

**Developmental and Promotion of
Early Literacy Skills for
Preschoolers Who are Spanish-
Speaking Language-Minority
Children**

Christopher J. Lonigan, Ph.D.
Florida Center for Reading Research
Florida State University

4th Annual RtI Early Childhood Summit
Santa Ana Pueblo, NM: September 20, 2012

Research Supported by

National Science Foundation (REC-0128970)

National Institute of Child Health & Human
Development (HD060292)

Institute of Education Sciences, U.S. Department
of Education (R305A090169)

Collaborators

JoAnn M. Farver (University of Southern California)
Beth M. Phillips (Florida State University)
Kimberley McDowell (Wichita State University)
Jeanine Clancy-Menchetti (Florida State University)
Kylie S. Flynn (WestEd)
Silvia Palenzuela (Florida State University)
Ana Marty (Florida State University)
Jonathan Nakamoto (WestEd)
Stephanie Eppe (Para Los Niños)

Overview

- As a group, children whose home language is not English (i.e., language minority children; LMC) are at considerable risk of educational difficulties.
- In the U.S., children whose home language is Spanish both constitute the largest LMC subgroup and are the fastest growing school-age population.
 - In the year 2000, roughly 3.9 million LM children were enrolled in grades K-12 (U.S. Census Bureau, 2000).
 - About 17% of these 3.9 million spoke primarily Spanish.
 - In 2006, Spanish-speaking LM children represented 34% of Head Start enrollment nationwide.
 - Estimates that the number of school-age Latino students will reach 16 million or 25% of the student population by 2030.

Overview

- Children who are classified as LM or English-language learners (ELL) tend to have poor literacy outcomes, poor math outcomes, lower overall academic achievement, and higher grade-repetition and school drop out rates than do their peers who are not classified as LM or ELL (NAEP, 2011).
- Based on existing evidence, a substantial number of children who are Spanish-speaking LM enter kindergarten with low levels of key early literacy and early math skills.
- Despite stark data on reading outcomes, there is little empirical guidance on educational practices to reduce this gap for LMY children.

Overview

- Research with monolingual English-speaking preschoolers and available research with Spanish-speaking LMC indicate three primary domains that are related to the development of later reading and writing skills.
- These domains include:
 - **oral language** (vocabulary and syntax)
 - **phonological awareness** (the ability to detect and manipulate sounds in words, independent of meaning), and
 - **print knowledge** (understanding print conventions and letter knowledge)

Overview

- These skills develop during the preschool period are typically referred to as "school readiness."
- At present, there is limited research concerning the development of these literacy-related school readiness skills in LMC populations.

Overview

This presentation will focus on results and implications of four recent studies with Spanish-speaking LM preschoolers:

- Two studies of the development of early literacy skills of preschool children who are Spanish-speaking LM.
 - Comparative development (LM vs monolingual)
 - Classification of LM Preschoolers
- Project developing measures for preschoolers who are Spanish-speaking LMC.
- RtI-format intervention study evaluating efficacy of an early literacy intervention for LM preschoolers.

Comparative Growth in Early Literacy Skills: Children who are Spanish-speaking LM versus Monolingual English speakers

Comparative Growth in Early Literacy Skills

Background

- Most studies of children who are language minority confound SES and language status.
- Often, these studies involve:
 - Comparisons to unselected populations
 - Comparisons to standardized measures
- Therefore, the extent to which obtained differences are the result of language status or SES is unclear.
- Purpose of this study was to compare early literacy skills of LM and non-LM children from families that were relatively equal in terms of SES.

Comparative Growth in Early Literacy Skills

Participants:

- 948 children (505 boys, 443 girls) who were enrolled in 30 Head Start centers located in several inner-city neighborhoods of Los Angeles, CA.
- Sample composed of Latino (60.5%; $n = 540$) and African-American (39.5%; $n = 408$) children who ranged in age from 37 to 60 months ($M = 50.73$ months; $SD = 5.04$).
- Based on parent-report, all of the Latino children were exposed to some Spanish in the home; none of the African American children were.
- All Latino children born in U.S. (vs. ~16% of parents).

Comparative Growth in Early Literacy Skills

Measures:

- Expressive Communication subscale of the Preschool Language Scales (4th Ed.).
- Blending, Elision, and Print Knowledge subscales of Preschool Comprehensive Test of Phonological and Print Processing.
- Parent-completed demographic questionnaire.

Procedure:

- All children assessed at beginning, middle, and end of their Head Start year.
- All assessments conducted by bilingual graduate and undergraduate RAs.

