Language Learning Growth for Young Children who are Deaf or Hard of Hearing

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Early Hearing Detection and Intervention
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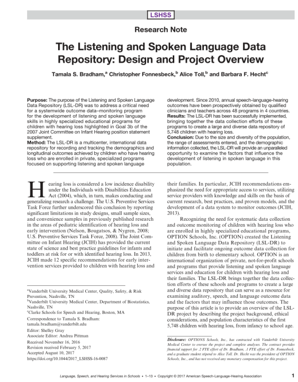
Introduction to the Study

Setting

- Midwest metropolitan area
- Center-based listening and spoken language intervention
  - Preschool-2nd Grade
- Full school day with:
  - Small class sizes (8 or fewer)
  - Acoustically modified classrooms
  - Individual speech and language intervention
  - Weekly music therapy
  - Consisted additional activities (extended school year, yoga, etc.)
  - Teacher and aid in every classroom
  - Professionals with focus on LSL



LSHSS

Research Note

The Listening and Spoken Language Data Repository: Design and Project Overview

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Purpose: The purpose of the Listening and Spoken Language Data Repository (LSL-DR) was to address a critical need for a systemwide outcome data–monitoring program for the development of listening and spoken language skills in highly specialized educational programs for children with hearing loss highlighted in Goal 3b of the 2007 Joint Committee on Infant Hearing position statement supplement.
Method: The LSL-DR is a multicenter, international data repository for recording and tracking the demographics and longitudinal outcomes achieved by children who have hearing loss who are enrolled in private, specialized programs focused on supporting listening and spoken language development. Since 2010, annual speech-language-hearing outcomes have been prospectively obtained by qualified clinicians and teachers across 48 programs in 4 countries.
Results: The LSL-DR has been successfully implemented, bringing together the data collection efforts of these programs to create a large and diverse data repository of 5,748 children with hearing loss.
Conclusion: Due to the size and diversity of the population, the range of assessments entered, and the demographic information collected, the LSL-DR will provide an unparalleled opportunity to examine the factors that influence the development of listening in spoken language in this population.

Hearing loss is considered a low incidence disability under the Individuals with Disabilities Education Act (2004), which, in turn, makes conducting and generalizing research a challenge. The U.S. Preventive Services Task Force further underscored this conclusion by reporting significant limitations in study designs, small sample sizes, and convenience samples in previously published research in the areas of pediatric identification of hearing loss and early intervention (Nelson, Bougatsos, & Nygren, 2008; U.S. Preventive Services Task Force, 2008). The Joint Committee on Infant Hearing (JCIH) has provided the current state of science and best practice guidelines for infants and toddlers at risk for or with identified hearing loss. In 2013, JCIH made 12 specific recommendations for early intervention services provided to children with hearing loss and their families. In particular, JCIH recommendations emphasized the need for appropriate access to services, utilizing service providers with knowledge and skills on the basis of current research, best practices, and proven models, and the development of a data system to monitor outcomes (JCIH, 2013).

Recognizing the need for systematic data collection and outcome monitoring of children with hearing loss who are enrolled in highly specialized educational programs, OPTION Schools, Inc. (OPTION) created the Listening and Spoken Language Data Repository (LSL-DR) to initiate and facilitate ongoing outcome data collection for children from birth to elementary school. OPTION is an international organization of private, not-for-profit schools and programs that provide listening and spoken language services and education for children with hearing loss and their families. The LSL-DR brings together the data collection efforts of these schools and programs to create a large and diverse data repository that can serve as a resource for examining auditory, speech, and language outcome data and the factors that may influence those outcomes. The purpose of this article is to provide an overview of the LSL-DR project by describing the project background, ethical considerations, and population characteristics of the first 5,748 children with hearing loss, from infancy to school age.

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Disclosure: OPTIONS Schools, Inc., has contracted with Vanderbilt University Medical Center to oversee the project and complete analyses. The contract provides financial support for .2 FTE effort of Dr. Bradham, .1 FTE effort of Dr. Fonnesbeck, and a graduate student stipend to Alice Toll. Dr. Hecht was the president of OPTION Schools, Inc., and has not received any monetary compensation for this project.

