



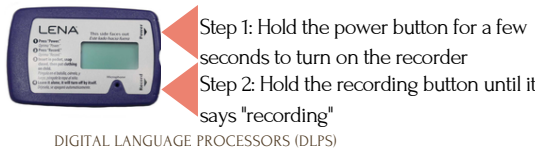
INTRODUCTION

There is a limited understanding of how deficits measured using traditional standardized tests translate to real-world communication in Persons with Aphasia (PWA). Also, there is a dearth of ecologically valid methods and measures that can help us objectively characterize everyday communication abilities in a PWA and the role home language environment plays in their rehabilitation. This study makes use of technology, called the Language Environment Analysis (LENA) Pro System, to objectively analyze and quantify interactive and contextual language use in a person with severe fluent aphasia and to examine changes in language use at home before and after treatment.

METHOD

The participant (MM) was a 77-year-old female, 30.5 months post-onset of left middle cerebral artery stroke. She presented with severe Wernicke's aphasia (WAB AQ=31). Treatment: MM underwent 30 hours of intensive therapy using Scheull's Stimulation Approach. Data Collection: LENA was used to record language use at home. Recordings were transcribed verbatim, and conversations were analyzed along several parameters.

Instructions to participant

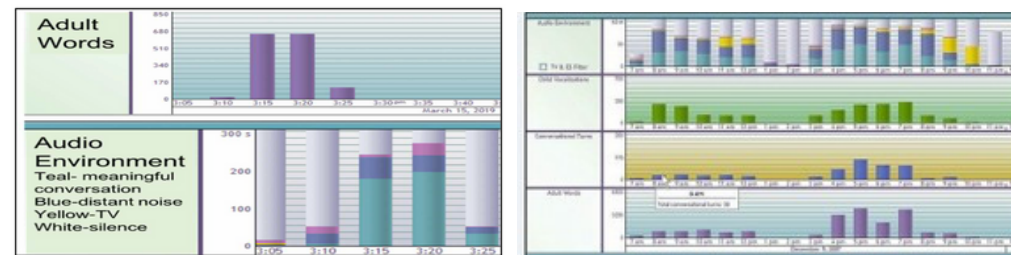


Record a minimum of 10 hours/day, two days pre-treatment, and two days at one-week post-treatment.

Data Preparation

Step 1

Audio data was transferred to a computer and analyzed using LENA software (ADEX)



Step 2

The recorded audio was divided into 30-second segments and Adult Words (AWs) for each segment were automatically estimated using ADEX

Step 3

240 segments with the highest number of AWs, spanning each of the two days of recording, were selected for analysis.

Step 4

These segments were manually transcribed and coded using an adapted version of the Social Environment Coding of Sound Inventory (SECSI).

METHOD

Six broad dimensions were coded. All of these categories were rated in a binary fashion (presence vs. absence), except for the AWs, conversational turns (CT), and numbers of people talking or present, which were raw counts.

Measures of Language Productivity: AWs & CT

Conversation: Small talk & Substantive conversations

Social Interaction

Activity

Environment

Expressed emotion

RESULTS

MM's score on the WAB-R AQ showed clinically significant improvement from baseline 31 to one-week post-treatment 37.7. MM had a raw score of 12 on the Auditory Comprehension Test for Sentences at pre-treatment, which did not change post-treatment. MM's language performance at home corresponded with the clinically significant improvements observed on behavioral tests as seen in the figures below:-

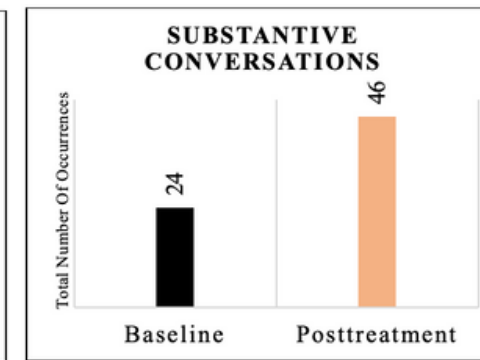
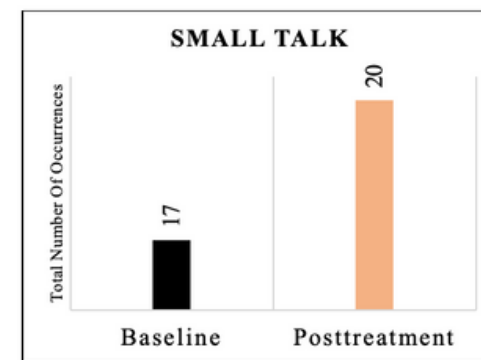
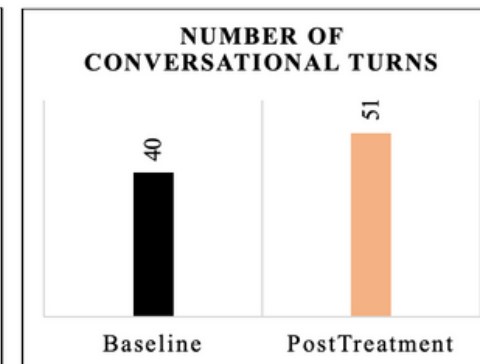
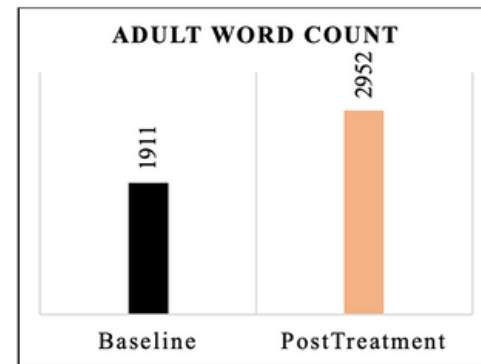


