

# *Trajectories of Child Language Use with Spanish-Speaking Caregivers Spanning the First Two Years of School*

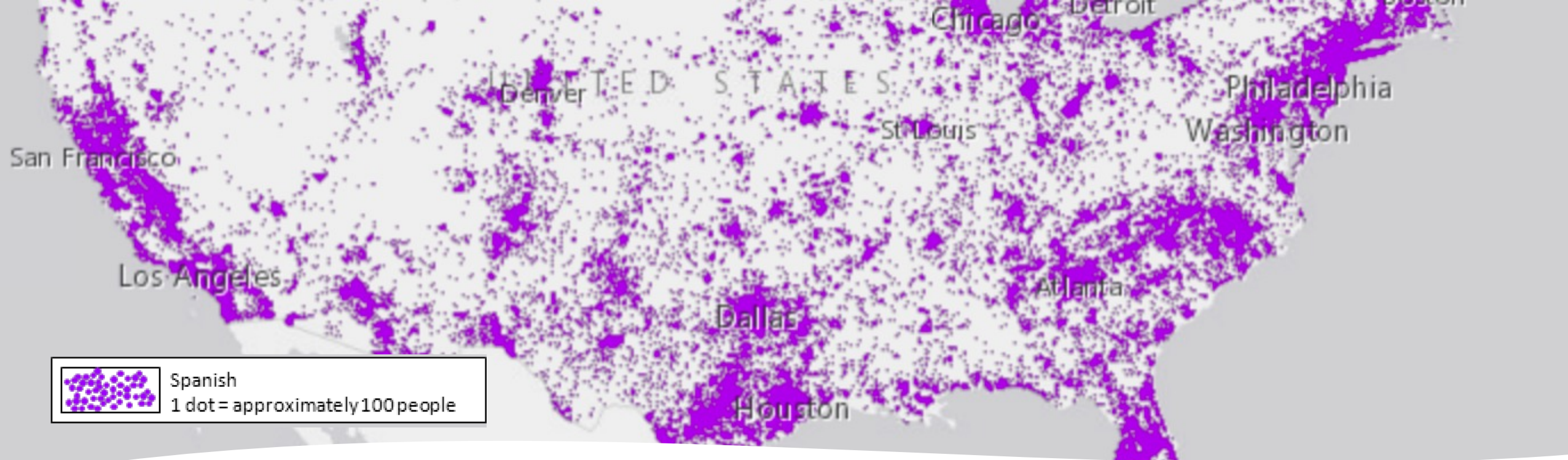
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University of Texas Health Science Center at Houston

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Chicago, IL

# Overarching Questions

How do home language practices shift after children start school? What contextual factors are associated with changes in Spanish and English use?





## Spanish-Speaking Dual Language Learners

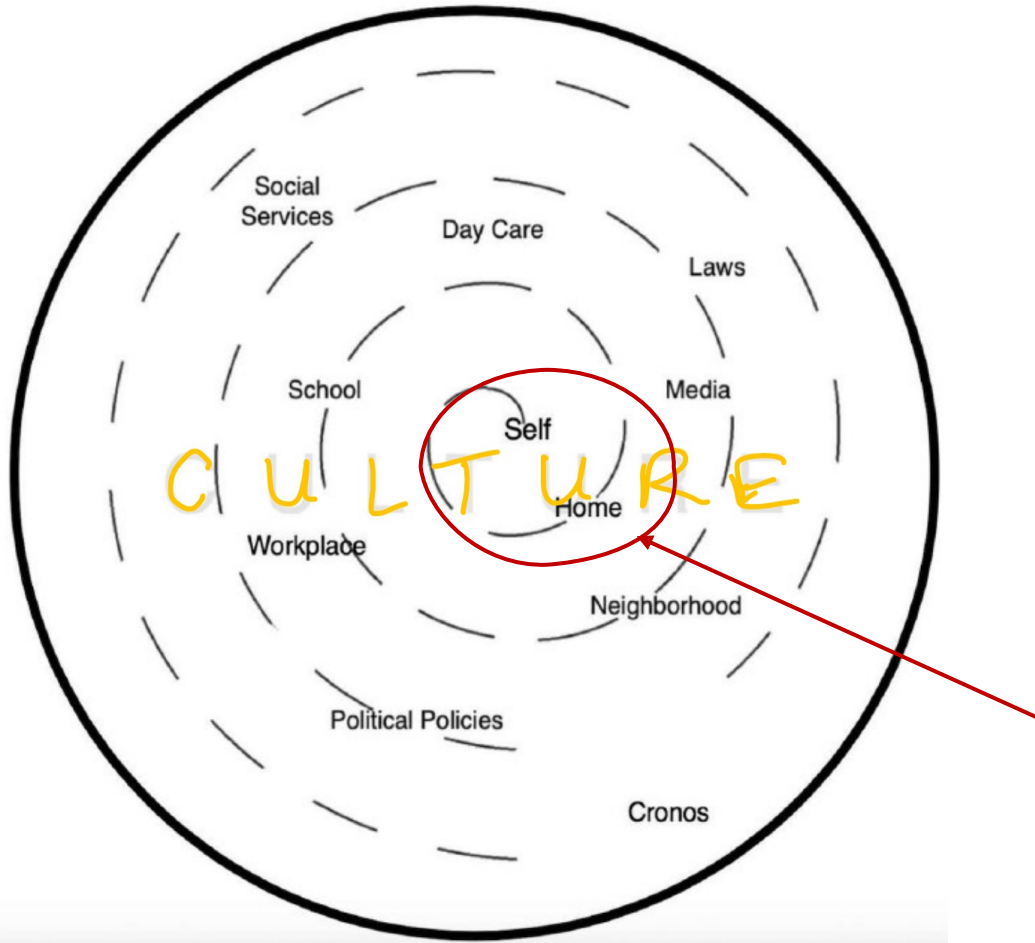
- Fastest-growing group of school-aged children in the United States
- Varied immigration histories, social circumstances, and cultural practices, including **language practices**



