Impact of code switching on Spanish vocabulary measures for English-educated bilingual preschoolers

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INTRODUCTION

Background
- Code switching is the alternating production of two languages by bilingual speakers (Gutiérrez-Clellan, 2009).
- Code switching is not considered to be indicative of a disorder (see Paradis, 2012 for a systematic review).
- Code switching was found to increase over time in children who are experiencing first language loss (Anderson, 2001; Gutberson et al., 2006).
- Code switching is a potential measure of first language loss in bilingual children.
- Code switching may be an important factor to consider in the clinical assessment of bilingual children.
- Code switching should be examined to determine its differential effects on vocabulary development of bilingual children in a variety of academic settings.
- The time course of code switching can be studied from a longitudinal perspective.
- To more precisely determine the impact of code switching on vocabulary development, vocabulary can be quantified including and excluding code switching.

Purpose
Model the differential development across two measures of vocabulary in bilingual children's narrative retells in Spanish taking into account code switching.

Research Question
How do measures of Spanish vocabulary differ over time in bilingual (Spanish-English) preschool-age children attending an English immersion school when code switching is accounted for?

Code Switching Examples
- C (Y) y fueron [Ir como pirate/s[CS] [G][SI-1].
- C Eso que era [ser una bee[CS] [G][SI-1].
- C Y luego la rana :06 jumped[CS] (en una) in[CS] the[CS] instrument[CS] [G][SI-1].

METHOD

- 37 typically developing Spanish-English bilingual preschoolers enrolled in an English immersion school.
- Narrative retell language samples collected in Spanish each academic semester over two years beginning in the fall of preschool using Mayer's wordless story books (Mayer, 1969; 1974; 1975a; 1975b).
- Narrative retell samples transcribed and coded by trained Spanish-English bilingual research assistants using the Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2017).
- Code switching coded at the word level to identify words produced in the non-target language (English).
- Number of different words (NDW) and moving-average type-token ratio (MATTR) have been used in previous studies to index vocabulary skills (Fergadotiots, Wright, & Green, 2015; Rojas & Iglesias, 2013).
- NDW identifies root words, rather than surface forms.
- MATTR used a moving window of 25 words to create a ratio of number different words to surface forms.
- MATTR controls for the length of the narrative language sample.
- Unconditional growth curve models estimated the growth of NDW and MATTR in Spanish including and excluding code switching over four academic semesters (waves).

RESULTS

Table 1
Participants’ Age, Code Switching (CS), and Vocabulary Measures in Spanish Descriptive Statistics by Wave

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Wave 1</th>
<th>Wave 2</th>
<th>Wave 3</th>
<th>Wave 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (months)</td>
<td>31.8 (7.01)</td>
<td>36.88 (6.39)</td>
<td>62.91 (7.1)</td>
<td>67.64 (7.0)</td>
</tr>
<tr>
<td>Proportion of CS Spanish</td>
<td>24.75 (14.96)</td>
<td>16.22 (27.36)</td>
<td>28.6 (36.27)</td>
<td>29.36 (32.85)</td>
</tr>
<tr>
<td>NDW Including CS</td>
<td>54.72 (24.55)</td>
<td>55.25 (20.76)</td>
<td>61.61 (26.29)</td>
<td>66.18 (23.67)</td>
</tr>
<tr>
<td>NDW Excluding CS</td>
<td>41.24 (28.56)</td>
<td>48.46 (25.33)</td>
<td>44.88 (32.37)</td>
<td>46.48 (28.81)</td>
</tr>
<tr>
<td>MATTR Including CS</td>
<td>0.72 (0.09)</td>
<td>0.74 (0.07)</td>
<td>0.68 (0.14)</td>
<td>0.68 (0.09)</td>
</tr>
<tr>
<td>MATTR Excluding CS</td>
<td>0.71 (0.13)</td>
<td>0.74 (0.07)</td>
<td>0.63 (0.17)</td>
<td>0.62 (0.01)</td>
</tr>
</tbody>
</table>

- NDW = number of different words in Spanish; MATTR = moving-average type-token ratio in Spanish.

Table 2
Growth Curve Models of Vocabulary Measures in Spanish Including and Excluding Code Switching (CS)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NDW</th>
<th>MATTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>50.03***</td>
<td>0.73***</td>
</tr>
<tr>
<td>Linear Slope</td>
<td>5.12***</td>
<td>-0.02*</td>
</tr>
</tbody>
</table>

Note: NDW = number of different words in Spanish; MATTR = moving-average type-token ratio in Spanish.

DISCUSSION

Implications
- NDW and MATTR in Spanish yielded comparatively higher intercepts and growth rates when code switching was included, than when it was excluded.
- NDW showed positive, significant growth.
- MATTR showed negative, significant deceleration.
- Findings suggest using more than one measure in bilingual assessment for clinical decision making.
- Findings suggest importance of considering code switching in clinical assessment to more precisely measure bilingual children's distributed vocabulary skills.

Limitations and Future Directions
- Participant sample came from one English immersion school in Dallas, Texas.
- Relatively small sample size.
- Not all children provided Spanish narrative samples at all waves of data collection.
- Future studies should examine the English vocabulary growth of these children.
- Future studies should include more children, over a longer period of time to track development of vocabulary in older, school age bilingual children.
- Future studies should include bilingual children attending dual language academic settings.

SELECTED REFERENCES

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