Determining Pre-Post-Cochlear Implant Outcomes for Young Children with Deaf-Blindness Through LENA Technology

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IDEAs that Work
Office of Special Education Programs

Project Partners

- The Teaching Research Institute (Western Oregon University)
- Cincinnati Children's Hospital Medical Center
- East Carolina University
- In collaboration – University of Kansas – LSI Parsons

A Federal Project: Influencing Outcomes for Children Who Are Deaf-Blind With Cochlear Implants

Steppingstones of Technology Innovation
Office of Special Education Programs
(#H327A080045: 2008-2011)

Participants for Two Studies

- Children who are 6 months-7 years of age with significant vision loss/severe-profound sensorineural hearing loss (deaf-blind
- Children eligible for cochlear implants and approved for implantation
- Children in the “pre-implant” phase of the process

Current Participants
November 2010-April 2010

- LENA (at least 3 DLPs) data on 8 children
- DLP have been sent to 3 additional children
- 2 new children

Data Collection Pre and Post Implant

- A battery of assessments are given pre-implant and post-implant (CSBS, MacArthur-Bates, Rynell-Zinkin, ITMAIS-MAIS, Speech Intelligibility) to determine developmental skills/needs
- Children and caregivers are video-taped in motivating routines and activities
- Language ENvironmental Analysis (LENA) data are used to examine the frequency & type of caregiver/teacher “talk” across a day (8-12 hours).

Question #1:

What are the differences in the caregiver's communicative interactions before and after implantation?

LENA: Three recordings are made for each phase of the research

- Phase 1: Data collected after eligibility and approval and prior to implantation.
- Phase 2: Data collected within 1 month after mapping.
- Phase 3: Data are shared with the family with discussions of ways in which to increase “meaningful speech” during interactions in specific routines; Facts and Features for Families are provided.
- Phase 3: Data collected within 6 months “time in sound” for those families who don’t participate in the intervention research.

Question 2:

What are the effects of individualized auditory intervention with delayed support prompts on child auditory, communication and language outcomes?

Within-Case Multiple Baseline Design Across Behaviors within Routines

- Phase 1: Data collected after “eligibility” and approval and prior to implantation
- Phase 2: Data collected within 1 month after mapping
- Phase 3: 15-18 sessions of systematically teaching the parents to implement specific techniques, as using the “auditory-lead/support/” in partial participation, directives, responsiveness, an opportunities for communication.

LENA Data

- Lena data are used to determine maintenance and generalization after the first two behaviors are implemented to criterion when interventionists are not present.

Case Example:

- First slide is 4 months pre-implant
- Second slide is 2 months pre-implant
- Child mapped on April 22nd: DLPs sent