# Diversity in DLLs' home language practices

- Spanish-English DLLs vary in the degree to which they use Spanish with Spanish-speaking parents
- In previous studies, on average, DLL children...
  - ...preferred to use **English** with bilingual parents (López et al., 2020)
  - ...**increased in their English use** over time (Hammer et al., 2011)
- But these average trends may obscure **distinct language-use trajectories** among DLLs
- Luo et al. (2020) used **group-based trajectory modeling** to identify different **parent** profiles of change in Spanish and English use
- The current study uses a similar approach to identify different profiles of change among **DLL children**

# Conceptual Framework



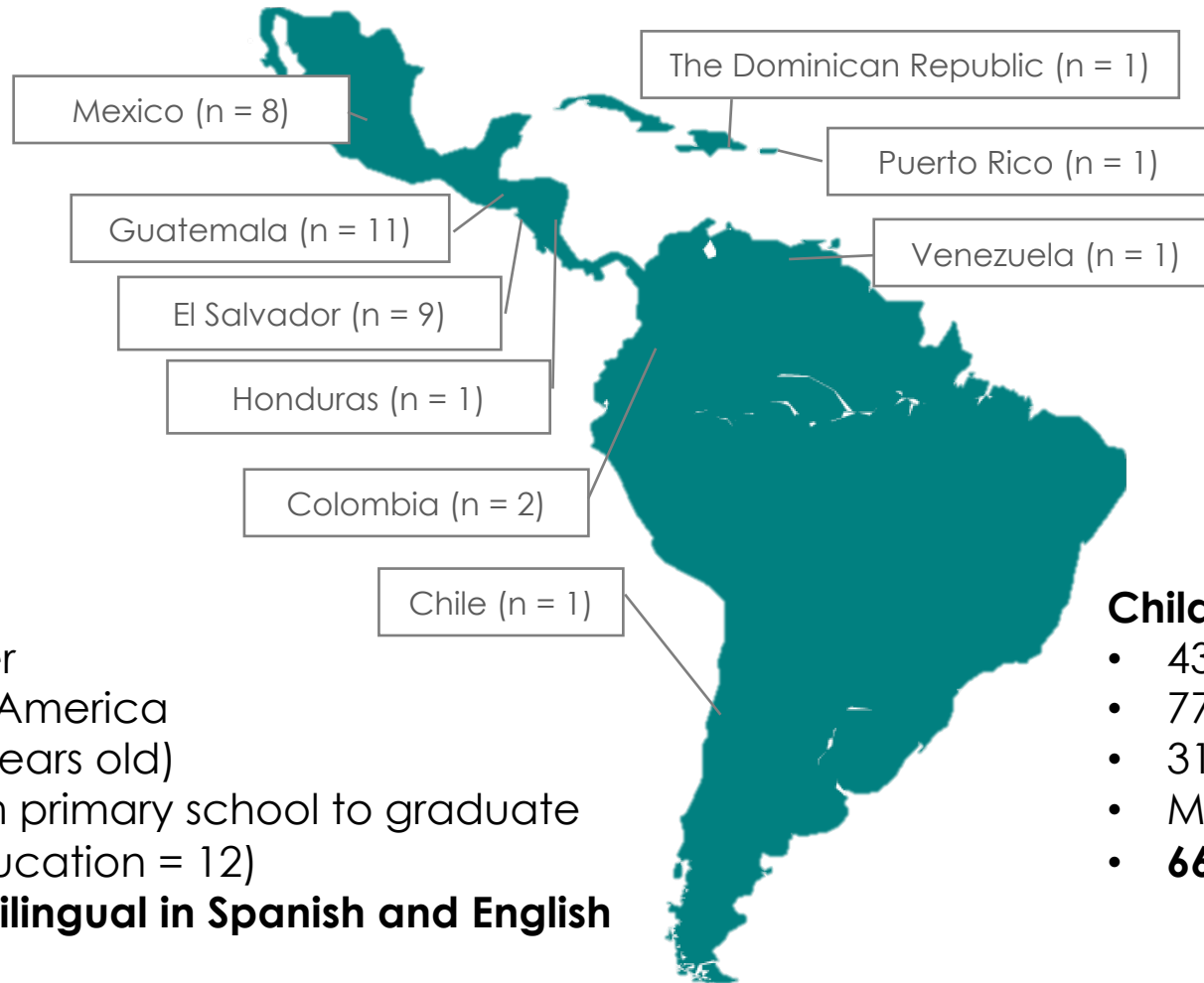
“Humans develop through their changing participation in the sociocultural activities of their communities, which also change.”  
(Rogoff, 2004)

- **Culture permeates all aspects of life** – including parent-child interactions
- **Culture is a diversifying force** rather than a homogenizing force
- The current study looks at **how children change in their participation in parent-child book sharing interactions over time**, and explores factors related to different language-use trajectories

# Research Questions

1. What distinct profiles can be identified in the **language-use trajectories** of DLLs in the 2 years spanning school entry?
2. What **contextual factors** are associated with membership in each profile?

