

Assessing English Language Proficiency and its Importance in Content Area Achievement

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H. Gary Cook, Wisconsin Center for Education Research
Robert Linqanti, WestEd



Background

- Title III Accountability motivates states and districts to consider very closely:
 - The notion of English language proficiency
 - Progress toward attaining English language proficiency
 - The relationship between English language proficiency & academic content proficiency
- This presentation shares results from a National Title III Evaluation Supplemental Report (Cook, Linqanti, Chinen, & Jung, 2012)



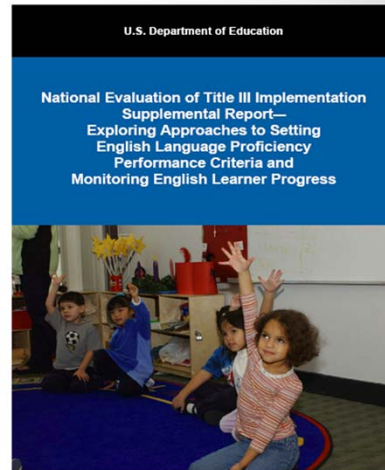
Context For Methods to Be Shared

- Common Core State Standards greatly expand the language demands for all students
 - Language practices and uses now clearly a part of academic content to be measured
- New ELP standards no longer stand-alone ("junior ELA") standards
 - Emphasize interactional, interpretive, & productive language uses needed within & across content areas
- PARCC and SBAC, EAG-ELP assessment consortia states must adopt common EL definition
- ESEA waivers underway & reauthorization looms



THE BIG QUESTIONS

1. WHAT DOES ENGLISH LANGUAGE PROFICIENCY MEAN?
2. HOW LONG DOES IT TAKE TO BECOME ENGLISH PROFICIENT?
3. HOW DO WE TAKE INTO ACCOUNT ENGLISH LANGUAGE PROFICIENCY LEVEL IN SETTING ACADEMIC PROGRESS-TO-PROFICIENCY EXPECTATIONS?



See www2.ed.gov/rschstat/eval/title-iii/implementation-supplemental-report.html



THE DATA

TO ADDRESS THESE QUESTIONS, WE HAVE USED DATA FROM MULTIPLE STATES AND DISTRICTS. THE FINAL REPORT APPLIES THE METHODS DESCRIBED BELOW ON THE COLLECTED DATA.



GUIDING PRINCIPLES

- Use *multiple analytic methods* when analyzing empirical data
- Select *methods that appropriately inform* decisions to be made / intended uses
- Offer *impact information* for each analytic approach



GUIDING PRINCIPLES

- Acknowledge *decisions are made by people not data* – select, train and support them well
- Remember *empirical approaches have limitations* that must be noted
- Ensure *transparency and feedback* – document process and validate decisions



INFORMAL GUIDING PRINCIPLE

“Essentially, all models are
wrong, but some are useful.”

Box & Draper (1987)



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WHAT DOES “ENGLISH PROFICIENT” MEAN?

- Goal – Determine a language proficiency level range that reflects “English proficient”
- Key Assumptions
 - A meaningful relationship exists between ELP and content assessments
 - ELP level becomes less related to content achievement as students approach English language proficiency



METHODS

- Decision Consistency – ELP Level & content achievement categorizations
- Logistic Regression – Likelihood that ELs at ELP levels will be academically proficient
- Descriptive Box Plots – Graphic approach to examining ELP and content relationships

DECISION CONSISTENCY MATRIX

		Criterion B	
		Below	Above
Criterion A	Above	<i>False</i> <i>Negative</i>	<i>True</i> <i>Positive</i>
	Below	<i>True</i> <i>Negative</i>	<i>False</i> <i>Positive</i>

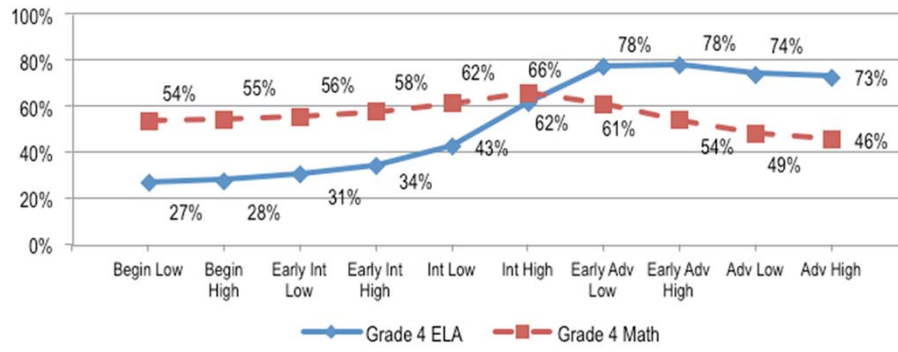
$$Correct = \left(\frac{\text{True Positives} + \text{True Negatives}}{\text{Total number in sample}} \right)$$

