Exploring Program Model Differences in English and Spanish Writing Outcomes

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Rationale for the Study

• Despite the proliferation of two-way immersion (TWI) programs in the United States, little is known about potential differences in student outcomes in either or both languages of instruction; as a result, logistical and/or political considerations frequently drive program model choices. Specifically, communities may avoid the 90/10 model because of concerns about English acquisition; similarly, they may modify the 50/50 model to avoid simultaneous biliteracy because of concerns that it will be confusing to students and impede literacy development.
What Do We Know about Program Model Differences in Literacy Outcomes?

• Comparing TWI to monolingual models, there is evidence of long-term benefits of TWI on literacy outcomes in English (Berens, Kovelman, & Petitto, 2013; Steele, et al., 2015; Thomas & Collier, 2002) and partner languages (Burkhauser, et al., 2016).

• Within TWI, there is evidence of a short-term advantage in English literacy among 50/50 students, with 90/10 students catching up by the upper elementary grades and remaining on par through the secondary grades; there is also evidence of a persistent advantage in Spanish literacy among 90/10 students (Lindholm-Leary & Howard, 2008).

• Within TWI, there is evidence of a relative advantage of each model for specific subskills of reading in the middle elementary grades – e.g. phonological awareness and decoding for 90/10 and reading comprehension for 50/50; in contrast, there is evidence of a consistent advantage in all reading subskills in Spanish for 90/10 students in the middle elementary grades (Berens, Kovelman, & Petitto, 2013).
Why Focus on Writing?

• Strong writing skills are essential for success in school and the workplace (Applebee, 1999; Graham, 2007; Schleppegrell & Colombi, 2002; Shanahan, 2006).

• Findings from the National Assessment of Educational Progress (NAEP) indicate that few students reach proficient or advanced levels of writing; most ELLs score below the basic level.

• Writing has received far less attention than reading in instruction, assessment, and research for both native speakers and second language learners (Lesaux, et al., 2008; Magrath, 2003).
A Conceptual Model of Skilled Writing

High-Level Skills - Composition
- Organization and Genre Conventions
- Writing Process

Low-Level Skills - Transcription
- Handwriting/Keyboarding
- Spelling
- Sentence Construction and Fluency

Skilled writing requires the integration of several skills acquired over years of instruction and practice.

Olinghouse, Wilson, & Neugebauer, 2012
Research Questions

RQ1: Controlling for home language input and socioeconomic status, are there program model differences in English and/or Spanish writing outcomes in grades 2-5?

RQ2: Controlling for home language input and socioeconomic status, are there program model differences in the rate of change in English and/or Spanish writing ability from grade 2-grade 5?
Sample

• Study 1: Total sample included 257 students across 6 schools
  – 88 in the 50/50 (simultaneous) model
  – 169 in the 90/10 (sequential) model
    • The larger number of students from the sequential model is due to the fact all three of the simultaneous models were strands within schools; in contrast, two of the three sequential programs were whole-school models

• Study 2: Total sample included 258 students across 6 schools
  – 98 in the monolingual model (English Only), 3 schools
  – 91 in the 90/10 (sequential) model, 2 schools
  – 69 in the 50/50 (simultaneous) model, 1 school
    • All schools in the study were whole-school models of their respective program type.
## Sample Characteristics

### Study 1. Sample Characteristics & Summary Statistics of Covariates

<table>
<thead>
<tr>
<th></th>
<th>Sequential</th>
<th>Simultaneous</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>169</td>
<td>88</td>
<td>257</td>
</tr>
<tr>
<td>Female</td>
<td>54.44%</td>
<td>55.68%</td>
<td>54.86%</td>
</tr>
<tr>
<td>Lunch</td>
<td>47.34%</td>
<td>51.14%</td>
<td>48.64%</td>
</tr>
<tr>
<td>Spanish</td>
<td>45.56%</td>
<td>63.64%</td>
<td>51.75%</td>
</tr>
<tr>
<td><em>Parent's Yrs of Ed.</em></td>
<td>5.06 (2.32)</td>
<td>5.26 (2.83)</td>
<td>5.12 (2.47)</td>
</tr>
<tr>
<td>*Home Lang Use</td>
<td>2.49 (1.12)</td>
<td>2.63 (1.10)</td>
<td>2.53 (1.11)</td>
</tr>
</tbody>
</table>

*Mean (Standard Deviation)*

### Study 2. Sample Characteristics & Summary Statistics of Covariates

<table>
<thead>
<tr>
<th></th>
<th>Monolingual</th>
<th>Sequential</th>
<th>Simultaneous</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>98</td>
<td>91</td>
<td>69</td>
<td>258</td>
</tr>
<tr>
<td>Female</td>
<td>51.02%</td>
<td>47.25%</td>
<td>56.52%</td>
<td>51.16%</td>
</tr>
<tr>
<td>Lunch</td>
<td>52.04%</td>
<td>41.76%</td>
<td>43.48%</td>
<td>46.12%</td>
</tr>
<tr>
<td>Spanish</td>
<td>41.84%</td>
<td>54.95%</td>
<td>50.72%</td>
<td>48.84%</td>
</tr>
<tr>
<td><em>Parent's Yrs of Ed.</em></td>
<td>11.81 (4.09)</td>
<td>12.52 (5.34)</td>
<td>14.34 (4.98)</td>
<td>12.72 (4.90)</td>
</tr>
<tr>
<td>*Home Lang Use</td>
<td>2.10 (1.32)</td>
<td>2.70 (1.12)</td>
<td>2.29 (1.26)</td>
<td>2.36 (1.26)</td>
</tr>
</tbody>
</table>