Comparative Growth in Early Literacy Skills

Results:

- Latent growth-curve models (LGCM) of children's oral language, phonological awareness (blending & elision), and print knowledge.
- Examined language-group effect in both unconditional and conditional LGCMs.
- Conditional growth models included both family-SES variables (parents' education, fathers' employment, 2-parent households) and child variables (age, cognitive abilities, initial oral language skills).

Note: Intentionally blank

Five data slides were redacted to preserve the publication integrity of study.

Data from Lonigan, C. J., Farver, J. M., & Nakamoto, J. (in review). Developmental Trajectories of Preschool Early Literacy Skills: A Comparison of Language-Minority and Monolingual-English Children.

Comparative Growth in Early Literacy Skills

Unconditional models:

- significant language group differences favoring EO children on all outcomes.
- faster oral language growth for LM than for EO children.
- relatively equal rates of growth on code-related skills.

Conditional models:

- no differences between groups for initial status for code-related skills, but continued differences on oral language.
- faster growth for oral language and print knowledge for LM children.

Comparative Growth in Early Literacy Skills

Conclusions:

- Differences between LM and EO children in oral language and code-related skills are not solely due to SES differences.
- Almost all of the differences in code-related skills could be accounted for by children's oral language skills at preschool entry (in English).
- If LM and EO children entered preschool with comparable oral language skills, LM children would end the year with higher skills because of faster growth.
- However, substantial differences in English oral language skills exist at preschool entry, putting LM children at a disadvantage relative to their peers.

Classification of Preschoolers Who are Spanish-Speaking Language-Minority Children

Classification of Preschool Children Who are Spanish-speaking LM

Background:

- There is a huge amount of diversity in children exposed to Spanish in the home.
- Historically, the research literature has classified most all of these children as "English-language Learners" (ELL).
- Schools classify children as ELL if they have "limited English proficiency."
- Once children acquire "English proficiency," they are no longer classified as ELL.

Classification of Preschool Children Who are Spanish-speaking LM

Question:

- Do children exposed to Spanish in the home differ from each other in meaningful ways (and if so, how)?

Preliminary Findings from Classification Study:

- Approximately 500 4-year-old children exposed to some level of Spanish in the home.
- Children were assessed in both English and Spanish across the preschool year.
- Latent-class analyses to determine distinct subgroups of children based on both Spanish and English language skills.

Note: Intentionally blank

One data slide was redacted to preserve the publication integrity of study.

Data from Lonigan, C. J., Goodrich, J. M., & Farver, J. M. (in progress).

Classification of Preschool Children Who are Spanish-speaking LM

Summary:

- Nine distinct subgroupings of LMCs based on oral language skills in English and Spanish.
 - All but three groups had English oral language skills below "average" range.
 - Four subgroups had Spanish oral language skills below "average" range.
- Do growth rates of children's skills across preschool vary based on subgroup membership?

Note: Intentionally blank

Four data slides were redacted to preserve the publication integrity of study.

Data from Lonigan, C. J., Goodrich, J. M., & Farver, J. M. (in progress).

Classification of Preschool Children Who are Spanish-speaking LM

Conclusions:

- Substantial and meaningful differences between subgroups of children who are exposed to Spanish in the home.
- For early literacy skills, these subgroups differ both on initial skill levels and on patterns of growth in these skills.
- Children in a substantial number of these groups have low language skills in both Spanish and English—although there are substantial differences in relative strength of Spanish vs. English across groups.

Development of a Spanish Early Literacy Assessment

Development of Spanish Early Literacy Assessment

- Existing measures for young children's early literacy related skills may not be optimal for a variety of reasons:
 - No measure includes all domains of early literacy skills.
 - Designed primarily for school-aged children.
 - Developed and/or normed with monolingual Spanish-speaking populations (e.g., TVIP).
 - Weak or unknown psychometric properties.
 - Not standardized or not standardized on relevant population.
 - Developed on only one Spanish-speaking group.

Development of Spanish Early Literacy Assessment

- Our goal was to develop a comprehensive measure of early literacy skills for use with preschool children who are Spanish-speaking LMC--the *Spanish Preschool Early Literacy Assessment* (SPELA).
- Our goal in development was to produce a measure of the three key early literacy domains that would be neutral with respect to the origin of the Spanish spoken by children.

