Early Learning Network Year 1 Results: *Preschool Educational Practices and Child Outcomes*

The Early Learning Network is funded by the Institute of Education Sciences.

National Research Conference on Early Childhood

June 27, 2018

The Early Learning Network aims to advance the understanding of *policies and practices* that narrow the achievement gap and *maintain early learning success* as children transition *from preschool to elementary school* and beyond.

- Five Research Teams
  - One Assessment Team
    - Network Lead

Complementary Research Studies

- Descriptive study:

  Identify systems-level policies and practices that support early learning

- Classroom observation study:

  Identify teaching practices and other classroom-level malleable factors associated with children's school readiness and achievement in preschool and early elementary school

- Longitudinal study:

  Identify malleable factors associated with early learning and school achievement over time from preschool through the early elementary school grades

Symposium Agenda

- Chair: Susan Sheridan, ELN Lead (University of Nebraska-Lincoln)

- Paper 1: How Does Quality of Curricular Implementation Support Diverse Children's Skills in Prekindergarten?: Evidence from Boston
  - JoAnn Hsueh, Meghan McCormick, Michelle Maier, Christina Weiland, Jason Sachs, Catherine Snow (MDRC & Partners)

- Paper 2: Pre-K classroom Characteristics and Pre-K Gains of Children Living in Rural Areas
  - Peg Burchinal, Irina Mokrova, Mary Bratsch-Hines, Ellen Peisner-Feinberg (UNC)

- Paper 3: Classroom quality and classroom network structure: Interplay and prediction of student outcomes
  - Jessica Logan, Jing Chen, Laura Justice, Tzu-Jung Lin, Kelly Purtell (OSU)

- Paper 4: Understanding the Effects of Classroom Processes on Child Outcomes in Pre-kindergarten
  - Bob Pianta, Ginny Vitiello, Jessica Whittaker, Erik Ruzek, Tara Hofkens & Arya Ansari (UVA)

- Discussant: Sara Vecchiotti, Foundation for Child Development

How Does Quality of Curricular Implementation Support Diverse Children's Skills in Prekindergarten?: Evidence from Boston

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The BPS Model as a Case Study for Examining Fidelity of Implementation

Curriculum in place	Example components adapted from OWL	Example Building Blocks components	Example district-developed components
Focus on K1 (district-adapted version of Opening the World of Learning & Building Blocks). Thematic curriculum that cuts across ELA, math, science, social study, and arts.	Centers & Introduction to Centers	Building Blocks centers	Thinking & feedback; SWPL; Let's Find Out About It
	Read Aloud	Building Blocks whole group activities	Storytelling
	Small Groups to support language/literacy	Building Blocks small group activities	Storyacting

Research questions

1. What does fidelity look like across prekindergarten public school classrooms in BPS?
2. What measures of fidelity are most closely associated with CLASS?
3. Is fidelity to the BPS PreK model associated with children's language and math scores in the Spring of PreK?
   - For which groups of students does fidelity appear most predictive of Spring outcomes (e.g., dual language learners, racial/ethnic minority students)?

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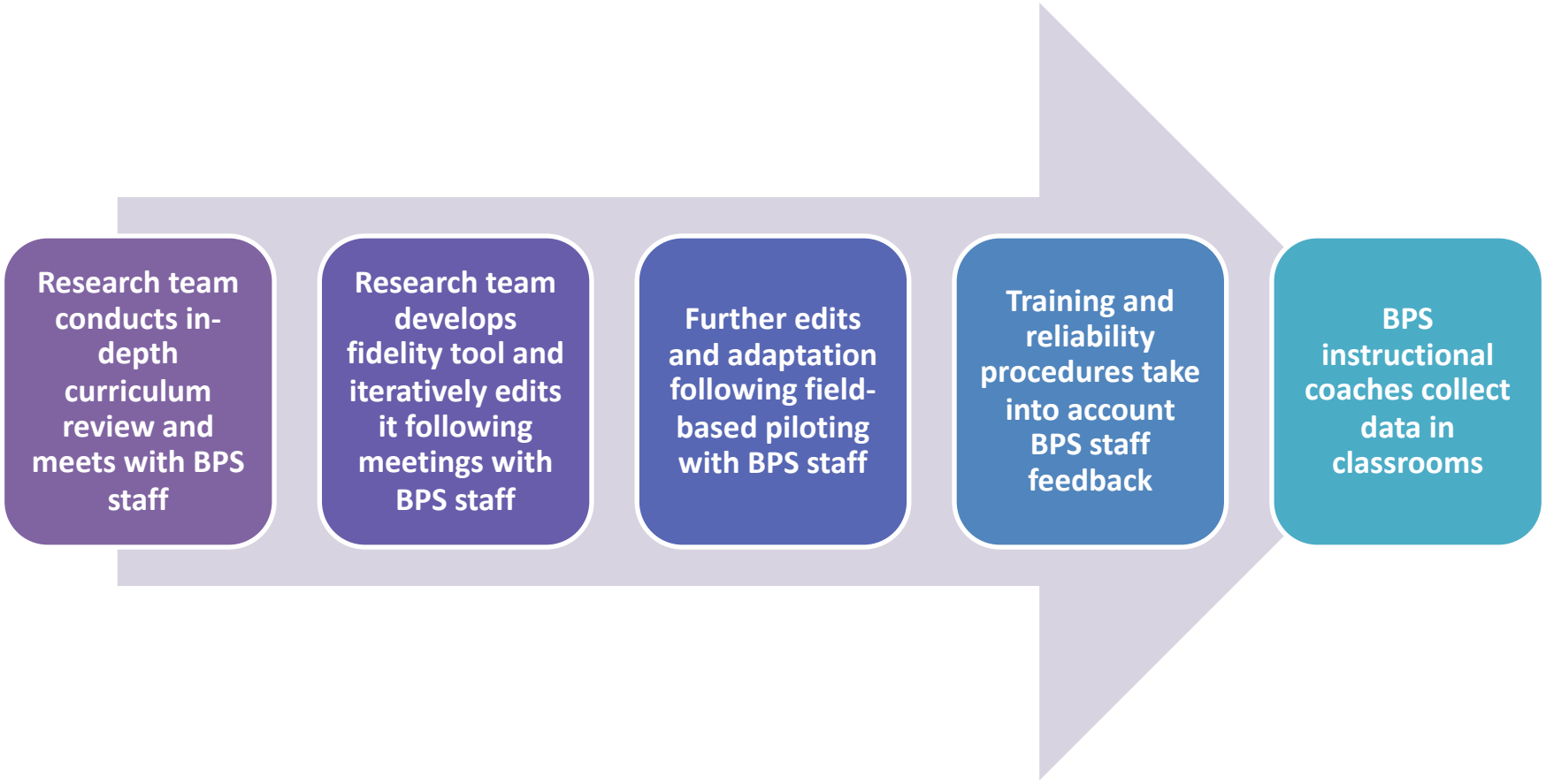
Research & BPS teams Co-construct Tool to Measure Fidelity of Implementation



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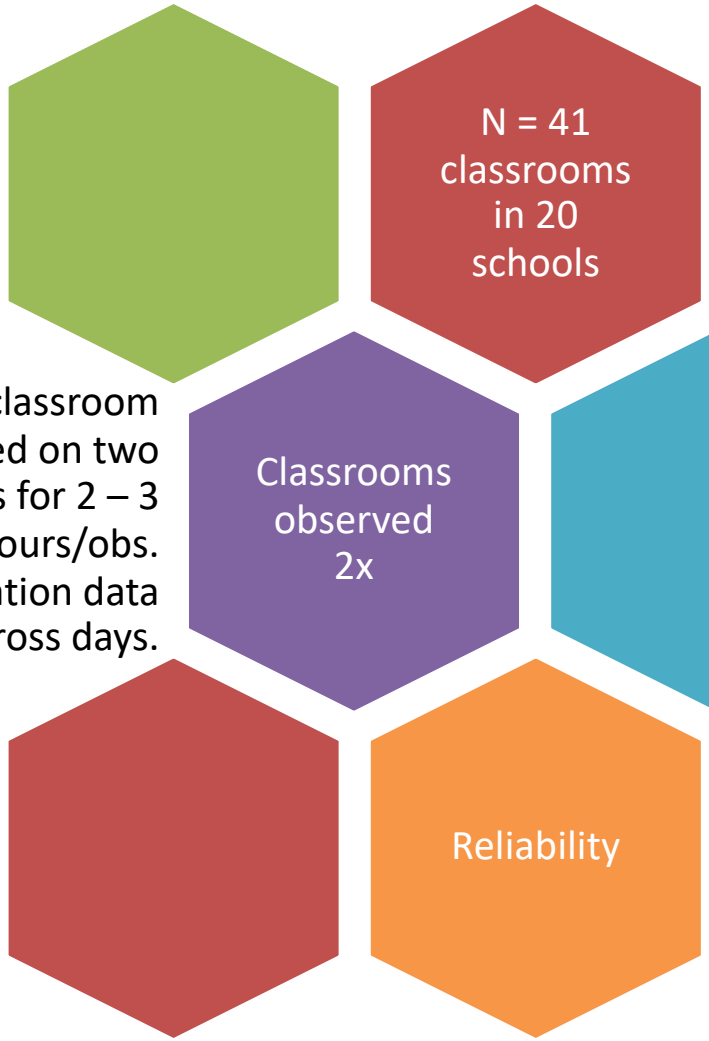
Fidelity Data in Public School Classrooms



