

Introducing a Novel Tool Capturing Parents' Perceived Social Value of Bilingualism

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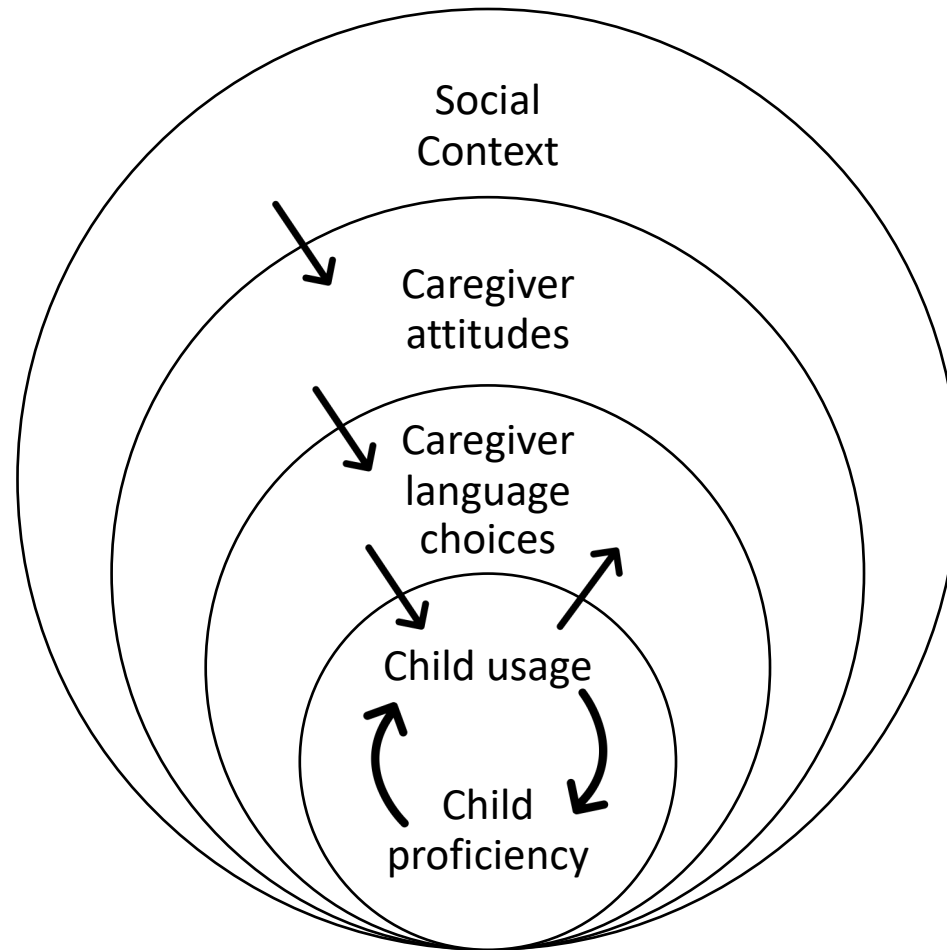
June 28, 2019

HARVARD

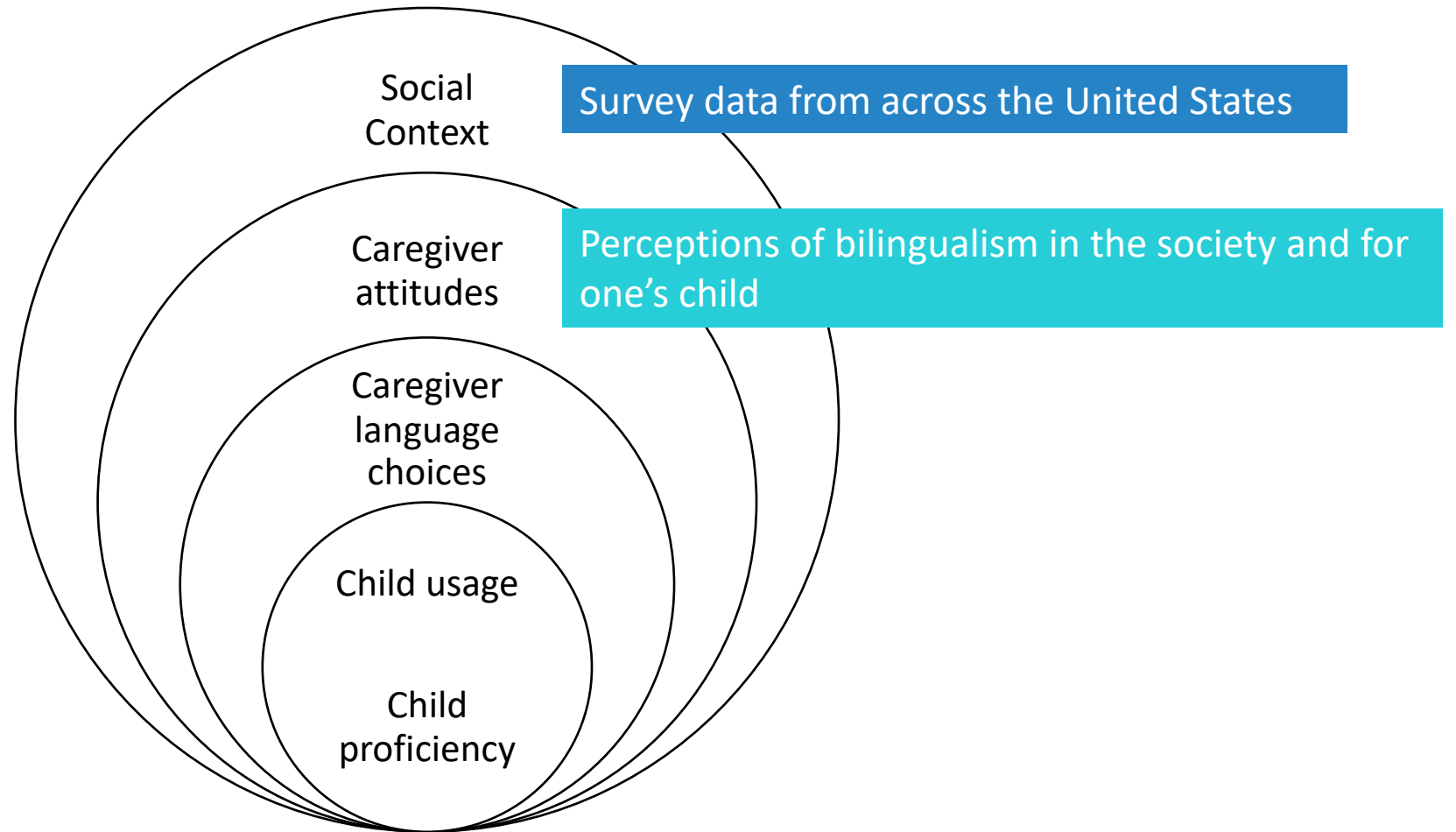


GRADUATE SCHOOL
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How do contextual factors shape children's bilingual development?



How do contextual factors shape children's bilingual development?



Why measure perceptions of bilingualism?



Increasing numbers of children are exposed to multiple languages at home, school, and in community.



Parents' attitudes towards bilingualism may predict language choices and variation in children's language outcomes (De Houwer, 1999, 2009, 2015; Hamers & Blanc, 1982; Pearson, 2007)



There is little recent research on language attitudes in the U.S., and **no scale exists** for measuring parents' attitudes towards bilingualism.

Aims of the current study

- Develop and evaluate two scales for use in bilingualism research in the U.S.
- Demonstrate how Item Response Theory can complement classical approaches to guide scale development

Study 1: PoB scale

- The degree to which bilingualism is seen as valued in the society
- Intended for use with all adults, including parents

Study 2: PoB+ scale

- The degree to which bilingualism is seen as valuable for one's child
- Intended for use with parents

Study 1.
Measuring
Perceptions of
the Value of
Bilingualism
with the PoB
Scale

1. Scale development
2. Psychometric properties
3. Demographic correlates

Participants

Sample 1 (n = 210, 109 parents)

- Qualtrics panels
- Adults 18+ representing U.S. population in education, race & region
- Oversampled Spanish-speaking parents of toddlers

