



# The School to Home Link: What LENA Can Reveal



**Mallene Wiggin**  
*MA, CCC-SLP*

**Sandra Gabbard**  
*PhD, CCC-A*

**Nanette Thompson**  
*MS, CCC-SLP, Cert AVT LSLS*

**Dianne Goberis**  
*MA, CED*

**Christine Yoshinaga-Itano**  
*PhD, CCC-A*

*Marion Downs Hearing Center, University of Colorado Denver Medical Center  
Department of Speech, Language & Hearing Science, University of Colorado, Boulder*

## Background:

Some children with hearing loss continue to demonstrate speech and language delays as compared with their same-age peers, even following the advent of universal newborn infant screening (Yoshinaga-Itano, 2004). Though children with hearing loss are often able to access preschool programming (Yoshinaga-Itano, Ruberry, & Stredler Brown, 1995), they do not have access to therapy or school over the summer months to help close this language gap. Hart & Risley (1995) showed that children who are deprived of quality or quantity of language input are at risk for delayed language & academic achievement.

## Rationale:

Additional information is needed to determine the amount of language deprivation children experience over the summer months and whether summer preschool programming can enhance access to spoken language as well as provide parent education opportunities to increase language input at home.

## Purpose:

1. To gain information about patterns of language use among families of preschoolers with hearing loss.
2. Provide an initial investigation into the impact of reduced educational programming over summer months for children with hearing loss.

## Research Question:

Is there a difference between the language children with hearing loss are exposed to during preschool as compared to home?

## Inclusion Criteria:

- Ages 3 years – 5 years
- Deaf or hard-of-hearing
- English spoken language level of 18 months – 4 years
- No significant additional disabilities impacting language acquisition
- Participation in entire 6 week preschool program

## Participants:

Eight children that attended a summer auditory-oral preschool program participated in the project. All children were appropriately amplified using cochlear implants or hearing aids. All children were reported to have normal cognitive ability based on previous testing. Five children had language scores in the average range (M=97.20, SD=9.44) and three scored below average (M=65.00, SD=4.00) as measured by the CELF-P2.

Child Demographics (N=8)	
Age	Range 36-68 months M = 52.6 months
Sex	3 boys 5 girls
Hearing Loss	7 bilateral, 1 unilateral, 2 ANSD

## Data Collection:

Parents were instructed how to put the LENA (Language Environment Analysis) recorder on their child and start recording. This is a small recording device that the child wears throughout the day to capture the language environment. LENA was sent home the night prior to recording and parents were asked to turn it on before coming to school. Data was collected during one day. Three hours were spent in the preschool and the remaining time was spent at home with caregivers. Home recordings ranged from 6 hours to 11 hours (M=8.6, SD=1.60).

## LENA Variables:

LENA was used to measure language throughout the child's day. This provided unique insight into the children's language environment that could not have been gained through traditional language sampling. Two variables were considered to compare the school and home environment:

- Adult Word Count (AWC) – Adult words spoken near or to the child.
- Conversational Turns (CT) – Interaction between child and adult counted when one participant responds within 5 seconds.