Listening and Spoken Language Data Repository (LSL-DR)

- Gathered internally by SLPs
- Initially submitted to OPTION, then returned to programs

Study Purpose

- Measure annual student growth
- Determine differences in student growth
- Build upon previous literature

Guiding Questions

- How much growth do students make in spoken receptive and expressive language, vocabulary, and articulation while receiving LSL intervention?
- Do the following demographic characteristics predict student growth during LSL intervention?
  a. Degree of hearing loss
  b. Speaking English as a second language
  c. An additional health or disability diagnosis

Method

Data Collection and Measures

- Measures
  - Language
    - CELF
    - CELF-P
  - Vocabulary
    - EVT
    - PPVT
  - Articulation
    - GFTA

Data Analysis: Linear Mixed Effect Model

- First level: student growth
  - $Y_{ij} = \pi_{0i} + \pi_{1i}TIME_{ij}$
- Second level: student growth based on covariate
  - $\pi 0i = y00 + y01PREDICTORi$
  - $\pi 1i = y10 + y11PREDICTORi$

Participants

- 198 children met inclusion criteria

Years of Intervention	
Initial Assessment/Enrollment	198
Year 1	119
Year 2	83
Year 3	56
Year 4	30
Year 5	10
Year 6	2
School Grade	
Early Intervention	156
Preschool (3 Years Old)	83
Preschool (Four and Five Years Old)	136
Kindergarten	52
First Grade	11
Second Grade	1
Not Reported	64

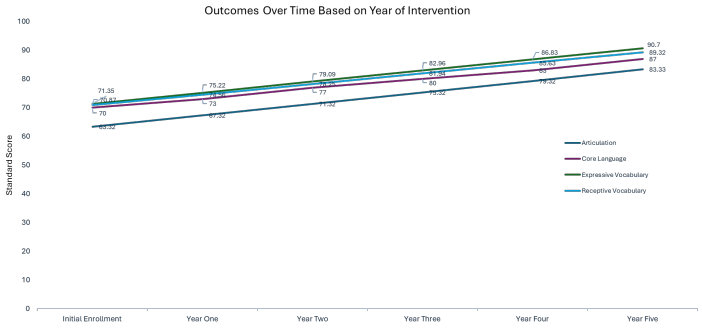
Hearing Characteristics

	n	Minimum	Maximum	M	SD
Age of Diagnosis	192	0	53	6.47	10.23
Age of Amplification	181	1	55	12.18	10.52
Age of Program Entry	194	2	97	26.33	19.05

Degree of Hearing Loss (Better Ear)		
Normal/Slight	8	4.04%
Mild	13	6.57%
Mild to Moderate	3	1.52%
Moderate	33	16.67%
Moderate to Severe	8	4.04%
Moderately Severe	28	14.14%
Severe	26	13.13%
Severe to Profound	8	4.04%
Profound (90+)	71	35.86%

Growth Means

	Core Language	Expressive Vocabulary	Receptive Vocabulary	Articulation
Intercept	69.57***	71.35***	70.87***	63.32***
Growth	3.48***	3.87***	3.69***	4.001***