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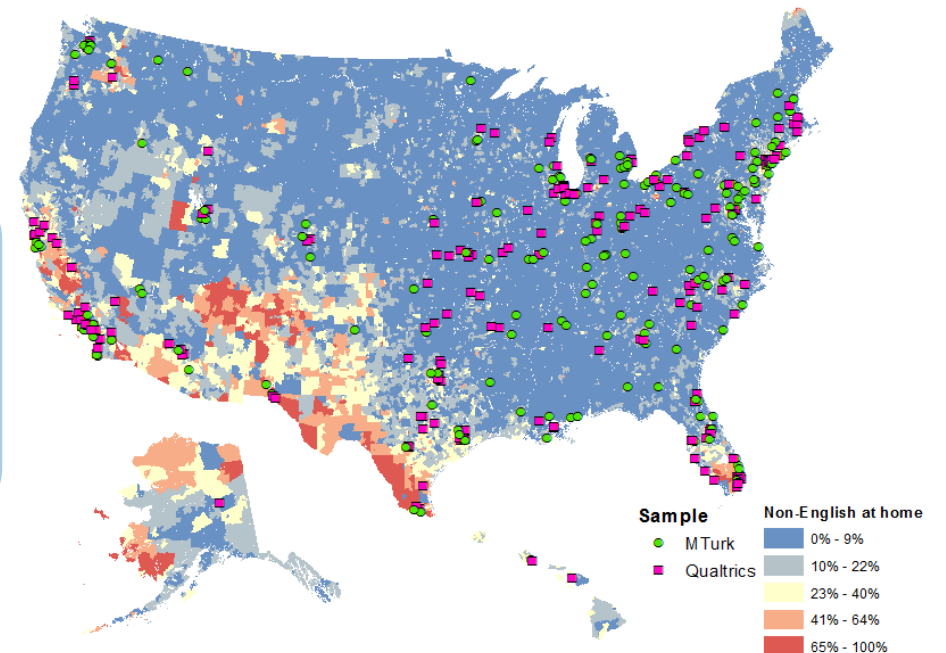
Sample 2 (n = 212 parents)

- Amazon Mechanical Turk (MTurk)
- Limited to parents of children <7
- Slightly younger, whiter, more education

=

Combined Sample (n = 422 total, 321 parents)

- 44% L1 English, no L2
- 60% 4-yr college degree or higher
- Mean age of 37 (SD = 14)
- 62% female



Developing the PoB scale

- PoB1 The ability to speak more than one language is highly valued in the United States.
- PoB2 The United States should have more than one official language.
- PoB3R To be considered American, one should speak English (Reversed)
- PoB4 Languages in addition to English should be taught in public elementary schools.
- PoB5R Parents in the United States who don't speak English should learn English to help their children. (Reversed)
- PoB6 People who speak more than one language should earn more money in the United States.
- PoB7 To be successful in the United States you need to speak more than one language.
- PoB8 Teachers, doctors, lawyers and police officers in the United States should speak a language in addition to English so they can communicate with the people they serve.
- PoB9 Parents whose native language is not English should teach their native language to their children.
- PoB10 Learning a second language helps a person think more creatively.
- PoB11R Learning a second language will negatively affect a person's first language (reversed)
- PoB12 I wish I spoke another language (in addition to the language or languages I speak at this time).
- PoB13 Speaking more than one language helps a person understand people from different cultural backgrounds.

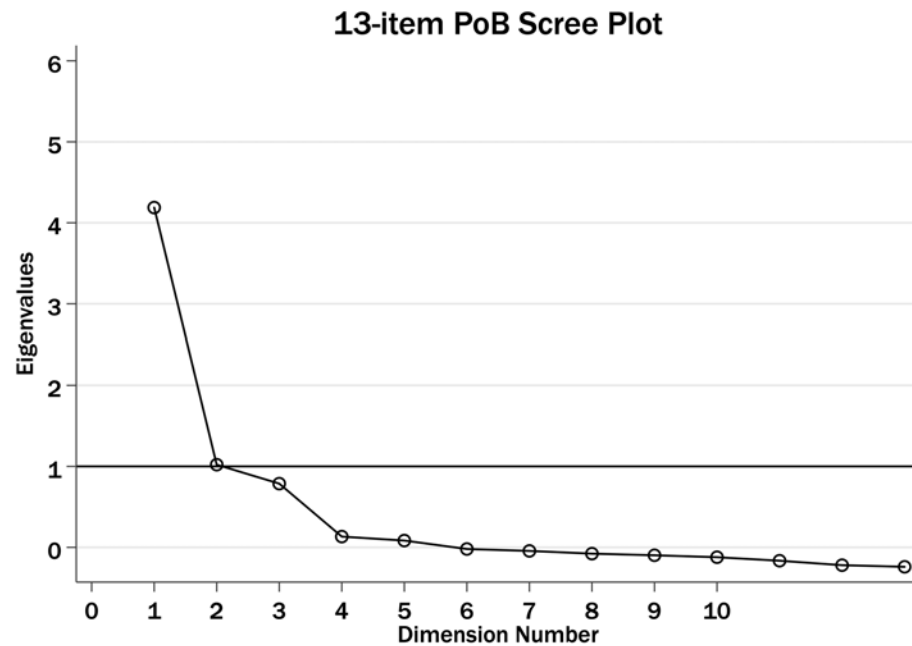
Developing the PoB scale

Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree)
- Translated to Spanish (4% of respondents took the survey in Spanish)
- Cognitive interviews were conducted in English and Spanish (n = 8)

Reliability and Factor Analysis

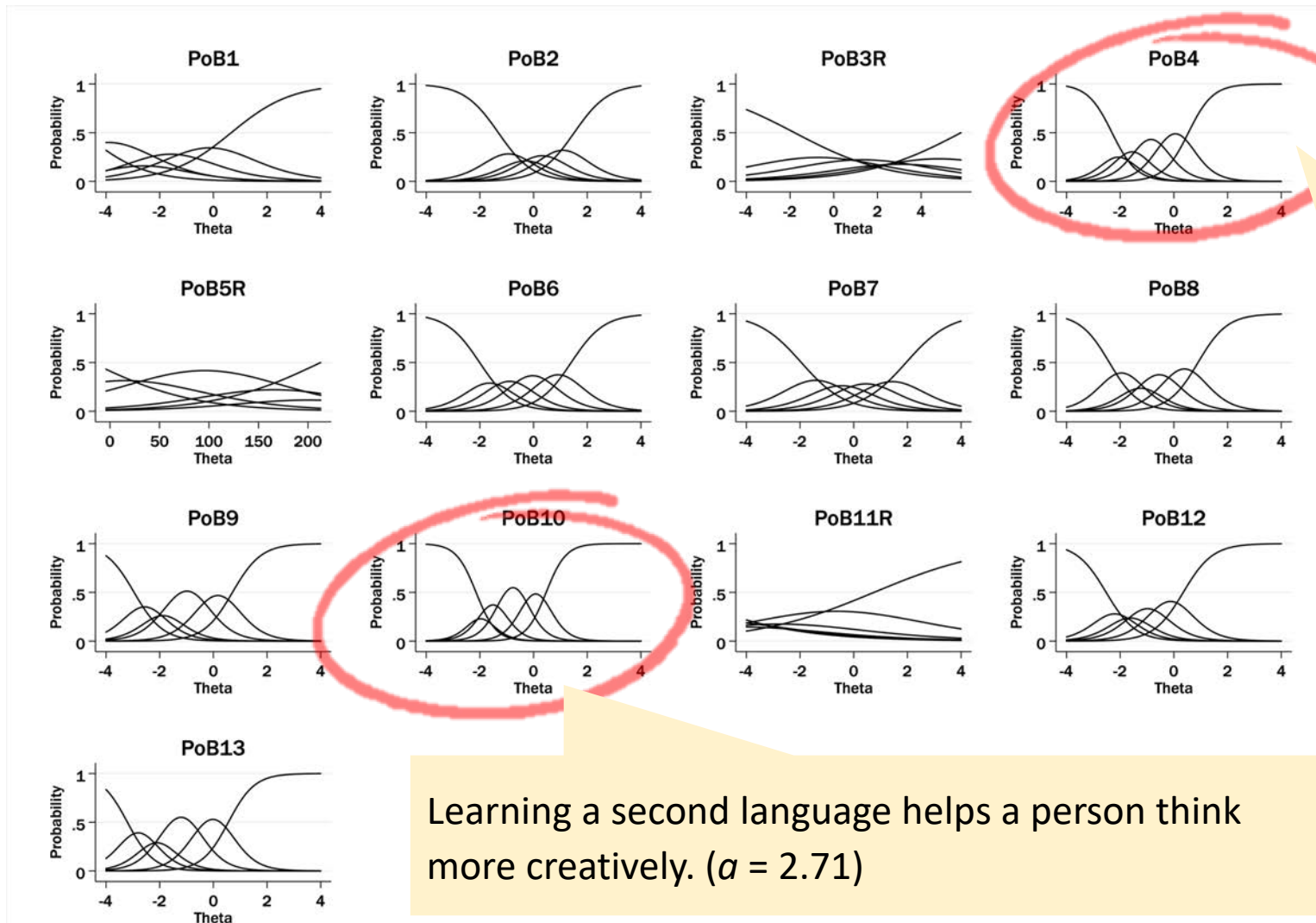
- Cronbach's alpha = .82
- 80% of the variance explained by one factor



	Item-total r	Factor loading
PoB1	.41	.36
PoB2	.70	.63
PoB3R	.40	.25
PoB4	.74	.72
PoB5R	.16	.02
PoB6	.68	.65
PoB7	.59	.57
PoB8	.69	.68
PoB9	.64	.63
PoB10	.75	.76
PoB11R	.18	.07
PoB12	.68	.67
PoB13	.67	.67

Fit statistics for 1-factor CFA χ^2 ($df=65$) = 501.23,
 RMSEA=.126, CFI=.765, TLI = .718, SRMR=.095