*Mean (Standard Deviation)*
Data Collection

Study 1 Outcome Measures

• Researcher-developed measure of English and Spanish narrative writing ability, including composition, grammar, and mechanics.
  - Scores range from 0 to 5
  - collected three separate times (fall/winter/spring) during each academic year, from 3rd to 5th grade.
  - The medial time point (winter) was selected for all analyses

Study 2 Outcome Measures

• English and Spanish assessments of lower-order writing skills (spelling, usage, and punctuation) were collected once per year in 2nd through 5th grade via the Woodcock Language Proficiency Battery-Revised.
  - Standard Scores (SS) – mean of 100 and sd of 15
  - W Scores (W) – 500 is benchmark for end of fifth grade performance
Data Collection, continued

Control Variables Used in Study 1 and Study 2

- Home Language Input, determined by averaging four questions on a parent questionnaire.
  - Indicates language input to child from:
    - Mother
    - Father
    - Other adults
    - Children in the home
  - Measured on a 5-point scale:
    - 1 = English monolinguial
    - 3 = balanced bilingual
    - 5 = Spanish monolinguial

- Socioeconomic status as indicated by years of parent education and free/reduced lunch eligibility
Data Analysis

• Research Question 1:
  – *Analysis of Covariance* (ANCOVA)
  – Test whether program models differed with respect to total writing ability
    • Controlling for parent education and home language input

• Research Question 2:
  – *One-Way Repeated Measures Analysis of Covariance* (RM-ANCOVA)
  – A multivariate technique producing:
    • A Within-Subjects effect, **Time**
    • A Between-Groups Effect, **Program Model**
    • As well as an interaction effect, **Time*Program Model**; testing whether or not trends differed as a function of program model, controlling for parent education and home language input
Results
Controlling for home language input and socioeconomic status, are there program model differences in English and/or Spanish writing outcomes in grades 2-5?
RQ1 English Results
Comparison of Adjusted Means
Comparison of Adjusted Means

3rd Grade:
- Monolingual versus Sequential: (Est.: 5.75; \( p = 0.007 \))
- Monolingual versus Simultaneous: (Est.: -6.97; \( p = 0.03 \))

* \( p \)-values were adjusted using Tukey’s Honest Significant Difference approach
Comparison of Adjusted Means

![Graph showing comparison of adjusted means for different grade levels in Spanish. The graph displays data points for 'seq' and 'sim' program types across third, fourth, and fifth grades. The x-axis represents grade levels, and the y-axis represents score levels. The data points indicate higher scores for the fifth grade in both program types.]
Comparison of Adjusted Means

Study 2 Model Implied Means -- Spanish

- Standard Score
- Grade: second, third, fourth, fifth
- Prg.Type
  - seq
  - sim
Summary of Findings: RQ 1

• English findings are equivocal. In Study 1, there is an early advantage for students in the 50/50 program that disappears by 5\textsuperscript{th} grade. In Study 2, the 50/50 advantage persists in 5\textsuperscript{th} grade. Interestingly, the 50/50 students have an advantage over students in monolingual English programs in grades 3 and 4, but not in grade 5. Similarly, monolingual English students outperform 90/10 students in grade 3, but not in grade 4 or 5.

• Spanish findings are generally consistent. In Study 1, there is no program model difference in grade 3, but there is an advantage for 90/10 students in grades 4 and 5. In Study 2, there is an advantage for 90/10 students in grades 2, 4, and 5.
Controlling for home language input and socioeconomic status, are there program model differences in the rate of change in English and/or Spanish writing ability from grade 2-grade 5?
Study 1: English Trend Lines
Study 2: English Trend Lines
Study 1: Spanish Trend Lines
Study 2: Spanish Trend Lines
Summary of findings: RQ2

• Significant differences in rates of change across program models for study 1 and study 2. Faster rate of change for 90/10 in study 1; different rates of change across the 3 models in study 2.

• Equivocal findings for Spanish – no difference in rates of change for study 1; significantly faster growth for 50/50 in study 2.
Conclusions
Discussion

• Both studies confirm previous findings that ...
  – on measures of English literacy, TWI students perform as well as or better than comparable students educated monolingually in English;
  – there is a Spanish literacy advantage for 90/10 students that develops and/or persists in the upper elementary grades;
  – there is an English literacy advantage for 50/50 students that goes away by 5th grade in Study 1 but persists through 5th grade in Study 2, thus raising questions about the length of time that the English advantage may persist;
  – both models promote ongoing growth in literacy ability in both languages, although there are sometimes differences in the rates of change; and
  – there is no evidence of confusion resulting from simultaneous biliteracy acquisition (50/50), as the English adjusted means for the 50/50 model were consistently as high as or higher than those for the other model(s) and at or above English monolingual norms.
Limitations

• The sample size within each program type was very small. It would be helpful to replicate this type of study with more schools per program model.

• The outcome measures were not designed for bilingual/biliterate students. Future research could develop and utilize specific measures for this population.

• The study only looked at global writing outcomes. Future investigations could look at writing subskills to see if there are nuanced differences.
Acknowledgements

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