

Effect of sign language exposure on speech perception and intelligibility in children with cochlear implants

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*Childhood Development
after Cochlear Implantation*



Should all deaf children learn sign language?

- **The benefits of learning sign language clearly outweigh the risks.**
- **For parents and families who are willing and able, this approach seems clearly preferable to an approach that focuses solely on oral communication.**
- **Early and continued exposure to sign language may provide a framework for early spoken language development.**

Research questions

- **Does the use of sign language following cochlear implantation provide advantages for speech perception or speech intelligibility?**
- **Does the use of sign language interfere with development of speech perception or intelligible speech?**

Research Design

- **Children in the CDaCI sample with speech intelligibility scores at 4-5 and 6-7 years post implant**



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Participants ($n = 122$)

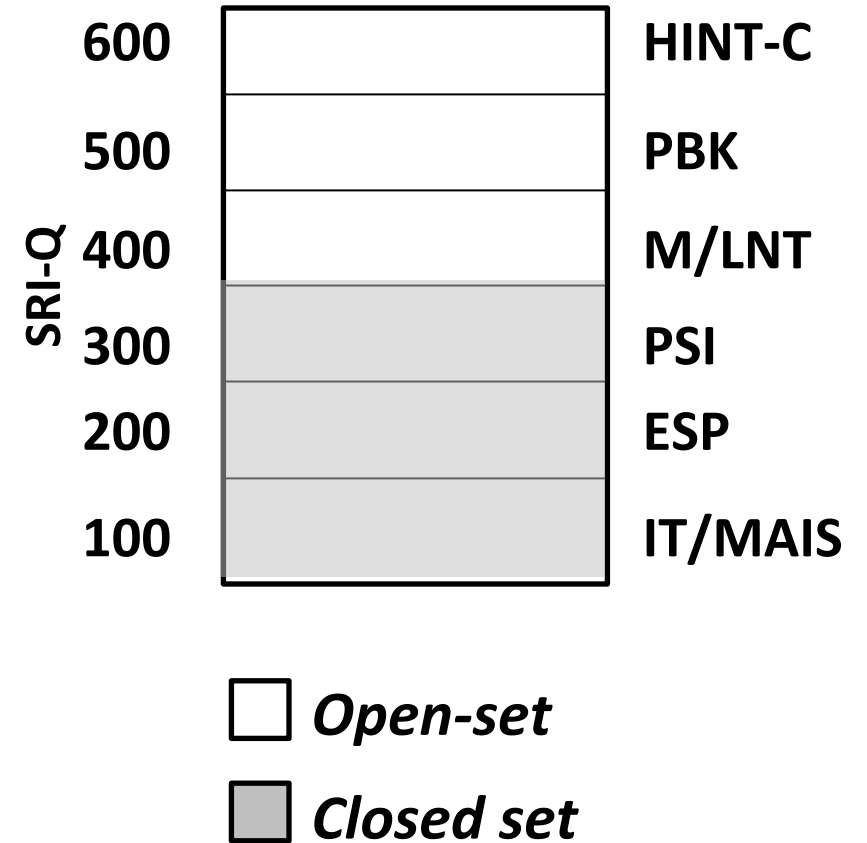
| | No sign exposure $n = 42$ | Early sign exposure $n = 36$ | Continued sign exposure $n = 44$ |
|---------------------------|---------------------------------|------------------------------------|--|
| Mean age at CI activation | 27.60 (15.95) | 28.64 (14.24) | 29.07 (14.32) |
| Mean IT-MAIS, Baseline | 32.14 (28.46) | 22.71 (23.88) | 16.25 (18.54) |

$p = .007$

- *Early sign* = Baseline and/or 1 year post-CI
- *Continued sign* = 1-3 years post-CI

Speech perception

- **Speech Recognition Index in Quiet (SRI-Q)**
 - Cumulative index (0-600)
 - Combines results across tests in quiet
 - Sensitive to change over time
- **12, 24, and 36 months post-implant**