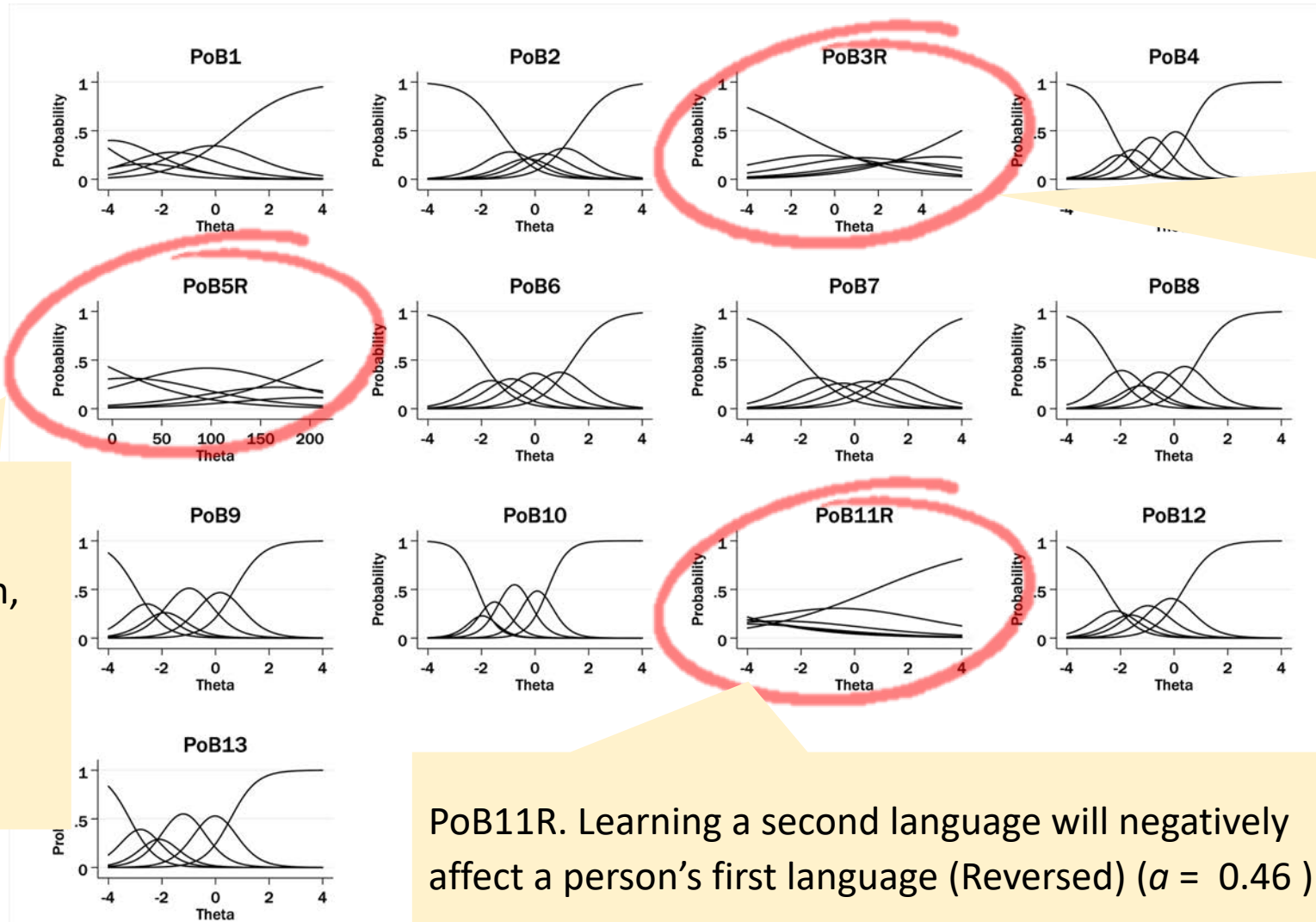
IRT Category Characteristic Curves



Languages in addition to English should be taught in public elementary schools. ($a = 2.19$)

Learning a second language helps a person think more creatively. ($a = 2.71$)

IRT Category Characteristic Curves



PoB5R. Parents in the United States who don't speak English should learn English to help their children. (Reversed) ($\alpha = 0.02$)

PoB3R. To be considered American, one should speak English (Reversed) ($\alpha = 0.47$)

PoB11R. Learning a second language will negatively affect a person's first language (Reversed) ($\alpha = 0.46$)

Properties of the 10-item PoB Scale

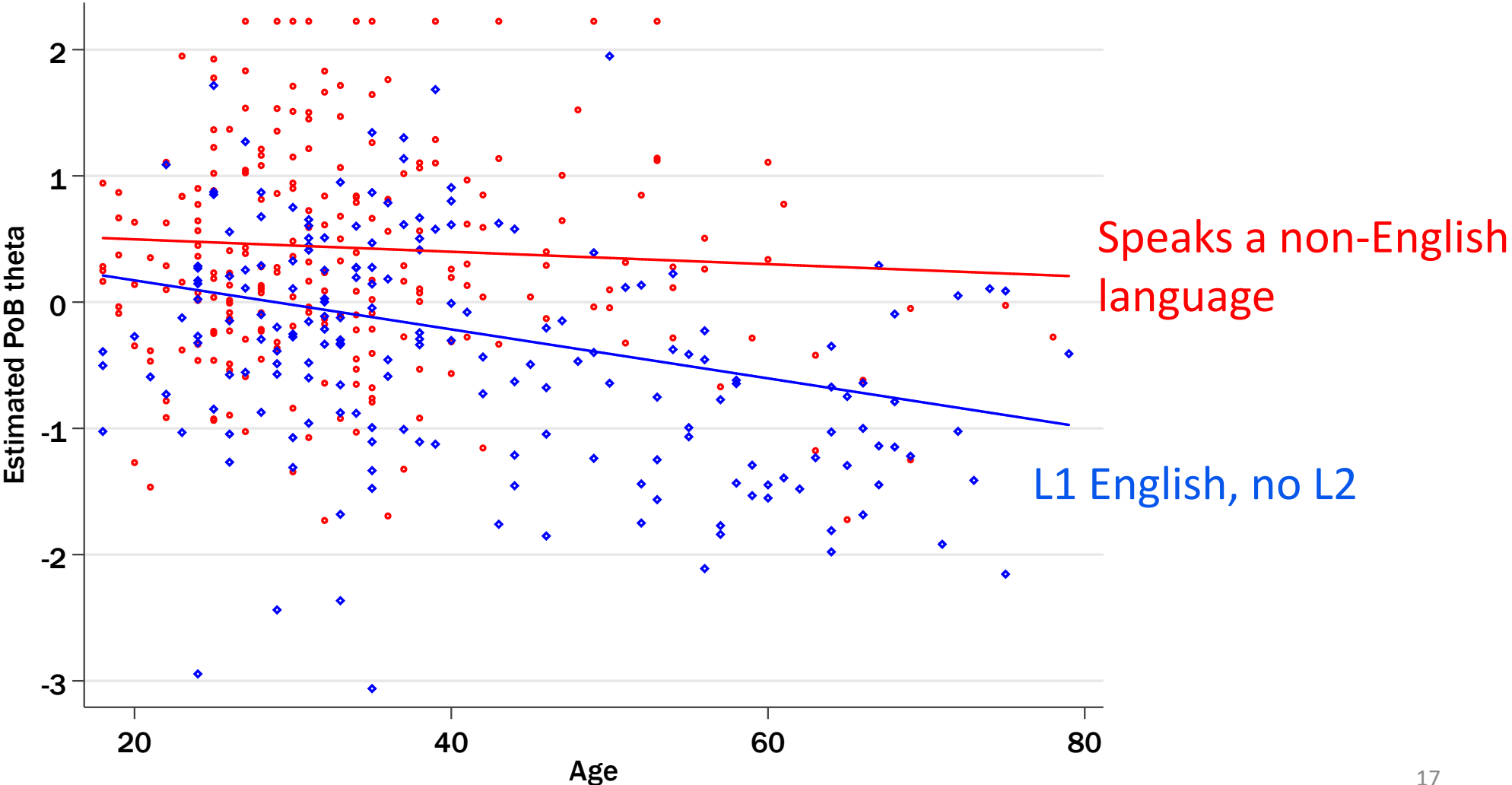
- Cronbach's alpha = .86 (vs. .82)
- 99% of the variance explained by one factor (vs. 80%)
- 1-factor CFA improved

$\chi^2 (df=35) = 193.922, RMSEA=.104, CFI=.898, TLI = .869, SRMR=.060$

Correlations with demographics

	PoB	L1 Eng no L2	Years of education	Age
L1 English, no L2	-.39***			
Years of education	.20***	-.18***		
Age	-.30***	.28***	-.10*	
Female	.19***	-.09	-.04	-.09

Regression Analysis



Study 1 Summary

- PoB scale was unidimensional, but 3 items stood out as problematic
 - IRT revealed that these items were providing little information
 - The final 10-item scale was more internally consistent
 - More positive perceptions of bilingualism associated with
 - Speaking a non-English language
 - More years of education
 - Being female
 - Being younger*
- *but age mattered more for those who only spoke English

