

Shifting Focus: Using Functional Listening Skills to Guide Paediatric Cochlear Implant Evaluation

Davis, A., Cowan, R. Harrison, E.



The Shepherd Centre

Giving deaf children a voice



**THE HEARING
CRC**



**MACQUARIE
University**

Author disclosure information

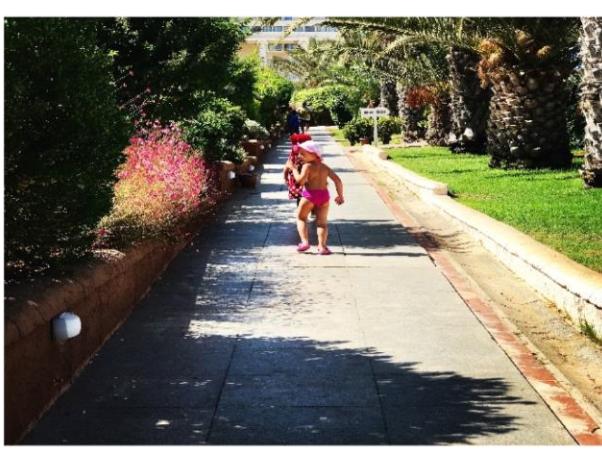
A. Davis & R. Cowan

Grant and Research Support: Cooperative Research Centres Programme, Business Australia, and Cochlear Limited.





Language is caught
not taught



It happens fast
It happens early
It happens differently



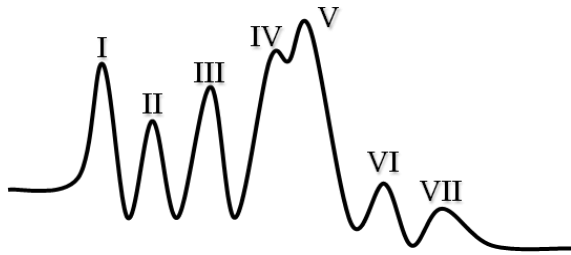
Exposure
Experience



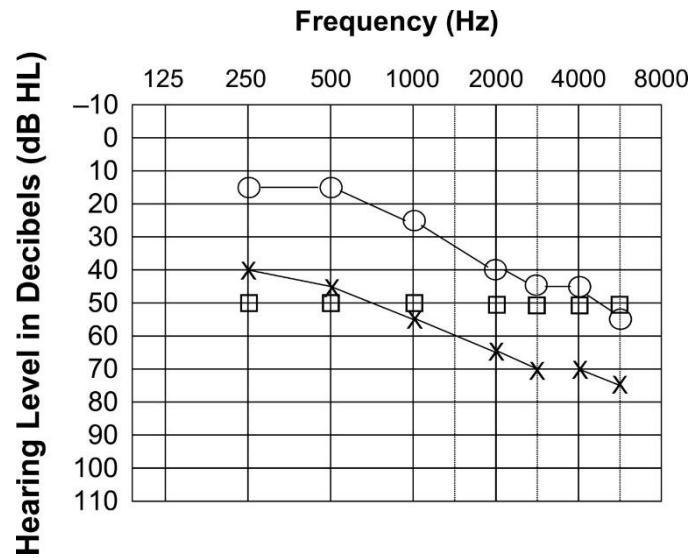
With everyone
Everywhere
About everything



What measures listening?



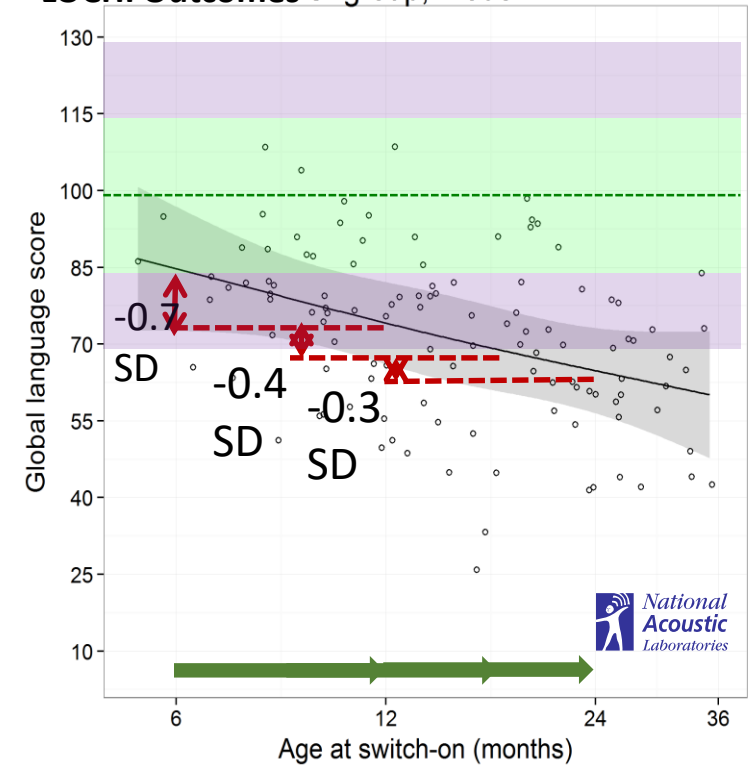
Objective Testing



Threshold testing



LOCHI Outcomes CI group, model 2



1SD language scores at 5yrs

FLI-P™ Development

Tracking the auditory skills that underpin language, literacy, communication development and social competence

- Measure of functional listening development from birth- 6yrs
- Develop a child's individual trajectories over time
- Compare to group data of other children (both HL and typical hearing)
- Auditory skills in natural every day environments (distance, digital signals, group situations) from early ages
- **More than detection:** 'Using' listening
- Detailed at each level of listening development (6 phases)
- Evidence and guidance for critical and timely decision making



The Functional Listening Index – Pediatric™

Phase 5: Listening through discourse and narratives

Recognise a familiar person on the phone



What can this look like

They can recognise on the phone someone that they know. They know who is calling from the sound of the person's voice.

How to check

Ask someone they know (family member, close friend, teacher) to talk to them on the phone. Can they tell you who it is?

