

# Exploring the Pronunciation- Identity Link of Spanish Immersion Learners

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Immersion 2012: Bridging Contexts for a Multilingual World

# Statement of Problem

- Native-like pronunciation
  - enhances communication (e.g., Okamura, 1995; Zampini, 1994)
  - improves credibility (Lev-Ari & Keysar, 2010)
  - is necessary to be considered a legitimate speaker (e.g., Lippi-Green, 1997; Lybeck, 2002; Miller, 2004)
  - is necessary for membership into some groups (e.g., Lippi-Green, 1997; Beebe & Zuengler, 1983; Bolton & Kwok, 1999; Lefkowitz & Hedgcock, 2002, 2006; Lybeck, 2002; Major, 2004; Zuengler, 1988)
- Native-like pronunciation is difficult to attain (e.g., Scovel, 1969)
  - early exposure → greater likelihood of developing native-like pronunciation (e.g., DeKeyser, 2000; Flege, MacKay, & Meador, 1999; Hojen & Flege, 2006; Munro, Flege, & MacKay, 1996; Scovel, 1969)

# Statement of Problem

- Immersion students' language differs from that of native speaker peers
- Phonology of one-way immersion students
  - Impressionistic accounts differ (e.g., Campbell, 1984; Day & Shapson, 1996; Flores, 1973)
  - Ratings of pronunciation as part of larger oral language assessment tend to show differences between immersion students & peers (Genesee, 1978; Fortune & Arrabo, 2006)
  - More focused studies show a peak in pronunciation abilities around 3<sup>rd</sup> grade followed by a decrease in target-like pronunciations (Harada, 1999; Menke, 2010; Snow & Campbell, 1985)

# L2 Acquisition of Spanish Sounds

- Research primarily conducted with adult L2 learners of Spanish sounds
- Elliot (1997) – 19 sounds that contribute to American accent in Spanish
  - [r, ɾ, b, β, ð, γ, p, t, k, d, ɲ, z, m, g, a, e, i, o, u]

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The background of the slide features a light gray gradient with numerous thin, vertical, teal-colored lines of varying lengths and positions, creating a textured, rain-like effect. A solid teal horizontal bar spans the width of the slide, positioned below the main background. The word "Methodology" is written in white, bold, sans-serif font within this teal bar.

# Methodology

# Methodology – Research Sites

	One-way	Two-way
No. of students	4,447	86,000
No. of schools	5	97
Race		
White	64.32%	26%
Hispanic	31.2%	62%
African American	2.2%	8%
Asian	2.12%	3%
Other	3%	1%
Free/Reduced Lunch	25%	46%
Limited English Proficient	5%	7%

# Methodology – Research Sites

	One-way		Two-way	
	Spanish	English	Spanish	English
<b>K</b>	NA	NA	90%	10%
<b>1</b>	100%	0%	90%	10%
<b>2</b>		30 min/day 2 <sup>nd</sup> sem only	80%	20%
<b>3</b>		30-45 min/day	80%	20%
<b>4</b>		1 hr/day	70%	30%
<b>5</b>		1 hr/day	60%	40%
<b>6</b>	Social Studies, Science	Math, English LA	50%	50%
<b>7</b>	Science, Spanish LA	Math, English LA, Social Studies	Science, History, Spanish LA	Math, English/Reading
<b>8</b>	Spanish LA	Math, English LA, Social Studies, Science	Science, Spanish LA, English LA	Math, History



# Methodology - Participants

	One-way NES				Two-way NES				Two-way NSS			
	1 <sup>st</sup>	3 <sup>rd</sup>	5 <sup>th</sup>	7 <sup>th</sup>	1 <sup>st</sup>	3 <sup>rd</sup>	5 <sup>th</sup>	7 <sup>th</sup>	1 <sup>st</sup>	3 <sup>rd</sup>	5 <sup>th</sup>	7 <sup>th</sup>
<b>Total No. of Participants</b>	10	9	8	8	8	8	4	3	9	9	7	6
<b>Males</b>	4	4	1	2	2	4	2	1	3	1	4	5
<b>Females</b>	5	5	7	6	6	4	2	2	6	8	4	1
<b>Mean Age</b>	7	8.2	10.4	12.8	6.9	8.8	11	13	6.5	8.5	11	12.7
<b>Born in US</b>	10	9	8	8	8	8	4	3	8	8	4	5
<b>Born in Mexico</b>	0	0	0	0	0	0	0	0	1	4	3	1

