

Expressive Language Skills of Preschool Children with and without Hearing Loss



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ABSTRACT

The purpose of this poster is to present interim findings from an ongoing study of developmental trends in language and literacy acquisition of preschool children with and without hearing loss. Specifically, we examined growth of oral language production, including expressive vocabulary, morphosyntax, and complex syntax use and errors in standardized assessments, as well as spontaneous spoken language samples. We measure growth over a six-month period from study entry to initial follow-up. Results indicate that children with hearing loss perform more poorly on measures of expressive language and exhibit growth over time; however, the growth rate is not sufficient to “catch up” to their peers with normal hearing. This study is funded by NIH/NIDCD (1R03DC014535; PI: Werfel).

BACKGROUND

Children with hearing loss fall behind their peers with normal hearing in many areas of language acquisition, in large part due to limited auditory input before amplification can be provided. Multiple aspects of oral language skills for children with hearing loss who develop spoken language are poorer than their peers with normal hearing.

Children with hearing loss are delayed in morphosyntax development compared to children with normal hearing (McGuckian & Henry, 2007). McGuckian and Henry reported that children with hearing loss exhibit a higher error rate in morphosyntax production, as well as a different order of acquisition of grammatical morphemes than is observed in children with normal hearing. Children with hearing loss as a group also are delayed in vocabulary development compared to children with normal hearing; vocabulary deficits of children with hearing loss include smaller receptive and expressive lexicons as well as deficits in word learning skills. (Lund, 2016; Pittman, Lewis, Hoover, & Stelmachowicz, 2005; Wake, Poulakis, Hughes, Carey-Sargeant, & Rickards, 2005). Little is known about complex syntax acquisition in this population

Research has established that children with hearing loss who use spoken language exhibit deficits in many of these early skills; however, to date, investigations of children with hearing loss have not included comprehensive longitudinal investigations of the acquisition of the early language skills that are implicated in later literacy achievement. Understanding the development of these early skills and how they relate to later language and literacy achievement will provide foundational knowledge that can guide early identification of the children with hearing loss developing spoken language who are most at-risk for later deficits.

PURPOSE

The purpose of this poster is to present interim findings from an ongoing study of language and literacy acquisition of preschool children with and without hearing loss. Specifically, we will present on the growth of oral language production, including expressive vocabulary, morphosyntax, and complex syntax use and errors in standardized assessments, as well as spontaneous spoken language.

METHOD

Preschool children with and without hearing loss complete a battery of early language and literacy assessments every six months from age 4 to 6.

Table 1. Participant Demographic Information

Group	n (boys)	Age in Months at T1 (SD)	Maternal Education in Years (SD)	Age at ID in Months (SD) Range: 0 – 24	Age at Amplification in Months (SD) Range: 2 – 24	Types of Amplification for CHL
Children with Hearing Loss	10 (4)	51.58 (4.07)	15.20 (2.10)	4.97 (7.74) Range: 0 – 24	7.42 (7.81) Range: 2 – 24	Bilateral CI: 8 Bilateral HA: 1 Bimodal: 1
Children with Normal Hearing	10 (3)	49.50 (4.50)	17.30 (1.77)	--	--	

Table 2. Performance by Group on Descriptive Measures

Tests	CHL Mean (SD) Range	CNH Mean (SD) Range	p	d
PTONI	109.30 (12.89) 88-133	116.78 (8.51) 101-126	.159	0.684
TELD-3 Receptive	98.00 (27.72) 61-134	121.00 (16.21) 91-134	.039	1.013
TELD-3 Expressive	84.30 (13.48) 65-102	104.40 (9.29) 91-116	.001	1.736
TELD-3 Spoken Language Quotient	89.40 (23.99) 59-119	115.30 (14.11) 92-130	.010	1.316
Arizona-3	83.70 (6.90) 76-96	100.70 (11.02) 84-114	.001	1.849

Children completed several demographic measures, including measures of nonverbal intelligence, omnibus language, and speech production, at Time 1.

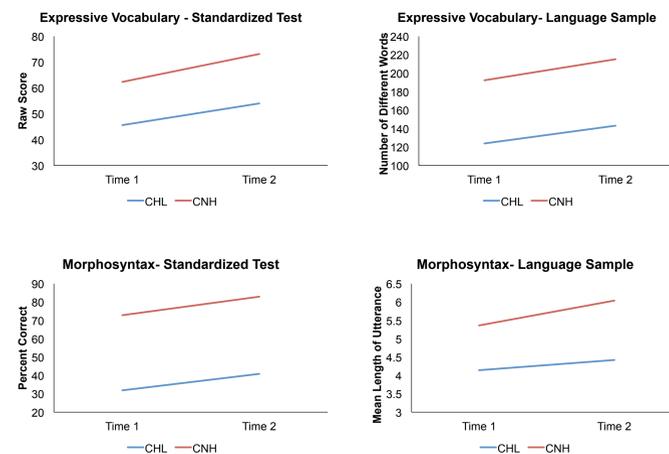
Table 3. Outcome Variables

Variable	Measure
Expressive Vocabulary – Standardized Test	EOWPVT-4
Expressive Vocabulary – Language Sample	Number of Different Words
Morphosyntax – Standardized Test	TEGI Screener
Morphosyntax – Language Sample	Mean Length of Utterance in Morphemes
Complex Syntax – Language Sample	Complex Syntax Density