Say things that surprise me because I don't know where they heard it



What can this look like

They can say words or phrases that you haven't said or taught them directly. When they say something

How to check

Children learn new words by their exposure to different words and different people talking. Listen

The Functional Listening Index – Pediatric™

Phase 1: Sound awareness

Phase 2: Associating sound with meaning

+ Makes sounds back to me when I talk to them



Phase 3: Comprehending simple spoken language

Phase 4: Comprehending language in different listening conditions

Phase 5: Listening through discourse and narratives

Phase 6: Advanced open set listening

+ Can have a simple conversation with a familiar person on the phone



+ Guesses a less familiar item from clues that I give



+ Remembers 4 things that happened in a story in the right order after reading a book together



+ Easily repeats a sentence of 8 to 10 words after me, even when one or two of the words are new to them



+ Understands that the way something is said changes the meaning of the sentence



Aims

To determine

1. The **impact** of incorporating a functional listening measure into CI evaluation protocols for professionals and families, through use of group data and individual trajectories
2. **Sensitivity** of the FLI-P to context and situational changes
3. Levels of concurrent, convergent and predictive **validity**



Methodology

- Retrospective analysis
- FLI-P data collected since 2013
- 2520 data points collected
- 548 children in integrated early intervention and cochlear implant program across 3 states in Australia,
- 178 now with CI
- Analyzed listening outcomes
- Statistical validation

Factors for analysis

Age of implant (<6mths, 6-11mths, 12-17mths, 18mths+)

Profound and residual bilateral hearing loss

ANSD, additional needs

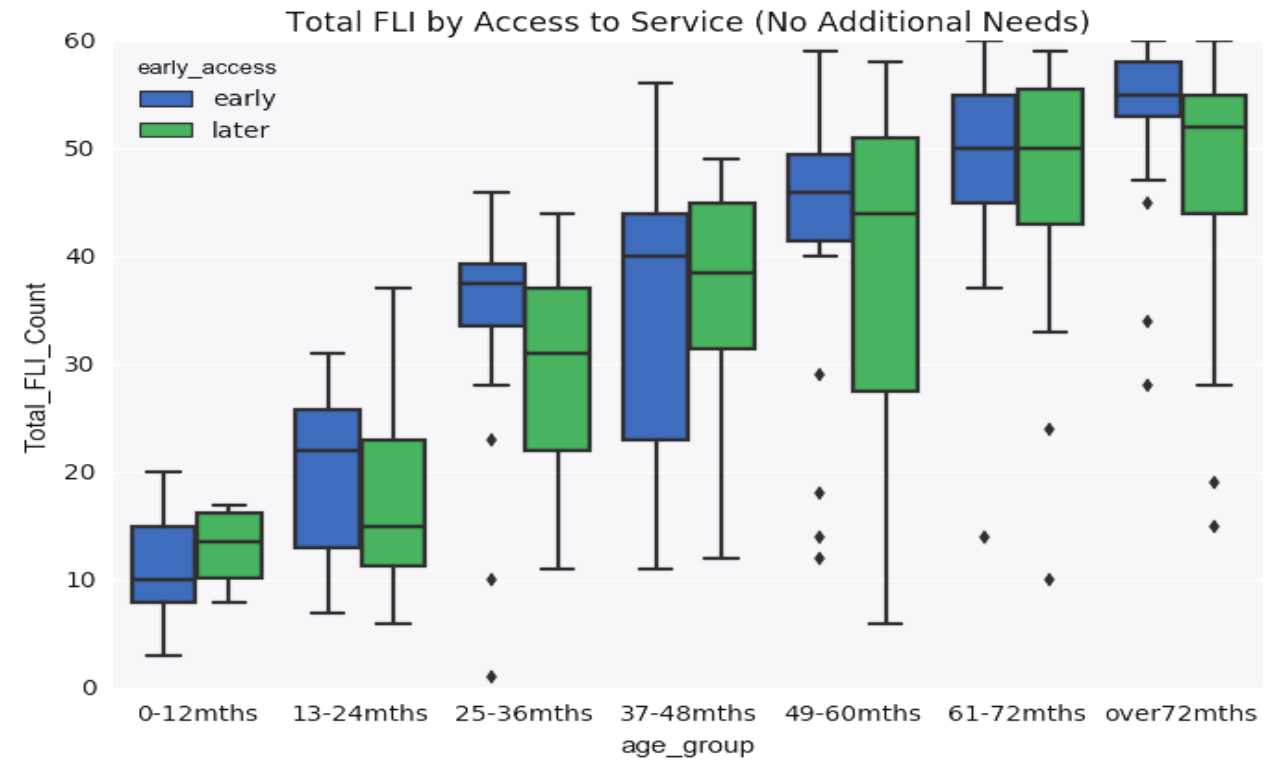
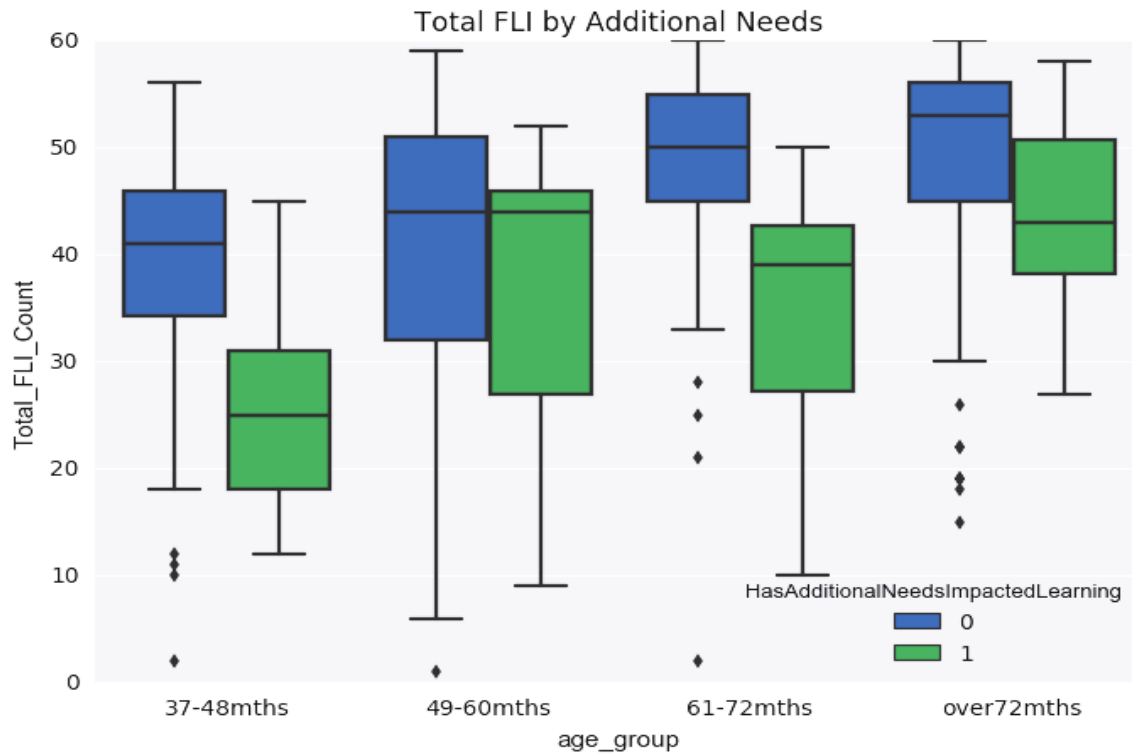
Language outcomes