Development of Spanish Early Literacy Assessment

Development of the SPELA involves seven main phases

- **Phase I:** Item Generation
- **Phase II:** Item Try Out)
- **Phase III:** Initial Item Selection
- **Phase IV:** Refinement of Reduced Item Pool
- **Phase V:** Selection of Final Item Pool
- **Phase VI:** Validity Studies

Sample Characteristics Across Phases

- In each phase of the project, four primary data collection sites participated to sample different population groups (Northeast, West, Midwest, Florida).
- Roughly equal numbers of 3-, 4-, and 5-year-old children were recruited at each site for each phase from Head Start, preschools, and child care locations.
- All children were identified by teachers as speakers of Spanish and this was confirmed by bilingual assessors through casual interactions with children.
- Parents asked to complete basic information about children's home-language environments.

Sample Descriptions for Phase of Project

	Project Phase				IRT Sample
	2 & 3	4	5	6	
N	247	131	436	554	1121
Age Range (months)	36 - 69	37 - 70	36 - 70	36 - 71	36 - 71
Sex (% Female)	47	49	49	50	50
Child's Primary Language					
English	5	1	7	6	6
Spanish	22	26	25	18	22
Both	72	73	63	67	66
Language Spoken in Home					
English	7	2	10	12	10
Spanish	57	57	60	49	54
Both	34	31	26	25	26
Language Spoken to Child					
English	7	4	11	14	11
Spanish	53	52	60	49	53
Both	39	30	24	23	24

Distribution of Sample Across Sites by Phase

Region	Project Phase				IRT Sample
	2 & 3	4	5	6	
South Florida %	22	24	21	21	22
Central Florida %	0	21	22	22	22
North Florida %	7	0	3	0	1
Los Angeles CA %	22	21	20	15	18
Wichita KS %	22	23	19	28	24
Massachusetts %	28	12	14	9	11
Southern New Mexico %	0	0	1	4	2

Distribution of Spanish Origin by Phase

Origin of Spanish	Project Phase				IRT Sample
	2 & 3	4	5	6	
Mexico	39	39	34	30	32
Cuba	14	5	15	19	16
Puerto Rico	26	25	24	16	20
Central American Country	10	12	14	7	11
South American Country	6	12	4	2	4
Dominican Republic	2	4	2	1	2
Spain	1	0	0	<1	<1
Unspecified/Other	3	3	7	24	15

Item Selection Across Phases

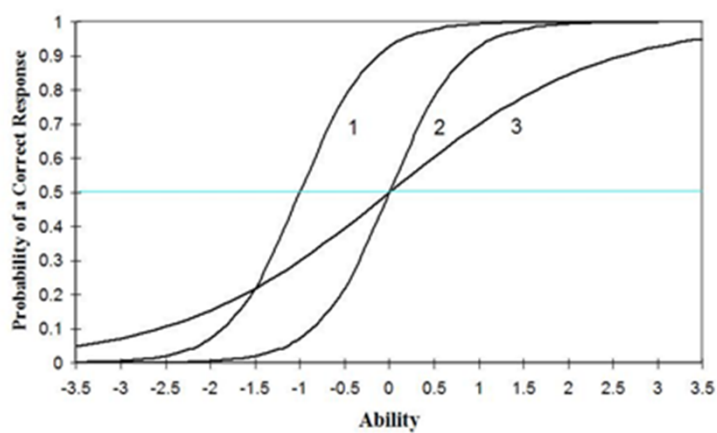
- Item selection involved the use of both Classical Test Theory (CTT) analyses and Item-Response Theory (IRT) analyses.
- When possible (i.e., Phases 3 & 5), IRT was used to evaluate Differential Item Functioning (DIF) to determine if items operated differently across different Spanish-background groups.
- Final item analysis used common data across Phases III – VI (1,121 children).

Item Response Theory (IRT) Analyses of Subtests

- Unlike classical test theory analysis, which provides psychometric information about a measure within the sample population, IRT analysis provides sample-independent information.
- IRT provides information about each item's discrimination and difficulty level.
- Instead of one value for item cohesion (i.e., alpha), IRT yields an estimate of measurement precision across the range of ability within a domain (standard errors across ability levels).
- Allows tests of similarities/differences (DIF) across discrimination and difficulty parameters by group.

Item Response Theory (IRT) Analyses of Subtests

Figure 1. Hypothetical Item Characteristic Curves



Note: Intentionally blank

Seven data slides were redacted to preserve the publication integrity of project.

Data from Lonigan, C. J., Farver, J. M., & McDowell, K. D. (in progress).