# Method: 35 Spanish-speaking parent-child dyads in the Boston area



## Parents

- 34 mothers and 1 father
- Immigrated from Latin America (M age of arrival = 25 years old)
- Education ranged from primary school to graduate degree (M years of education = 12)
- **31% self-identified as bilingual in Spanish and English**

## Children

- 43% female
- 77% born in U.S.
- 31% oldest or only child
- Mean age = 46 months at Time 1
- **66% Spanish strongest language**

# Method: Study Design and Procedures



- Video-recorded parent-child interactions with a wordless picture book
  - Transcribed in CLAN
  - Word types per minute in Spanish & English, child-initiated code-switching
- Parent interview, child vocabulary assessment in Spanish & English (CELF-P2)



# Analytic Approach

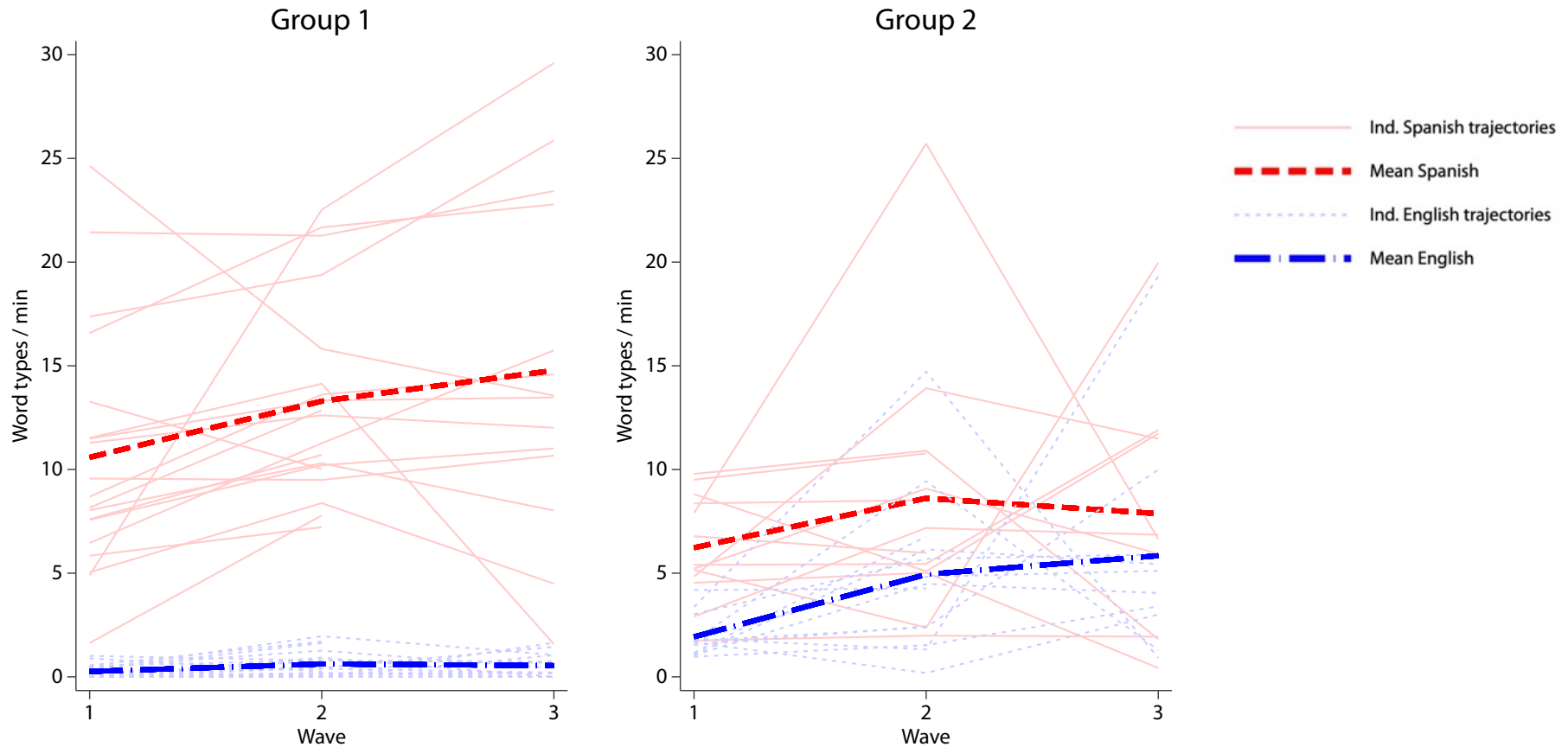
- Group-based trajectory model using the Stata traj plugin
  - Independent variable: child age (centered)
  - Dependent variables: child Spanish types/min, child English types / min
- Full-information maximum likelihood (FIML)
  - $n = 32$  with 2 or 3 waves
- Evaluated fit:
  - BIC/AIC, posterior probabilities ( $> .9$ ), sample size per group
- Resulting groups compared on:
  - Parent and child demographics and language history
  - Characteristics of parent and child language use

RQ1: What distinct profiles can be identified in the **language-use trajectories** of DLLs in the 2 years spanning school entry?