Figure 1
Total Adult Word Count (AWC, Left) & Number of Conversational Turns (CTC, Right) Before and After Therapy

Figure 2
Types of Conversation: Small Talk & Substantive Conversations Before and After Therapy

e.g., Small Talk: MM talking to partner while watching TV "Look it. I love that. Look at these. I love those. Those are nice. I like him"
e.g., Substantive Conversation : MM describing a fair in Wyoming "I love going to it. I see you went there. We we get allenates it. Doing things, we get mekethins, too. I love to do things. I love, I love the things. They nice and uh fun"

RESULTS

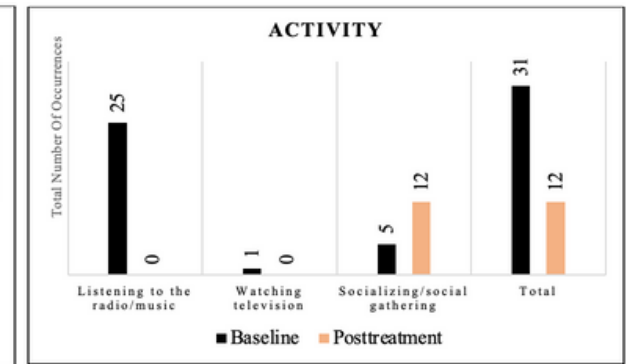
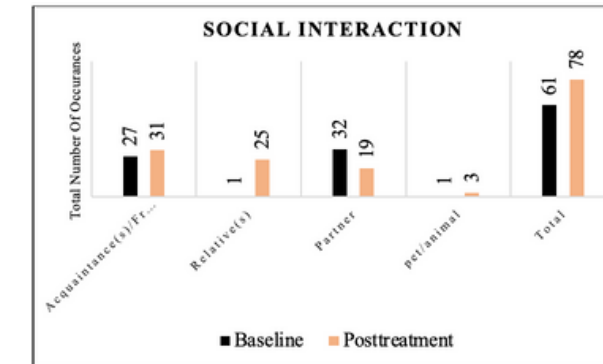


Figure 3
Number of Communication Partners & Number of Exchanges with Those Communication Partners Before and After Therapy

Figure 4
Everyday Life Activities Before and After Therapy

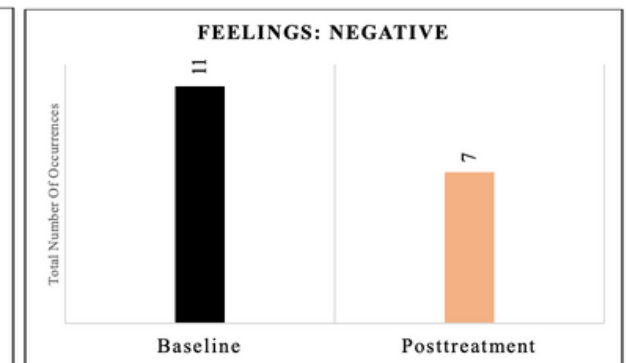
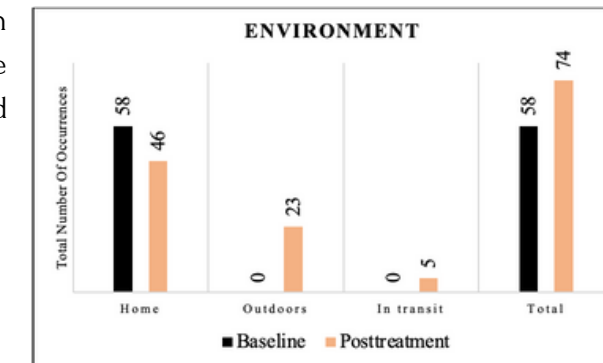


Figure 5
Communication Environment Before and After Therapy

Figure 6
Expression of Negative Emotions Before and After Therapy

DISCUSSION

According to our preliminary results, LENA appears to be a feasible tool to measure the language use of PWA in their home environments. A participant with severe Wernicke's aphasia independently operated the DLP and was successful in delivering >40 hours of recordings. We systematically analyzed language along several dimensions pre and posttreatment.

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