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DECISION CONSISTENCY



English-language proficiency level

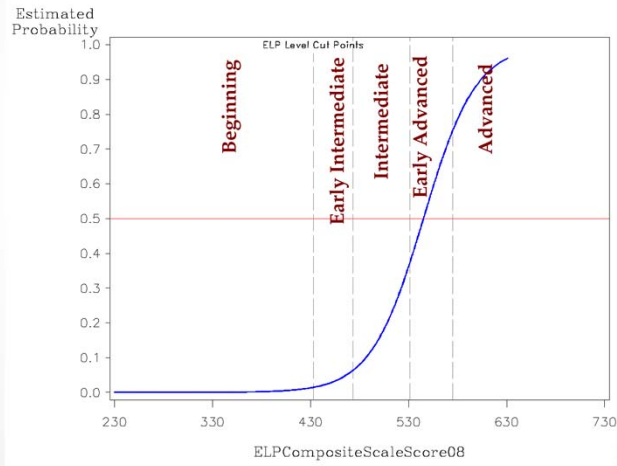
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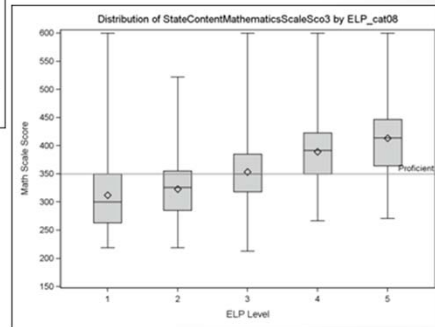
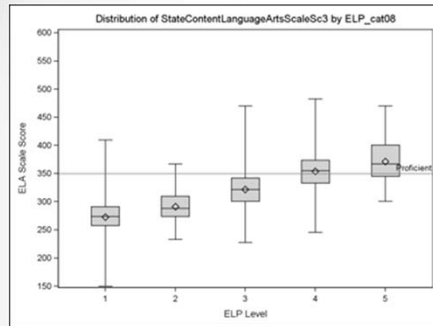
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LOGISTIC REGRESSION

Grade 4, 2008 ELA Logistic Plot



DESCRIPTIVE BOXPLOT



Highest Score
 Q3 – 75th percentile rank
 Mean
 Median
 Q1 – 25th percentile rank
 Lowest Score



SUMMARY

- Approaches are *corroborative*
- Example findings provide no single answer
- Approaches should be used to *support* decisions
- Several caveats with analyses, e.g.
 - Assessment administration dates
 - Missing data



HOW LONG TO ENGLISH PROFICIENCY?

- Goal – Identify representative timelines for ELs to attain English proficiency
- Assumptions
 - Appropriate analysis requires longitudinal data
 - Longitudinal data has special challenges
 - ELP growth rates vary systematically by starting ELP level, grade
 - Observed timelines are likely underestimates of actual time to proficiency



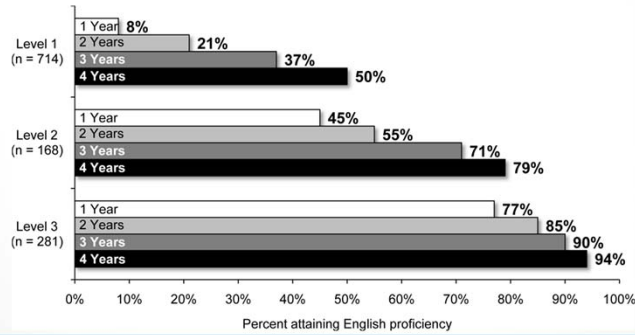
METHODS

- *Descriptive analysis* – in table and graphic formats, shows proportions of ELs attaining ELP performance standard by year in school system
- *Event History analysis* – estimates likelihood that an EL will attain ELP performance standard in any particular year in school system
- *Combined Results analysis* – uses findings from above methods to create a prediction timeline