# Model Selection

No. of Groups	BIC	AIC	% Assigned to each group		
			Group 1	Group 2	Group 3
1	-506.55	-501.42	100%	na	na
<b>2</b>	<b>-451.48</b>	<b>-441.22</b>	<b>59%</b>	<b>41%</b>	<b>na</b>
3	-463.61	-448.22	59%	41%	0%

# Trajectories of Spanish and English use by group



**High-increasing Spanish use & low-stable English use**

**Variable Spanish & increasing English use**

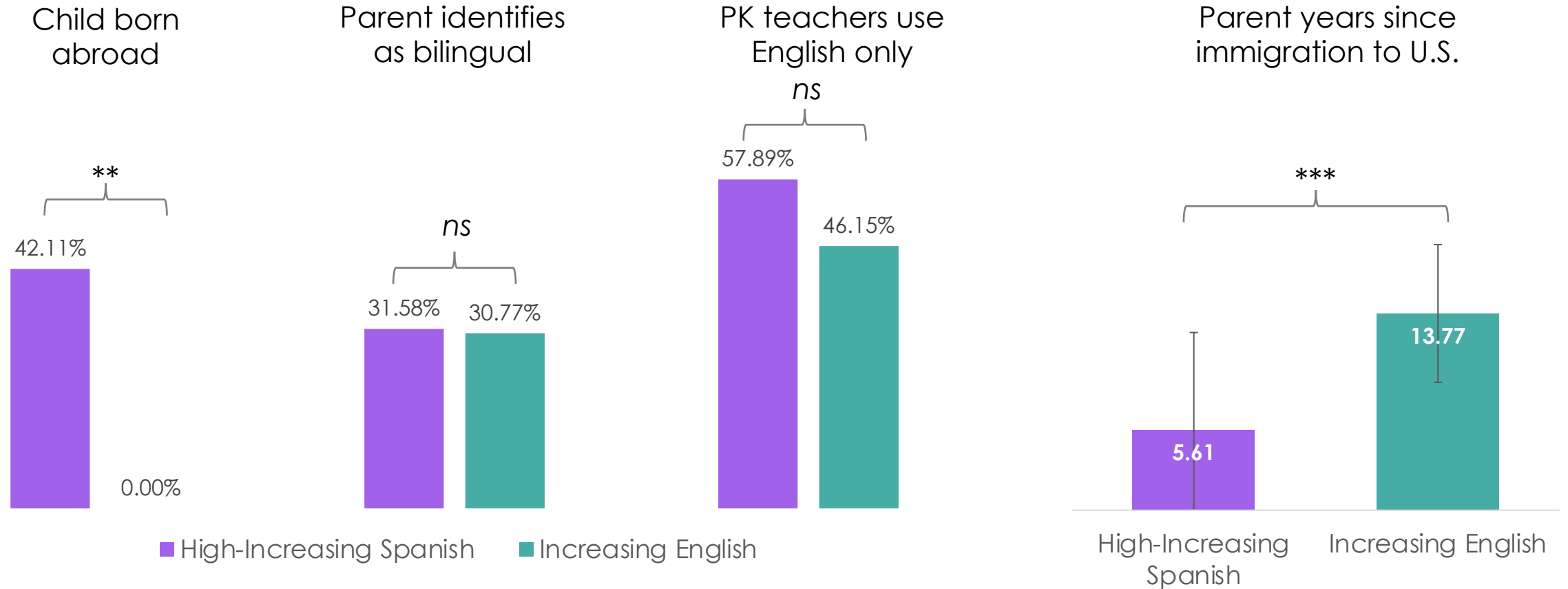
# Spanish and English word types for 2 trajectory groups

	Group 1. <b>High- increasing Spanish use,</b> low-stable English use	Group 2. Variable Spanish use, <b>increasing English use</b>	Comparing groups (2-tailed t-test)
Posterior probability	.98	.95	
Percentage	59%	41%	
<i>n</i>	19	13	
Spanish types; M(SD)			
Wave 1	10.59 (5.89)	6.23 (2.53)	* <i>p</i> =.0180
Wave 2	13.29 (4.77)	8.61 ( 6.18)	* <i>p</i> =.0219
Wave 3	14.77 (8.09)	7.87 (6.00)	* <i>p</i> =.0325
English types; M(SD)			
Wave 1	.26 (.31)	1.93 (.99)	*** <i>p</i> <.0001
Wave 2	.62 (.62)	4.94 (3.90)	*** <i>p</i> <.0001
Wave 3	.54 (.57)	5.84 (5.40)	** <i>p</i> =.0013



RQ2: What contextual factors are associated with membership in each profile?

# Do profiles differ by demographics or language history?



\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , comparisons use chi-square tests and t-tests