Medical, social and situational context (linguistic, cultural)



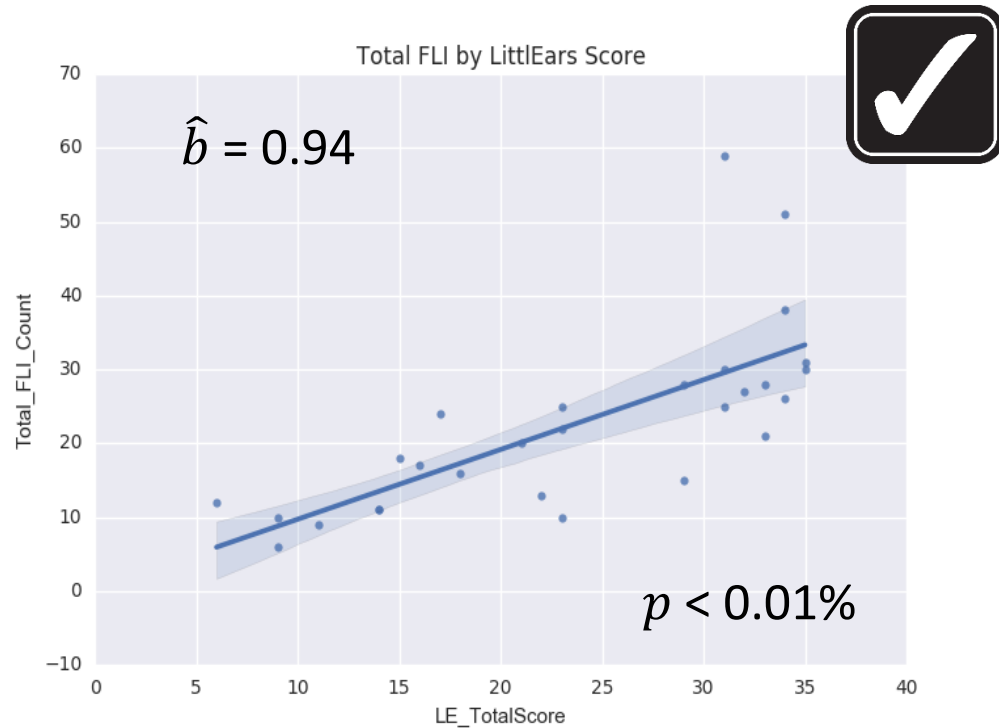
Concurrent validity FLI-P™

Between groups: Additional needs & age of entry to EI

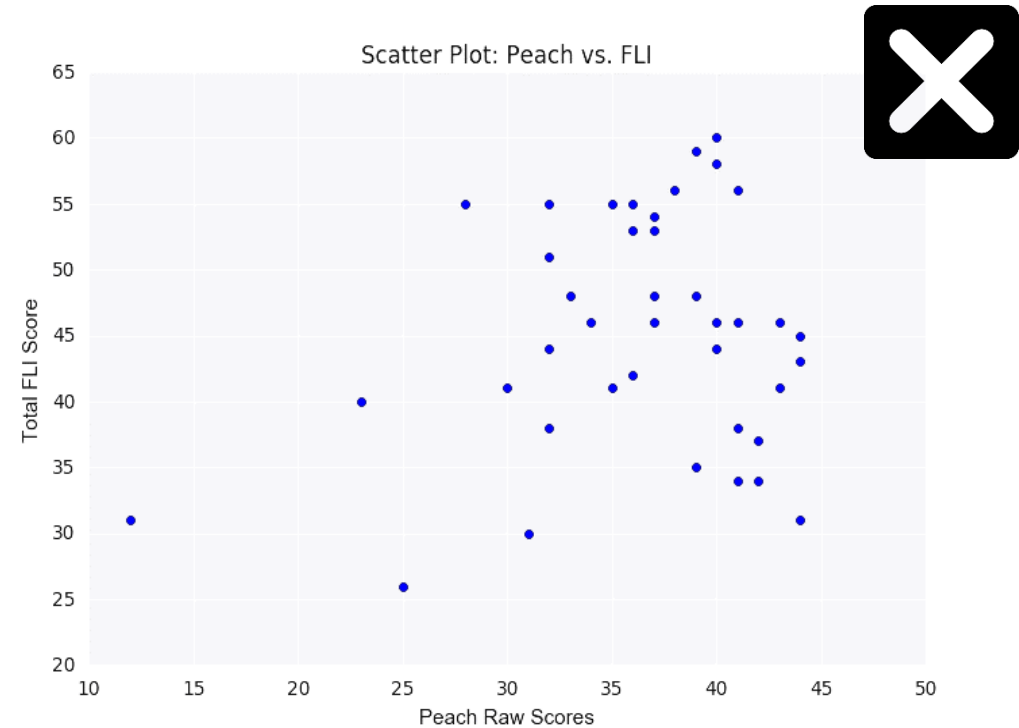


Convergent validity FLI-P™

Similar measures: LittleEars & PEACH



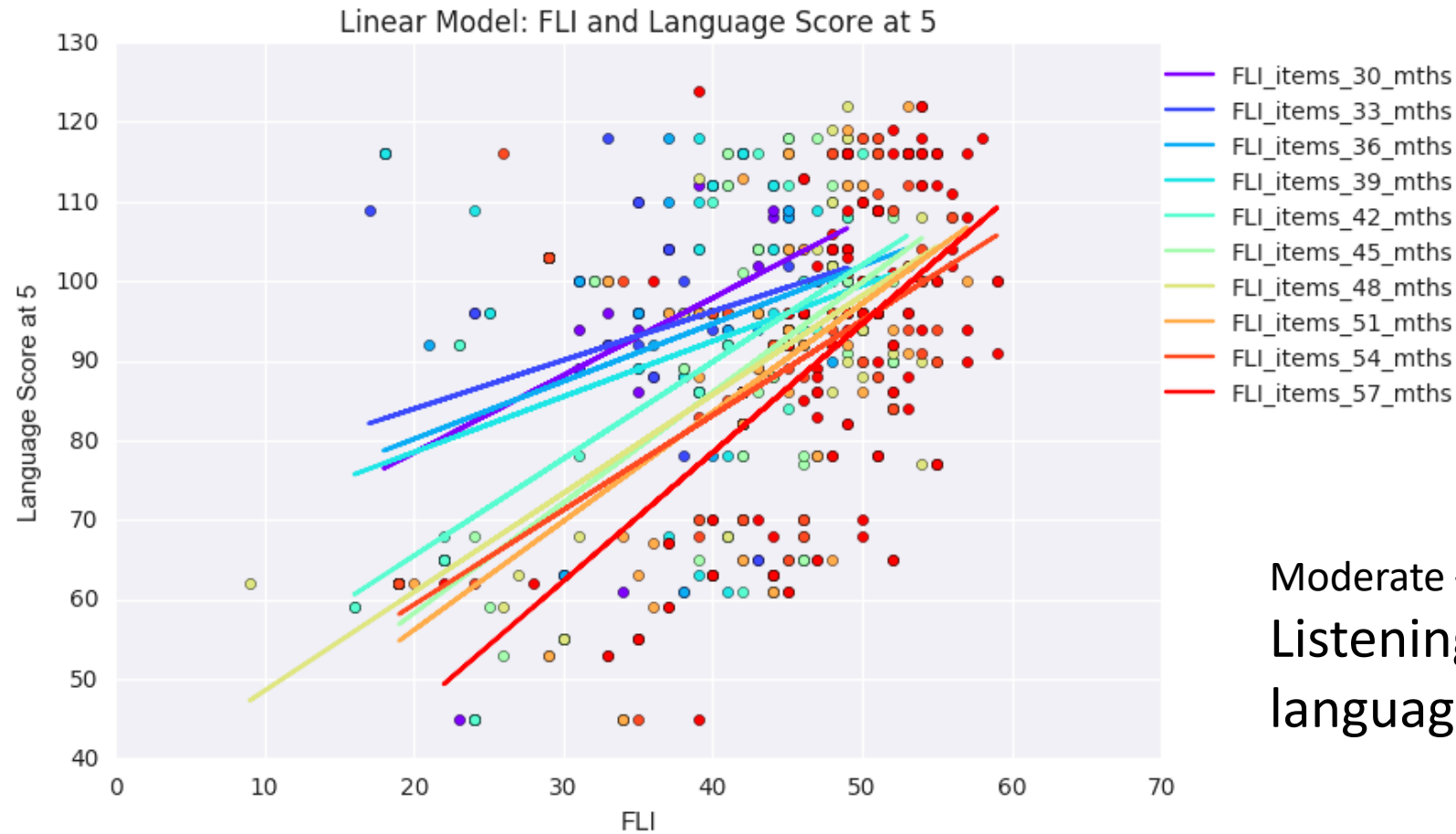
A 1 unit increase in LittleEars score corresponds to a 0.94 unit increase in FLI



No evidence of a linear relationship

Predictive validity: FLI-P™

Linear regression - FLI predictive of language scores at 4/5yrs?



Moderate – Strong linear relationship
Listening scores at 3yrs predicted
language scores at 5yrs