41 total public prekindergarten classrooms participated (97% of teachers in participating schools)

Each classroom observed on two separate days for 2 – 3 hours/obs. Observation data averaged across days.

20% of observational visits were coded by two BPS coaches; Reliability analysis suggests high agreement.

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Classroom & teacher participants (*N* = 41 public school classrooms across 20 schools)

Teacher characteristic	%age/Mean
Teacher age	43.95 (SD = 9.37)
Years teaching	14.79 (SD = 9.25)
Years teaching prekindergarten	8.6 (SD = 7.37)
Years teaching at current school	7.79 (SD = 8.01)
Teacher has master's degree	90%
Teacher female	100%
Teacher Black	22%
Teacher White	49%
Teacher Hispanic	13%
Teacher Asian or other race	16%
Classrooms per school	1.35 (SD = .42)

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Summary of Fidelity Data for BPS K1 Classrooms

Component	% classrooms component observed
Centers	100%
Intro to Centers	95%
Read Aloud	93%
SWPL	80%
Building Blocks Whole Group	66%
Small Group, Language/Literacy	63%
Building Blocks Centers	49%
Building Blocks Small Group	41%
Thinking & Feedback	32%
Storytelling	15%
Story-acting	12%
Let's Find Out About it	7%

Cross-component fidelity measures

Vocabulary

(α = .91)

Extending/Building

(α = .91)

Summary/ Reflection/Making Connections

(α = .79)

Scaffolding/ Differentiation

(α = .82)

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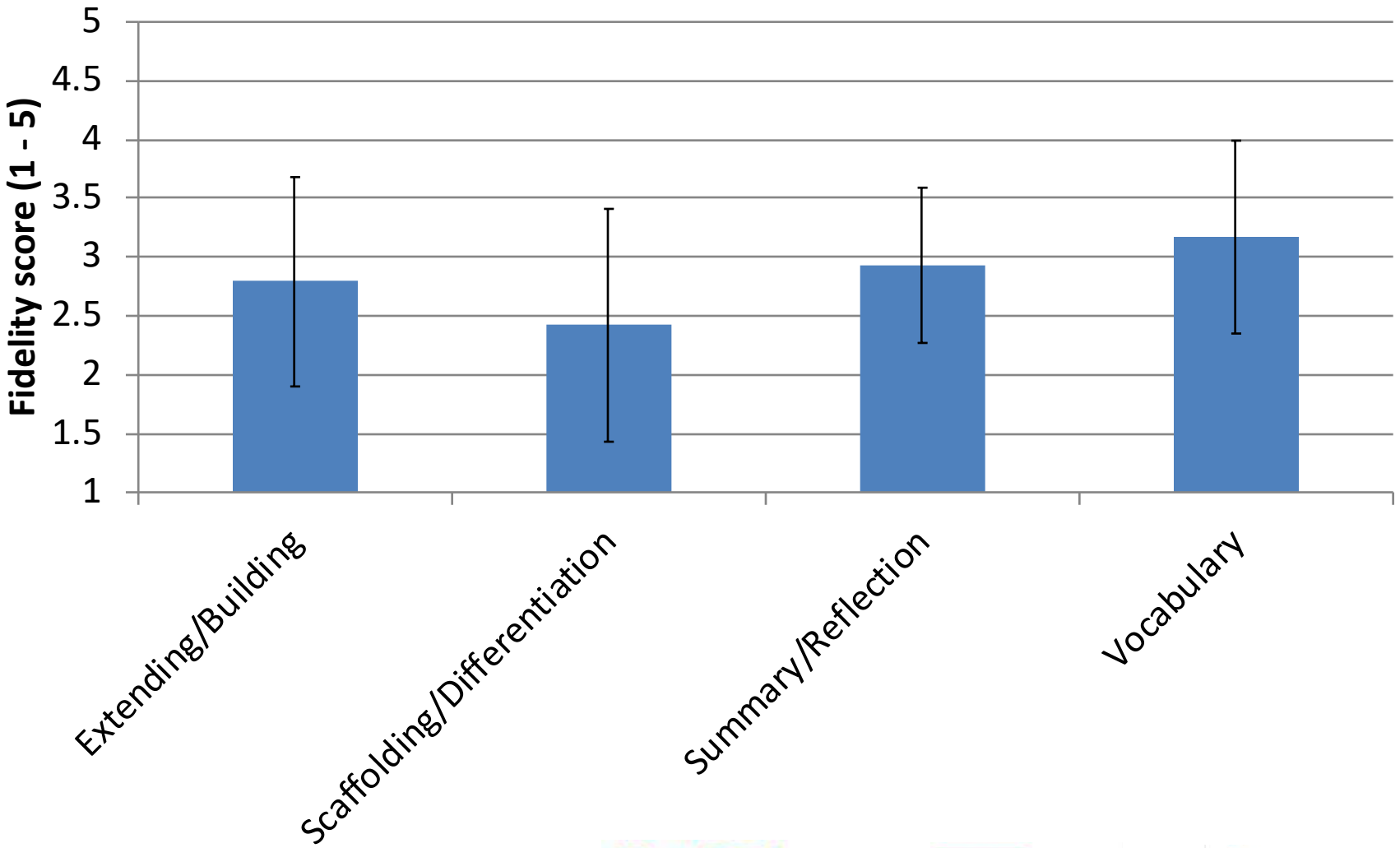
What does fidelity look like overall in BPS public school prekindergarten classrooms?