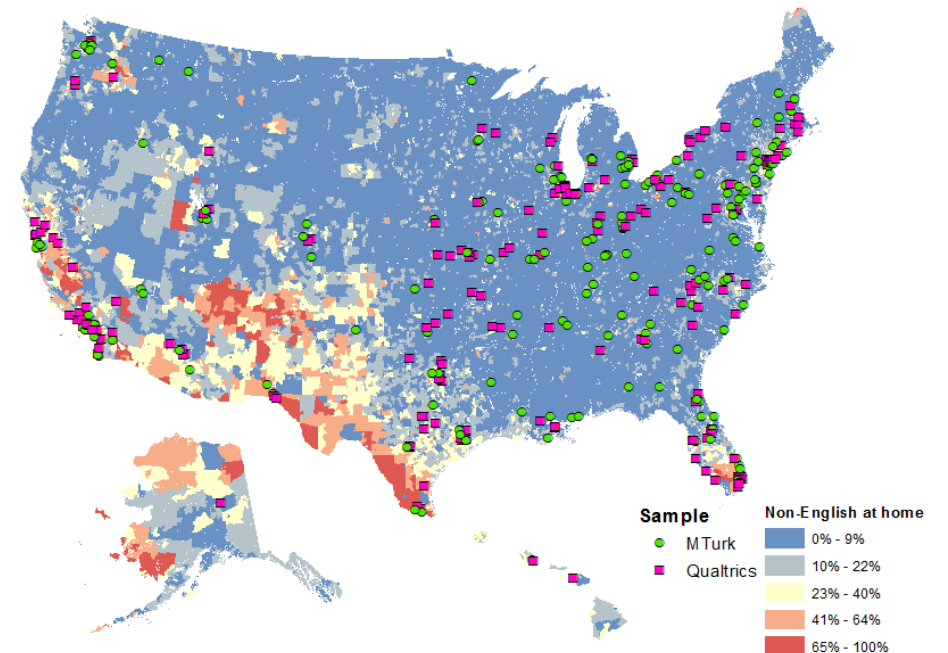
Study 2.
Measuring
Parents'
Perceptions of
the Value of
Bilingualism
for their Child
using the
PoB+

1. Scale development
2. Psychometric properties
3. Demographic correlates

Participants

Parents from combined sample (n = 321)

- Same as full sample in gender and education
- Slightly younger (M = 34, SD = 9)
- 39% L1 English, no L2
- 31% speak a non-English language to child at least half of the time

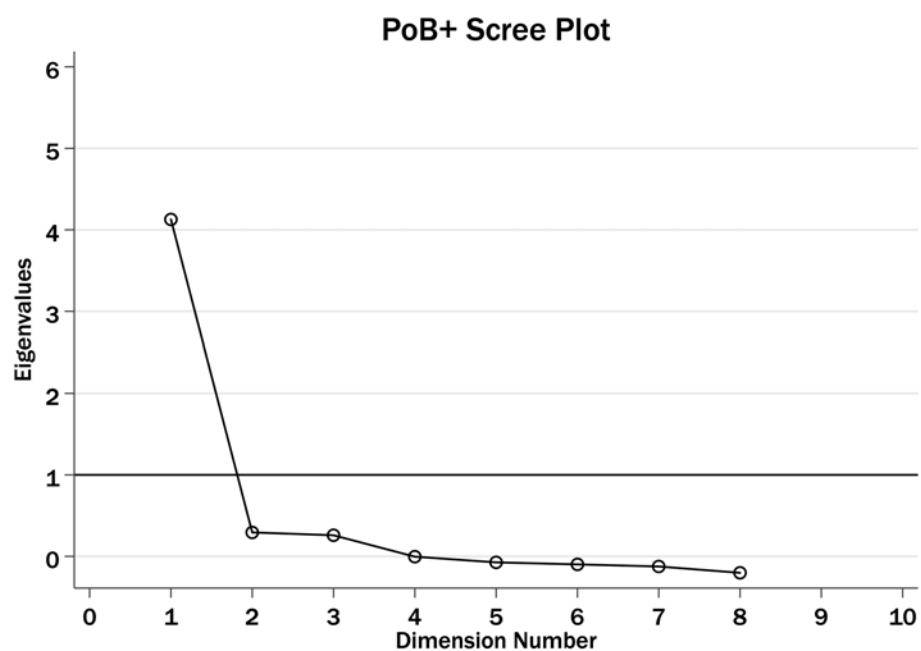


Developing the PoB+ scale

- PoB+1 It is important for my child to SPEAK more than one language.
- PoB+2 Speaking more than one language will help my child succeed in school in the long term.
- PoB+3 It is important for my child to learn to READ and WRITE more than one language.
- PoB+4 Speaking more than one language will help my child compete in the job market.
- PoB+5R My child will be confused if he or she learns two languages at the same time. (reversed)
- PoB+6 Speaking more than one language will help my child become a stronger thinker.
- PoB+7R To be successful, the ONLY language my child needs to speak well is English. (reversed)
- PoB+8 Speaking more than one language will help my child understand people from different cultural backgrounds.

Reliability and Factor Analysis

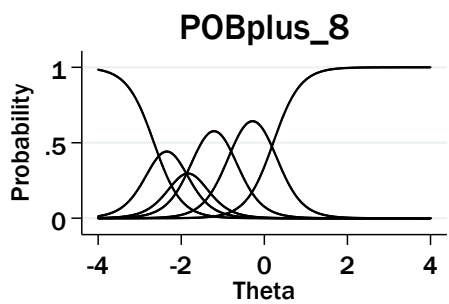
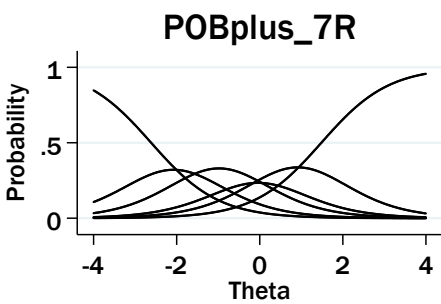
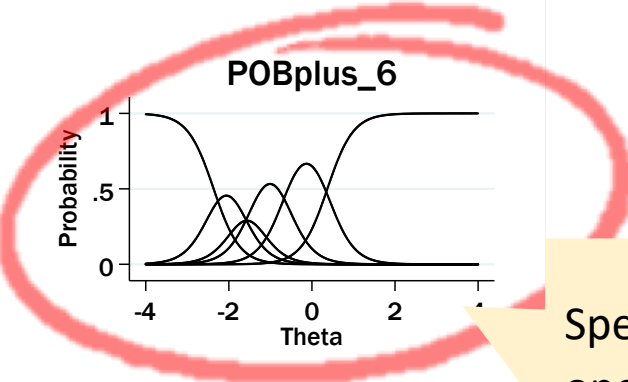
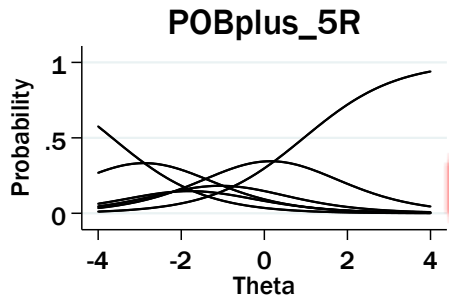
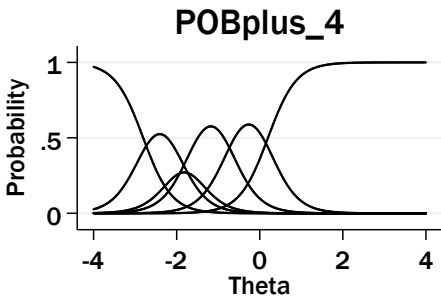
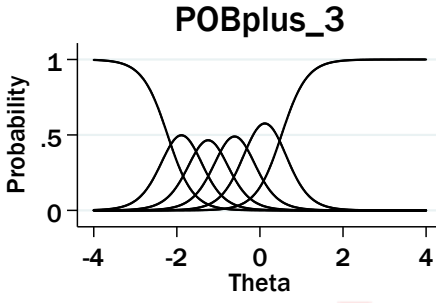
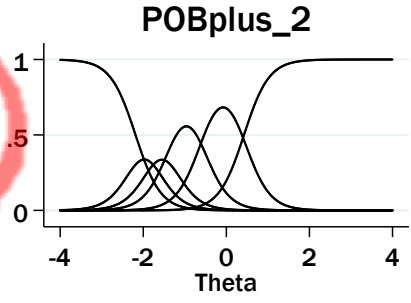
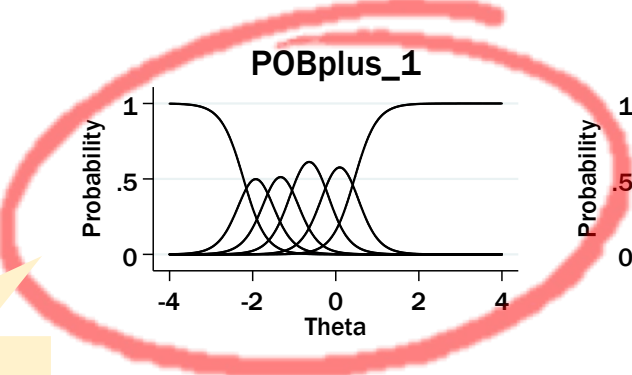
- Cronbach's alpha = .88
- 99% of the variance explained by the first factor



