



# Language Outcomes of Children who are Deaf and Hard of Hearing in OPTION Programs

Uma Soman, Meredith Berger, Betsy Brooks, Ronda Rufsvold, and Tamala Bradham

Carle Auditory Oral School, Clarke Schools for Hearing and Speech, Moog Center for Deaf Education, CCHAT Sacramento, Vanderbilt University Medical Center, and OPTION Schools

## Project Objective

Characterize language development trajectories of children who are deaf and hard of hearing, are learning to develop listening and spoken language, and have attended OPTION programs between the ages of 3-5 years.

- OPTION programs are a consortium of schools and intervention programs that provide listening and spoken language (LSL) intervention to infants, toddlers and children who are deaf or hard of hearing (DHH).
- OPTION programs in the US, assess vocabulary and language proficiency annually, and enter outcomes data into the Listening and Spoken Language Data Repository (LSL-DR).
- Outcomes for children on whom three data points for standardized vocabulary and/or language assessments at age three, four, and five years were available, were analyzed.

## Methods

Vocabulary scores at age three, four, and five years, on the **PPVT & EVT** or **ROWPVT & EOWPVT** were available for 404 children. Language scores on **CELF-P** or **OWLS** were available on 125 of these children.

**Gender** - Female (49%), Male (51%)

**Hearing Technology** - Bilateral cochlear implants (36%), Bilateral hearing aids (27%), Bimodal - HA, CI (29%), BAHD/ Softband (8%)

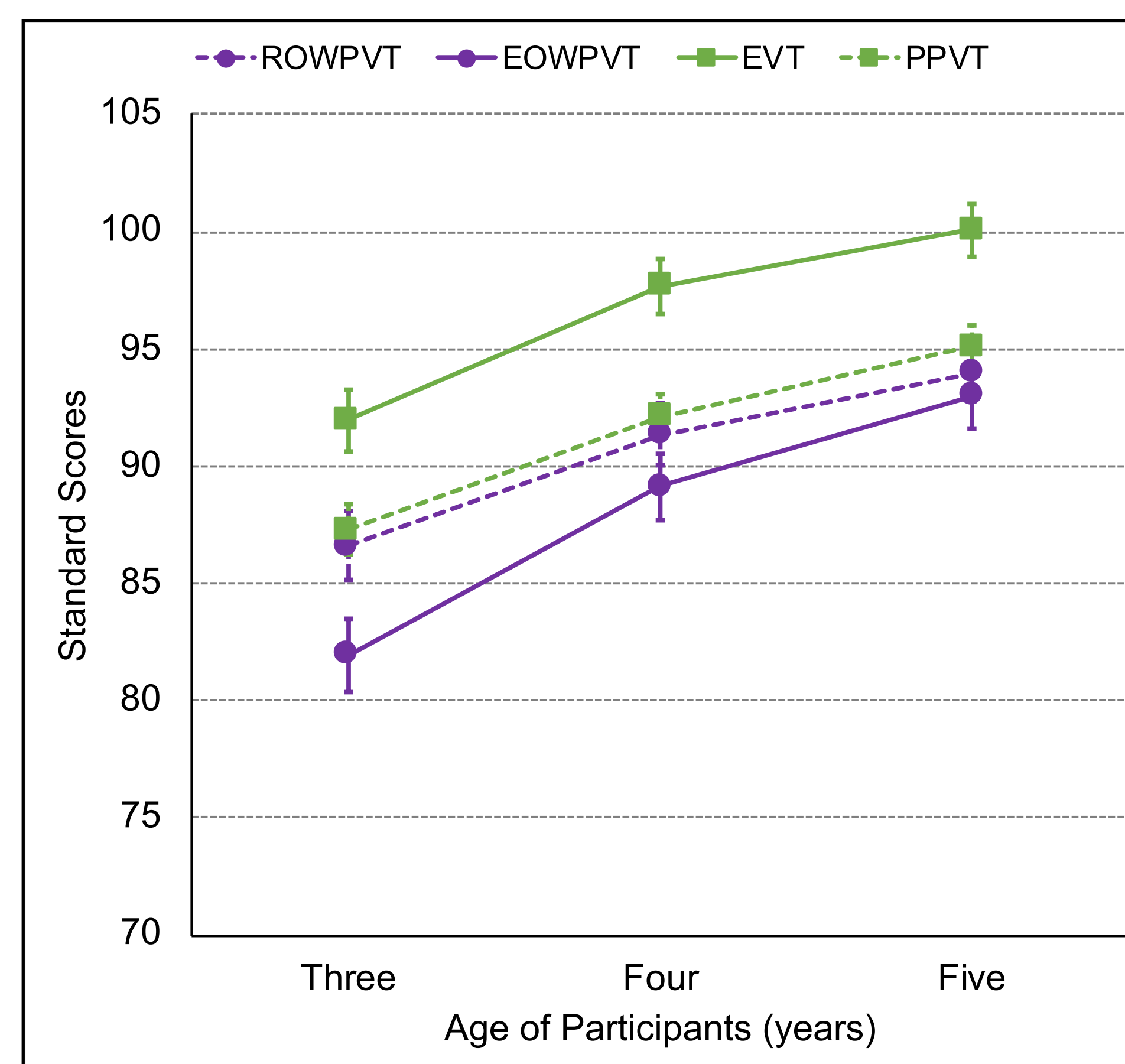
**Age at Intervention in OPTION program** - at or before 18 months (42%), 19-36 months (47%), after 36 months (11%).