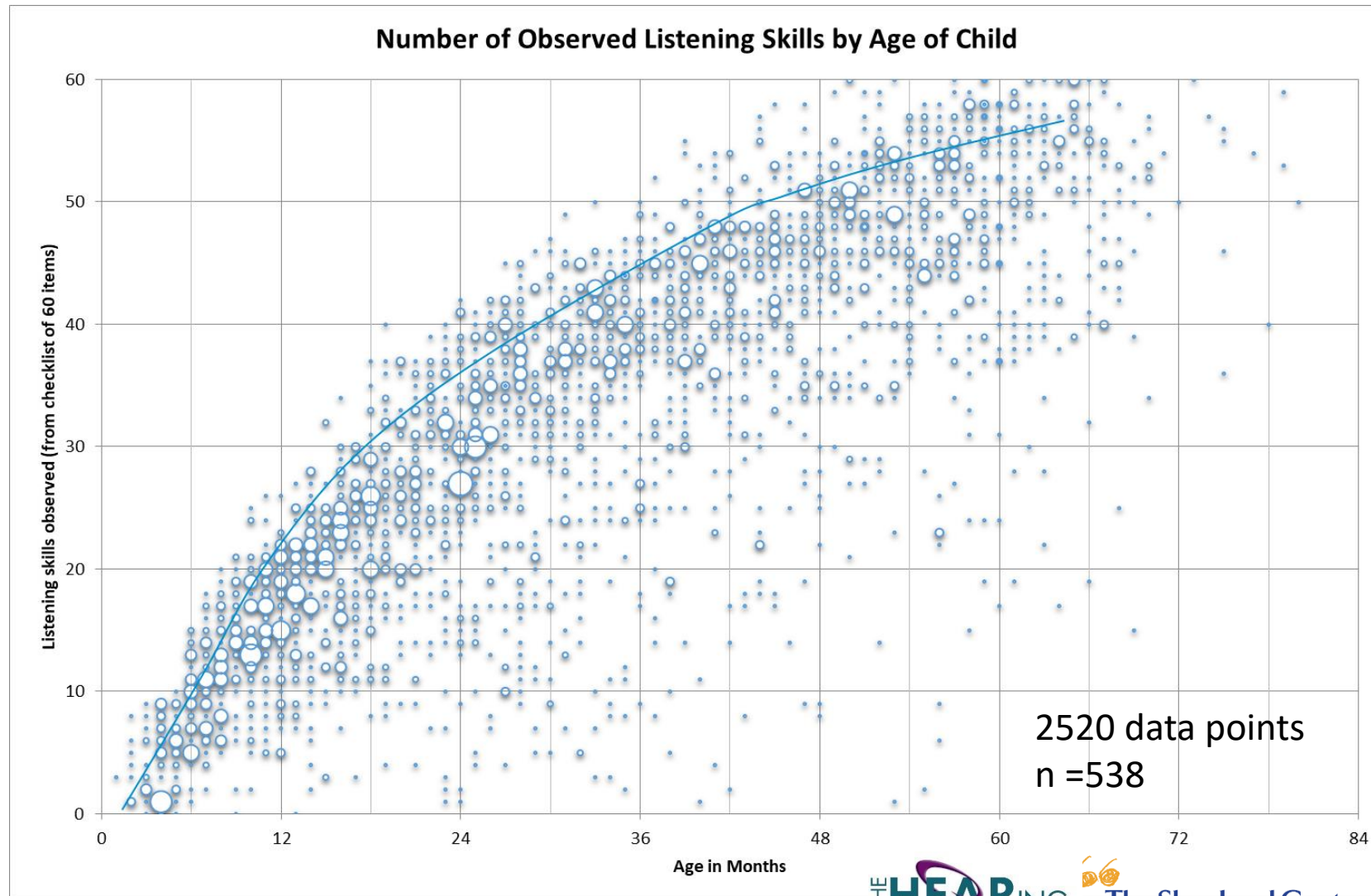
Evidence and guidance

Group data & Individual outcomes

Using clinical evidence to support families

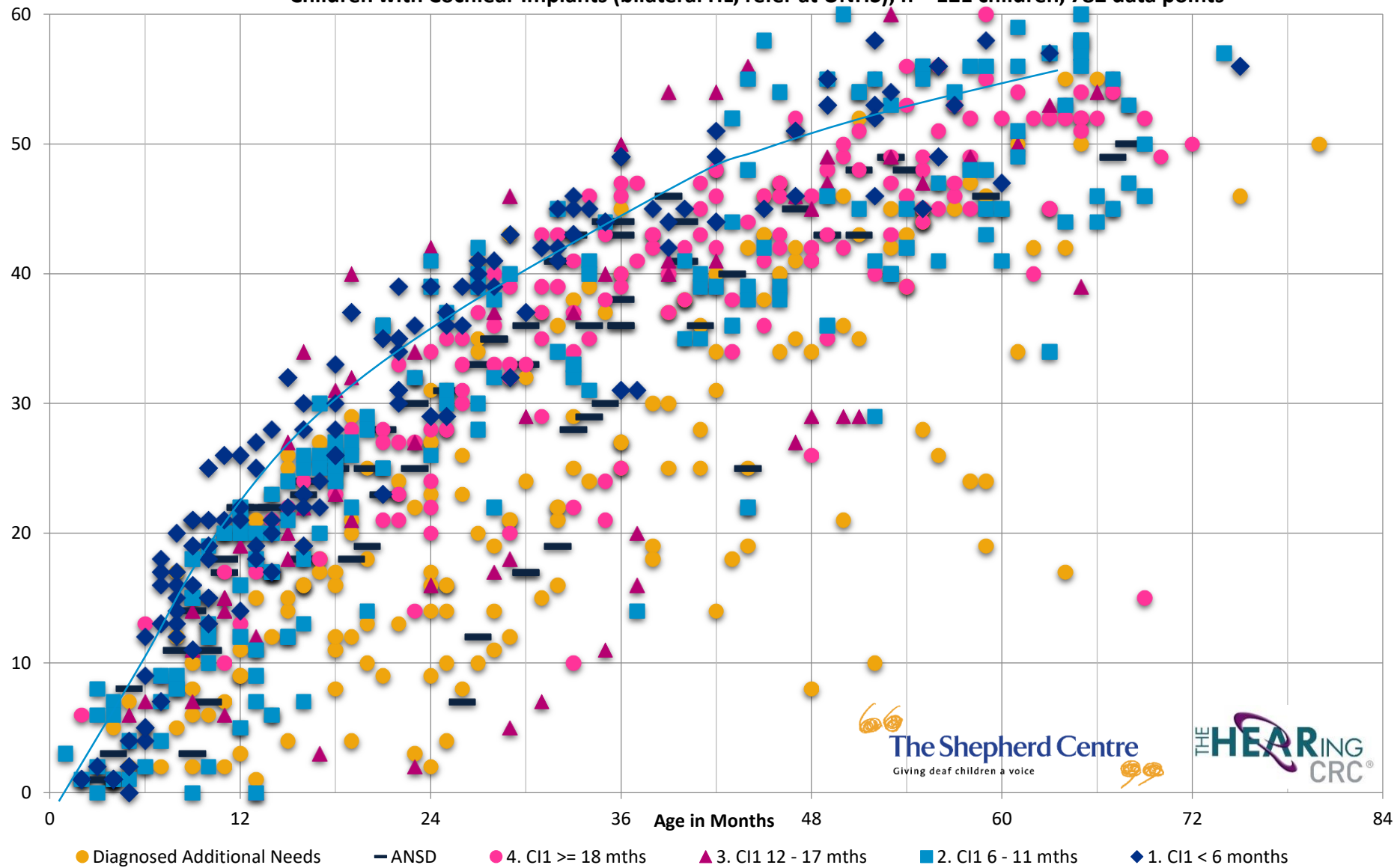


The Functional Listening Index – Pediatric™ (FLI-P)