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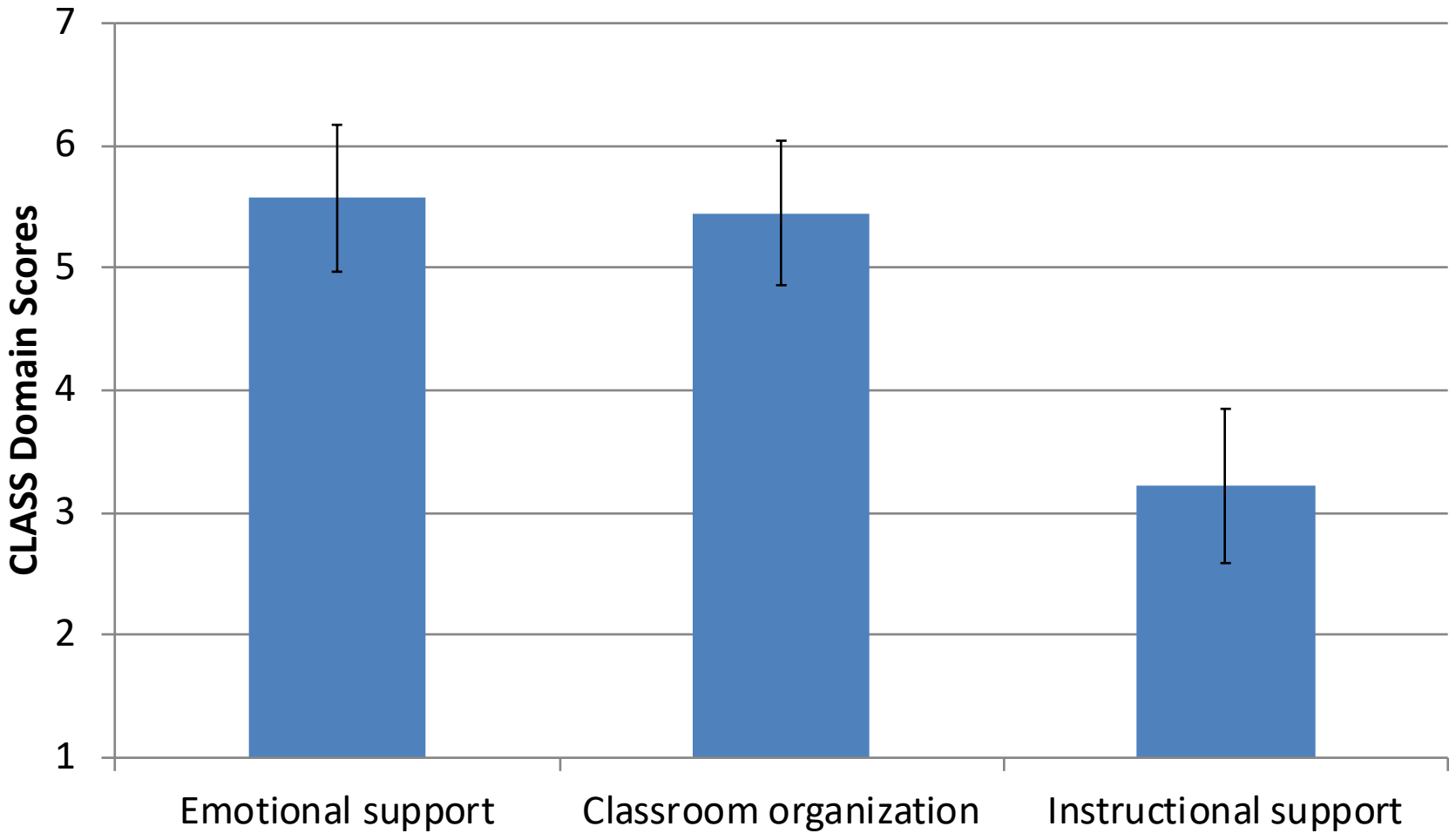
How does this compare to CLASS scores?



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How do fidelity measures relate with CLASS?

	Instructional support	Emotional support	Classroom org.
Instructional support	1.0		
Emotional support	.67	1.0	
Classroom org.	.69	.85	1.0
Extending/Building	.18	.16	.10
Summary/Reflection	.22	.10	.14
Vocabulary	.01	.01	-.07
Scaffolding/Differentiation	.35	.21	.22

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How does implementation vary depending on classroom composition?

- There are some differences in implementation between classrooms. **On average**:
  - Classrooms with higher percentages of white students have higher quality of implementation
  - Classrooms with higher percentages of black and Hispanic students have lower quality of implementation
  - Classrooms with higher percentages of DLLs have similar quality of implementation as classrooms with fewer DLLs, but more variation across classrooms.

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Links between fidelity of implementation and improvements in language and math across prekindergarten year

- Full sample of students - no significant associations between cross-component fidelity measures and gains in language or math across prekindergarten year

- No significant associations detected in this preliminary work using cross-component fidelity constructs to predict PPVT outcomes

- Statistically significant interactions between fidelity of implementation, Hispanic and DLL status, and math outcome

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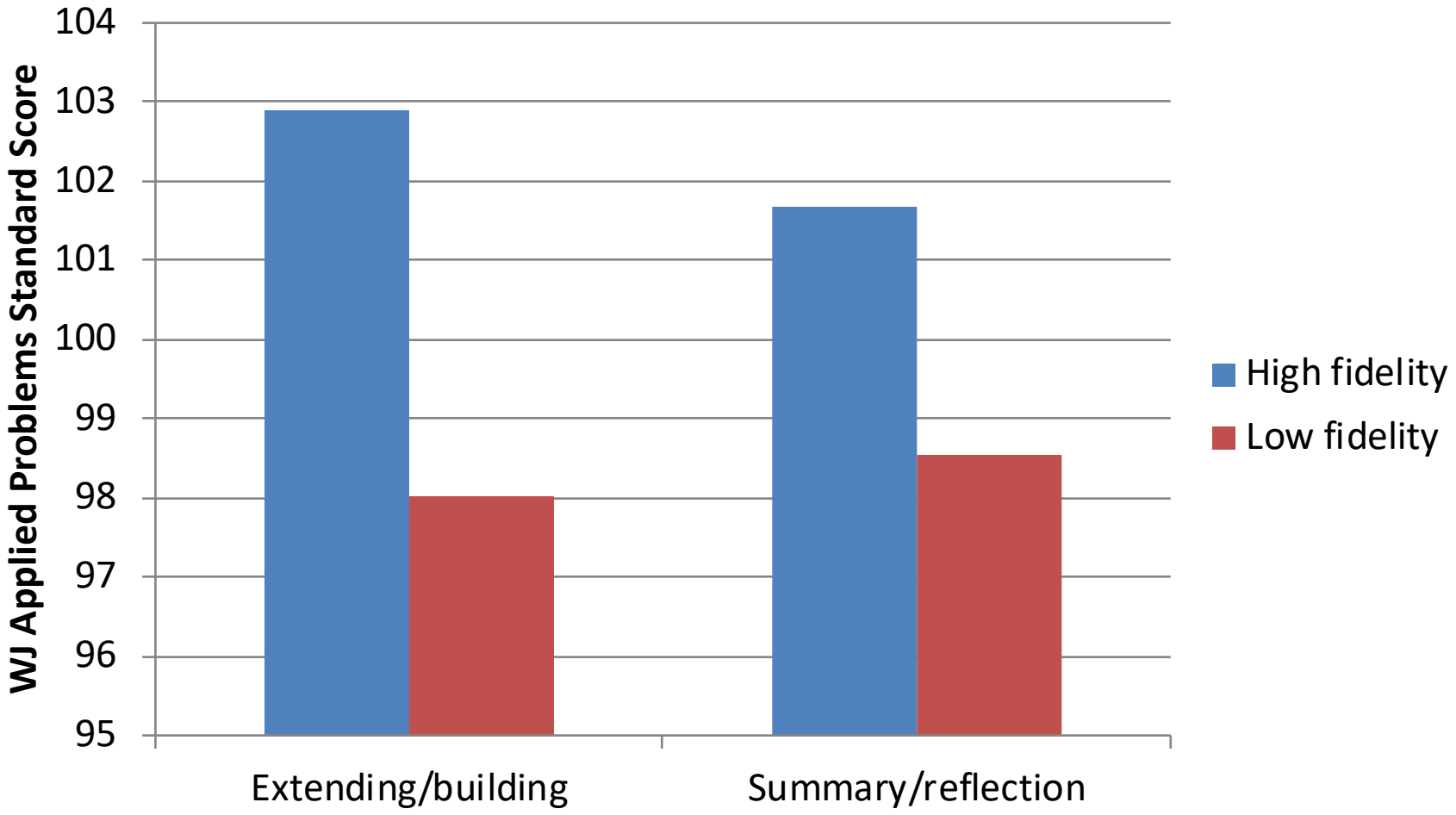
Example of Predicted Math Skills for Hispanic Students at End of Prekindergarten Year