# Methodology – Tasks

- Language Background Information Questionnaire
- Picture Sort
- Picture Walk
- Student Attitude Questionnaire

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# Methodology - Analysis

## ⊙ Acoustic analysis

### ○ Praat v.4.5.16 signal-processing software

○ Vowels – F1 & F2 values at mid-point, LPC formant tracking algorithm

○ /p, t, k/ - VOT in ms

○ /r ,r/ - production

## ⊙ Statistical analyses via SPSS v18.0 ( $p=0.01$ )

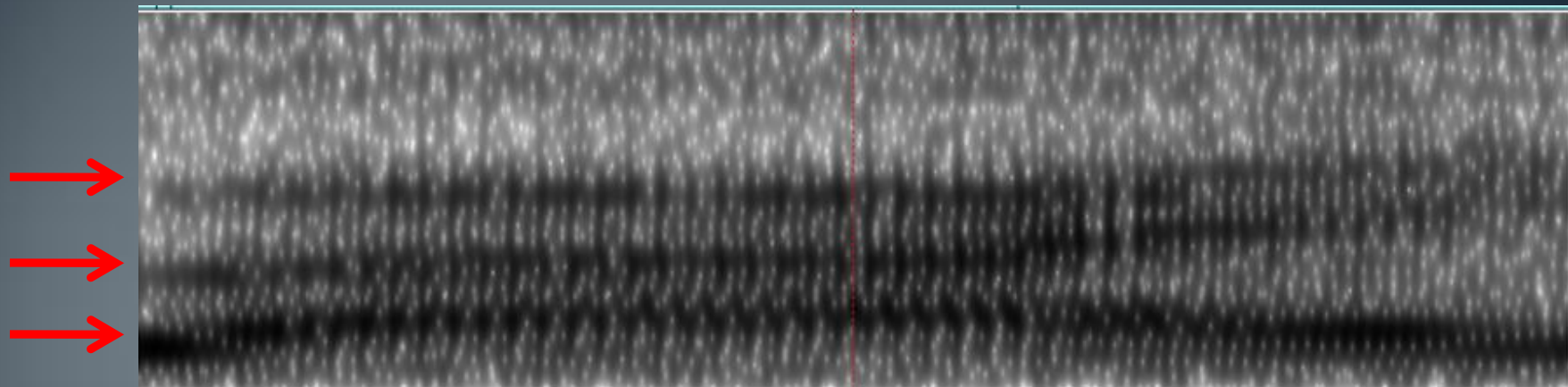
The image features a background of numerous thin, vertical teal lines of varying lengths and positions, creating a textured, rain-like effect. A solid teal horizontal bar spans the bottom of the image, containing the word "Results" in white text. Two thin yellow horizontal lines are positioned above and below the teal bar.