Listening Outcomes using the Functional Listening Index (FLI-P 1.1)

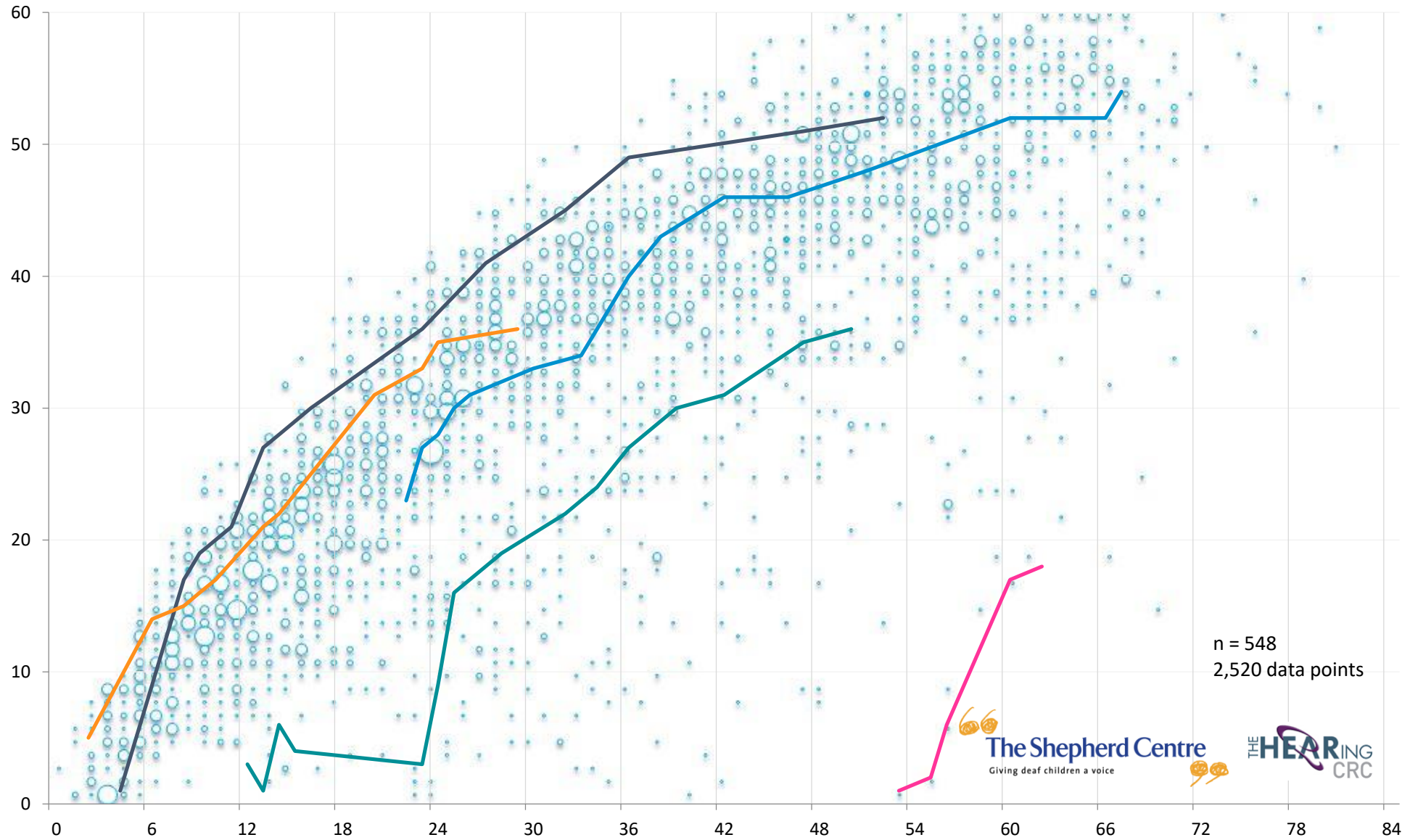
Children with Cochlear Implants (bilateral HL, refer at UNHS); n = 121 children, 782 data points