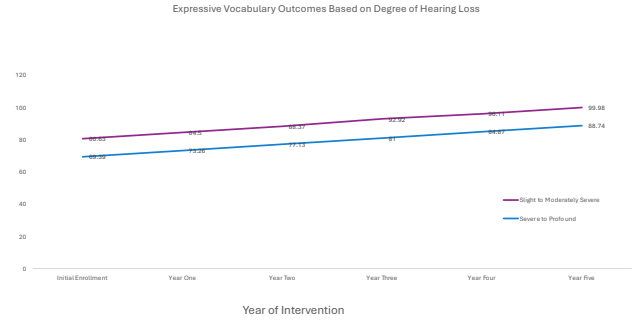


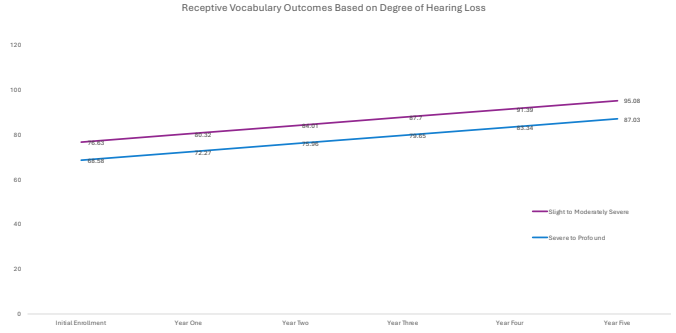
Covariate Growth Means

Growth with Covariates: Degree of Hearing Loss

	Slight to Moderately Severe	Severe to Profound
Expressive Vocab	80.63***	-11.24*
Receptive Vocab	76.63***	-8.05*
Articulation	55.7***	10.02

***p*<.001; **p*<.05

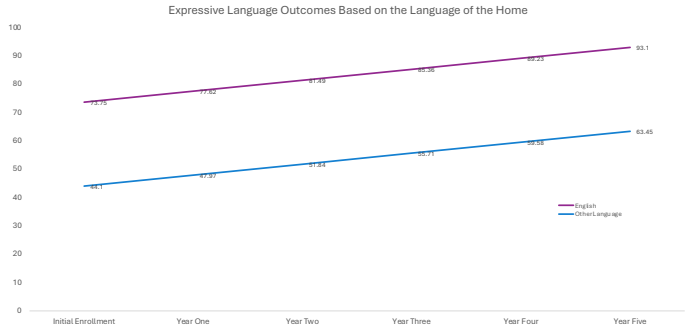


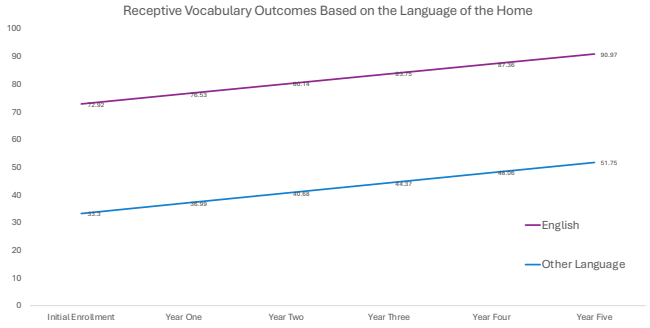


Language of the Home

- Language of the Home:
  - Expressive vocabulary:
  - Unconditional growth: 73.75*** (English); -29.65* (Other)
- Receptive vocabulary:
  - Unconditional growth: 72.92*** (English); -39.62** (Other)
  - Rate of change: 3.61***(English)
- Articulation
  - Unconditional growth: 64.61*** (English)
  - Rate of change: 4.12***(English)

****p*<.001; *p*<.01; **p*<.05





Additional Diagnosis

- Articulation
  - Unconditional growth: 66.66*** (No diagnosis)
  - Rate of change: 3.09* (No diagnosis)

****p*<.001; *p*<.01; **p*<.05

Discussion

Initial Takeaways

- Students are making more than one year's progress in one year's time on average
- There were several areas where covariates predicted a student's skills before they began intervention
  - Student parallel growth was common, meaning some students have lower initial values but similar growth to their peers

Implications for Practice

- Implications for center-based placement
  - Developing individual goals and intervention strategies.
- Implications for inclusive setting transition and placement
  - Understanding student growth prior to transition provides information for understanding student preparedness and comparison to typically hearing peers

Recommendations for Future Research

- Replication with larger sample size
- Determine student growth depending on the years of intervention
- Expand research methods regarding questions for longitudinal growth
  - Single subject design
  - Qualitative designs
- Seek longitudinal outcomes in language, vocabulary, and articulation in inclusive settings

Questions?