Composite View

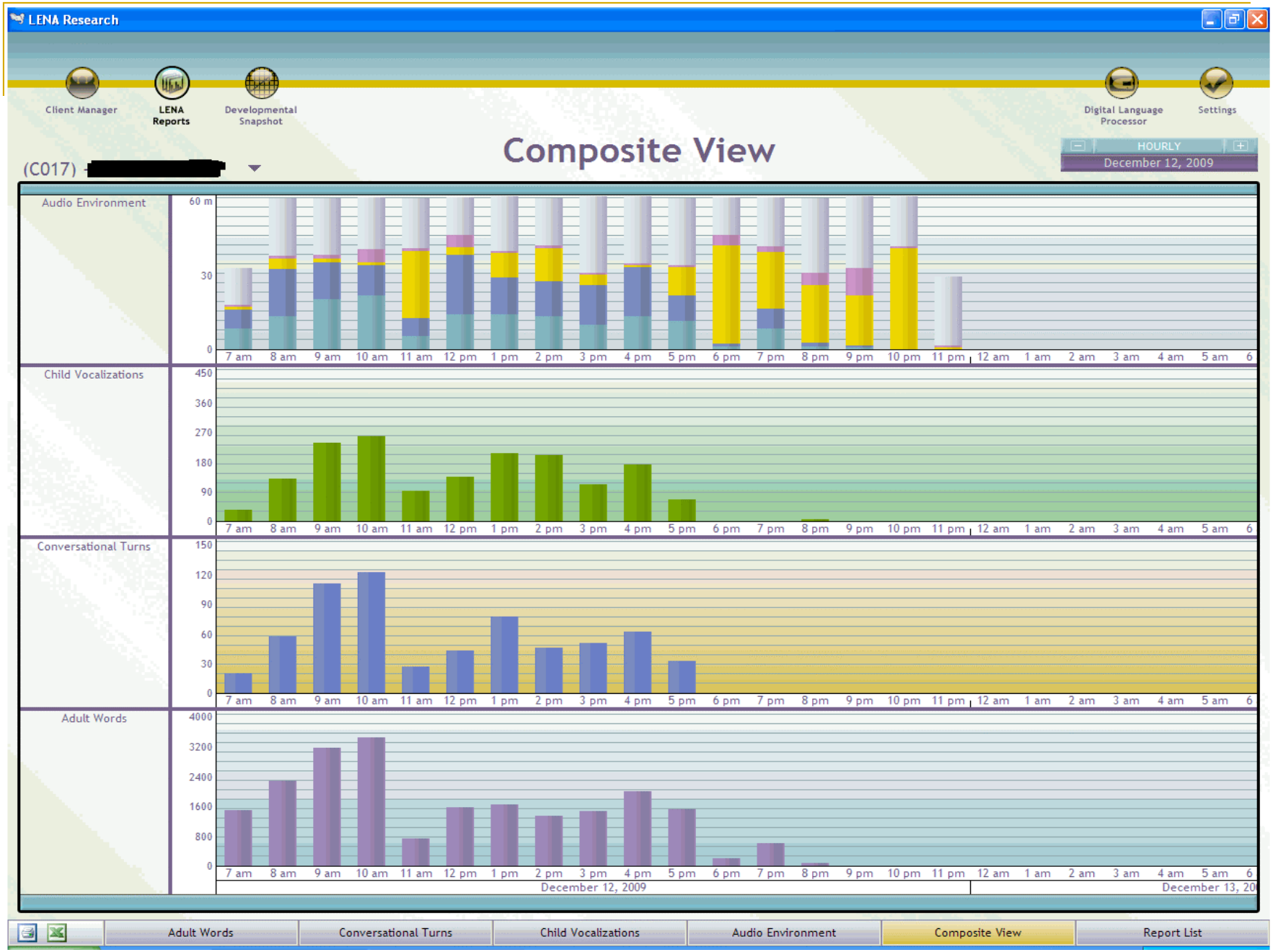

Composite View
Ethan
60 m
30
0
6 am
7 am
8 am
9 am
10 am
11 am
12 pm
1 pm
2 pm
3 pm
4 pm
5 pm
6 pm
7 pm
8 pm
9 pm
10 pm
11 pm
12 am
1 am
400
320
240
160
80
0
150
120
90
60
30
3000
2400
1800
1200

Composite View

Additional Ways in Which We Have Used LENA in the Project

- To examine “meaningful speech” and noise in a preschool environment to advocate for an FM system for a child
- To look at the effects of bilateral implants
- To assist parents to determine if vocalizations are decreasing across time


LENA Research
Client Manager
LENA Reports
Developmental Snapshot
Digital Language Processor
Settings
Composite View
(C005) [redacted]
HOURLY
September 3, 2009
Audio Environment
60 m
30
0
Child Vocalizations
500
400
300
200
100
0
Conversational Turns
150
120
90
60
30
0
Adult Words
3500
2800
2100
1400
700
0
6 am 7 am 8 am 9 am 10 am 11 am 12 pm 1 pm 2 pm 3 pm 4 pm 5 pm 6 pm 7 pm 8 pm 9 pm 10 pm 11 pm 12 am 1 am 2 am 3 am 4 am 5
September 3, 2009
September 4
Adult Words
Conversational Turns
Child Vocalizations
Audio Environment
Composite View
Report List


LENA Research
Client Manager
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Developmental Snapshot
Digital Language Processor
Settings
Composite View
(C017) [redacted]
HOURLY
December 12, 2009
Audio Environment
60 m
30
0
Child Vocalizations
450
360
270
180
90
0
Conversational Turns
150
120
90
60
30
0
Adult Words
4000
3200
2400
1600
800
0
7 am 8 am 9 am 10 am 11 am 12 pm 1 pm 2 pm 3 pm 4 pm 5 pm 6 pm 7 pm 8 pm 9 pm 10 pm 11 pm 12 am 1 am 2 am 3 am 4 am 5 am 6
December 12, 2009
December 13, 20
Adult Words
Conversational Turns
Child Vocalizations
Audio Environment
Composite View
Report List