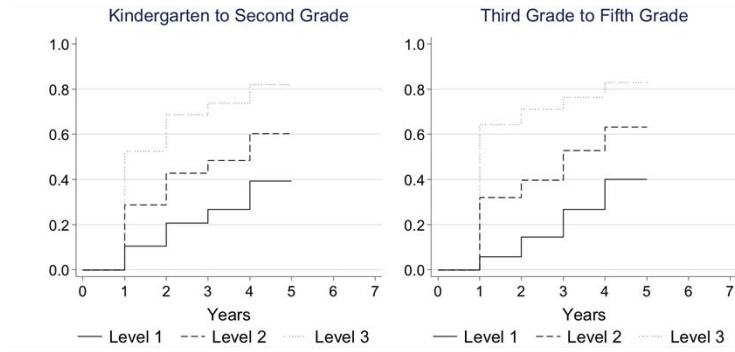
DESCRIPTIVE ANALYSIS

**Exhibit 13
(Method A)
Cumulative Percentage of Student Proficiency, by Year,
Third to Fifth Grade (Without Missing Records), Education Agency 1**



EVENT HISTORY ANALYSIS

**Exhibit 14 (Method B)
Censored Adjustment 1
Probability of ELs Identified During 2003–04 Becoming Proficient,
by Grade Cohort and ELP Level, Education Agency 1**



COMBINED ANALYSIS

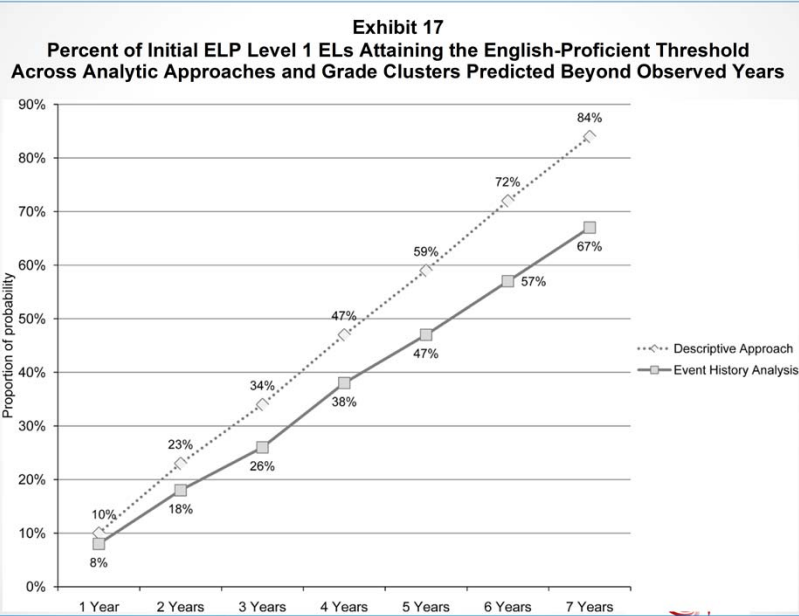
Exhibit 16
Combined Outcomes From Descriptive Approach and Event History Analyses,
by Grade Cluster, 2003–04 Initial Proficiency Level and Time

Level/ Time	Kindergarten to Second Grade			Third to Fifth Grade		
	Descriptive Approach (Proportion)	Censored Adjustment 1 (Probability)	Censored Adjustment 2 (Probability)	Descriptive Approach (Proportion)	Censored Adjustment 1 (Probability)	Censored Adjustment 2 (Probability)
ELP Level 1						
1	12%	0.10	0.10	8%	0.06	0.06
2	24%	0.21	0.21	21%	0.14	0.14
3	31%	0.27	0.26	37%	0.27	0.25
4	44%	0.39	0.37	50%	0.40	0.34
ELP Level 2						
1	33%	0.29	0.29	45%	0.32	0.32
2	49%	0.43	0.43	55%	0.40	0.40
3	55%	0.48	0.48	71%	0.53	0.51
4	66%	0.60	0.58	79%	0.63	0.57
ELP Level 3						
1	57%	0.52	0.52	77%	0.64	0.64
2	74%	0.69	0.69	85%	0.71	0.71
3	79%	0.74	0.73	90%	0.76	0.75
4	86%	0.82	0.80	94%	0.83	0.79

Source: National Evaluation of Title III Implementation student-level longitudinal achievement data sets.