Item Response Theory (IRT) Analyses of Subtests

Differential item functioning analyses

- Examined DIF across different Spanish-origin groups
- Two types of DIF
 - Uniform (bad): b parameters
 - Non-uniform (okay): a only or both a and b parameter
- Across subtests, little overall significant DIF
- Most significant DIF was non-uniform DIF, reflecting more or less discrimination ability of items for one subgroup over others.
- Indicates success in developing measures that worked equally well across different versions of Spanish.

Validity Studies (ongoing)

- Includes both current and longitudinal measurement.
- In this phase, 500+ 3-, 4-, and 5-year-old children, selected to represent all of the major Spanish dialects/origins, were administered the refined versions of the SPELA subscales.
- These children also completed a variety of other measures of general cognitive ability, language skills, phonological awareness skills, print knowledge skills, and math skills in both Spanish and English.

Note: Intentionally blank

One data slide was redacted to preserve the publication integrity of project.

Data from Lonigan, C. J., Farver, J. M., & McDowell, K. D. (in progress).

Summary & Conclusions

- Goal was to create a measure of early literacy skills for 3-, 4-, and 5-year-old children exposed to Spanish in the home that would work across different versions of Spanish.
- Iterative process of development--starting with advisory panel made up of native speakers of major Spanish variations--yielded subtests with a high degree of measurement precision across a wide range of abilities.
- All subtests functioned well across variations of Spanish (i.e., little to no DIF).
- Ongoing concurrent validity analysis suggests strong to adequate construct validity.

Efficacy of RtI-Format Early Literacy Intervention for Spanish-speaking LM Preschoolers

Efficacy of Early Literacy Intervention

- Results for adaptation of core Literacy Express activities for children who were Spanish-speaking LM preschoolers.
- 98 children attending Head Start in Los Angeles
- Three groups:
 - **Business-as-usual control**
 - **LE – English only**
 - **LE – Spanish-English Transitional**
- Intervention conducted as a pull-out program from November to end of school year.
- Children tested in both English and Spanish

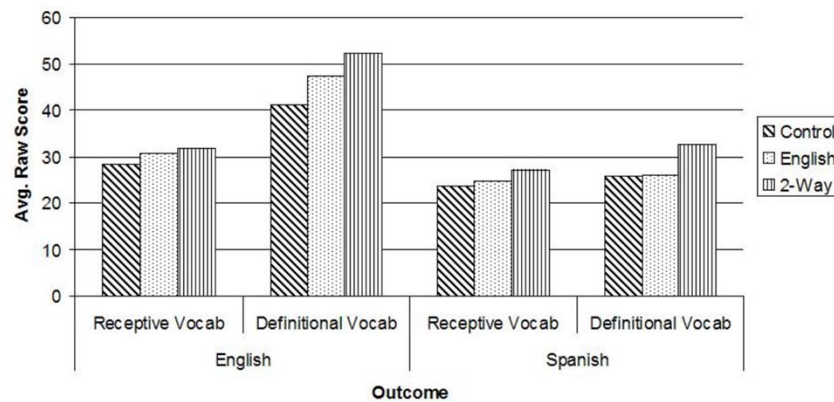
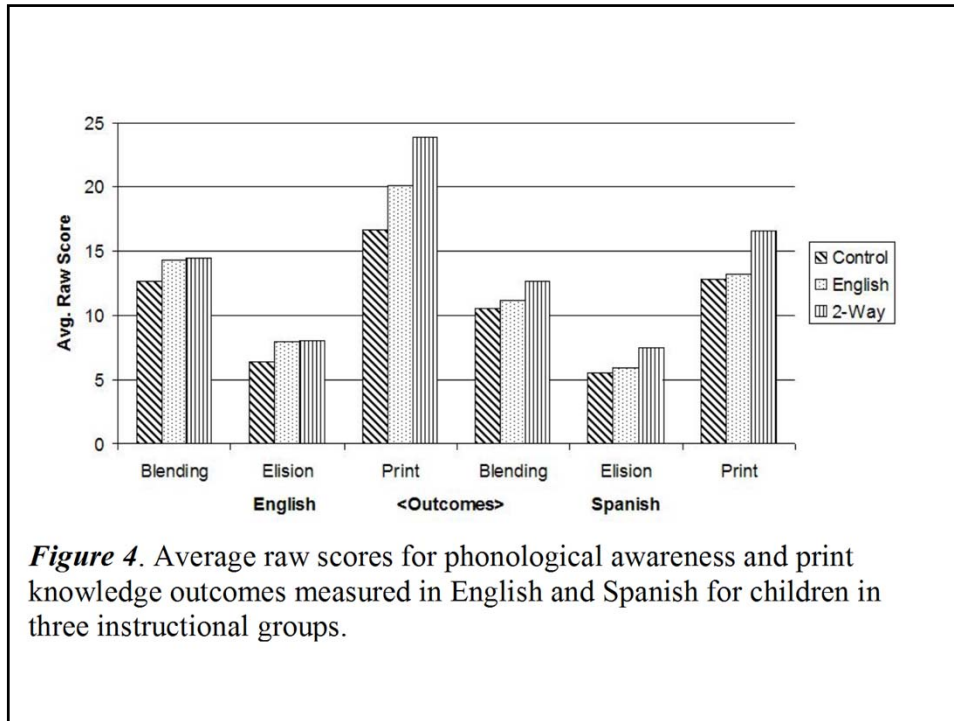