Speech intelligibility

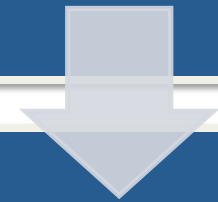
DIGITAL RECORDINGS, McGARR STIMULI

Listener hears a child or sentence once



WRITTEN WORD-LEVEL JUDGMENTS

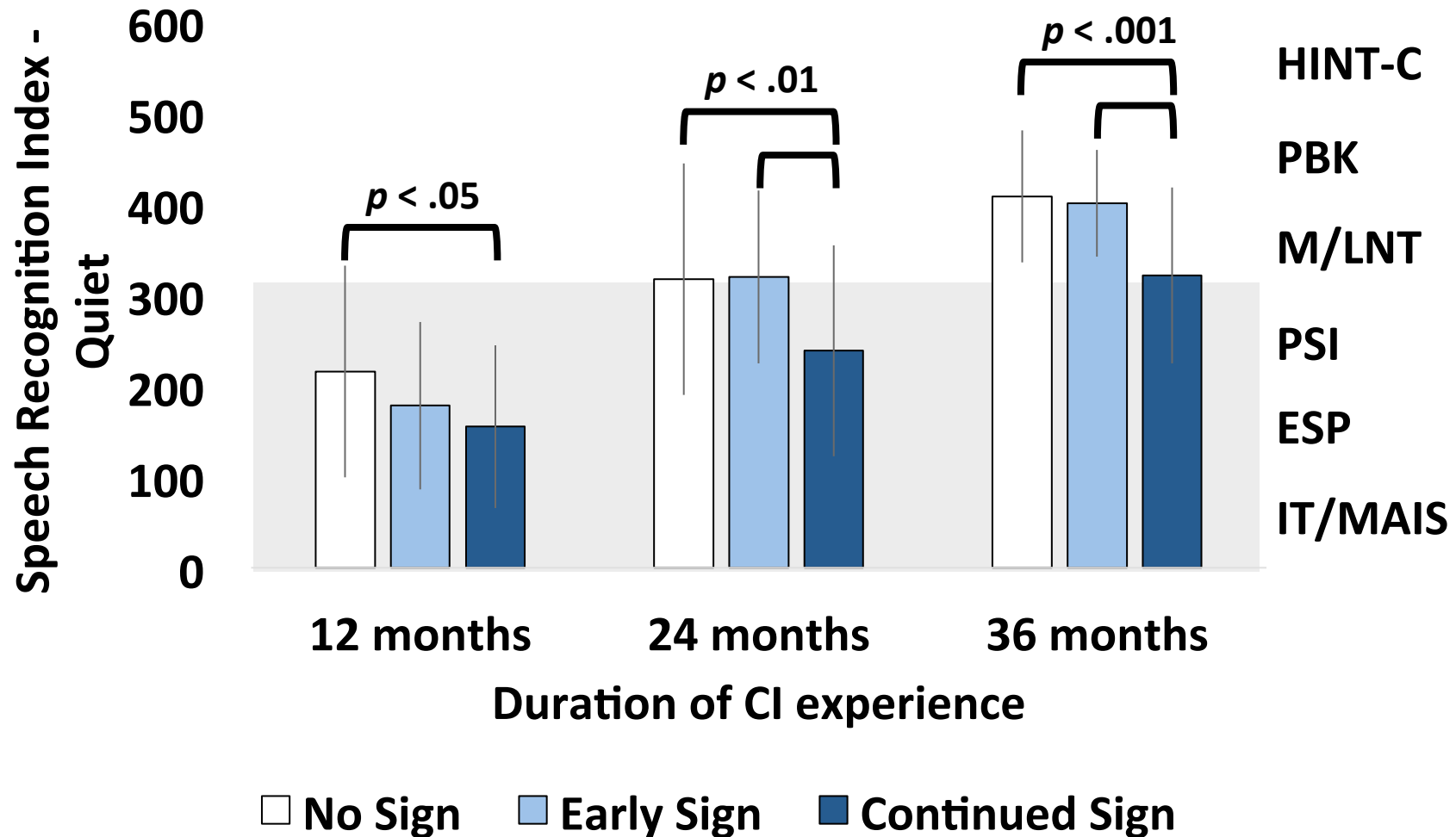
3 naive adult listeners with normal hearing