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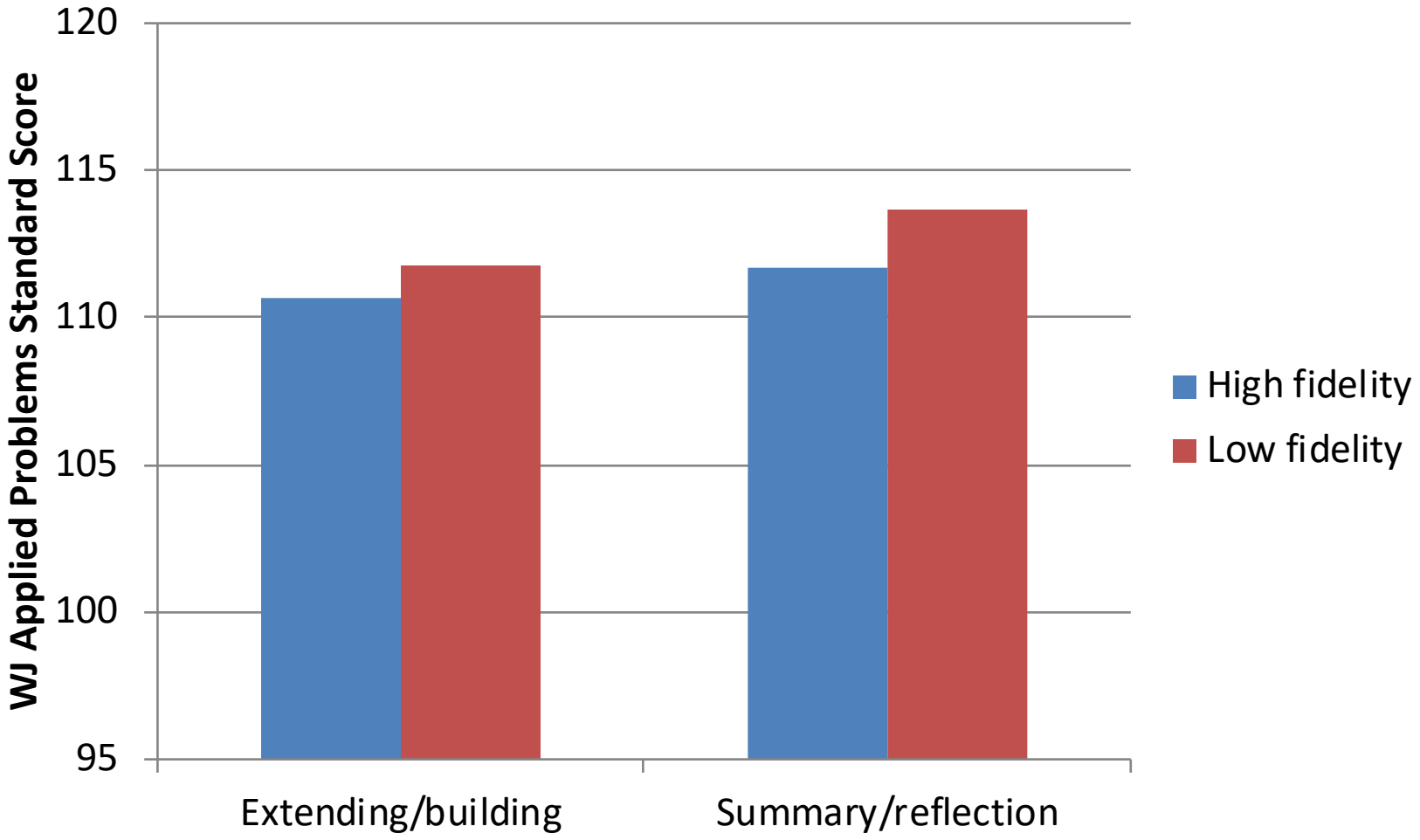
Example of Predicted Math Skills for White Students at End of Prekindergarten Year



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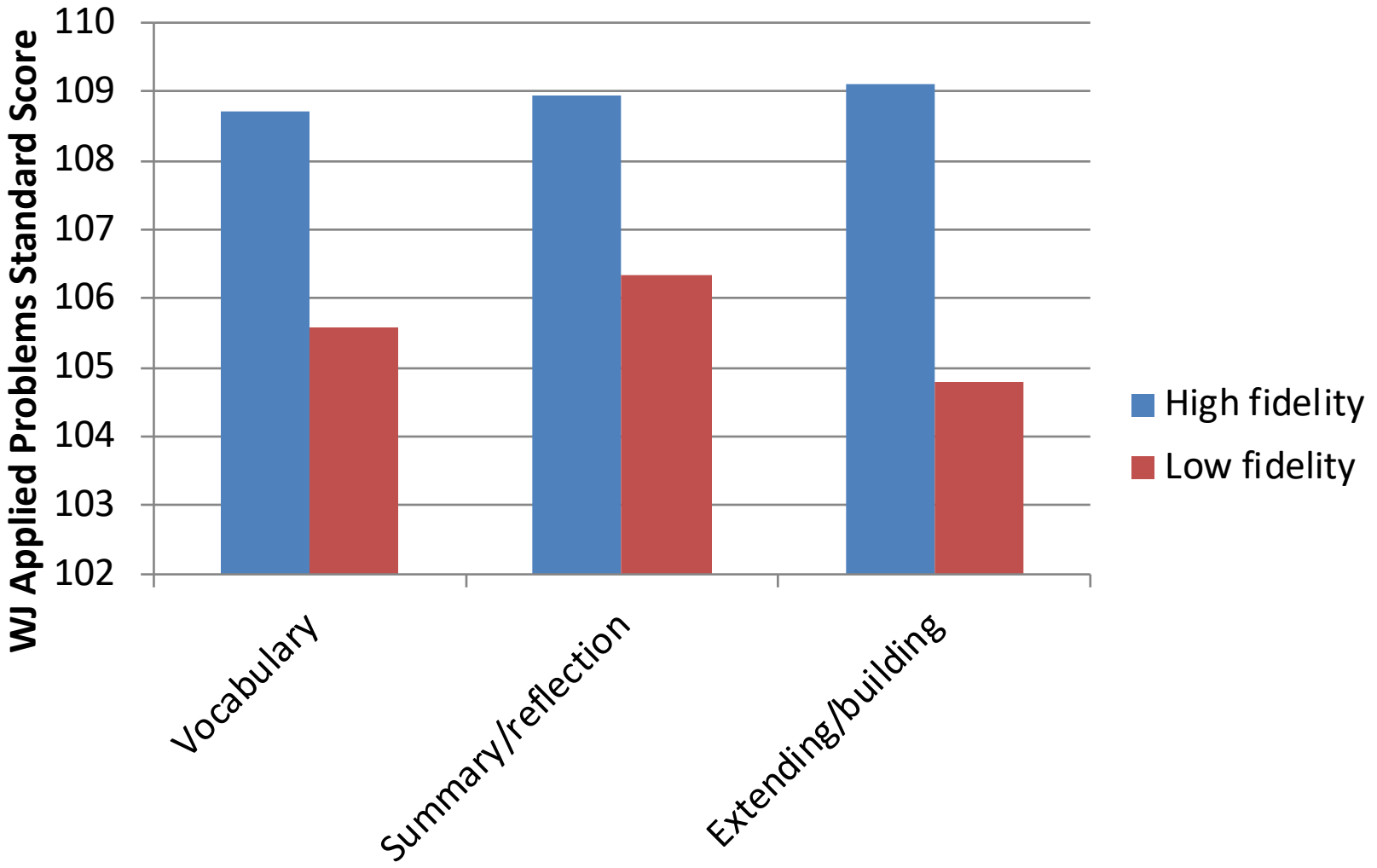
Example of Predicted Math Skills for Dual Language Learner Students at End of Prekindergarten Year



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Some preliminary conclusions

Reliable fidelity data can be collected by district staff.

Systematic variation in fidelity across classrooms.

Fidelity may predict math outcomes (on a small magnitude) but story is likely in the subgroups for a diverse sample with varying skill levels at baseline and follow-up.

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Limitations & Next Steps

- Work is **very preliminary** and in early stages
  - Future models will include more rigorous work to determine covariates and alternative model fits.
- More measurement work needed to operationalize fidelity constructs and consider any within-component measures of adherence, dosage, quality
- Data are correlational across one school year
- Sample is fairly small in Year 1 study (particularly for subgroups); future years will include larger samples for subgroup examination

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Pre-K classroom characteristics and Pre-K gains of children living in rural areas

Peg Burchinal
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Mary Bratsch-Hines
Ellen Peisner-Feinberg
University of North Carolina at Chapel Hill

Educational practices and child outcomes in Pre-K

- ECE can reduce achievement gap
- State and federal preschool programs
- But – questions remain:
  - Which child outcomes are promoted by which aspects of preschool ECE?