Figure 3. Average raw scores for Receptive and Definitional Vocabulary outcomes measured in English and Spanish for children in three instructional groups.



Efficacy of Early Literacy Intervention

Effect Sizes for Group Comparisons on English-language Outcome Measures

Outcome Measure	E vs C	T vs C	T vs E
Receptive Vocabulary	.40*	.71***	.23
Definitional Vocabulary	.41**	.75***	.39*
Blending	.47**	.53***	.04
Elision	.63**	.62**	.02
Print Knowledge	.41**	.94***	.46**

Efficacy of Early Literacy Intervention

Effect Sizes for Group Comparisons
on TOPEL Standard Scores

TOPEL Subtest	E vs C	T vs C	T vs E
Definitional Vocabulary	.43**	.90***	.51*
Phonological Awareness	.57**	.52***	-.04
Print Knowledge	.33*	.84***	.48**

Efficacy of Early Literacy Intervention

Effect Sizes for Group Comparisons on
Spanish-language Outcome Measures

Outcome Measure	E vs C	T vs C	T vs E
Receptive Vocabulary	.20	.66***	.49**
Definitional Vocabulary	.01	.40***	.36***
Blending	.19	.59***	.47**
Elision	.27	.83***	.60***
Print Knowledge	.05	.48***	.43***

**Standardized Emergent Literacy Scores
 at Pre-Intervention by Group**

TOPEL Subtests	Control	English	Transitional
	Adj. <i>M</i> (<i>SD</i>)	Adj. <i>M</i> (<i>SD</i>)	Adj. <i>M</i> (<i>SD</i>)
Definitional Vocabulary	74.32 (17.47)	77.22 (18.88)	82.22 (14.00)
Phonological Awareness	78.94 (10.10)	81.75 (12.02)	82.26 (12.24)
Print Knowledge	87.61 (10.50)	90.08 (11.35)	93.78 (18.04)

**Standardized Emergent Literacy Scores
 at Post-Intervention by Group**

TOPEL Subtests	Control	English	Transitional
	Adj. <i>M</i> (<i>SD</i>)	Adj. <i>M</i> (<i>SD</i>)	Adj. <i>M</i> (<i>SD</i>)
Definitional Vocabulary	80.61 (17.70)	87.61 (14.70)	94.63 (12.94)
Phonological Awareness	82.57 (11.19)	88.90 (11.08)	88.45 (11.67)
Print Knowledge	92.21 (13.36)	96.66 (13.64)	102.42 (10.29)

Efficacy of Early Literacy Intervention

Conclusions:

- Powerful impacts of a pull-out early-literacy intervention program.
- Large impacts on English-language outcomes for both the English-only and Transitional-bilingual instructional strategies.
- Children in both intervention conditions had end-of-year scores within the average range.
- Two advantages for Transitional model: Definitional Vocabulary, Print Knowledge.
- No detrimental effect of English-only on children's Spanish skills; Transitional improved these skills.

Overall Conclusions

- Lots of variability between children exposed to Spanish in the home.
- Differences in skills at preschool entry (and exit) due primarily to differences in oral language skills (not SES differences).
- Targeted preschool intervention programs and curricula can substantially enhance children's skills.
- Language of instruction matters less than high-quality instruction.



The logo for the Florida Center for Reading Research (FCRR) features the letters 'FCRR' in a stylized font. The 'F' is a simple vertical bar. The 'C' is a semi-circle with a yellow-to-orange gradient. The 'R's are black with a white outline. Below the logo is the text 'Florida Center for Reading Research'. To the right of the logo is a photograph of four children: a boy in a red shirt, a boy in a striped shirt, a boy in a white shirt, and a girl in a white shirt holding a purple book.

Florida Center for Reading Research

www.FCRR.org

Email: lonigan@psy.fsu.edu