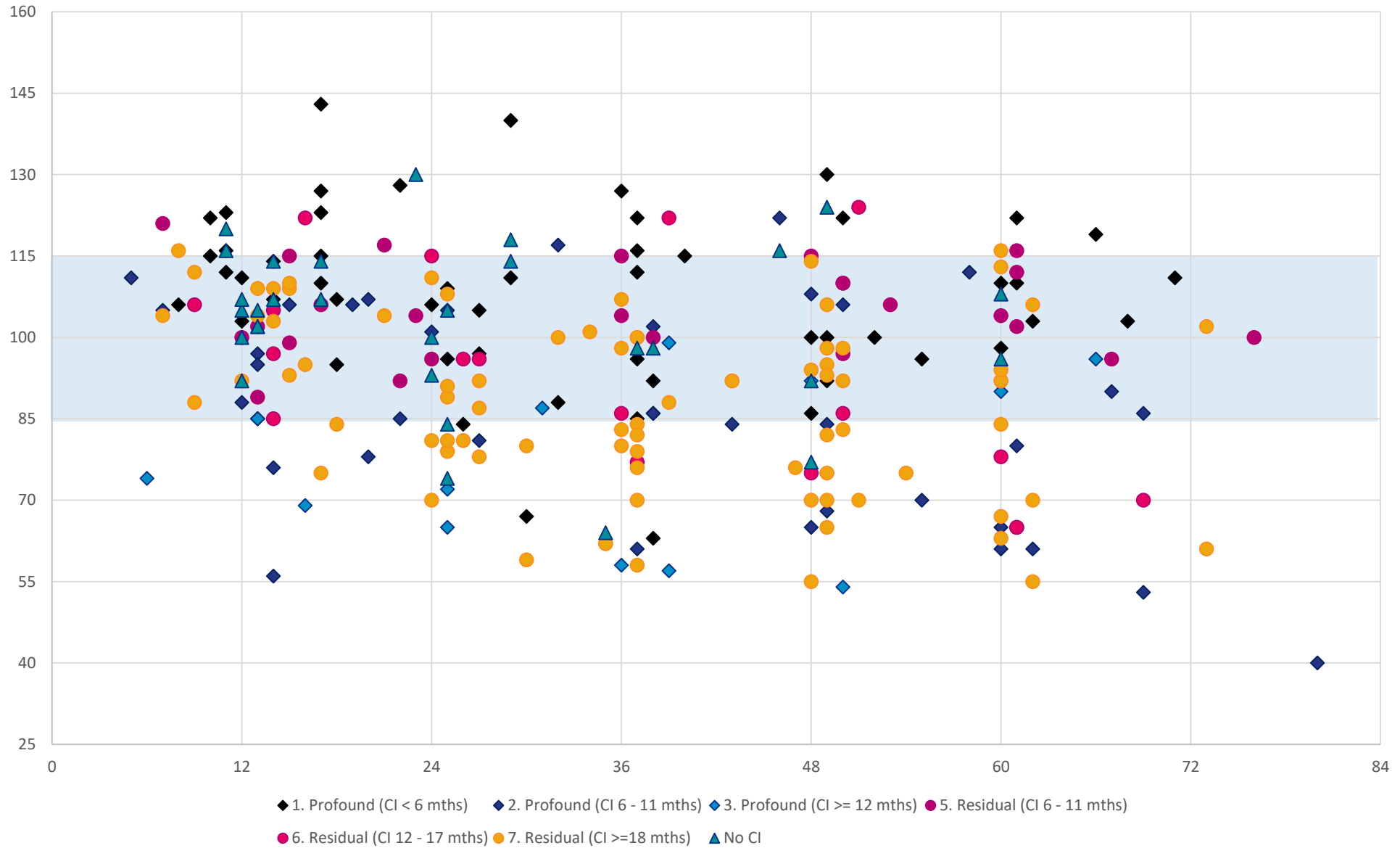
 **The Shepherd Centre**
Giving deaf children a voice

 **THE HEARING CRC**

Listening Outcomes using the Functional Listening Index (FLI-P 1.1)