# Results

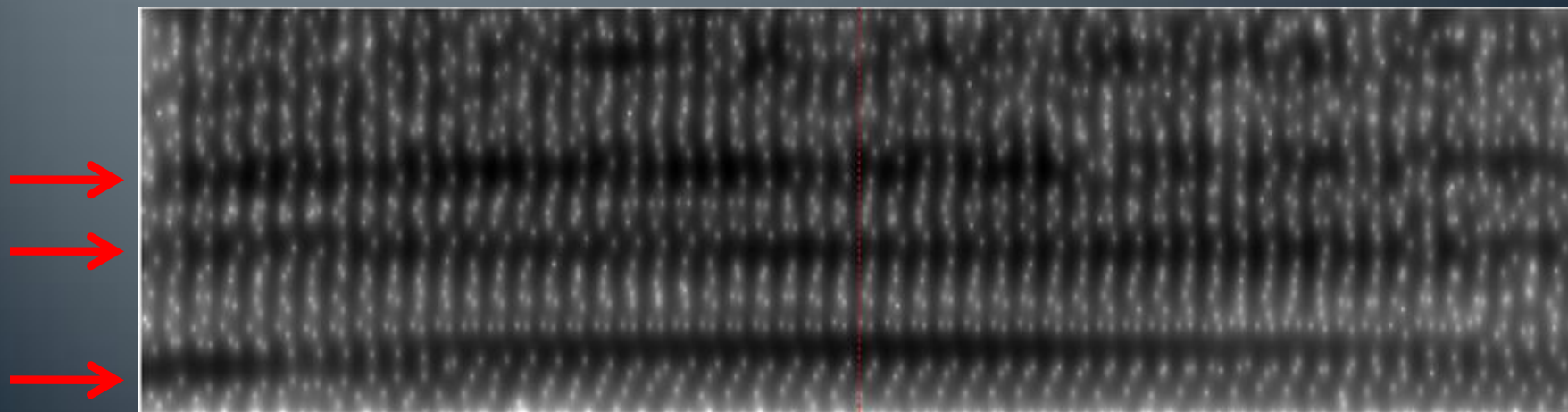
# Results Section Overview

- vowels
- /p, t, k/
- /r, r/
- identity

# Vowels



A3-3a8-1



A7-6e12-1

# Vowels

- F1 – tongue height
  - Higher tongue position, lower F1 value
  - Lower tongue position, higher F1 value
- F2 – tongue backness
  - More fronted tongue position, higher F2 value
  - More back tongue position, lower F2 value