	Item-total r	Factor loading
PoB+1	.85	.84
PoB+2	.81	.81
PoB+3	.81	.76
PoB+4	.80	.76
PoB+5R	.52	.42
PoB+6	.83	.82
PoB+7R	.62	.47
PoB+8	.78	.72

Fit statistics for 1-factor CFA $\chi^2 (df=20) = 89.50$,
 RMSEA=.128, CFI=.922, TLI = .891, SRMR=.055

IRT Category Characteristic Curves

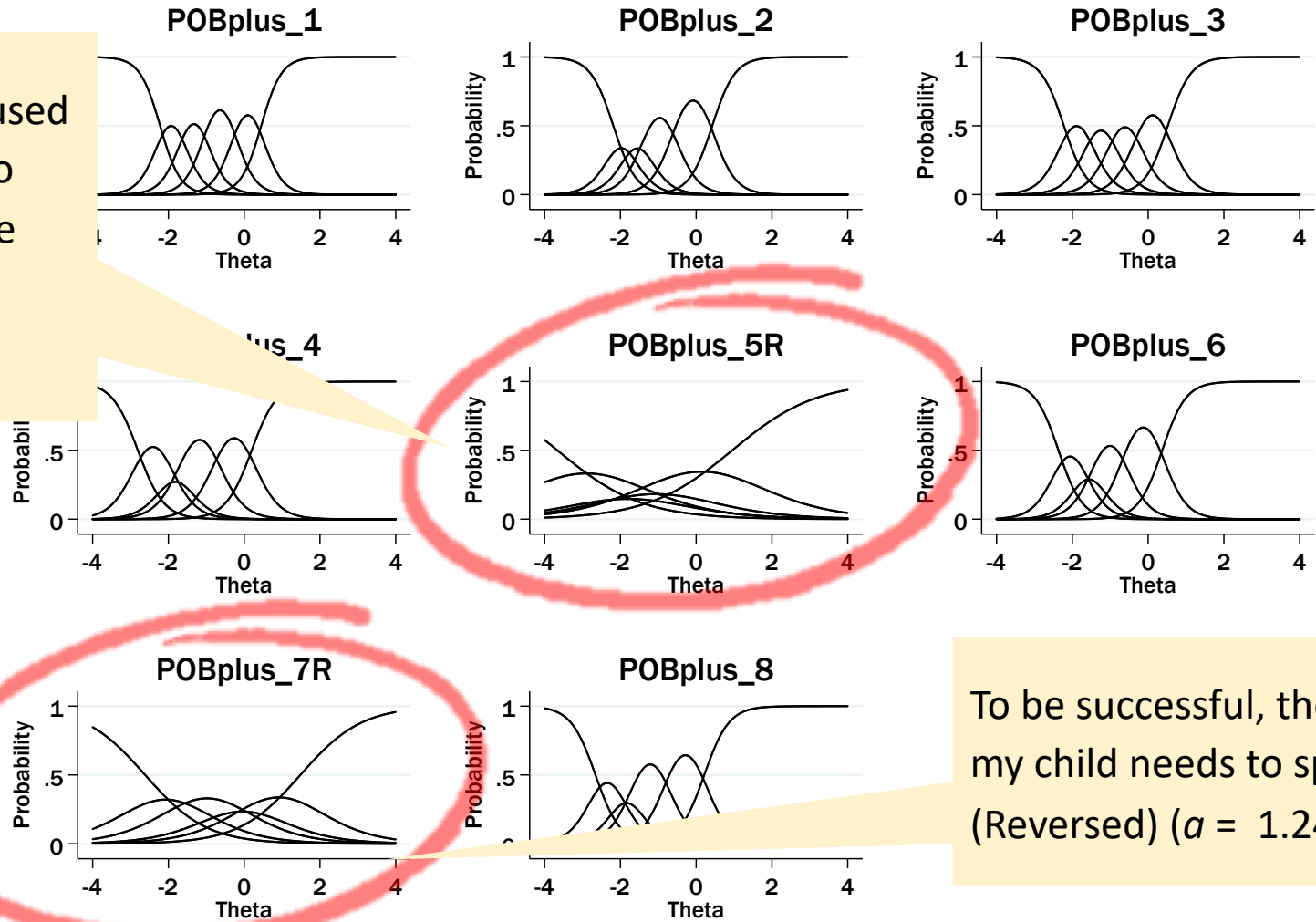


It is important for my child to SPEAK more than one language.
($a = 3.72$)

Speaking more than one language will help my child become a stronger thinker.
($a = 3.20$)

IRT Category Characteristic Curves

My child will be confused if he or she learns two languages at the same time. (Reversed)
($a = .90$)

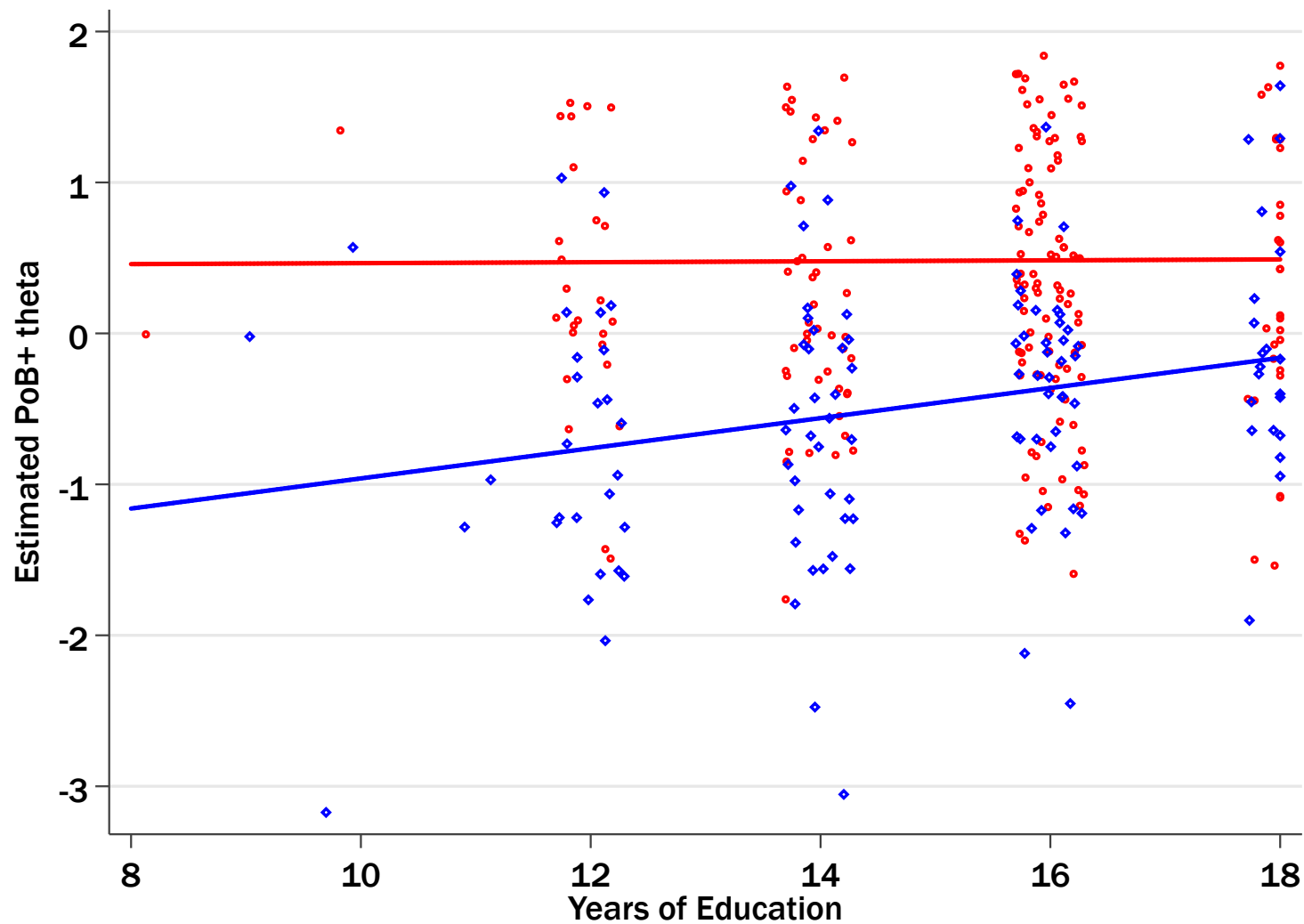


To be successful, the ONLY language my child needs to speak well is English. (Reversed) ($a = 1.24$)

Correlations

	PoB+	PoB	L1 Eng no L2	Years of education	Age
PoB scale score	.82***				
L1 English, no L2	-.41***	-.33***			
Years of education	.13*	.09	-.11*		
Age	-.09	-.10	.18**	.03	
Female	.19***	.22	-.10	-.10	-.02