ECE quality dimensions

- Process quality
  - Teacher sensitivity and classroom management relate to socio-emotional outcomes,
  - Widely examined; modest associations
- Verbal interactions with adults
  - T-C conversations relate to language
  - Verbal literacy instruction relate to literacy skills
  - Less widely examined; modest associations

ECE quality dimensions

- Instruction time
  - More time in content area relates to gains in that skill
  - Less widely studied: modest associations
- Setting
  - Small groups help young children learn
  - Centers provide children with hands-on learning opportunities: Cornerstone of ECE instruction
- Curriculum
  - Wide-scale belief in whole child curricula
  - Moderate to strong evidence for some domain-specific curricula

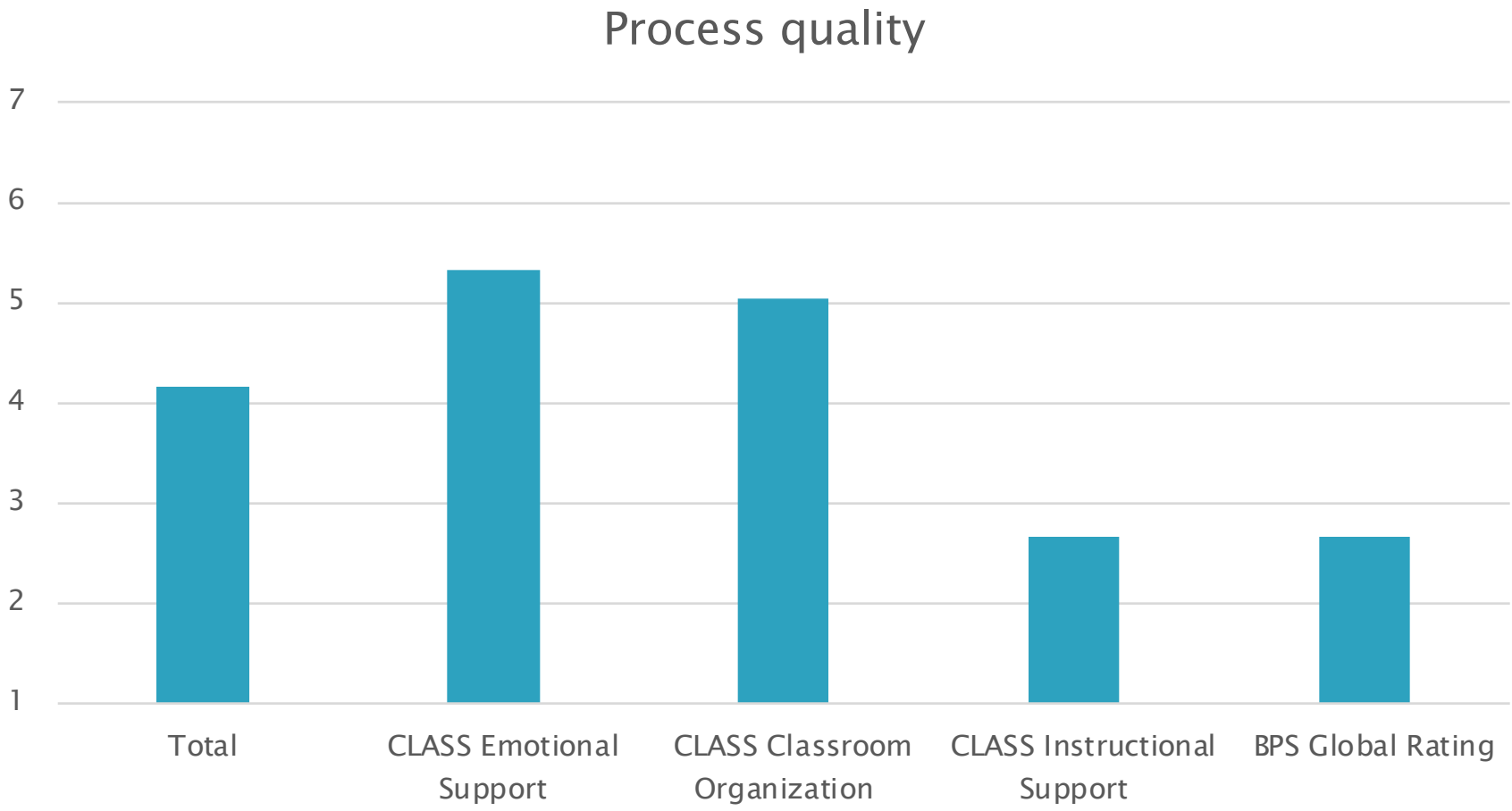
Design and participants

- Cohort study of rural NC
  - 6 NC rural counties
  - 63 randomly selected NC Pre-K classrooms
- Pre-K children
  - 351randomly selected children
    - 34% Spanish-English dual language learners
- ECE dimensions
  - Classroom observations
  - Teacher report of curriculum

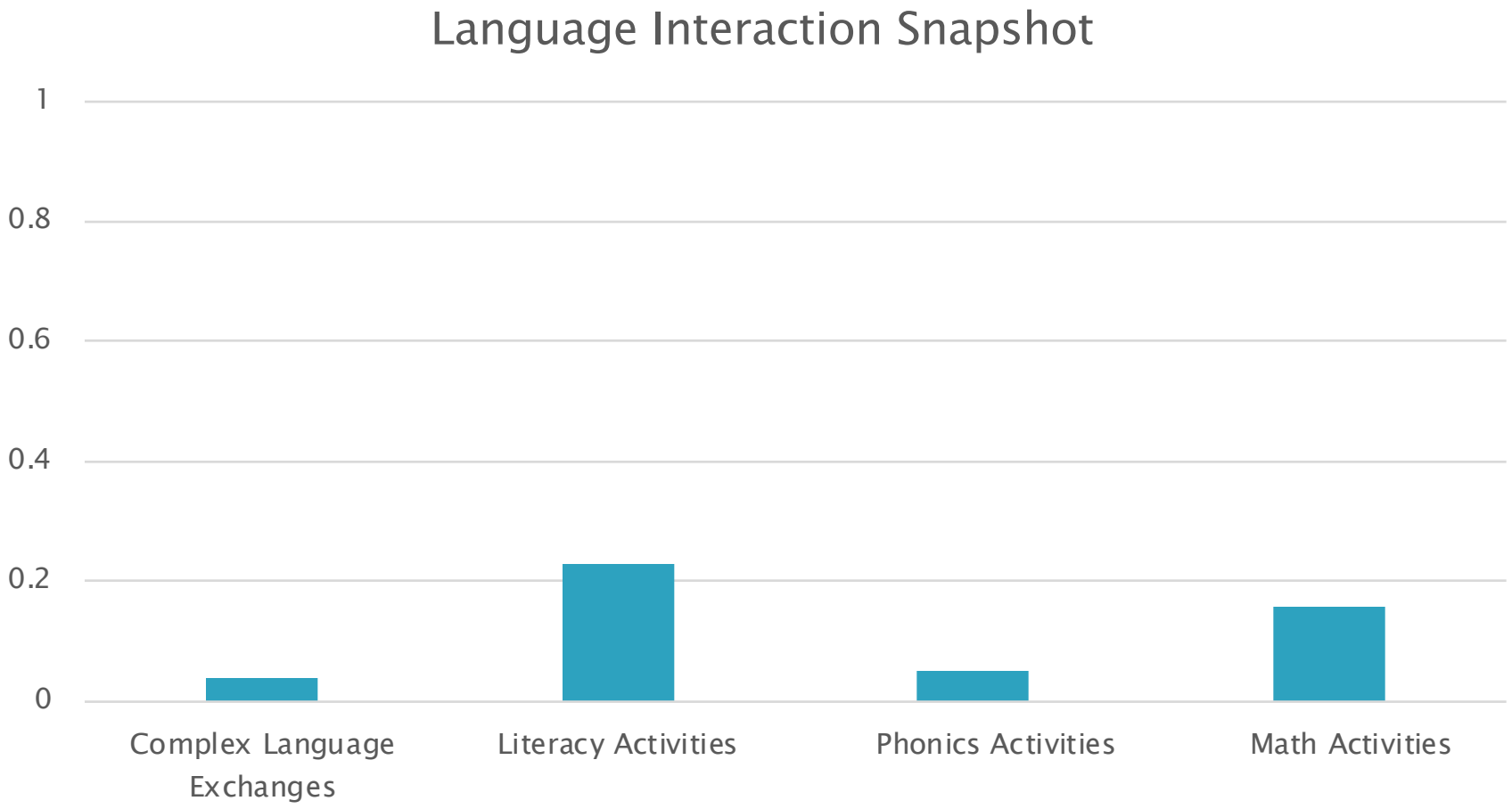
Quality measures

- Classroom observed
- Day 1
  - CLASS
  - High quality instructional practices – adapted Boston pre-K "fidelity" checklist
  - Combined – alpha =.90
- Day 2
  - Language Interaction Snapshot (LISn)- summarized for classroom
    - Time sampling observations of individual children
      - 30 second recording of language exchanges
      - 5 minute recording of setting and activity
      - 4-6 cycles for 6 or more children