Approximately 20% of children demonstrated **additional impacting factors**.

**PPVT** = Peabody Picture Vocabulary Test, **EVT** = Expressive Vocabulary Test, **ROWPVT** = Receptive One-Word Picture Vocabulary Test, **EOWPVT** = Expressive One-Word Picture Vocabulary Test, **CELF-P** = Clinical Evaluation of Language Fundamentals - Preschool, **OWLS** = Oral Written Language Scales

## Results

### Vocabulary Growth Over Age 3 to 5 years



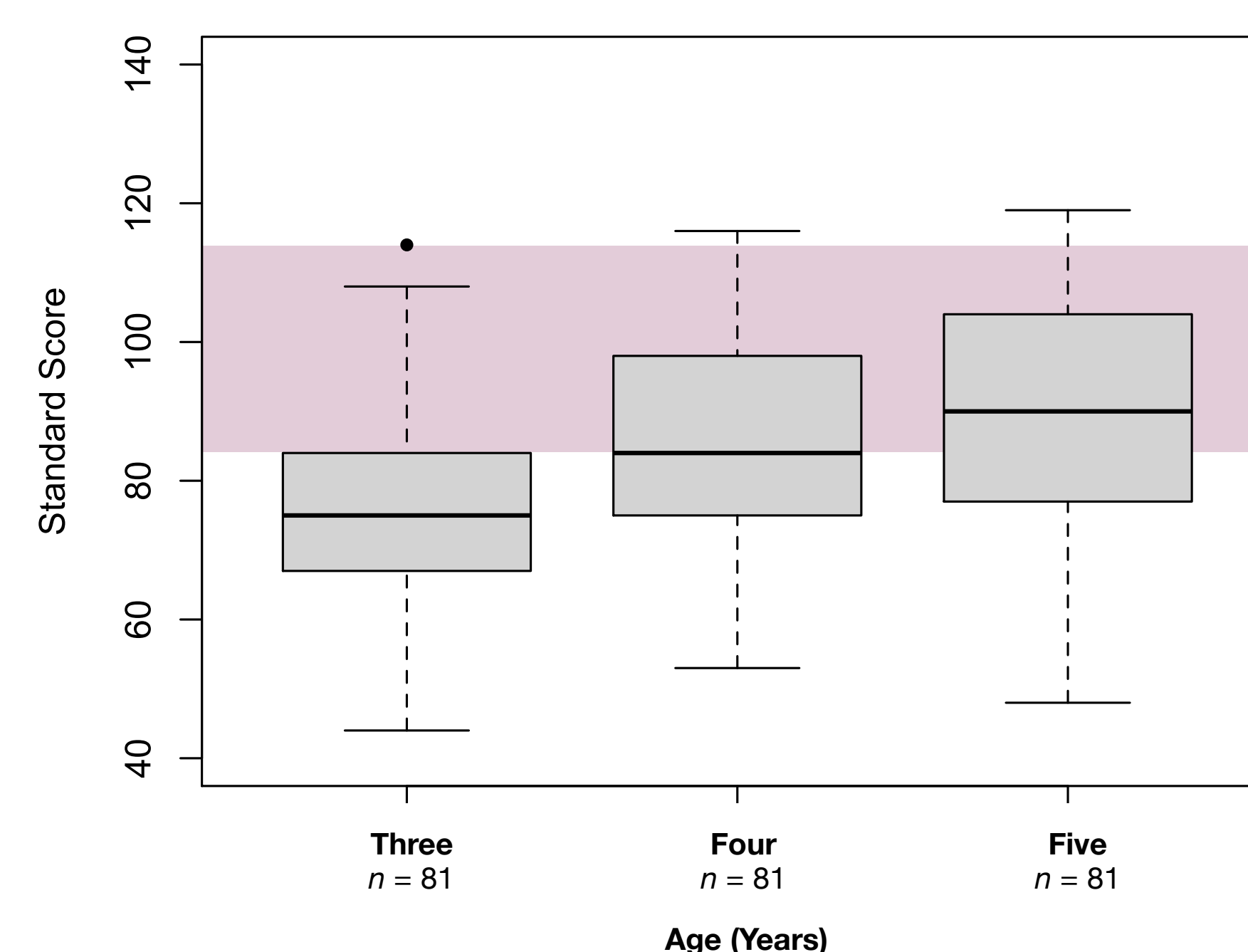
A review of performance on receptive & expressive vocabulary assessments of 404 children indicates that on average, standard scores improved from age 3 years to 5 years, indicating that many children in this sample made more than one year of progress in one year of time.

**Development can be impacted by additional factors** including presence of additional disabilities. The table below compares the scores of the children whose learning is not impacted by additional factors (DHH) and those whose learning is impacted (DHH+) at age five.