Regression Analysis



Speaks a non-English language

L1 English, no L2

Study 2 Summary

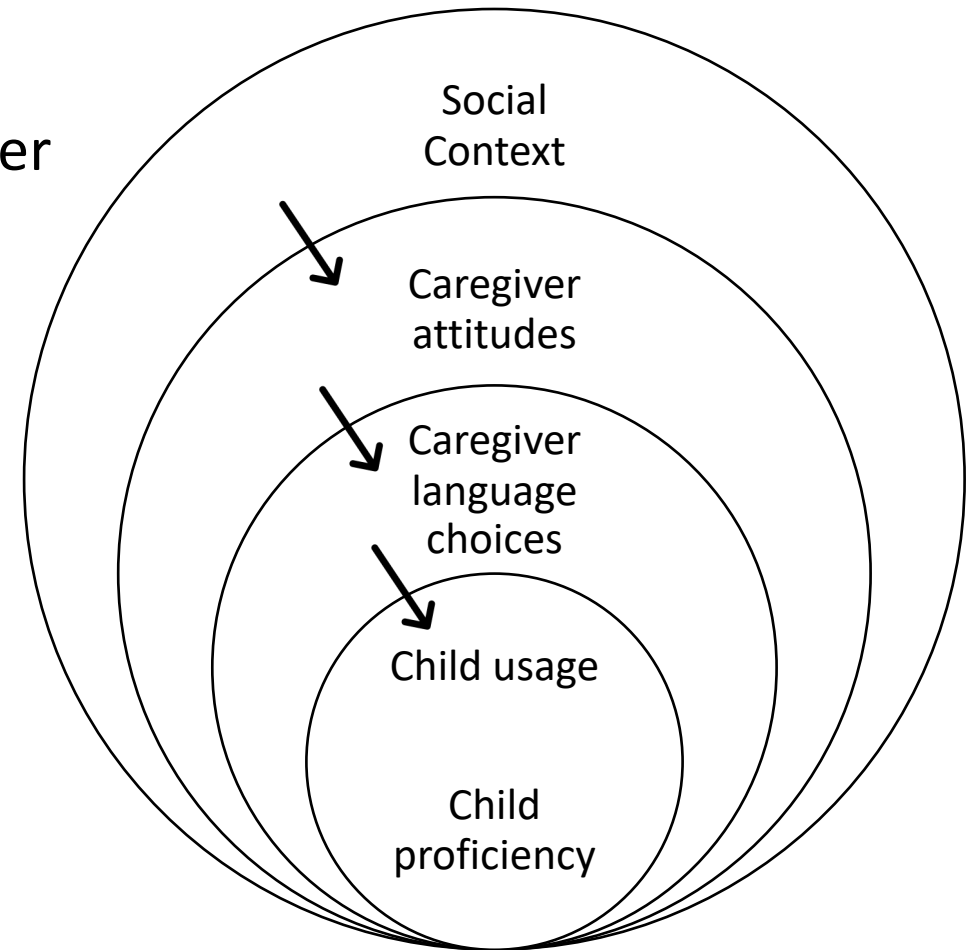
- The 8-item PoB+ scale showed strong internal consistency and unidimensionality
- The reverse-coded items provided the least information but were of substantive interest
- Positive perception of bilingualism for child associated with
 - Speaking a non-English language
 - Being female
 - More years of education*
 - *but education mattered more for those who only spoke English

Limitations

- Online survey
- Only available in English and Spanish
- Content validity and construct coverage
 - Items about negative consequences of bilingualism
 - Is this a separate construct?

Conclusions & Next Steps

- The PoB and PoB+ scales are psychometrically promising and short enough to embed in a longer survey.
- Stay tuned for:
 - PoB scores by census data
 - local language diversity matters!
 - PoB+ scores predict home language practices and decision to apply for a dual language program
 - Relation to child language outcomes following preschool entry
 - PoB adaptations for Quebec, Luxembourg, Singapore, Shanghai



Thank you!
Any questions?



Gigi Luk



Gladys
Aguilar



Alexandra
Chen



Dasha
Maghooli



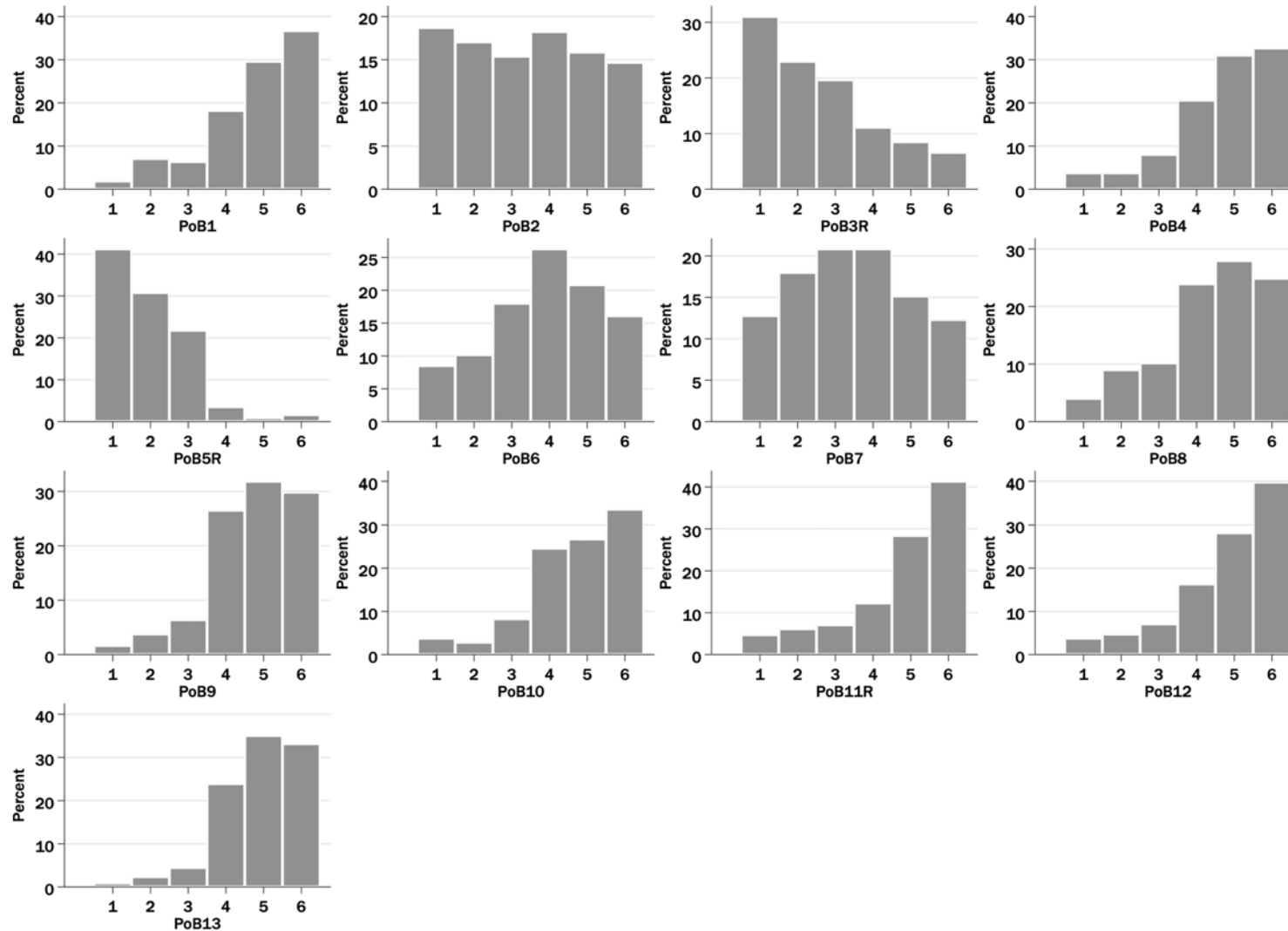
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Shin

Appendices

Study 1 Methods: Participants

	Sample 1 (n=210)	Sample 2 (n=212)	Combined (n = 422)
Female	64%	60%	62%
Age	42 (17)	33 (7)	37 (14)
Born in U.S.	86%	90%	88%
L1 English, doesn't speak an L2	46%	43%	44%
Region of U.S.			
West	26%	21%	24%
South	35%	38%	36%
Midwest	22%	21%	22%
Northeast	16%	19%	18%
Education			
Some high school or less	10%	-	5%
High school graduate	27%	13%	20%
Some college or Associates Degree	27%	25%	26%
College Graduate	26%	45%	36%
Graduate School Degree	10%	17%	24%
Ethnicity/Race			
White alone (not Hispanic)	50%	67%	58%
Black	11%	4%	8%
Asian or Pacific Islander	5%	8%	6%
Hispanic	31%	17%	24%
Mixed race or other	3%	4%	3%

Item-score histograms for all 13 PoB items



All 13 original PoB items with the mean and standard deviations (n = 422)

	PoB Item	M	SD
PoB1	The ability to speak more than one language is highly valued in the United States.	4.77	1.30
PoB2	The United States should have more than one official language.	3.40	1.71
PoB3R	To be considered American, one should speak English. (Reversed)	2.63	1.55
PoB4	Languages in addition to English should be taught in public elementary schools.	4.69	1.31
PoB5R	Parents in the United States who don't speak English should learn English to help their children. (Reversed)	1.97	1.06
PoB6	People who speak more than one language should earn more money in the United States.	3.89	1.48
PoB7	To be successful in the United States you need to speak more than one language.	3.45	1.56
PoB8	Teachers, doctors, lawyers and police officers in the United States should speak a language in addition to English so they can communicate with the people they serve.	4.37	1.40
PoB9	Parents whose native language is not English should teach their native language to their children.	4.73	1.16
PoB10	Learning a second language helps a person think more creatively.	4.69	1.30
PoB11R	Learning a second language will negatively affect a person's first language. (Reversed)	4.77	1.44
PoB12	I wish I spoke another language (in addition to the language or languages I speak at this time).	4.80	1.36
PoB13	Speaking more than one language helps a person understand people from different cultural backgrounds.	4.77	1.30

Note: Items 3, 5, and 11 were reverse coded. These items were later dropped from the scale.

