

# Sensitivity of Quantitative Narrative Measures to Change Following English-Only Therapy in Bilingual Children with Primary Language Impairment

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## Background Information

Approximately 7% of the English-only school-age population is diagnosed with primary language impairment (PLI). PLI is characterized by significantly reduced language skills in the face of otherwise typical development (Kohnert, Windsor, & Ebert, 2009). Language treatment is indicated for children with PLI to improve educational, social and vocational outcomes.

An estimated 21% of the United States population over age five speaks a language other than English at home (U.S. Census Bureau, 2010). As with English-only learners, a small subset of bilingual children are diagnosed with PLI. For these children, treatment is often provided only in English.

For treatment to be effective, there must be improvement in a child's language skills when measured at the end of a treatment period, as compared to performance on these same measures prior to starting treatment. The analysis of spoken narratives has been proposed as a method to document change following treatment in monolingual children with PLI (Klee, 1992). Narratives include all types of discourse in which event structure material, both real and imagined, is shared with interlocutors (Wei and Moyer, 2008). There have been no previous investigations to determine whether treatment gains for bilingual children with PLI are reflected in narrative measures.

The purpose of this study is to determine whether narrative analysis is sensitive to change in both languages of bilingual children with PLI following English-only therapy.

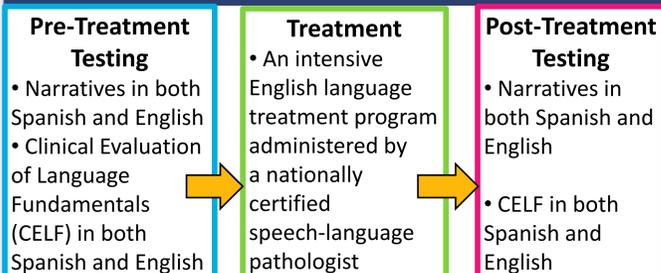
## Research Questions

1. Are select quantitative measures of narrative productivity in English sensitive to treatment gains in bilingual children with PLI?
2. Are select quantitative measures of narrative productivity in Spanish sensitive to treatment gains in bilingual children with PLI?

## Methods: Participants

Eight normal-hearing Spanish-English bilingual children (four girls, four boys) with PLI ages 6;2 - 9;6. All passed a hearing screening and scored within the normal range on a test of nonverbal intelligence. All scored at least two standard deviations below the mean on normative measures of language in Spanish and English.

## Methods: Procedure



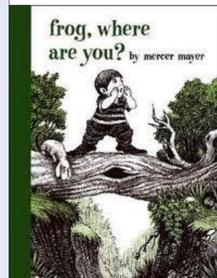
## English Therapy

**Goal:** Improve language comprehension and production by practicing grammatical constructions, expanding vocabulary, and improving children's ability to follow oral directions. There was no direct training of narrative production or comprehension.

**Duration:** Six weeks, four times per week in 75-minute after-school sessions. Each session was divided into five, 15-minute long activities, including three computer games played individually and three interactive games played with the clinician or with the clinician and 1-2 other participants.

## Narrative Task

**Stimulus:**  
Wordless picture book *Frog, Where Are You* by Mercer Mayer (1996)



**Procedures:**  
Researchers fluent in the test language elicited narratives in both Spanish and English on different days. Participants looked through the book, then told the story while looking at the pictures. Each narrative was digitally recorded and transcribed using the Systematic Analysis of Language Transcripts (SALT) (Miller & Iglesias 2010) software.

## Narrative Scoring and Analysis

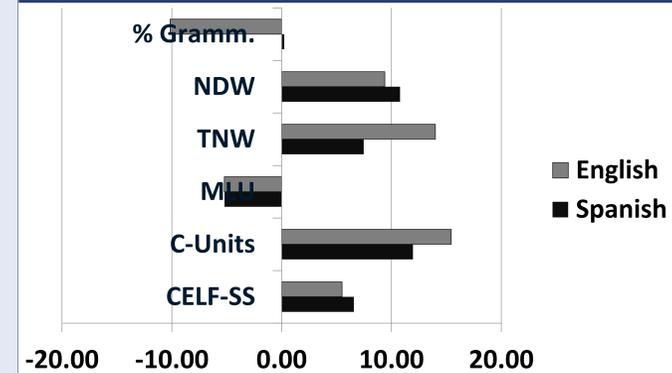
5 measures for each child, in each language

1. **Communication Unit (C-Unit):** Grammatical unit used to measure productive language. Includes an independent clause and conjoined subordinate clauses.
2. **Mean Length of Utterance (MLU):** Reflects semantic and grammatical development. In English it is counted in morphemes (smallest unit of meaning); in Spanish it is counted in words.
3. **Total Number of Words (TNW):** Measure of lexical-semantic productivity
4. **Number of Different Words (NDW):** Measure of lexical diversity
5. **Grammaticality:** Measure of grammatical accuracy

## Results

There was considerable variation in the results, leading to large ranges and standard deviations for each measure.

## Group Percent Change Scores from Pre- to Post-Treatment



## Individual Change English

Participant	CELF	C-Units	MLU	TNW	NDW	% Grammatical
1	+	0	--	--	--	0
2	+	--	+	--	--	--
3	+	--	0	--	0	--
4	0	--	0	+	+	--
5	+	+	0	+	+	0
6	--	+	--	0	0	+
7	+	0	0	0	0	--
8	+	+	0	+	+	0
<b>+/total</b>	<b>6/8</b>	<b>3/8</b>	<b>1/8</b>	<b>3/8</b>	<b>3/8</b>	<b>1/8</b>

Note: +: >= 10% gain -- : >= 10% loss  
0: <=10 % gain or loss

## Individual Change Spanish

Participant	CELF	C-Units	MLU	TNW	NDW	% Grammatical
1	+	--	0	--	--	0
2	0	--	-	--	--	+
3	+	+	0	+	+	+
4	0	+	0	+	+	--
5	0	0	--	0	0	0
6	+	+	0	+	+	0
7	+	+	0	+	+	--
8	--	0	0	0	0	0
<b>+/total</b>	<b>4/8</b>	<b>4/8</b>	<b>0/8</b>	<b>4/8</b>	<b>4/8</b>	<b>2/8</b>

Note: +: >= 10% gain -- : >= 10% loss  
0: <=10 % gain or loss

## Summary & Discussion

### Group Level Pre- to Post-Treatment Comparison:

- English CELF: significant change (p < .05)
- Spanish CELF: approached significance (p = .056)
- Narrative Measures: no significant change

The lack of statistically significant change in group performance on quantitative narrative measures coupled with the significant change found on standardized tests may limit the value of these measures in determining treatment effectiveness for bilingual children with PLI. However, results at the individual level indicate that certain measures were sensitive to change for some participants.

## Study Limitations

- Small sample size (n = 8) and large age range (6;2 - 9;6)
- Decreased reliability of MLU for older children (Rosenthal-Rollins et al., 1996)
- Global grammaticality coding scheme: A mostly correct utterance and a mostly incorrect utterance were both marked ungrammatical. A composite scoring system, which codes individual errors instead of utterances as a whole, may provide a more accurate portrayal of grammaticality. The inclusion of a category for utterances influenced by the other language is also recommended (Bedore et al., 2010).

## References

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