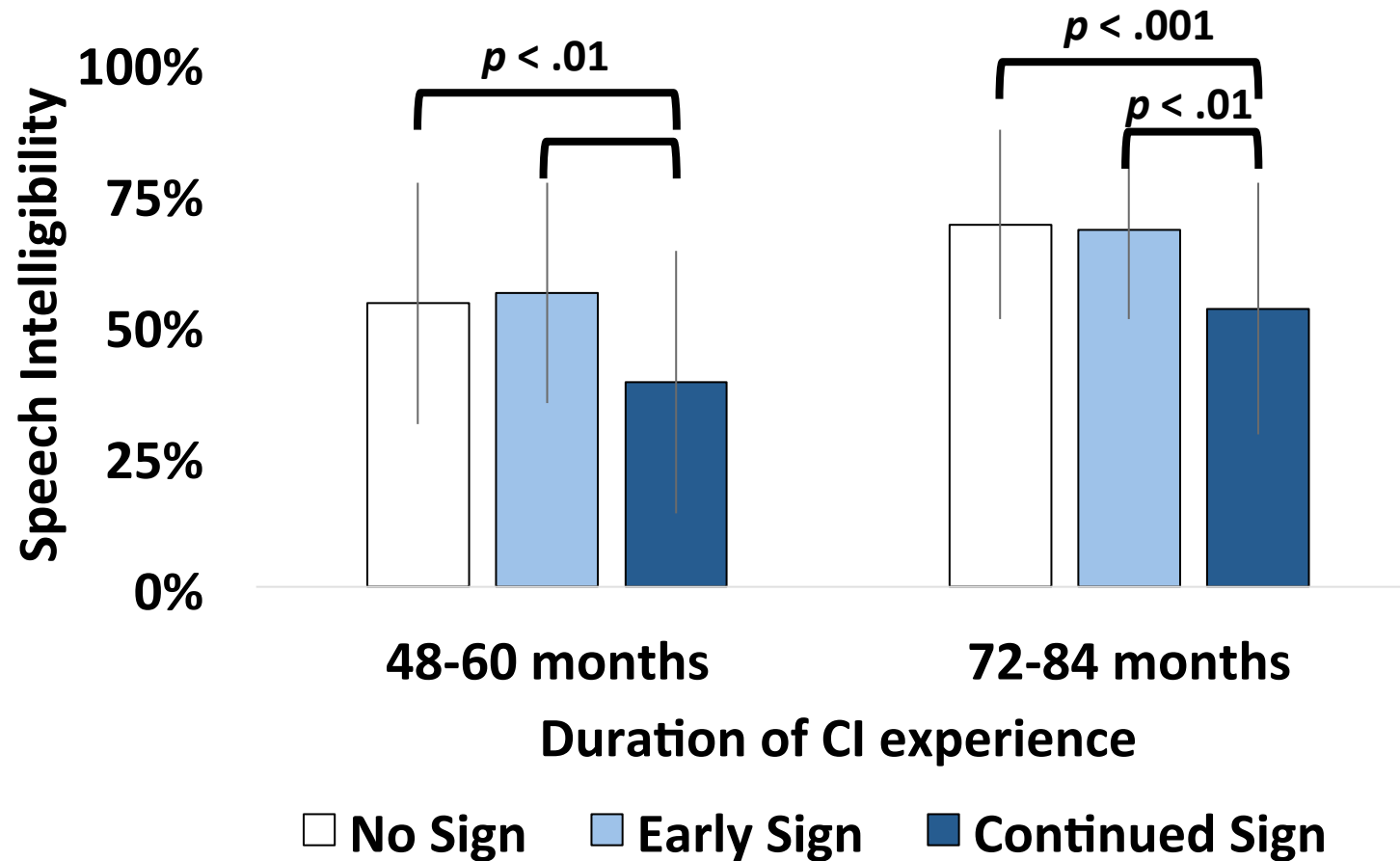
SPEECH INTELLIGIBILITY (%) CALCULATED

Key word identification

Results – Speech perception



Results – Speech intelligibility



Summary

- **Continued use of sign language was associated with poorer auditory speech perception over the first 3 years of device use.**
- **Continued sign language exposure corresponded with lower speech intelligibility at 6-7 years post-CI.**
- **Early exposure to sign (pre-implant and/or year 1) did not interfere with either speech perception or speech intelligibility.**

Discussion

- **Sign language exposure does not benefit and may interfere with speech perception and speech intelligibility.**
- **Future work will focus on the effect of sign language exposure on spoken language, academic, and social skills.**

Acknowledgments

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