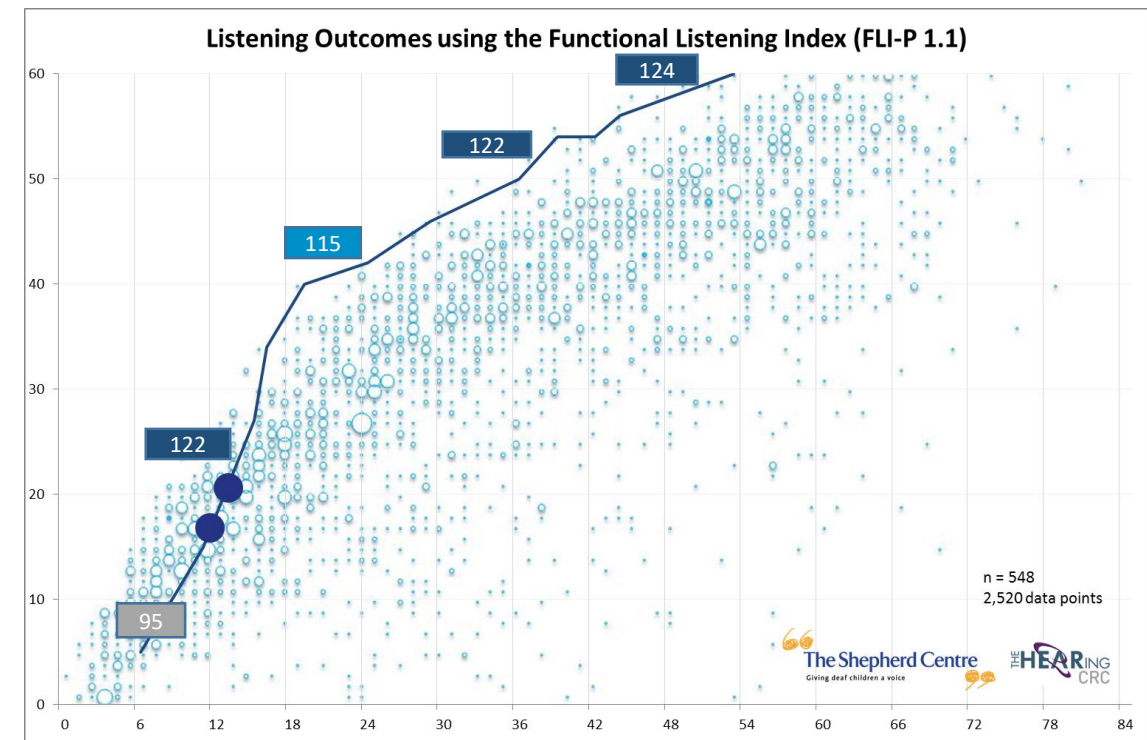
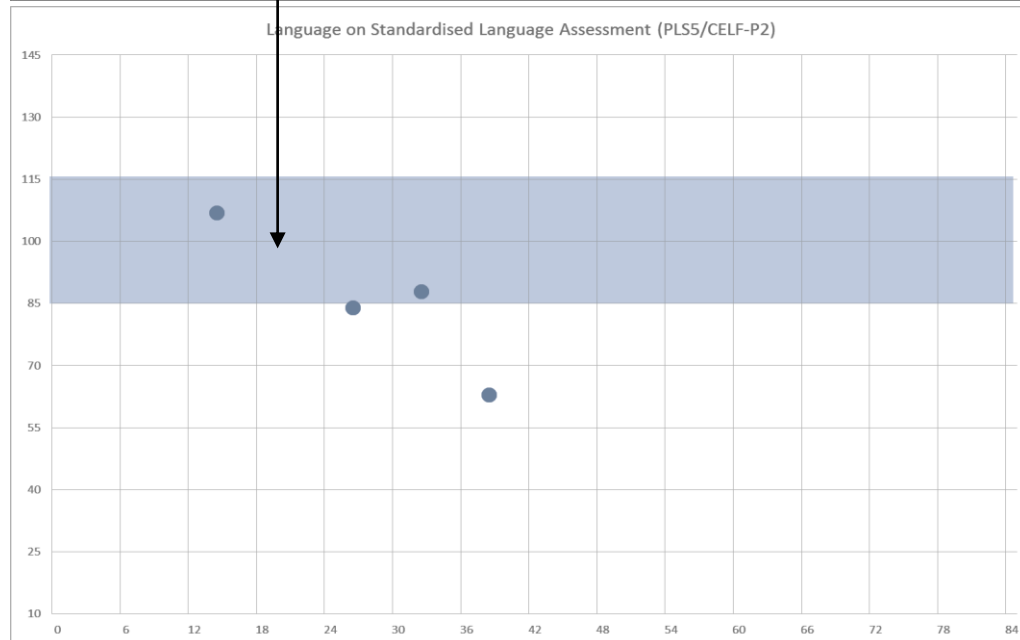
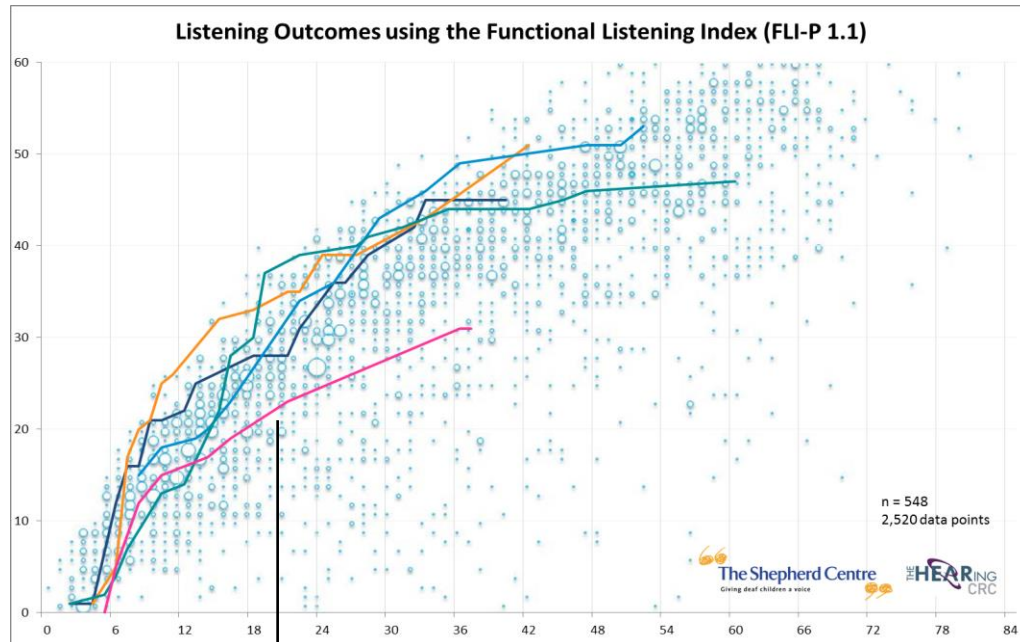


Language outcomes by level of hearing loss

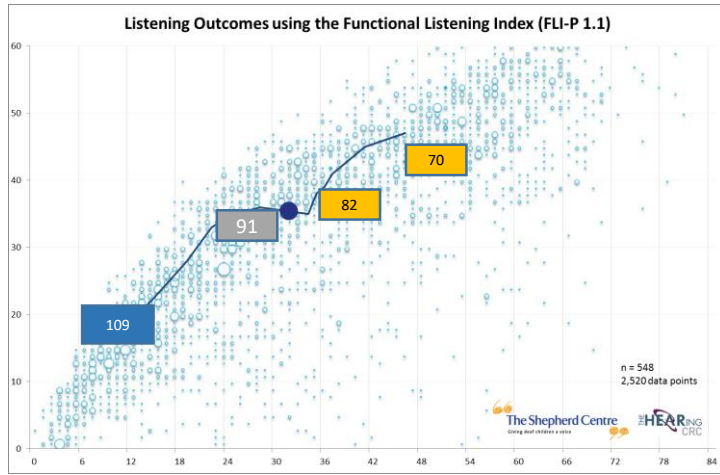


Changes in listening – impact on language scores: reaching potential?