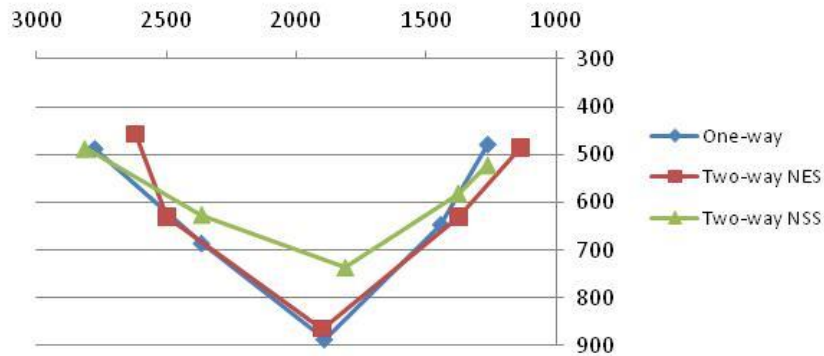


# Vowel Tokens Analyzed

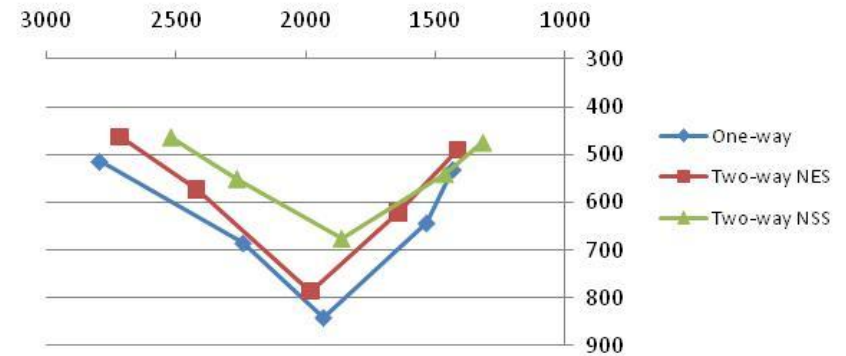
		One-way				Two-way NES				Two-way NSS				
		1st	3rd	5th	7th	1st	3rd	5th	7th	1st	3rd	5th	7th	
i	s	88	90	79	75	71	75	39	25	84	86	76	54	<b>842</b>
	u	94	87	73	71	66	68	36	21	74	66	71	52	<b>779</b>
e	s	89	88	82	78	74	80	40	26	79	81	77	51	<b>845</b>
	u	64	66	47	54	36	55	25	10	57	43	44	39	<b>540</b>
a	s	100	90	81	80	77	78	37	29	89	90	80	58	<b>890</b>
	u	94	89	79	75	76	75	39	21	77	83	76	59	<b>843</b>
o	s	78	83	67	66	61	63	31	16	70	54	59	44	<b>692</b>
	u	100	90	86	79	74	79	36	28	89	88	79	57	<b>885</b>
u	s	53	59	45	44	34	48	22	11	52	46	41	31	<b>486</b>
	u	30	40	39	36	37	32	20	10	30	35	30	17	<b>356</b>
		<b>790</b>	<b>782</b>	<b>678</b>	<b>658</b>	<b>606</b>	<b>653</b>	<b>325</b>	<b>197</b>	<b>701</b>	<b>672</b>	<b>633</b>	<b>462</b>	<b>7158</b>

# Vowels

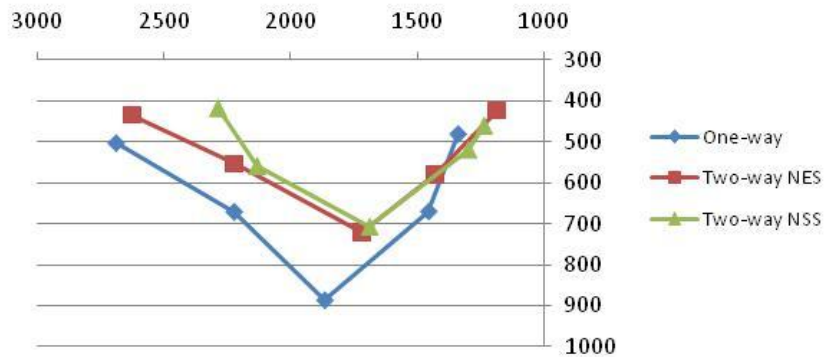
## Across Program Comparisons 1st grade



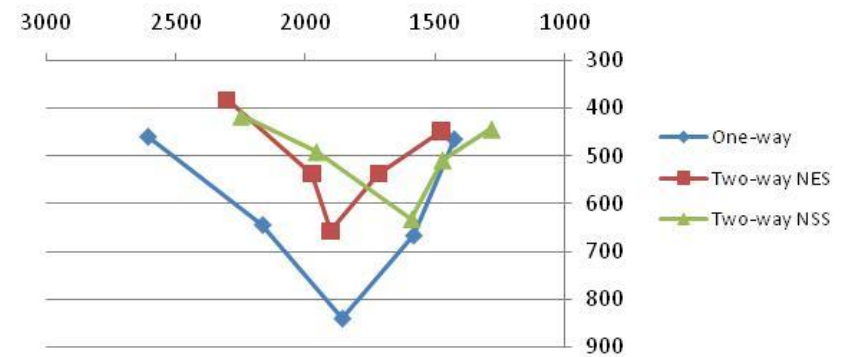
## Across Program Comparisons 3rd grade



## Across Program Comparisons 5th grade



## Across Program Comparisons 7th grade



# Vowels

## Summary of the Number of Statistical Differences between Program/Language Groups at Each Grade Level

Control Group		Two-way NSS	
Learner Group		One-way NES	Two-way NSS
Grade Level	1 <sup>st</sup>	4	7
	3 <sup>rd</sup>	5	6
	5 <sup>th</sup>	9	3
	7 <sup>th</sup>	8	4

# /p, t, k/

- Voice Onset Time (VOT)

- Time elapsed between closure release and onset of voicing (vocal cord vibration),