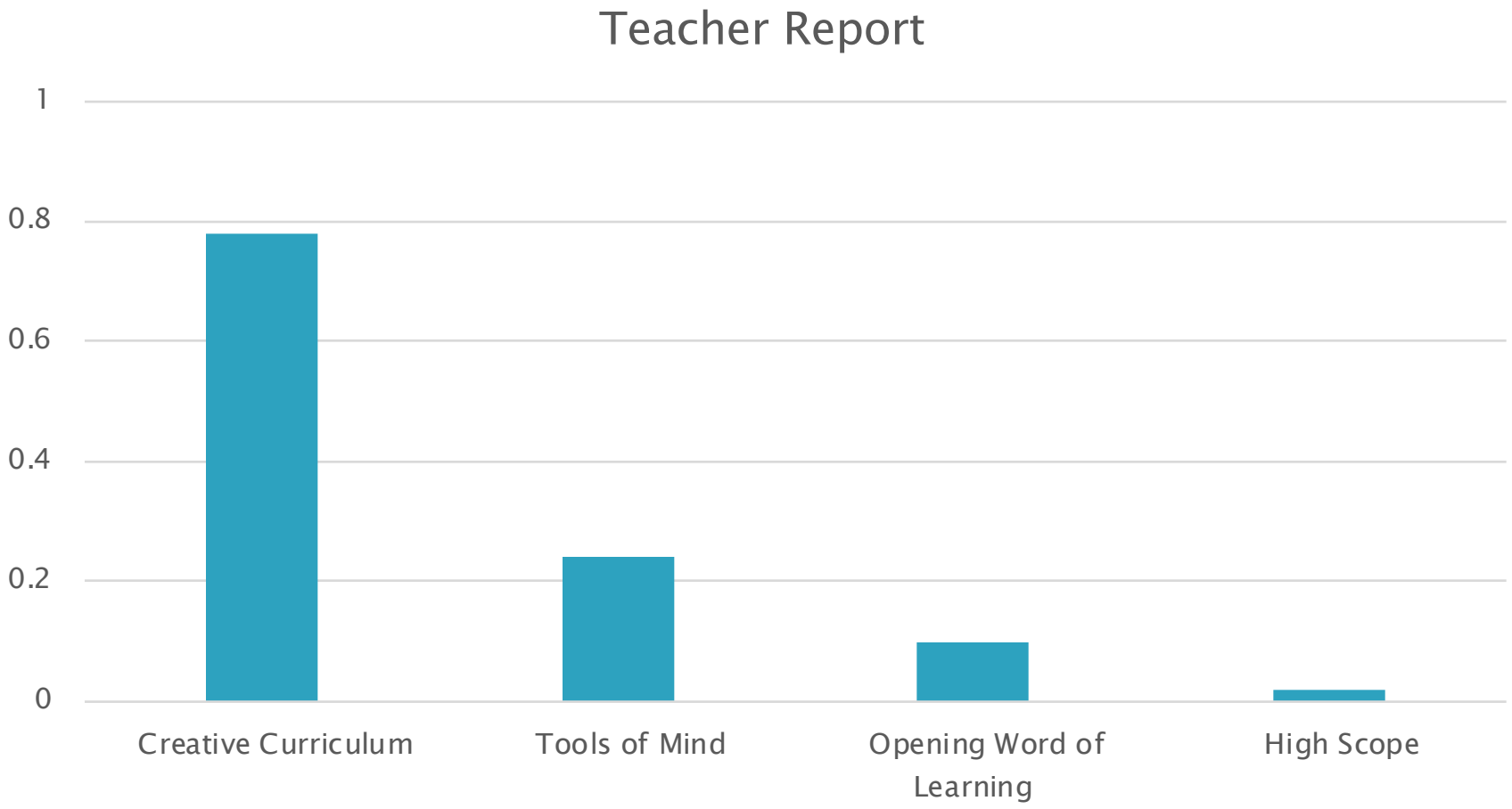
ECE Dimensions



ECE Dimensions:
Teacher Talk and Instructional Time



ECE Dimensions: Curriculum



ECE Dimensions

	N	% Mean	Sd
High Quality Practices	62	4.17	0.66
Teachers: complex language	61	0.04	0.03
Instructional Time Literacy Activities	61	0.23	0.12
Phonics Activities	61	0.05	0.05
Math Activities	61	0.16	0.13
Grouping – Small Group	61	0.08	0.11
Whole Group	61	0.36	0.18
Free Choice/Center	61	0.48	0.19
Creative Curriculum	59	78%	

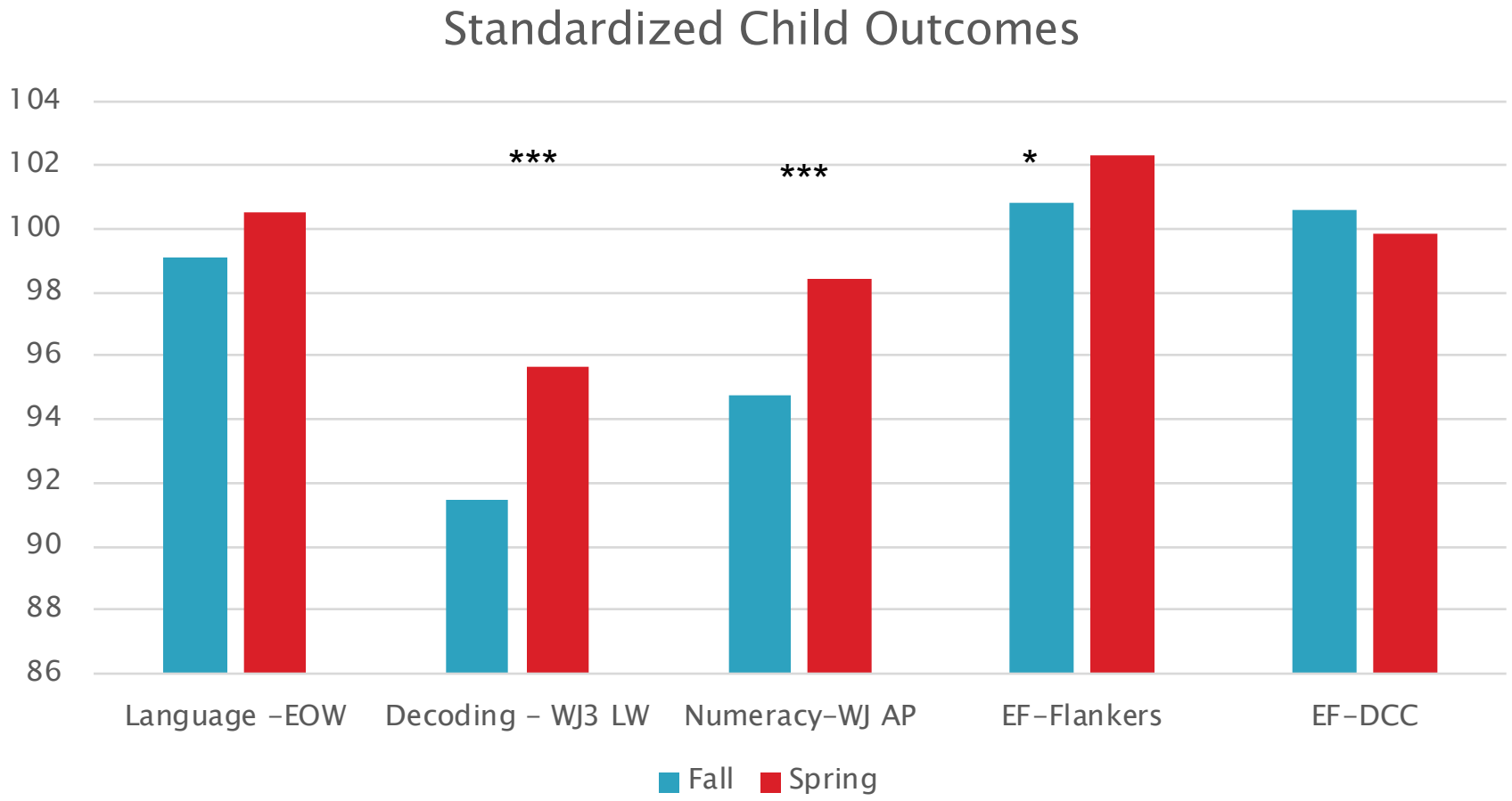
Correlations among Quality Dimensions

	Process Quality	Complex conver-sation	Literacy Activities	Sounds Activities	Math Activities	Small Group	Whole Group	Creative Curric.
Process quality		.27*	.16	-.04	.13	-.10	.25*	.20
Complex conver-sation			.34**	.24+	.47***	.35**	.07	-.18
Literacy Activities				.63***	.05	.01	.21+	-.24+
Sounds Activities					.12	.00	.05	-.37**
Math Activities						.50***	.06	-.34**
Small group							-.27*	-.24+
Whole group								-.13