Of interest in the present study is children’s performance on a variety of expressive language measures at Times 1 and 2. Table 3 lists the measures that form each variable. The Hadley (1998) protocol was used to collect spontaneous language samples from the CHL and CNH groups. The average length of language sample was between 12 and 13 minutes in length. Each sample followed the protocol to elicit conversation about topics relevant to the child, including the child’s birthday party, siblings, pets, and movies and TV shows (s)he has seen. Picture stimuli were used to support the conversation. Transcription involved three steps. First, a lab student made a first pass, getting down on paper what was said in the interaction. Second, a different lab member “cleaned up” the transcription. Finally, a third person checked the sample for errors. If more than three errors were found, the sample returned to the second step for another pass. This process ensured that all transcriptions had 100% agreement. Samples were coded twice, once for grammatical morphemes (GM) and once for complex syntax (CS). SALT was used to calculate MLU and NDW from the GM sample and complex syntax density – number of correct CS features/ total number of utterances – for the CS sample.

RESULTS

Comparison of CHL and CNH: Vocabulary and Morphosyntax

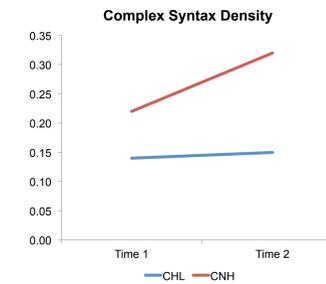


For both expressive vocabulary measures, repeated measures ANOVA indicated main effects of time ($p < .001$ for EOWPVT, .017 for NDW) and group ($p = .009, < .001$, respectively). The interaction of time and group was not significant for either measure ($p = .460, .838$, respectively).

For both morphosyntax measures, repeated measures ANOVA indicated a main effect of group ($p = .029$ for TEGI, .019 for MLU) but not time ($p = .111, .133$, respectively). The interaction of time and group was not significant for either measure ($p = .653, .512$, respectively). Because this comparison was underpowered, we performed follow-up t-tests for T1, T2 comparisons for each group. These t-tests indicated that for MLU, CNH exhibited a significant difference between T1 and T2 ($p = .033$) but CHL did not ($p = .626$).

RESULTS

Comparison of CHL and CNH: Complex Syntax



For complex syntax density, repeated measures ANOVA indicated a main effect of group ($p = .036$) but not time ($p = .119$). The interaction of time and group was not significant ($p = .213$). Because this comparison was underpowered, we performed follow-up t-test group comparisons at each time. These t-tests indicated the groups did not differ at Time 1 ($p = .216$) but CNH had higher complex syntax density than CHL at Time 2 ($p = .014; d = 1.24$).

IMPLICATIONS

This poster reports findings from Year 2 of the ELLA study, a longitudinal investigation of early language and literacy acquisition in children with hearing loss. As a group, children with hearing loss scored below children with normal hearing on all expressive language measures at Times 1 and 2.

- Expressive Vocabulary: Regardless of task, children with hearing loss scored below children with normal hearing. Additionally, on both measures, children with hearing loss made progress from Time 1 to Time 2 but this progress was not sufficient to “close the gap” in vocabulary skills between children with hearing loss and same-age children with normal hearing.
- Morphosyntax: Regardless of task, children with hearing loss scored below children with normal hearing. In contrast to expressive vocabulary, children with hearing loss did not make significant progress from Time 1 to Time 2.
- Complex Syntax: Children with hearing loss scored below children with normal hearing. As with morphosyntax, children with hearing loss did not make significant progress from Time 1 to Time 2.

Overall, these findings indicate that children with hearing loss, by 4 years of age, perform below children with normal hearing on a range of expressive language measures. For expressive vocabulary, children with hearing loss appear to make similar progress to children with normal hearing. Because they start off behind, however, future research should explore effective intervention methods to accelerate this rate of progress. In contrast, children with hearing loss do not appear to make progress on measures of morphosyntax or complex syntax. There is a vital need, therefore, to explore ways in which expressive grammatical skills can be fostered for this population.

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References available upon request: werfel@sc.edu