PREDICTION TIMELINE



SUMMARY

- How long it takes depends on where you start
 - For ELs entering at lowest ELP level, 5-7 years
 - For ELs entering close to ELP performance standard, 1-2 years
- Many caveats e.g.,
 - Longitudinal data are limited
 - Fast-growing ELs leave & are no longer tested
 - Censoring issues & assumptions
 - Missing students



ACADEMIC EXPECTATIONS AND ELP LEVEL

- Goal – Explore methods to adjust academic content progress and proficiency expectations based on ELP level and time in school system
- **Key Assumptions**
 - ELP level fundamentally and systematically affects content performance
 - Adjusting for this provides more realistic, accurate account of overall EL content performance
 - Only “on-track” ELP levels should be adjusted



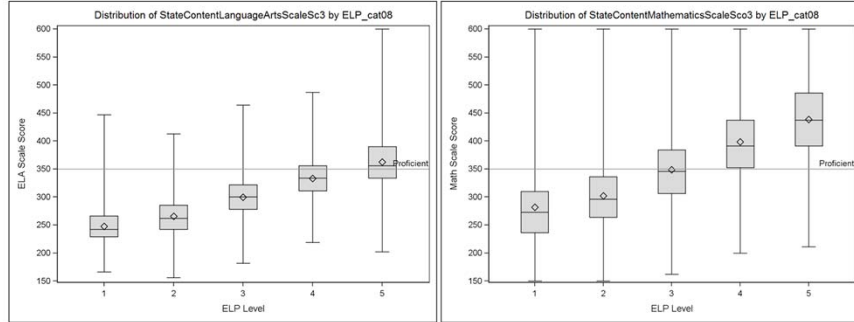
METHODS

- *Progressive benchmarking* – adjusting based on current or expected ELP level (by time)
- *Indexed Progress* – adjusting (ELA only) based on ELP growth
- *Status & Growth Accountability Matrix* – not adjusting for ELP level but using content proficiency growth or status



WHAT WE KNOW

Exhibit 18
Education Agency 1, Grade 3: Box Plots of English Language Arts
and Mathematics Scale Scores, by ELP Performance Level (2007–08)



BEING ON TRACK - EXAMPLE

ELP Level	Expected ELP Level by Year in School			
	Initial Year	2 nd Year	3 rd Year	4 th Year
Level 1	Level 1	Level 2	Level 3	Level 4
Level 2	Level 2	Level 3	Level 4	Proficient
Level 3	Level 3	Level 4	Proficient	--
Level 4	Level 4	Proficient	--	--

Expected Growth in English-Language Proficiency
(ELP) Level by Year in State Schools



Progressive Benchmarking

- Two approaches explored: Adjusts either ELs' content scale score results or ELs' weight (individual count) based on "on-track" ELP levels
- Steps:
 1. Compare non-EL & EL distributions on content test
 2. Establish benchmark criterion (e.g., 75th %ile)
 3. Develop adjustment factor and formula
 4. Set adjustment timeline per ELP "on-track" status
 5. Calculate adjusted achievement outcomes



Progressive Benchmarking: *Adjusted Scale Score Method*

Distribution of Grade 3 Mathematics Scale Scores for ELs (by level) and Non ELs

Groups		25 th Percentile	50 th Percentile	75 th Percentile
ELs	Level 1	245	282	336
	Level 2	287	325	377
	Level 3	320	364	407
	Level 4	346	377	437
	Level 5	361	417	469
Non ELs		341	399	451

Distribution of Grade 3 ELA Scale Score for ELs (by level) and Non ELs

Groups		25 th Percentile	50 th Percentile	75 th Percentile
ELs	Level 1	224	242	266
	Level 2	250	272	296
	Level 3	281	307	330
	Level 4	296	326	356
	Level 5	315	347	384
Non ELs		311	342	377

75th Percentile



Progressive Benchmarking: *Adjusted Scale Score Method*

- Adjustment Factor for “on-track” ELP levels:

- Adjustment Formula:

$$\frac{\text{Proficient Scale Score Value}}{\text{EL Scale Score Value at 75th percentile}}$$

Observed Scale Score x adjustment factor



Progressive Benchmarking: *Adjustments*

ELP Level Scale Score Adjustment Factor for English Language Arts Results				
ELP Level	Years in Program			
	0 to 1	2	3	4
1	1.32	1.18	1.06	1.00
2	1.18	1.06	1.00	1.00
3	1.06	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00