# Do profiles differ by parent or child language use?

## Parent Language

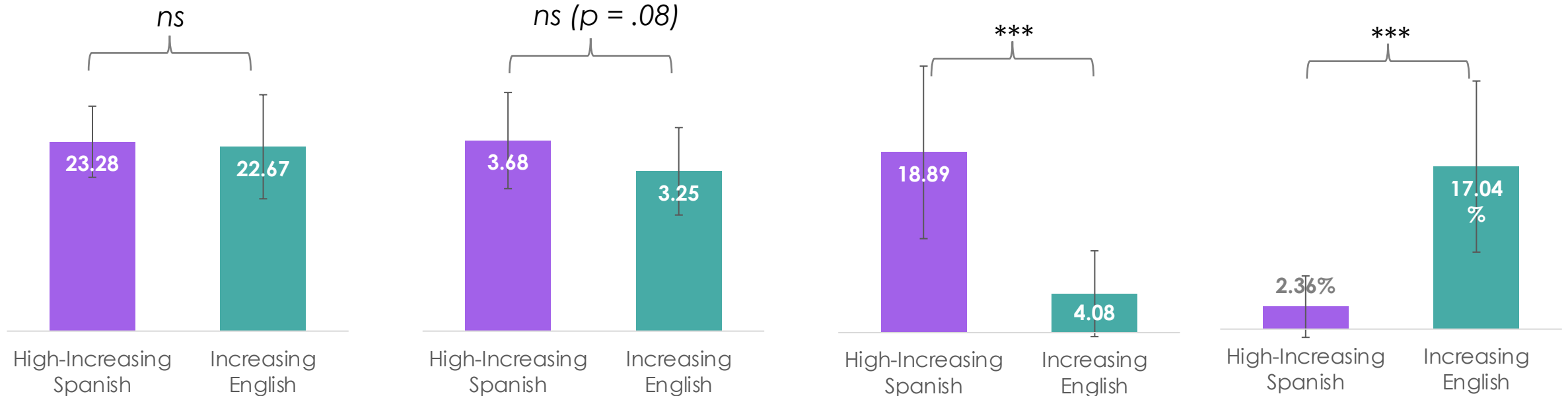
## Child Language

Parent Spanish  
word types/ min

Parent Mean Length  
of Utterance

Child Spanish Exp.  
Vocab. raw score

Child-initiated Code-  
Switches to English

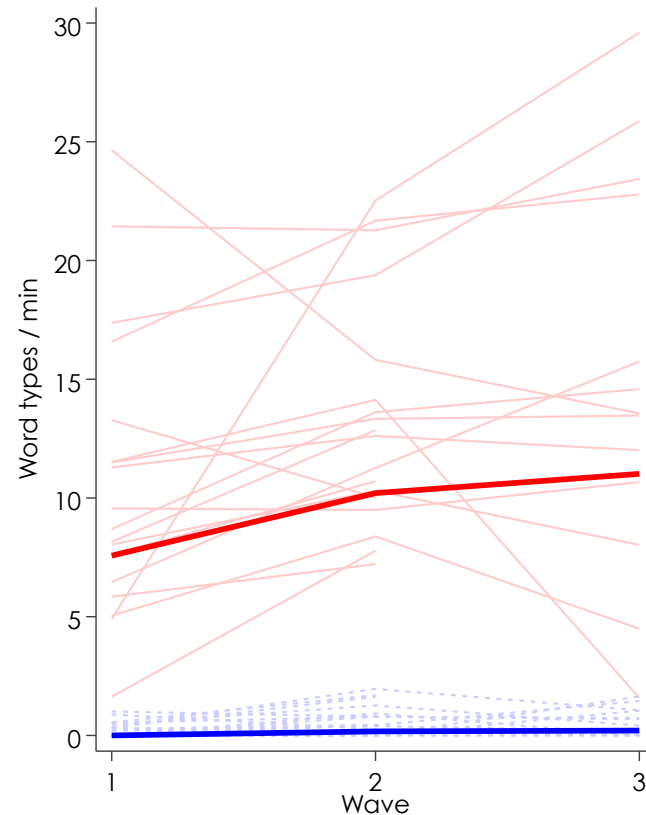


\*p < .05, \*\*p < .01, \*\*\*p < .001, comparisons using t-tests

# A tale of two children: Samuel and Deisy\*

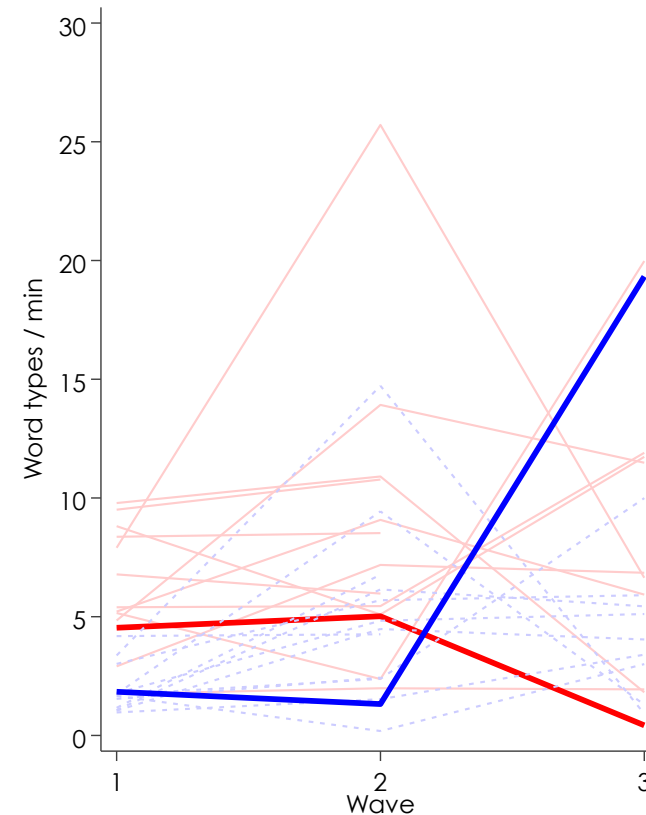
## Samuel

- Has twin brother
- Mom from Colombia has lived in U.S. for 11 years
- Dad from U.K but also lived in Colombia
- Both parents are bilingual and use Spanish with children
- Grandma from Colombia lived with family
- PK at an English-only Montessori school