Spanish stops

/b, d, g/

/p, t, k/

English stops

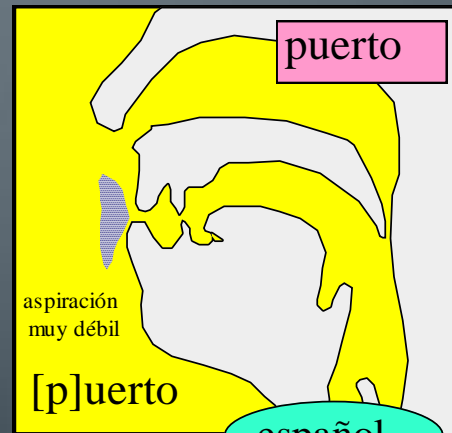
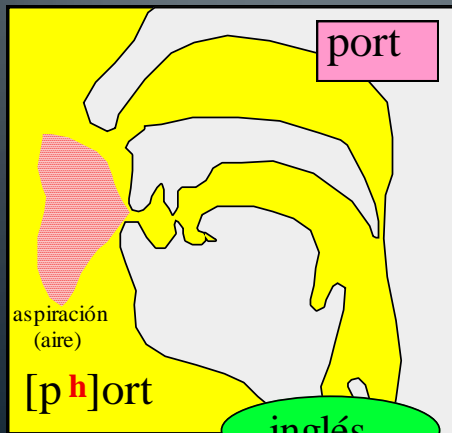
/b, d, g/

/p, t, k/

lead voicing

short lag

long lag



# Acquisition of /p, t, k/

- Stop consonants acquired early in Spanish
  - VOT is not defining factor in early development (Deuchar & Clark, 1996)
- Bilingual speakers have intermediate (or “comprised”) VOTs, not like VOTs of monolinguals, even in their L1

(Flege, 1987, 1991; Flege & Eefting, 1987; Flege & Hillenbrand, 1984; Hazan & Boulakia, 1993, Major, 1992; Thornburgh & Ryalls, 1998)
- Those who acquire L2 before age of 6 more likely to produce stops with native-like VOTs

(Flege, 1991; Mack, 1989; Williams, 1977)

# /p, t, k/

	/p/		/t/		/k/	
	one-way	two-way	one-way	two-way	one-way	two-way
1 <sup>st</sup>	15.135 n=51	15.737 n=53	28.194 n=32	17.983 n=32	30.077 n=44	29.801 n=48
3 <sup>rd</sup>	13.517 n=52	18.218 n=48	18.717 n=36	26.256 n=30	22.627 n=50	25.815 n=41
5 <sup>th</sup>	21.608 n=52	20.01 n=38	34.959 n=37	56.225 n=25	42.075 n=52	58.473 n=40
7 <sup>th</sup>	19.309 n=46	21.392 N=24	26.732 n=27	34.132 n=16	24.884 n=43	36.703 N=22

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	/p/		/t/		/k/	
	mean	range	mean	range	mean	range
Lisker & Abramson (1964)	4	0-15	9	0-15	29	15-55
Deuchar & Clark (1996)	22	10-53	32	9-44	46	23-71