Child outcomes

- Collected fall and spring
- Measures
  - Expressive One Word Picture Vocabulary
  - Woodcock Johnson III
    - Letter Word
    - Applied Problems
  - DIBELS
    - First Sound Fluency
    - Phonemic Segmentation Fluency
  - NIH Tool Box
    - Flankers (inhibitory control)
    - Dimensional Card Sort (cognitive flexibility)

Pre-K Child Outcomes



Gains in Child Outcomes-raw or W scores	N	Mean	SD
Expressive One Word	345	7.14*	11.93
WJ3 Letter Word Identification	352	21.05***	19.73
DIBELS First Sound Fluency	351	3.86*	8.96
DIBELS-Phonemic Segmentation	350	2.89*	8.39
WJ3 Applied Problems	352	18.66***	18.71
NIH Tool Box-EF: Flanker	341	8.74*	13.18
NIH Tool Box-EF: Dimensional Card Sort	332	7.00*	15.89

HLMs:

- Gain scores analyzed
- Model
  - Level 1: $Y_{ijk} = d_{ojk} + d_{1jk} <\text{child covariates}> + e_{ijk}$
  - Level 2: $d_{ojk} = B_o + B_1$ High Quality Practices$_{jk}$ +
    B_2 T Complex Language$_{jk}$ + B_3 Content Activities$_{jk}$ +
    B_4 Small Group$_{jk}$ + B_5 Whole Group$_{jk}$ +
    B_6 Creative Curriculum$_{jk}$ + e_{jk}
- Backwards elimination to check findings

HLM Results

	Language EOW	Literacy WJ LW	Letters DIBELS FSF	Phonemic DIBELS PSF	Math WJ AP	EF Flankers	EF Card Sort
Process Quality		.19**				-.14**	
Complex Conversation							
Instruction: Literacy Sounds Math	.21*		.16**				
Small Group							
Whole Group	–.17*				-.12*		
Creative curriculum		–.17**		-.17**			

Conclusions

- Surprisingly sparse findings
  - No one ECE dimension predicted all outcomes
  - Best predictors
    - Instructional time: positively related to gains in language and specific literacy skills
    - Whole group: negatively related to gains in language and math
    - Curriculum: negatively related to gains in literacy
    - Process quality: mixed, positive gains-decoding, negative gains – inhibitory control

Conclusions

- May need attend to
  - Other ECE dimension in addition to process quality
  - Measures of individual child experiences as well as measures of teachers
- Different predictors for different outcomes –
  - need to be strategic in what ECE dimenions should be promoted for specific child outcomes

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- To all research assistants and project staff
- To the Institute of Education Sciences

Thank You

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Classroom quality and classroom network structure: Interplay and prediction of student outcomes

Jessica Logan, Jing Chen, Laura Justice, Tzu-Jung Lin, Kelly Purtell

The Ohio State University

NRCEC

6/27/2018

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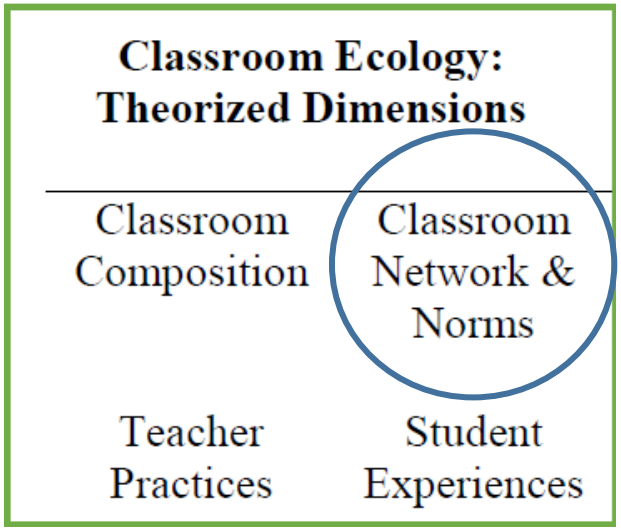
Early Learning Ohio

Broad goal: Expand our understanding of classroom ecology

A comprehensive examination of the classroom ecology and its relations with children's learning PreK – grade three.



Classroom Network

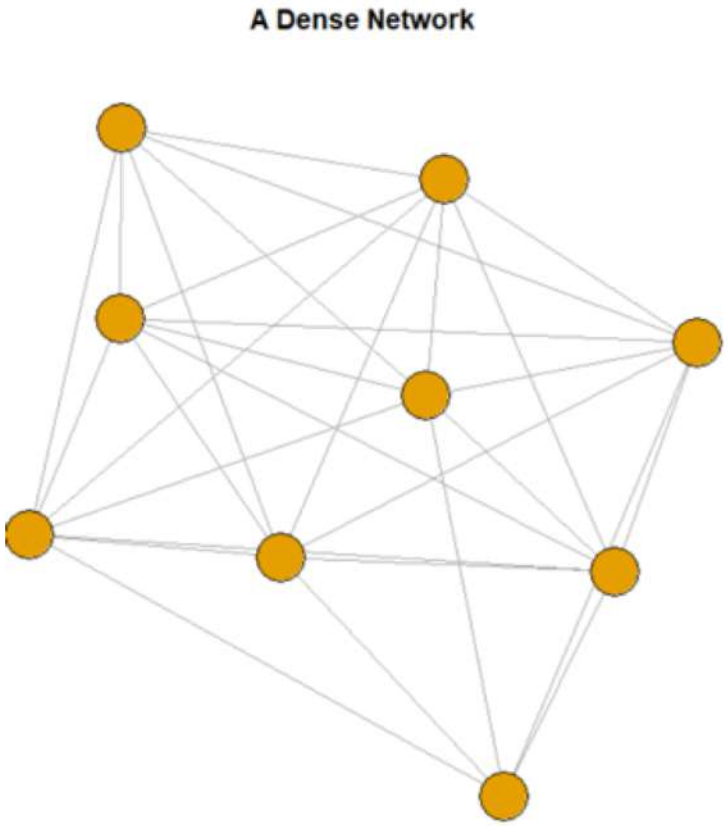
- Children's language and social skills are shaped by who is around them
  - Complexity of teacher talk (e.g., Justice et al., 2013)
  - The skills of their peers (e.g., Justice, Logan, Lin, & Kaderavek, 2016)

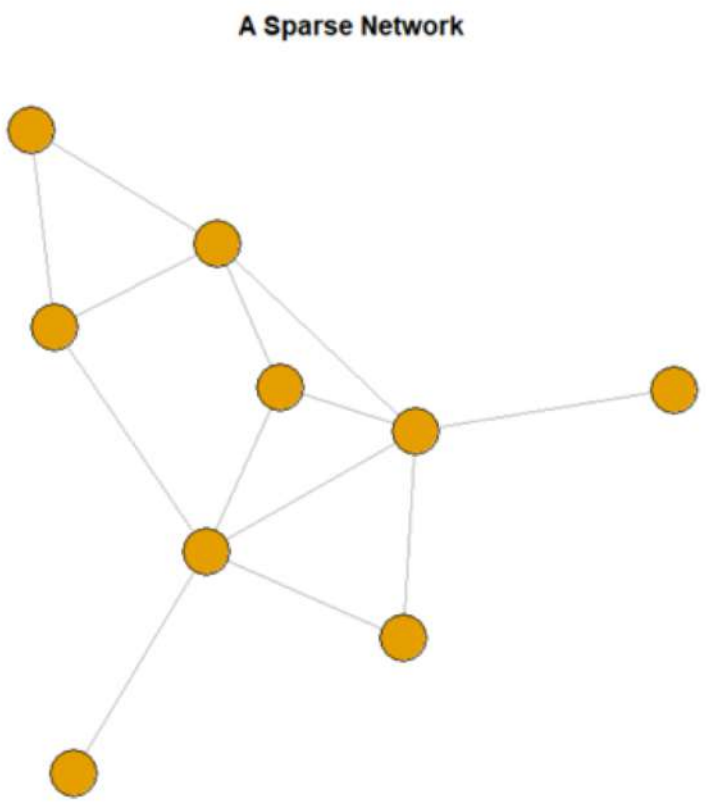
- Classroom social networks *directly* measure who children spend time with, and can be characterized