## Deisy

- Has older siblings who use only English
- Mom from Mexico has lived in U.S. for 20 years
- Dad from El Salvador
- Mom is bilingual, dad is more dominant in Spanish
- PK at an English-only Head Start, K at English-only charter school



\*All names are pseudonyms

# Group 1 Example: Samuel



**Age: 3;0**

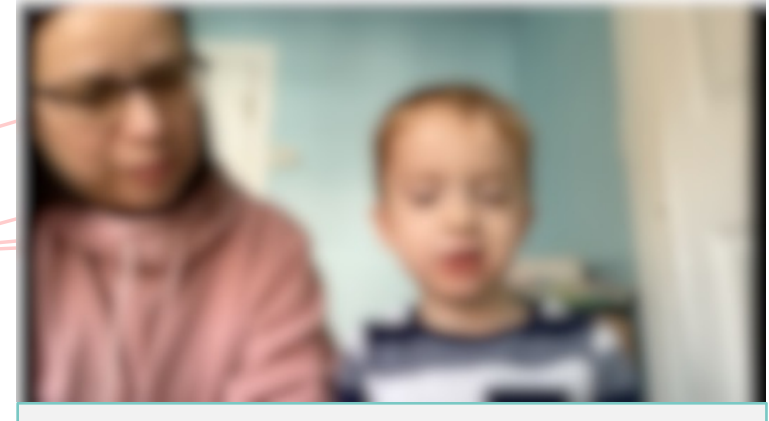
- \*PAR: ay, quién se quedó?
- \*PAR: shh!
- \*PAR: mira.
- \*PAR: quién está haciendo shh?
- \*PAR: alguien se quedó del tren, amor.
- \*PAR: quién es?
- \***CHI: el mico.** (the monkey)
- \*PAR: pero mira el mico pícaro qué está haciendo?
- \*PAR: shh!
- \***CHI: shh!**



**Age: 3;10**

- \*PAR: es un mico pícaro.
- \***CHI: ya se bajó.** (he already got off.)
- \*PAR: aquí mira él estaba aquí con la familia.
- \*PAR: quieres verla?
- \***CHI: mhm.**
- \*PAR: míralo aquí está el mico?
- \***CHI: y de repente se bajó?** (and he suddenly got off?)

2  
Wave

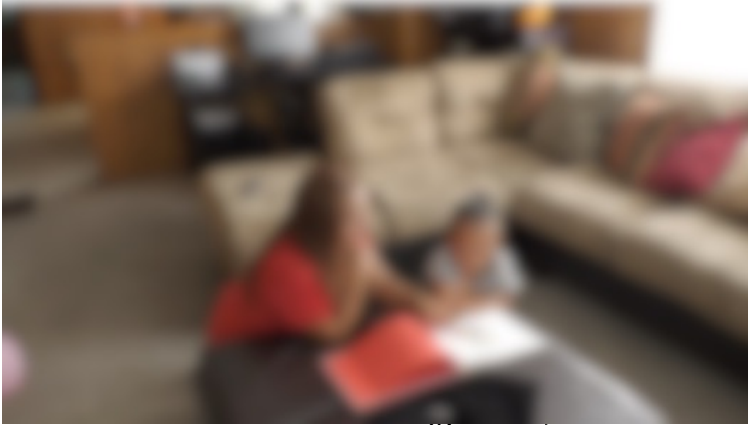


**Age: 5;4**

- \*PAR: mira cómo se subió el mico aquí?
- \***CHI: porque los micos son muy buenos escaladores.** (because monkeys are very good climbers.)
- \*PAR: es un buen escala(dor) +/-.
- \***CHI: primero estaba aquí y subió.** (he was here first and then he climbed up.)
- \***CHI: y llegó aquí.** (and he got here.)
- \*PAR: y el viejo cómo estaba?
- \***CHI: triste.** (sad.)
- \*PAR: triste.

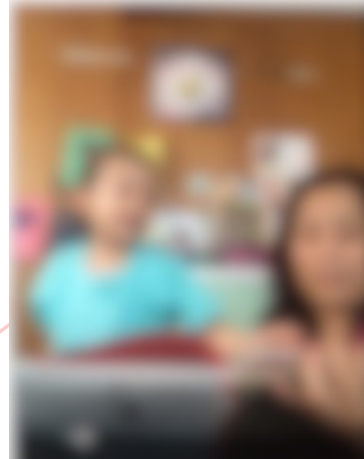


# Group 2 Example: Deisy



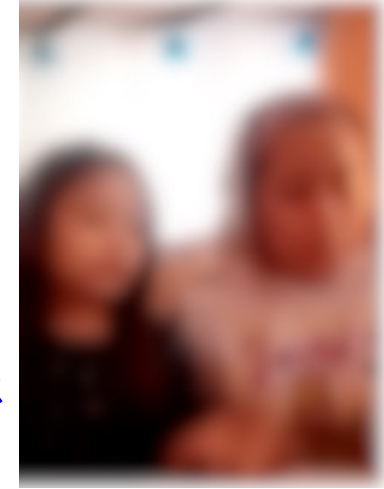
## Age: 4;6

- \*PAR: oh mira y se quedó con el payasito!
- \*PAR: quién es él?
- \*CHI: monkey.
- \*PAR: sí un monito ve.
- \*PAR: y se quedó feliz.