ELP Level Scale Score Adjustment Factor for Mathematics Results				
ELP Level	Years in Program			
	0 to 1	2	3	4
1	1.04	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00



Progressive Benchmarking

Adjusted Count Method

Probability of Being Proficient (Logistic Regression)

Group		Math	ELA
Non ELs		0.692	0.437
ELs	Level 1	0.211	0.016
	Level 2	0.392	0.034
	Level 3*	0.629	0.152
	Level 4	0.753	0.438
	Level 4*	0.890	0.786



Progressive Benchmarking

Adjusted Count Method

ELP Count Adjustment Values for English Language Arts

ELP Level	Years in Program			
	0 to 1	2	3	4
Level 1	0.10	0.20	0.40	0.50
Level 2	0.20	0.40	0.50	1.00
Level 3	0.40	0.50	1.00	1.00
Level 4	0.50	1.00	1.00	1.00
Level 5	1.00	1.00	1.00	1.00



Adjusted Count Method Formula

$$\frac{\text{Number of [Eligible Former EL + Current EL] Students Proficient on Assessment}}{\text{Number of Eligible Former EL Students} + \sum \text{Count Adjustment Values for Current ELs}}$$

$$\frac{\text{Number of Current EL Students Proficient on Assessment}}{\sum \text{Count Adjustment Values for Current ELs}}$$



Progressive Benchmarking Sample Impacts

Exhibit 27.
Content Proficiency Outcome Comparisons of Progressive Benchmarking Methods, for English Learners at Grade 3 (N = 18,101), in Education Agency 1

Method	Percent Proficient
Mathematics Proficiency (no method applied)	39.3%
1.a. Mathematics Proficiency using Scale Score Adjustments	39.4%
1.b. Mathematics Proficiency using Count Adjustments	42.0%
ELA Proficiency (no method applied)	6.3%
1.a. ELA Proficiency using Scale Score Adjustments	7.6%
1.b. ELA Proficiency using Count Adjustments	7.0%



Indexed Progress

- Adjusts how ELs are counted as proficient in ELA by establishing index values based on “on-track” ELP growth
- Steps
 1. Identify “on-track” ELs’ ELP scale score gain by level
 2. Establish benchmark criterion (e.g., 75th %ile)
 3. Set adjustment timeline per ELP “on-track” status
 4. Create indexed progress gain table
 5. Apply gain table and calculate achievement levels



Indexed Progress

Average Growth by ELP Level and Years in Program,
in ELP assessment composite scale score units

ELP Level	Years in Program			
	0 to 1	2	3	4
Level 1	182	69	48	21
Level 2	69	48	21	--
Level 3	48	21	--	--
Level 4	21	--	--	--
Level 5	--	--	--	--



Indexed Progress Sample Impacts

Content Proficiency Outcome Comparisons of Indexed Progressive Method, for Third Grade EL Students, EA 1

Method	Percent Proficient
ELA Proficiency Results (Unadjusted)	6.3%
ELA Proficiency Results with Indexed Progress	17.4%

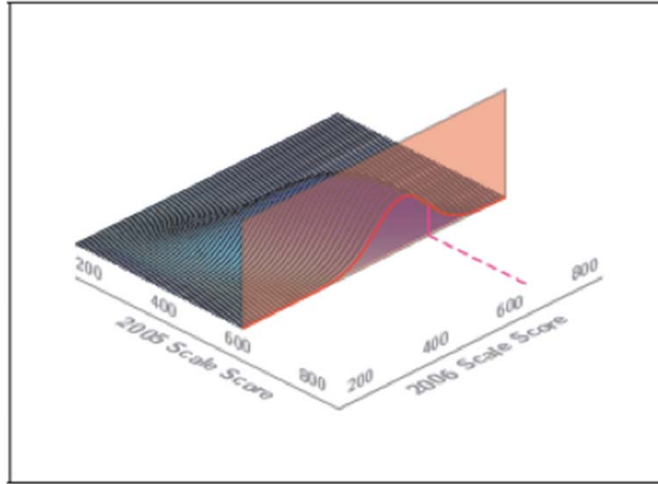


Status & Growth Accountability Matrix (SGAM)