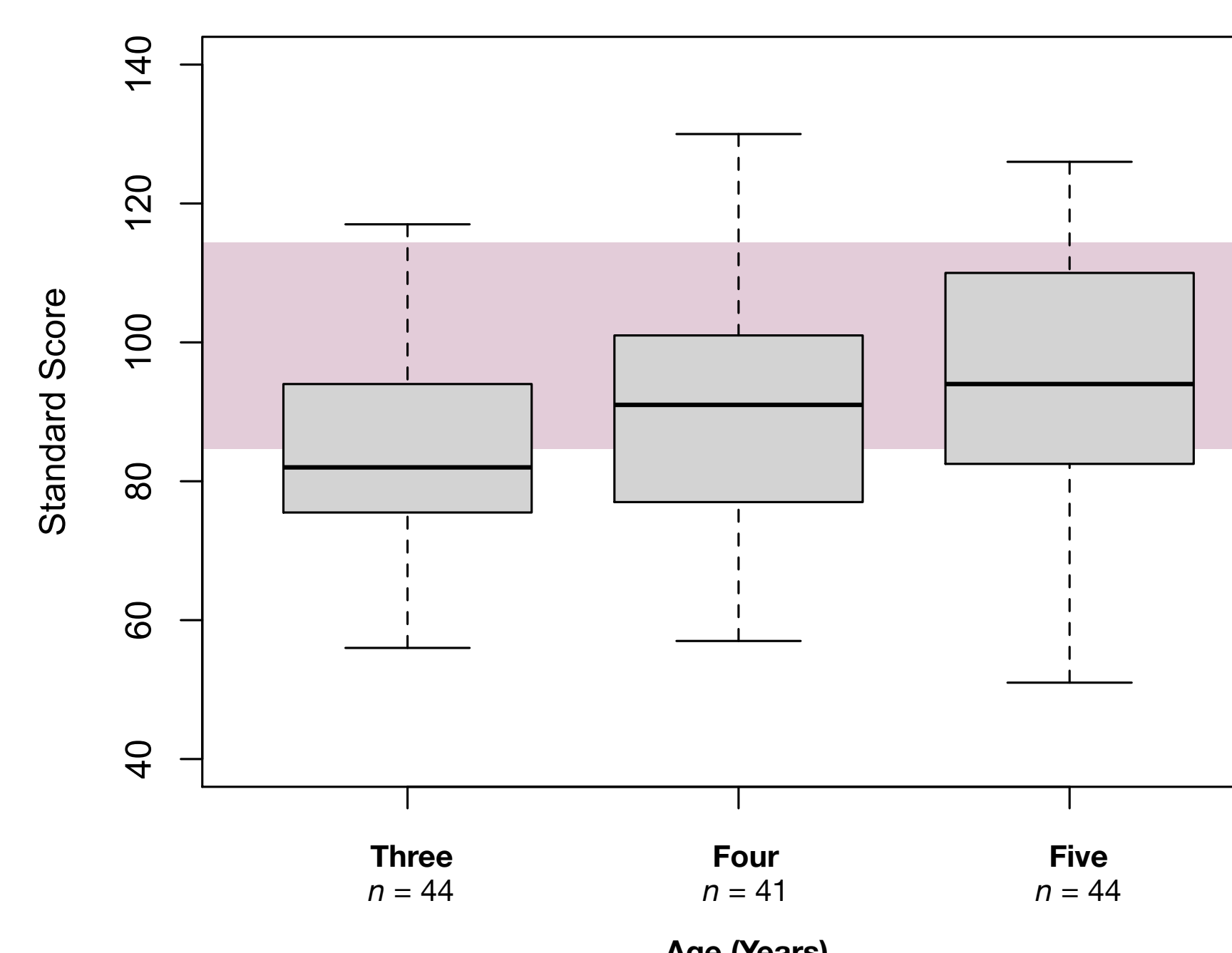
Percentile	DHH			DHH +		
	25th	50th	75th	25th	50th	75th
<b>PPVT</b>	87	99	107	77	88	100
<b>EVT</b>	93	102	113	86	96	104
<b>ROWPVT</b>	86	95	105	81	92	99
<b>EOWPVT</b>	84	95	105	73	85	94

### Language Growth Over Age 3 to 5 years

Performance on Clinical Evaluation of Language Fundamentals-P



Performance on Oral Written Language Scales



The boxplots above characterize language proficiency of children who are DHH. The upper and lower edges of the boxplots refer to approximately the 75th and 25th percentile of this sample, respectively. The thick line in the box refers to median or 50th percentile. The light pink shaded area indicates the average range, i.e., standard score between 85-115.

A review of performance on connected language assessments indicates a positive trend of growth in this domain from age three to five, with more than 50% of the sample demonstrating scores within the average range by age five years. However the variability in outcomes indicates that development of connected language might be an area of vulnerability. Some children who are DHH might need additional support as they enter the elementary school years.

## Conclusions

- In this sample of 404 children who are deaf or hard of hearing, learning to develop listening and spoken language, and attended an OPTION program, on average, children demonstrated age appropriate receptive and expressive vocabulary proficiency by age five years.
  - Children whose learning was impacted by additional factors also demonstrated growth in vocabulary by age five.
- Language growth trajectories of a subset of 125 children from this sample also indicate growth over time. However, a fewer proportion of children demonstrated average language proficiency by age five years and there was more variability in outcomes.

These findings suggest that many children who are DHH and receive intervention in OPTION programs, are catching up to their hearing peers. They benefit from the specialized LSL intervention at an OPTION program. By age five years, many children transition to mainstream educational settings performing similarly to their hearing peers, while some children, need support to continue to “catch up” to their hearing peers.

## Acknowledgements

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