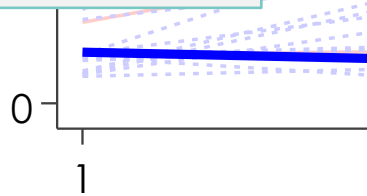
## Age: 5;4

- \*PAR: mire se quedó triste el señor granjero.
- \*CHI: sí, and the monkey.
- \*PAR: sí.
- \*CHI: the monkey...
- \*PAR: y?
- \*PAR: se quedó dijo.
- \*PAR: silencio!
- \*PAR: que no se diera cuenta que se quedó con él.
- \*CHI: sí.
- \*PAR: sí?
- \*PAR: y qué pasó?
- \*CHI: the end.



## Age: 6;10

- \*CHI: the monkey...
- \*CHI: went around and the farmer's just sitting.
- \*PAR: está descansando mira.
- \*CHI: oh the monkey's on the roof!
- \*PAR: mhm.
- \*CHI: how'd he got up there?
- \*PAR: mhm.
- \*CHI: and the farmer goes in the house.



3

# Contributions, Limitations, and Future Directions

- Culture matters
  - Children born in the U.S. to parents who lived in the U.S. for longer were more likely to increase in their English use with Spanish-speaking parents
  - This mattered more than measures of current exposure to Spanish and English at home and school
- Language-use trajectories emerge early
  - By PK entry at age 3-4, children with smaller Spanish vocabularies and who code-switched to English more frequently were more likely to be in the *increasing English* profile
- Limitations: small sample, only looked at booksharing context, minimal measures of school language environment
- Next steps: Sequential analysis of parent-child interactions in this data (ISB14 in Sydney), trajectory modeling with a larger dataset

# Acknowledgements



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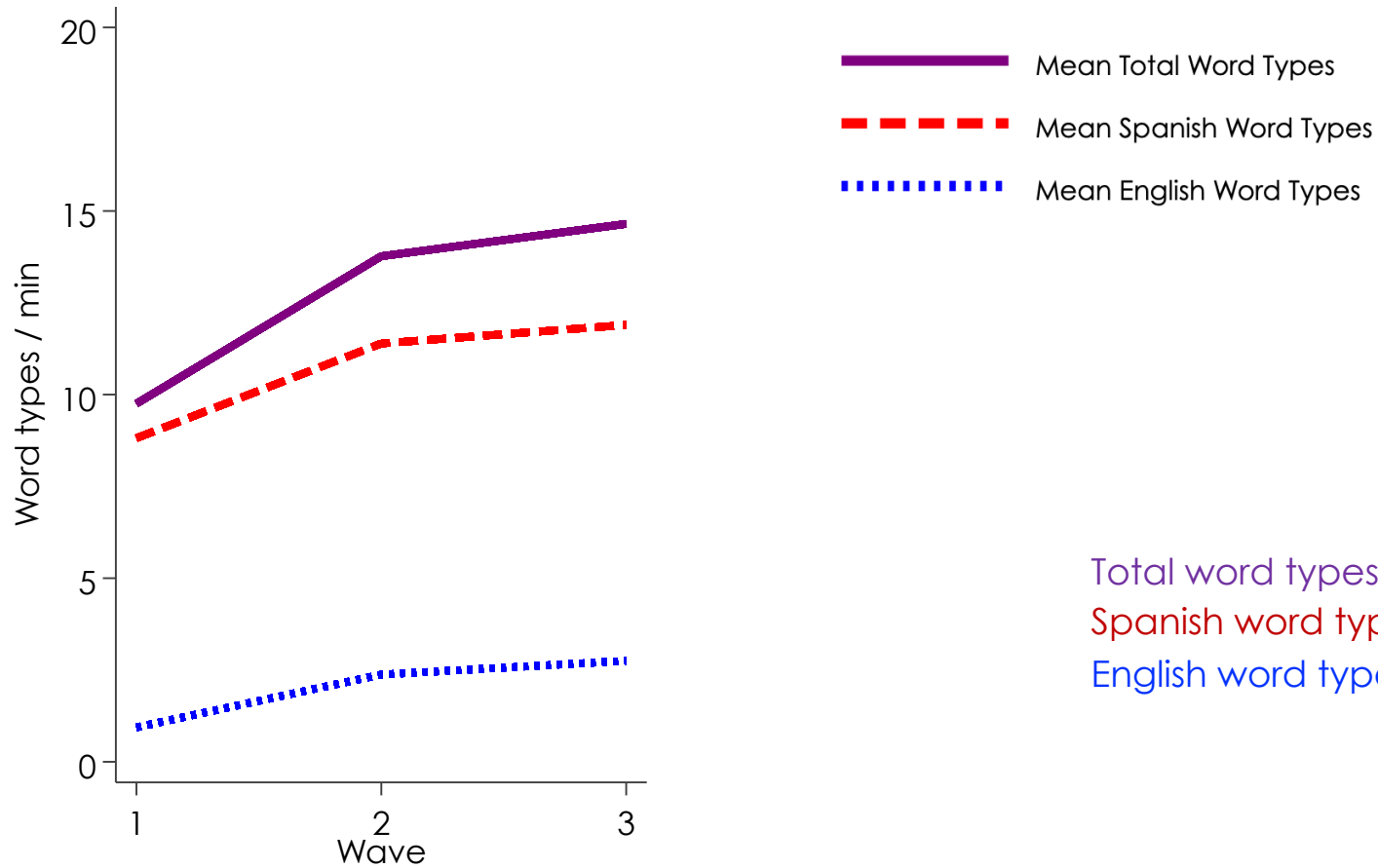