- Instead of using ELP level, counts content achievement growth and status.
- Steps
 1. Identify growth model
 2. Apply to all students
 3. Establish benchmark criterion (e.g., 75th %ile)
 4. Create status/growth matrix
 5. Apply matrix weights
 6. Calculate achievement results



Status & Growth Accountability Matrix



Status & Growth Accountability Matrix

	Growth on Content Assessment	
	Low Growth	High Growth
Proficient or Above on Content Assessment	I Content Scale Score ≥ 350 and Student Growth Percentile < 75	II Content Scale Score ≥ 350 and Student Growth Percentile ≥ 75
Not Proficient on Content Assessment	III Content Scale Score < 350 and Student Growth Percentile < 75	IV Content Scale Score < 350 and Student Growth Percentile ≥ 75

Criterion = Growth Percentile of 75



Status & Growth Accountability Matrix

Sample Impacts

Group	N	Method	Percent Proficient
Non-EL	30293	Mathematics Proficiency (no method applied)	71.2%
		3. Mathematics Proficiency using SGAM Method	72.5%
		ELA Proficiency (no method applied)	44.0%
		3. ELA Proficiency using SGAM Method	50.5%
EL	18101	Mathematics Proficiency (no method applied)	39.3%
		3. Mathematics Proficiency using SGAM Method	43.4%
		ELA Proficiency (no method applied)	6.3%
		3. ELA Proficiency using SGAM Method	20.7%



MODEL COMPARISONS GRADE 3 – ELA*

Method	Mean Percent Proficient in English Language Arts				
		Schools Clustered by Density of New ELs			All Schools (N=458)
		Low (N=115)	Moderate (N=230)	High (N=113)	
No method applied	Mean	10%	7%	9%	8%
	Std	0.17	0.07	0.11	0.11
1.a. ELP Level Adjusted Scale Score Method	Mean	11%	8%	14%	10%
	Std	0.17	0.08	0.14	0.12
1.b. ELP Level Adjusted Count Method	Mean	12%	7%	12%	10%
	Std	0.23	0.08	0.16	0.15
2. ELP Indexed Progress Method	Mean	22%	17%	22%	20%
	Std	0.21	0.10	0.15	0.15
3. Status and Growth Accountability Matrix Method	Mean	23%	21%	22%	22%
	Std	0.19	0.11	0.16	0.15

*By % of new ELs in school



MODEL COMPARISONS GRADE 3 – Math*

Method	Mean Percent Proficient in Mathematics				
		Schools Clustered by Density of New ELs			All Schools (N=458)
		Low (N=115)	Moderate (N=230)	High (N=113)	
No method applied	Mean	47%	40%	47%	43%
	Std	0.24	0.15	0.21	0.20
1.a. ELP Level Adjusted Scale Score Method	Mean	47%	40%	47%	43%
	Std	0.24	0.15	0.21	0.20
1.b. ELP Level Adjusted Count Method	Mean	48%	42%	56%	47%
	Std	0.25	0.16	0.30	0.23
3. Status and Growth Accountability Matrix Method	Mean	51%	44%	49%	47%
	Std	0.24	0.15	0.21	0.20

*By % of new ELs in school



SUMMARY

- Methods yield varying outcomes in sample
 - SGAM effects largest change
 - *Indexed progress* similar to SGAM for ELA
 - *Progressive benchmarking* much more modest
 - Effects much larger on ELA than math
 - Effects vary by % new ELs in school



SUMMARY

- Caveats:
 - Purpose is to illustrate application of exploratory methods, not promote any single one
 - Different assessments, performance standards, EL demographics affect methods and outcomes
 - Different criteria may yield different findings
 - e.g., “Optimal criteria” using school or teacher quality
 - Substantial statistical and data capacity needed



TAKEAWAYS

- Empirical methods can support decision-makers in policymaking for ELs
- Other informative methods are being explored
- States unequal in their capacity to employ these methods – need support
- Larger policy context – Common Core State Standards greatly expand the language demands for all students
 - Language practices and uses now clearly a part of academic content to be measured



TAKEAWAYS

Larger policy context –

- New ELP standards no longer stand-alone (“junior ELA”) standards
 - Emphasize interactional, interpretive, & productive language uses needed within & across disciplines
- PARCC and SBAC, EAG-ELP consortia states must adopt common EL definition
- ESEA waivers & reauthorization
- Methods presented (others being developed) offering empirically supported decisions take on increased importance