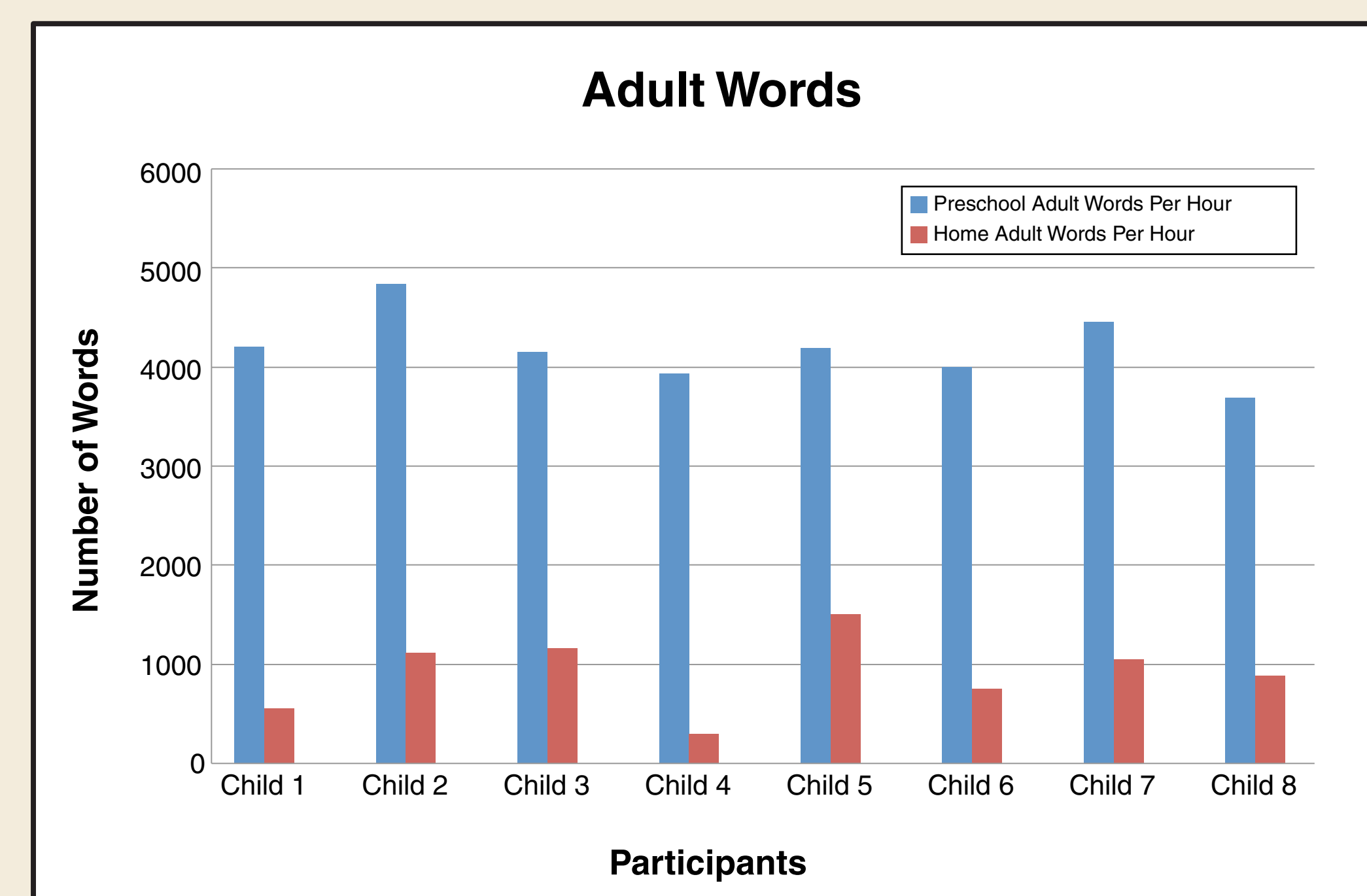
## Results:

Repeated measures ANOVA shows that there is an effect of context on adult words [ $F(1, 7)=528.56$ ,  $p<0.01$ ,  $d=8.98$ ] and conversational turns [ $F(1, 7)=20.18$ ,  $p<0.01$ ,  $d=1.96$ ]. This indicates that there are more adult words and conversational turns in the school context as compared to home. Though observations of individual differences were noted, none of the children received more adult words or conversational turns per hour in the home environment.

Comparisons of Conditions		
	Adult Words Per Hour	Conversational Turns Per Hour
Home	M=913.60 SD=381.41	M=36.39 SD=14.87
Preschool	M=4181.63 SD=345.20	M=90.04 SD=35.74

## Discussion:

This preliminary investigation indicates that a preschool setting gives children opportunity to access more adult words and conversational turns than they would if they spent the entire day at home. Increased access to language through summer preschool programming may be one way to help children with hearing loss close the gap in their language skills.



## Future Plans:

This data provides a preliminary comparison of the two language environments. Future plans include implementing intervention related to increasing adult language input at home during the summer preschool program. Additionally, a control group who receives no summer preschool programming will be compared to the children enrolled in the summer preschool program.

## Acknowledgements:

We are grateful to all of the families who participated in Marion's Way preschool program and to the teachers, staff, and donors who made the program possible. We would like to mention the work of Kolleen Davis who provides equipment support and Sandra Gabbard who directed the Marion's Way preschool program.

## References:

Hart, B., & Risley, T.R. (1995). Meaningful differences in the everyday experience of young American children. Baltimore, MD: Paul H. Brookes.

Yoshinaga-Itano, C., Ruberry, J., & Stredler Brown, A. (1995). Colorado Individual Performance Profile: Preschool Pre-CIPP. Seminars in Hearing, 16, 151-165.

Yoshinaga-Itano, C. (2004). Levels of evidence: universal newborn hearing screening (UNHS) and early hearing detection and intervention systems (EHDI). Journal of Communication Disorders, 37(5), 451-465.