Checking Local Independence for the PoB

Covariance residuals

	PoB1	PoB2	PoB3R	PoB4	PoB5R	PoB6	PoB7	PoB8	PoB9	PoB10	PoB11R	PoB12
PoB1	0.000											
PoB2	-0.109	0.000										
PoB3R	-0.352	0.654	0.000									
PoB4	0.010	-0.010	0.112	0.000								
PoB5R	-0.234	0.390	0.710	0.039	0.000							
PoB6	-0.094	0.235	0.001	-0.083	0.118	0.000						
PoB7	0.335	0.328	-0.211	-0.096	0.084	0.320	0.000					
PoB8	0.126	0.197	-0.132	-0.059	-0.084	0.076	0.360	0.000				
PoB9	-0.054	-0.122	-0.070	0.004	-0.111	-0.087	-0.131	-0.018	0.000			
PoB10	-0.031	-0.045	-0.130	0.013	-0.033	-0.006	-0.070	-0.084	0.047	0.000		
PoB11R	0.038	-0.493	0.066	0.135	-0.140	-0.308	-0.585	-0.172	0.250	0.044	0.000	
PoB12	0.014	-0.242	0.053	0.072	-0.067	-0.029	-0.193	-0.209	0.110	0.098	0.217	0.000
PoB13	-0.008	-0.093	0.029	0.035	-0.109	-0.068	-0.191	0.058	0.034	0.008	0.198	0.046

Yet another indicator that items 3, 5, and 11 are problematic.

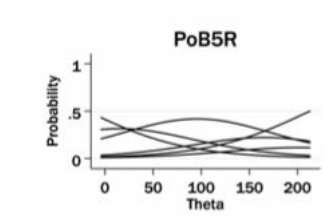
IRT Graded Response Model

$$P(Y_{pi} \geq k | a_i, b_{ik}, \theta_p) = \frac{1}{(1 + \exp(-a_i(\theta_p - b_{ik})))}; \theta_p \sim N(0,1)$$

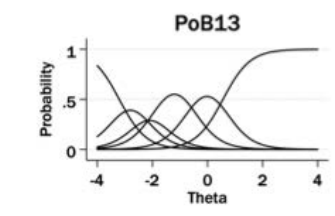
- Y is the response given by participant p on an item i that has k boundaries between response options.
- All items had six response options, resulting in 5 different boundaries ($k = 1 \dots 5$).
- The latent construct, hypothesized to be the degree to which bilingualism is seen as valuable in the society, is represented by theta (θ), which is constrained to have a mean of 0 and a standard deviation of 1.
- The discrimination parameter (a) represents the degree to which an item distinguishes between respondents with similar latent attitudes.
- The location parameter (b) tells us the theta score needed to have a 50% chance of scoring at or above each boundary.

IRT: Item parameters

Item	Discrimination Parameter Estimates		Location Parameter Estimates			
	a	b1	b2	b3	b4	b5
PoB1	0.89	-4.85	-2.95	-2.23	-0.94	0.67
PoB2	1.56	-1.31	-0.57	-0.02	0.67	1.52
PoB3R	0.47	-1.79	0.35	2.28	3.80	5.83
PoB4	2.19	-2.31	-1.84	-1.27	-0.43	0.54
PoB5R	0.02	-18.48	49.35	141.99	188.77	212.83
PoB6	1.63	-2.01	-1.28	-0.50	0.44	1.40
PoB7	1.23	-1.95	-0.88	-0.01	0.93	1.95
PoB8	1.83	-2.40	-1.50	-0.97	-0.11	0.90
PoB9	1.86	-2.95	-2.17	-1.59	-0.38	0.71
PoB10	2.71	-2.14	-1.80	-1.22	-0.31	0.47
PoB11R	0.46	-6.82	-4.86	-3.57	-2.02	0.76
PoB12	1.82	-2.52	-1.89	-1.36	-0.60	0.35
PoB13	2.04	-3.20	-2.39	-1.81	-0.60	0.56



!?

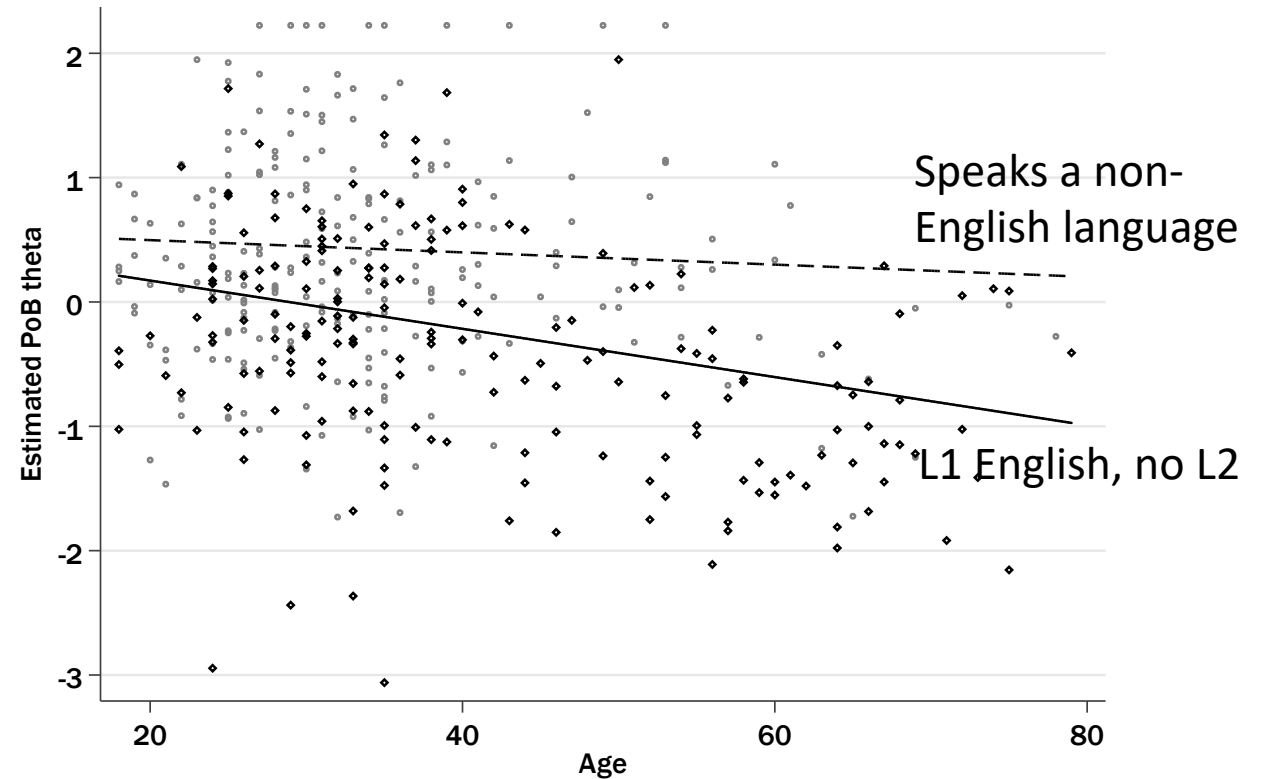


Note: All items have 6 score points and thus 5 threshold location parameters.

