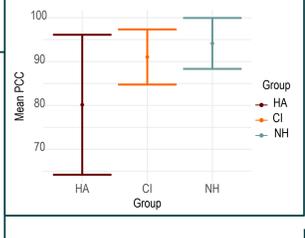
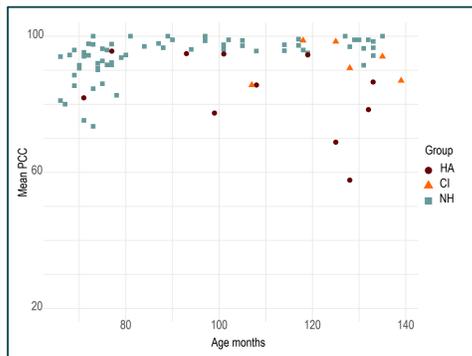
RESULTS

Picture Naming



- PCC scores: children with NH and children with CI are equivalent, children with HA lower > more variability for children with HA and NH than children with CI
- PCC scores increase with age for children with NH (but not for children with CI nor HA)
- The higher the CS decoding level, the higher the PCC scores
- Variability decreases with the CS decoding level
- Children with HA and a high CS decoding level reach scores of children with CI

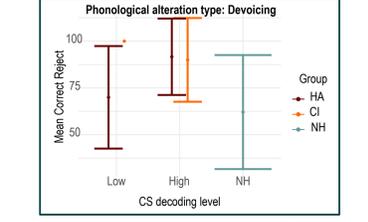
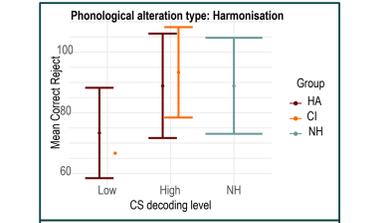
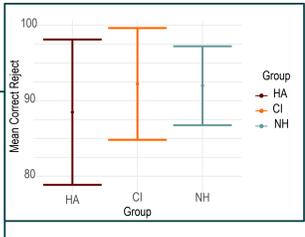
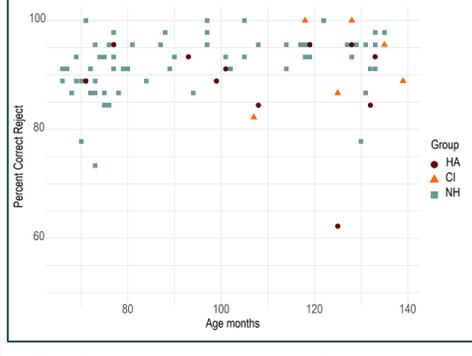
Pseudoword Repetition



- PCC scores: HA < CI < NH
 We observed more variability for children with HA than the other two groups (CI and NH)
- PCC scores increase with age and tend to peak from 8 years old for children with NH (but not for children with CI nor HA)
- The scores are equivalent regardless of the CS decoding level > more variability for children with HA
- Unlike in the Picture Naming task, we cannot observe an effect of the CS decoding level on the scores in these preliminary data

Lexicality Judgement

Correct reject



- Correct reject scores: children with CI and NH are equivalent, children with HA lower > we observed more variability for children with HA and CI than children with NH
- The CS decoding level seems to improve scores to reach a level equivalent to or higher than that of children with NH

CONCLUSION & PERSPECTIVES

Benefits of cochlear implantation

In speech production
 Less variability in children with cochlear implants but lower scores than hearing pairs
 Cochlear implants seem to **improve scores** compared to hearing-aids

In speech perception
 Cochlear implants seem to **improve perceptual abilities** relative to hearing-aids (Children with CI lexicality judgment similar to Children with NH) but **perception remains limited** (pseudoword scores lower than NH)

Impacts of Cued Speech education

In speech production
 Cued Speech seems to **facilitate isolated syllables production** (Syllable repetition task) and to **improve scores in Picture-naming**

In speech perception
 Cued Speech seems to **improve the perception of some phonological features perception** (voicing) and to **help detect syllable or phoneme deletion** (Lexicality Judgement)

Perspectives

Further data collection
Analysis of phonological features: is there a link between production difficulties and perception difficulties ?
Comparisons based on different factors (CS exposure time, duration of implant use, multilingualism, auditory age,...)