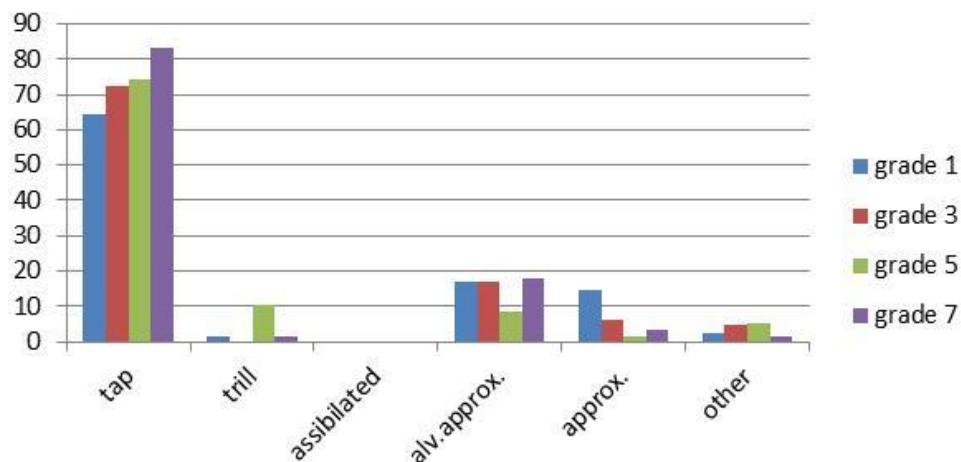
# Acquisition of /ɾ/ and /r/

- Late-acquired sound by L1 Spanish-speaking children (3.5-6.5 yrs)  
(Acevedo, 1983; Fantini, 1984; Jimenez, 1987; Linares, 1981; Melgar, 1976, Anderson & Smith, 1987; de la Fuente, 1985)
- Previous studies with adult learners
  - Beginning learners
    - Transfer of English alveolar approximant for both phones
  - Intermediate learners
    - /ɾ/ - increase in accuracy, especially word-internally
    - /r/ - overgeneralization of [ɾ] to this context, higher rate of native-like productions
  - Advanced learners
    - /ɾ/ - high levels of accuracy
    - /r/ - some overgeneralization of [ɾ], relatively high rates of accuracy (~70%+)

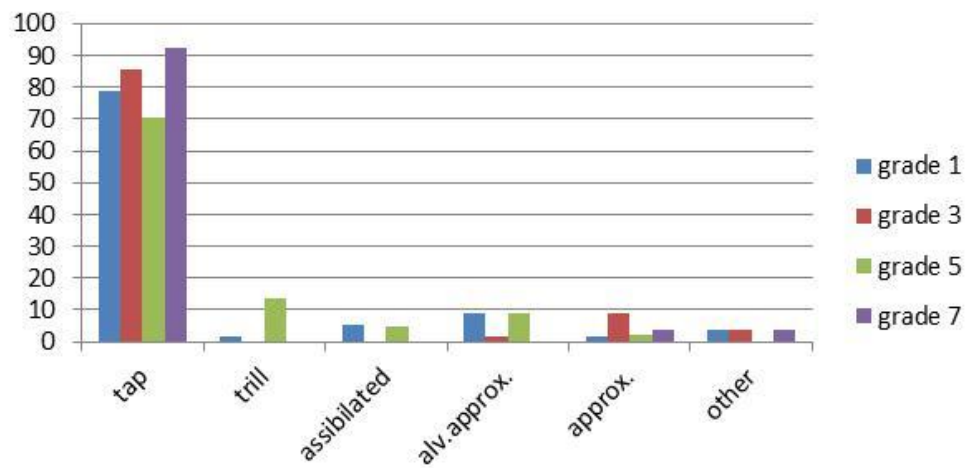
(Face, 1996; Face & Menke, 2010; Major, 1986; Reeder, 1998; Rose, 2010)