# Questions?

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# Descriptive statistics: Language use at each wave



Total word types  
Spanish word types  
English word types

Wave 1		Wave 2		Wave 3	
Mean	SD	Mean	SD	Mean	SD
9.75	4.98	13.77	5.14	14.65	7.02
8.82	5.23	11.39	5.78	11.9	7.95
0.94	1.06	2.38	3.28	2.75	4.32



# Stata script and output

```
. traj, multigroups(2) var1(types_spa1CHI_min types_spa2CHI_min types_spa3CHI_min) ///
> indep1(w1_childage_ctr w2_childage_ctr w3_childage_ctr) modell1(cnorm) ///
> min1(0) max1(30) order1(2 2) ///
> modell2(zip) var2(types_eng1CHI_min types_eng2CHI_min types_eng3CHI_min) ///
> indep2(w1_childage_ctr w2_childage_ctr w3_childage_ctr) order2(2 2)
```

```
==== traj stata plugin ==== Jones BL Nagin DS, build: Oct 25 2021
```

```
32 observations read.
32 observations used in the trajectory model.
```

Maximum Likelihood Estimates  
Model: Censored Normal (cnorm)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob >  T
1	Intercept	10.06733	1.00768	9.991	0.0000
	Linear	0.24536	0.12020	2.041	0.0427
	Quadratic	-0.00010	0.00441	-0.024	0.9813
2	Intercept	6.92870	1.19362	5.805	0.0000
	Linear	0.28604	0.14813	1.931	0.0551
	Quadratic	-0.00923	0.00523	-1.765	0.0794
	Sigma	5.13664	0.40404	12.713	0.0000

Maximum Likelihood Estimates  
Model: Zero Inflated Poisson (zip)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob >  T
1	Intercept	-0.82948	0.36582	-2.267	0.0246
	Linear	0.01970	0.03660	0.538	0.5911
	Quadratic	-0.00029	0.00124	-0.236	0.8138
2	Intercept	1.12374	0.15928	7.055	0.0000
	Linear	0.00229	0.01541	0.149	0.8820
	Quadratic	0.00082	0.00045	1.814	0.0713

Group membership

1	(%)	60.04073	10.29238	5.834	0.0000
2	(%)	39.95927	10.29238	3.882	0.0001

BIC= -463.41 (N=176) BIC= -451.48 (N=32) AIC= -441.22 ll= -427.22

Entropy = 0.870

# Family and teacher language use by group

	Group 1. <b>High-increasing Spanish use</b>	Group 2. <b>increasing English use</b>	Comparing groups (t/ $\chi^2$ , p-value)
<b>Family language use patterns, M (SD)</b>			
Reported parent Spanish input (1-5)	4.42 (.77)	4.08 (.76)	$t(30) = 1.25, p = .221$
Average reported input across all family members at wave 1	4.28 (.65)	3.94 (.58)	$t(30) = 1.52, p = .138$
Parent Spanish types/min at wave 1	23.28 (4.37)	22.67 (6.40)	$t(30) = 0.32, p = .748$
Parent MLU at wave 1	3.68 (.68)	3.25 (.61)	$t(30) = 1.84, p = .076\sim$
<b>Teacher language use in daycare and PK (%)</b>			
Attended English-only childcare prior to Wave 1	36.84%	30.77%	$\chi^2(1) = .13, p = .722$
PK teacher used only Eng. in Wave 2	57.89%	46.15%	$\chi^2(1) = 0.43, p = .513$

# Parent and child characteristics by group

	Group 1. <b>High-increasing Spanish use</b>	Group 2. <b>increasing English use</b>	Comparing groups (t/ $\chi^2$ , p-value)
<b>Parent Characteristics, M (SD)</b>			
Years of parent ed	13.32 (4.32)	10.08 (4.84)	$t(30) = 1.98, p=.057\sim$
Years parent in the US	<b>5.61 (6.83)</b>	<b>13.77 (4.82)</b>	<b><math>t(30) = -3.71, p=.001^{***}</math></b>
Parent English proficiency (1-5 scale) <sup>1</sup>	2.57 (1.45)	2.5 (.97)	$t(22) = 0.14, p=.894$
<b>Child Characteristics, M (SD) or %</b>			
Child age at wave 1	46.68 (7.99)	45.77 (8.02)	$t(30) = 0.32, p=.753$
Child gender	31.58%	53.85%	$\chi^2(1) = 1.59, p= .208$
Child born abroad	<b>42.11%</b>	<b>0.00%</b>	<b><math>\chi^2(1) = 7.30, p= .007^{**}</math></b>
Oldest or only child	47.37%	15.38%	$\chi^2(1) = 3.50, p= .061\sim$
Spa. exp. vocab. raw at wave 1	<b>18.89 (9.04)</b>	<b>4.08 (4.50)</b>	<b><math>t(30) = - 5.45, p&lt;.001^{***}</math></b>
Eng. exp. vocab. raw at wave 1	3.17 (3.67)	6.60 (5.60)	$t(26) = -1.96, p= 0.060\sim$
Child-initiated CS to Eng. at wave 1	<b>.02 (.03)</b>	<b>.17 (.09)</b>	<b><math>t(30) = -6.58, p&lt;.0001^{***}</math></b>

<sup>1</sup>Self-report at wave 3, n=24 (14 in group 1, 10 in group 2)