Regression Analysis

Model 5

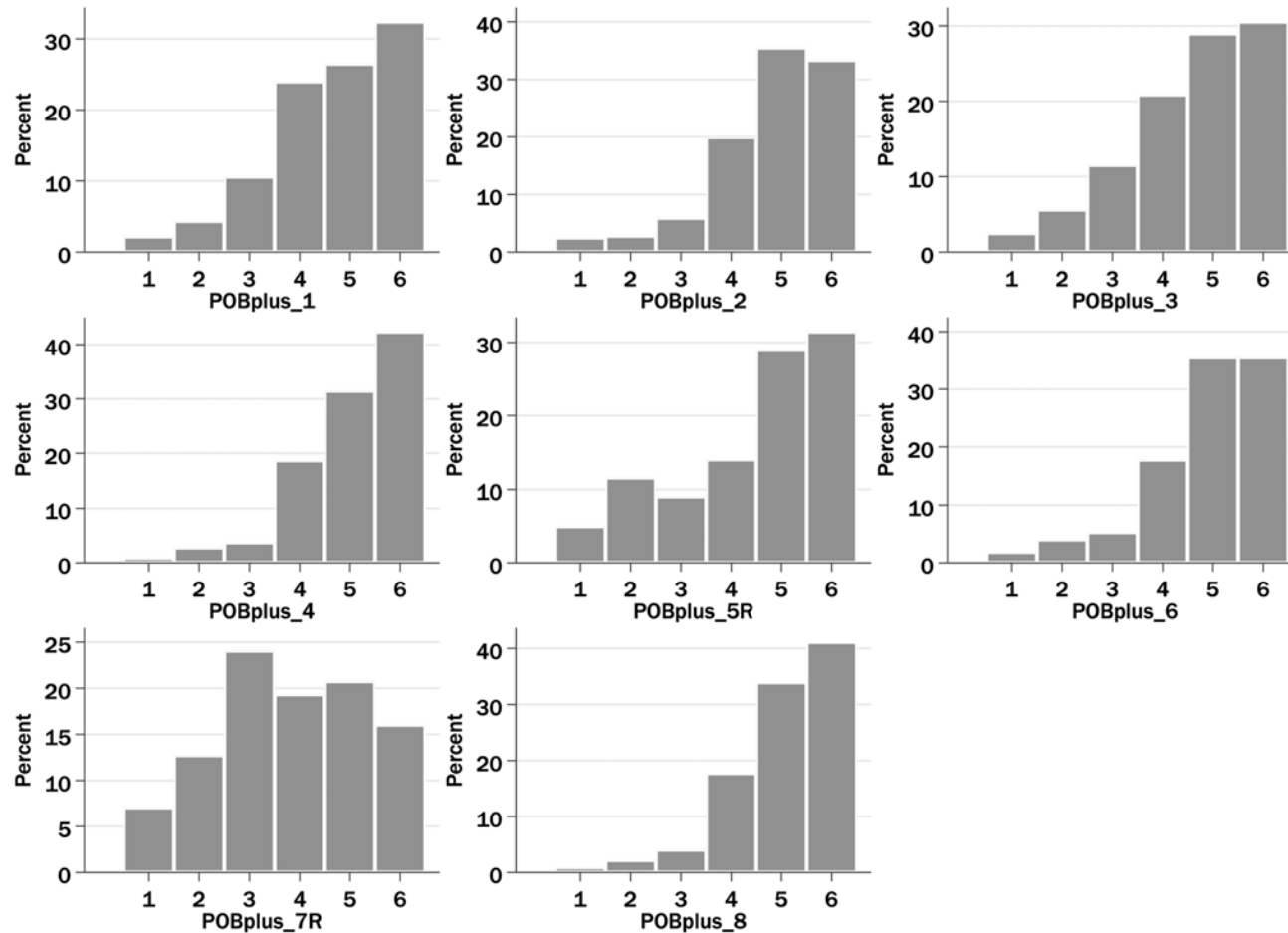
L1 English, no L2	-0.571 ^{***} (.086)
Years of education	0.051 ^{**} (0.019)
Age (centered)	-0.005 (0.005)
Female	0.300 ^{***} (0.084)
L1 Eng x Age	-0.014 [*] (0.006)
Constant	-0.648 (0.294)
R^2	.240
df_m	5
df_r	416
F	26.23



Methods: Participants

	Sample 1 (n = 109)	Sample 2 (n = 212)	Combined (n = 321)
Parent is female	67%	60%	62%
Parent age	35 (11)	33 (7)	34 (9)
Parent was born in U.S.	80%	90%	87%
Parent years of education	14.5 (2.2)	15.3 (1.8)	15.1 (2.0)
Parent Knowledge of Infant Development (KIDI) score	4.6 (2.0)	5.5 (2.1)	5.2 (2.1)
Parent L1 English, doesn't speak L2	30%	43%	39%
Language parent speaks to child			
All English	48%	52%	50%
Mostly English	13%	22%	19%
Half English, half another language	32%	24%	27%
Mostly or only another language	7%	2%	4%

Item-score histograms for the PoB+



Perceptions of Bilingualism for one's child (PoB+) scale

	PoB+ Item	M	SD
PoB+1	It is important for my child to SPEAK more than one language.	4.65	1.27
PoB+2	Speaking more than one language will help my child succeed in school in the long term.	4.83	1.18
PoB+3	It is important for my child to learn to READ and WRITE more than one language.	4.60	1.31
PoB+4	Speaking more than one language will help my child compete in the job market.	5.04	1.08
PoB+5R	My child will be confused if he or she learns two languages at the same time. (reversed)	4.45	1.53
PoB+6	Speaking more than one language will help my child become a stronger thinker.	4.88	1.18
PoB+7R	To be successful, the ONLY language my child needs to speak well is English. (reversed)	3.82	1.49
PoB+8	Speaking more than one language will help my child understand people from different cultural backgrounds.	5.05	1.05

Checking Local Independence for the PoB+

Covariance residuals

	POBplus_1	POBplus_2	POBplus_3	POBplus_4	POBplu~5R	POBplus_6	POBplu~7R	POBplus_8
POBplus_1	0.000							
POBplus_2	-0.020	0.000						
POBplus_3	0.205	-0.054	0.000					
POBplus_4	-0.081	0.100	-0.092	0.000				
POBplus_5R	-0.067	-0.054	-0.165	0.046	0.000			
POBplus_6	-0.047	0.004	-0.052	0.057	0.062	0.000		
POBplus_7R	0.084	-0.052	0.038	-0.130	0.452	0.010	0.000	
POBplus_8	-0.011	-0.013	-0.023	0.005	0.073	0.034	-0.054	0.000

- Moderate to high, positive correlation between the residuals of the two reverse-coded items
- Moderate, positive correlation between the residuals on items 1 and 3, which have similar wording
- Modification indices indicated that covarying the errors on items 1 and 3 results in a 48.640 reduction in χ^2

	χ^2 (df)	RMSEA	CFI	TLI	SRMR
Model 1: One factor CFA	89.50 (20), p = <.001	.128	0.922	0.891	0.055
Model 2: CFA w/ corr. errors	44.01 (19), p = <.001	.079	0.972	0.959	0.047

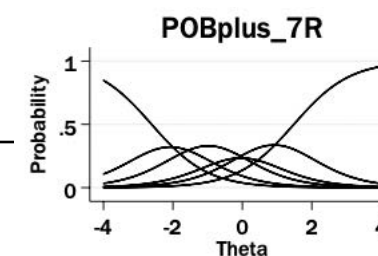
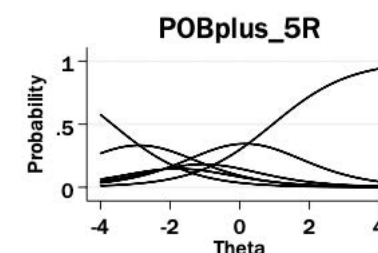
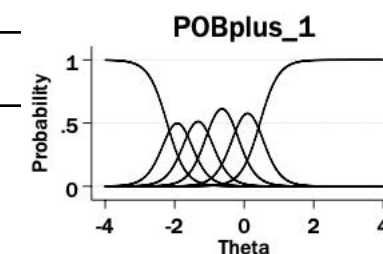
But What About Local Independence?

- Items PoB+1 and PoB+3 have similar wording and both have relatively high discrimination parameters (3.72 and 3.27).
- Could these two items have inflated discrimination estimates and undue influence on the latent variable? (Edelen & Reese, 2007, p.7)
- If PoB+3 is dropped
 - Range of discrimination parameter estimates changes slightly (.95-3.52 instead of .90-3.72)
 - Two items change ranking (PoB+1 moved to 5th place and PoB+6 moved to 1st)
 - Mean difference in location parameter was .04 (75% of the 35 location parameters changed by >.01)
- However, theta scores from the two models correlate .9879

IRT Item parameters

Item	Discrimination Parameter Estimates		Location Parameter Estimates			
	a	b1	b2	b3	b4	b5
PoB+1	3.72	-2.22	-1.63	-1.02	-0.26	0.45
PoB+2	3.31	-2.19	-1.76	-1.34	-0.58	0.42
PoB+3	3.27	-2.22	-1.55	-0.94	-0.28	0.52
PoB+4	2.92	-2.81	-2.01	-1.63	-0.73	0.20
PoB+5R	0.90	-3.66	-2.13	-1.47	-0.65	0.95
PoB+6	3.20	-2.37	-1.75	-1.38	-0.63	0.37
PoB+7R	1.24	-2.61	-1.54	-0.43	0.35	1.48
PoB+8	3.07	-2.66	-2.04	-1.64	-0.78	0.21

Note: All items have 6 score points and thus 5 threshold location parameters.



Regression Analysis

Model 5	
L1 English, no L2	-1.904*** (.745)
Years of education	0.003** (.032)
Female	0.526*** (.126)
L1 Eng x Female	-0.489* (.199)
L1 Eng x Education	0.097* (.048)
Constant	-0.092 (.505)
R ²	.233
df_m	5
df_r	315
F	19.09