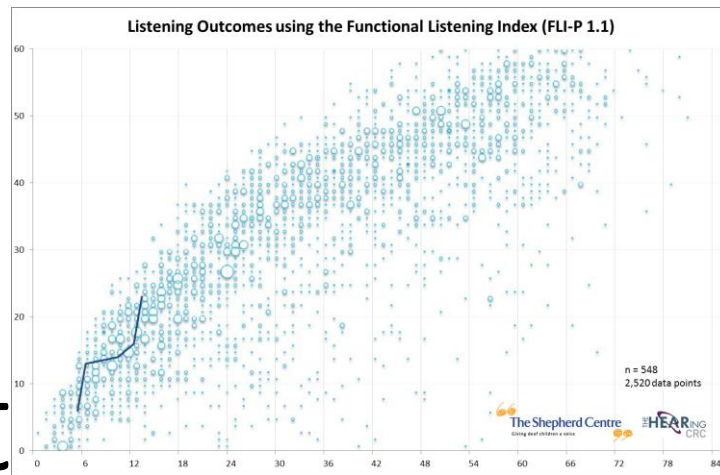
n= 5, bilateral profound
CI1 < 6 months
English as Primary Language
No Additional Needs



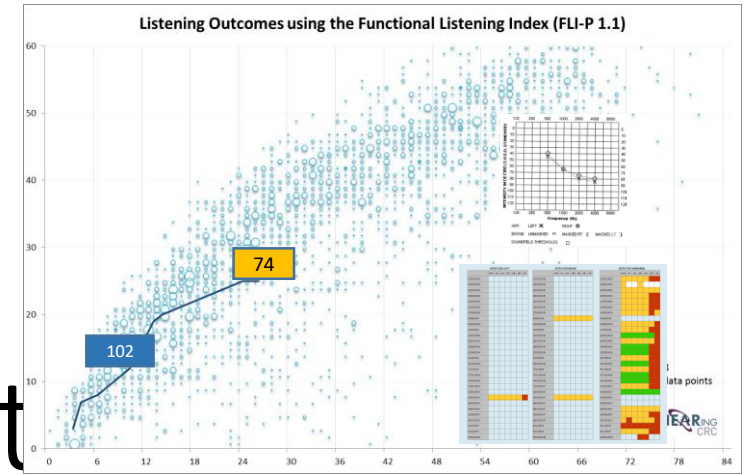
Decision making



Ongoing middle ear

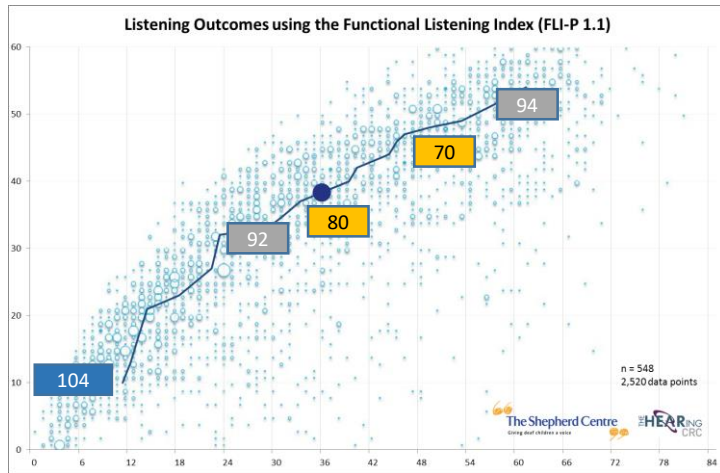


Access to sound

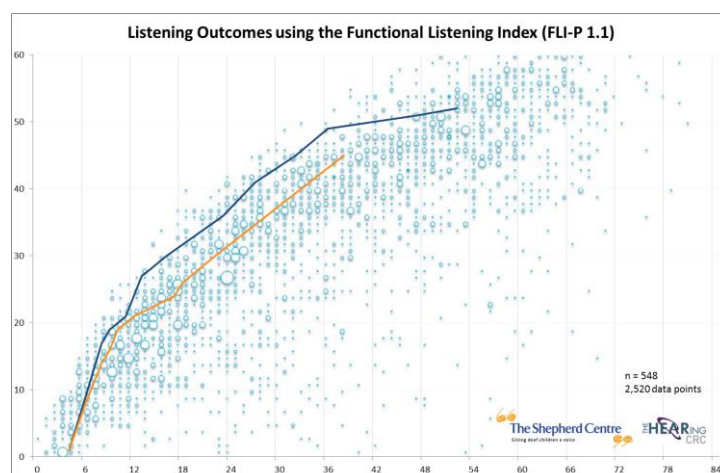


site, text

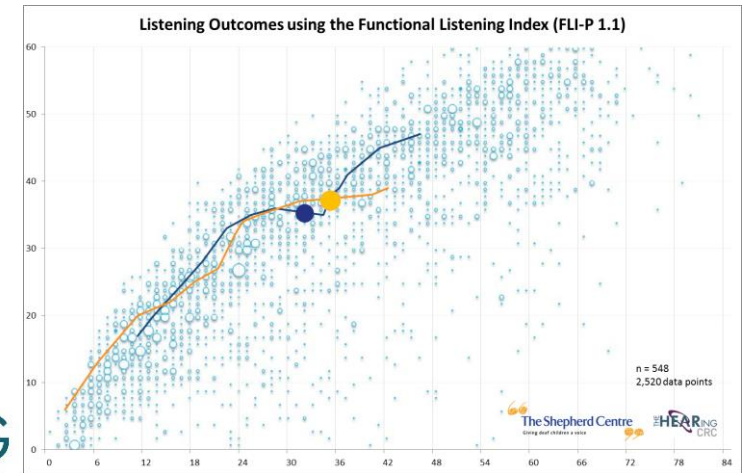
Varied opinions



Bilingual



Linguistic environment



HEARING CRC

Giving deaf children a voice



Functional Listening: a core component of implant evaluation & post-op progress

- The opportunity to bring a child's real world listening skills into candidacy considerations
- Quantify cognitive components of auditory skill development in a meaningful and contextual way for families
- Flexible, dynamic and adaptable to individual context and changing situations
- Responsive to multiple systems necessary for communication development
- Scalable and spreadable across needs and environments



Information that's responsive &
reflective of every day life

Meets short term needs with
long term benefits

Compatible with experience
and needs

Early insights into later outcomes
to guide choices and decisions

**THE HEARING
CRC[®]**



The Shepherd Centre

Giving deaf children a voice



Thank you to all the families and team at The Shepherd Centre

Special thanks to Alyshia Hansen, Jim Hungerford, Tracy Hopkins, and the I&A and Research team for supporting the ongoing development of the FLI-P

Contact details: Aleisha.Davis@shepherdcentre.org.au