# /ɾ/ - “tap”

## One-way Productions of /ɾ/

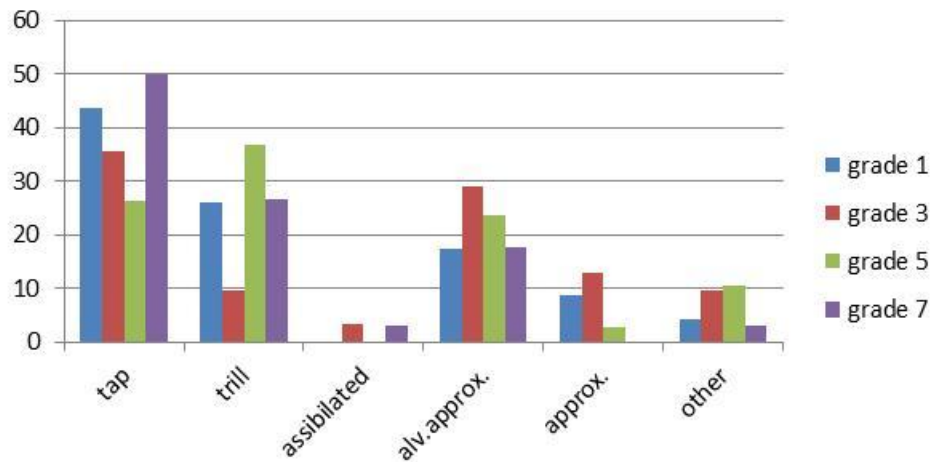


## Two-way Productions of /ɾ/

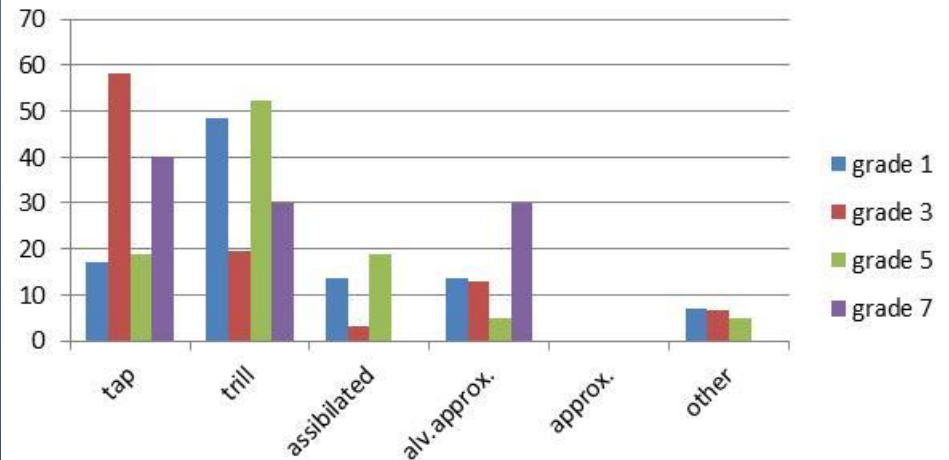


# /r/ - “trill”

## One-way Productions of /r/



## Two-way Productions of /r/



# Summary of Production Findings

- Vowels
  - Two-way learners become more native-like in pronunciation as grade level increases
  - One-way learners become less native-like in pronunciation as grade level increases
- /p, t, k/
  - No differences between groups
  - “Intermediate” VOTs (high end of Spanish norms, low end of English norms)
- /ɾ, r/
  - “tap” – increase in native-like productions; two-way learners tend to have greater percentage of native-like productions
  - “trill” – overall low percentages of native-like productions; inconsistency across grade levels; dialectal variant present in two-way learners productions

# Connections to previous studies

- 5<sup>th</sup> grade, one-way immersion learners have least native-like pronunciation
  - Greatest number of significant differences in vowel productions
  - Greatest VOT values
  - Lowest percentage of trill productions
- Two-way immersion students have more native-like pronunciation
  - More native like vowel productions
  - Greater percentages of [rɾ] and [r] productions

# Identity and Pronunciation

- Connection between student attitudes toward the second language, culture and people, and pronunciation
  - “covert prestige” (Hedgcock & Lefkowitz, 2000)
  - Not identifying with target culture (Lybeck, 2002)

# Methodology - Attitudes

- Attitudes
  - Factor 1: Positive attitude toward Spanish
  - Factor 2: Recognition of instrumental reasons/motivations for knowing Spanish
  - Factor 3: Recognition of the importance of pronunciation
  - Factor 4: Positive rating of pronunciation abilities
- Perception of abilities



# Attitudes

		Factor 1 mean	Factor 2 mean	Factor 3 mean	Factor 4 mean	Ability mean
1 <sup>st</sup>	<b>Poss. range</b>	n/a	n/a	n/a	n/a	1-4
	<b>one-way</b>	n/a	n/a	n/a	n/a	3.2
	<b>two-way</b>	n/a	n/a	n/a	n/a	3.88
3 <sup>rd</sup>	<b>Poss. range</b>	4-16	5-20	3-12	1-4	1-4
	<b>one-way</b>	5.89	7.78	6.22	1.67	3.33
	<b>two-way</b>	5.25	7.13	5.88	1.88	3.38
5 <sup>th</sup>	<b>Poss. range</b>	5-20	5-20	5-20	3-12	1-4
	<b>one-way</b>	6.88	6.13	9.13	5.63	3.38
	<b>two-way</b>	6.0	7.75	10.00	6.75	3.75
7 <sup>th</sup>	<b>Poss. range</b>	5-20	5-20	5-20	3-12	1-4
	<b>one-way</b>	7.13	8.13	9.13	5.88	2.88
	<b>two-way</b>	8.33	6.67	11.00	6.33	3.33

# Ethnic ties to the language

## One-way students

- ◎ 35 total participants
  - ◎ 32 Caucasian, American or United States
  - ◎ 2 Hispanic
  - ◎ 1 French, Chinese, English mix

## Two-way students

- ◎ 23 total participants
  - ◎ 22 Hispanic
    - ◎ 19 Mexican
    - ◎ 2 Nicaraguan
    - ◎ 1 Puerto Rican
  - ◎ 1 African-American.

# Ethnic ties to the language

		One-way NES	Two-way NES
Parent 1	Spanish	1	6
	English	30	16
	Other	3 (2 bilingual Sp/Eng; 1 French)	1 (bilingual Sp/Eng)
Parent 2	Spanish	0	6
	English	32	10
	Other	0	1 (bilingual Sp/Eng)

## First Language of Parents of NES Participants

## Knowledge of Spanish by Parents of NES Participants

		One-way NES	Two-way NES
Parent 1	Yes	16 47%	18 78%
	No	18 53%	5 22%
Parent 2	Yes	9 28%	14 78%
	No	23 72%	4 22%

# Language use patterns outside of school

		0%	1-20%	20-40%	40-60%	60-80%	80-100%
Source of Exposure to Spanish	mother	8	19	1			
	father	17	9				
	siblings	11	15	1			
	grandparents	18	8	1		1	
	neighbors	21	2	3			
	friends	10	13	3			
	radio	20	6				
	audio or video tapes	18	10				
	TV or movies	12	16				
	other: maid/nanny nanny/caretaker housekeeper Mexico nanny		4	2	1	1	1

**One-way NES**

		0%	1-20%	20-40%	40-60%	60-80%	80-100%
Source of Exposure to Spanish	mother	6	7	6	1		2
	father	8	6	5	1		1
	siblings	12	3	1		1	1
	grandparents	2	5	7	3	3	3
	neighbors	14	2	4	1	1	
	friends	10	5	2	1	1	1
	radio	10	4	4	1		1
	audio or video tapes	9	3	3	2	1	
	TV or movies	6	6	6		3	1
	other: aunt reading books		1	1	1		

**Two-way NES**

# Discussion of Identity

- Not significant differences in attitudes toward Spanish and its speakers
  - Program design – increased use of English in late elementary
  - Novelty of language wears off
  - Increased exposure to Spanish outside of classroom
    - Value of “overhearing” in early years (Au, Knightly, Jun & Oh, 2002; Au, Oh, Knightly, Jun & Romo, 2007; Knightly, Jun, Oh & Au, 2003)

# Conclusions

- Earlier exposure does not guarantee native-like pronunciation nor does it guarantee more native-like pronunciation than those who learn an L2 later.
- The input and instruction provided inside a one-way (foreign language) immersion program may be insufficient for the development of native-like pronunciation to development.
- Contact with NSS peers, whether inside or outside the school, may be necessary to promote phonological acquisition.

# Pedagogical Implications

- Increase contact with native speakers
- Increase attention to phonological system
  - Phonemic differences ([ɹ] vs. [r], [e] vs. [eɪ])
  - Allophonic differences ([β, ð, ʏ])
- Increase saliency of acoustic signal

# Directions for Future Research