- Children's academic growth is likely affected by both classroom quality *and* the nature of the social network created by their peers (Gest et al., 2014)

- Children's language is significantly predictive of classroom density in preschool (Chen et al., 2017).
  - Higher language scores → more dense classrooms

Classroom Density
(observed ties / possible ties)





Research Questions

1. Is classroom density predictive of children's gains in academic and social skills?

2. Is density more important for children of different skill levels?

3. Interactions with classroom quality

ELO: Cross-Sectional Study Numbers

Study Year 1 (2016-2017 school year)

- One school district
  - Some Head Start, some private PreK programs
- 79 classrooms in five grades: (Prek – 3rd Grade)
  - Attempted to enroll all children in each classroom
- 1,142 students with active and passive consent
  - 80% consent rate
  - Used for social network measures
- 915 with active consent
  - Used for child outcomes
  - 58% white, 78% speak fluent English, 60% moms have HS degree or less

Density

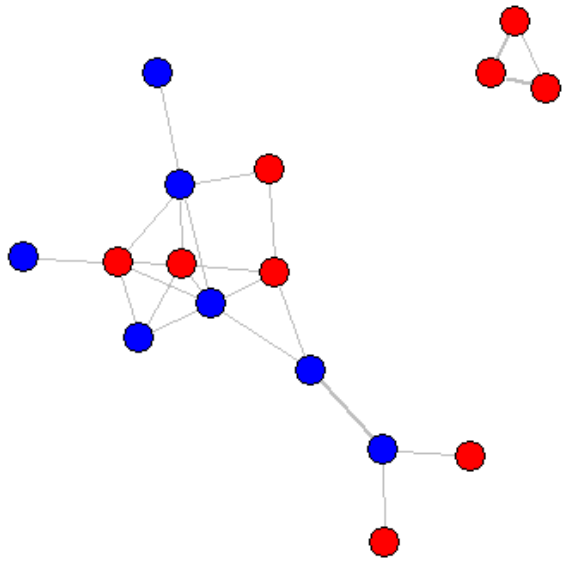
- Network density generated using SNA package in R (Butts 2016)

- Rated per classroom in two ways:
  - Students: Viewed a class roster and asked them who they like to play with.
  - Teachers: Asked to rate how frequently each pair of students in their class play or work together

- Before I get to research questions – want to show you the data in depth

Teacher Ratings of Classroom Density

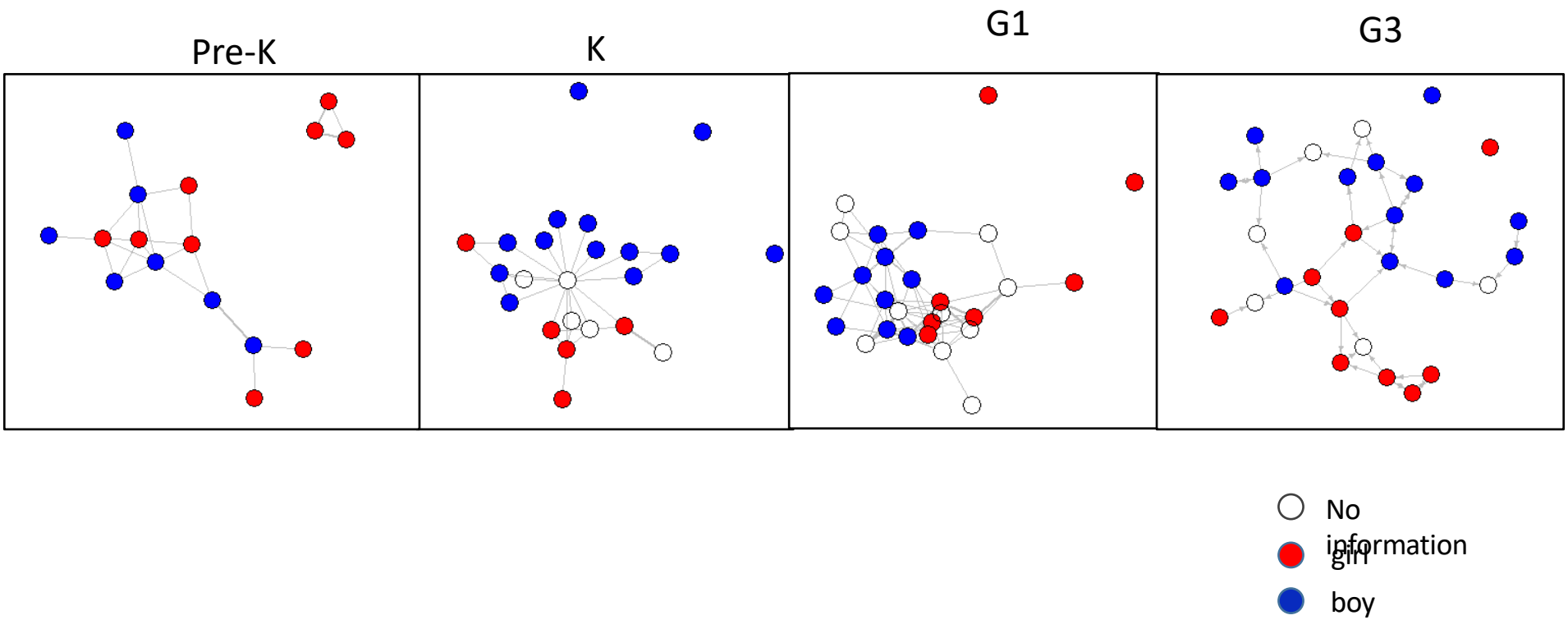
- A randomly selected preschool Classroom
- Teacher reported who plays and works together
- A pair of children is rated as either playing and working together (1) or not (0).



girl

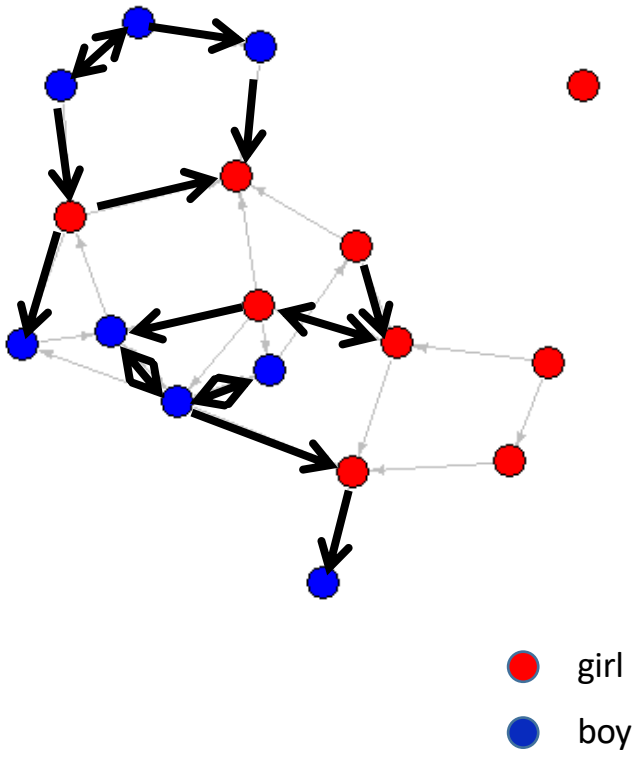
boy

Results: Teacher Ratings of Density

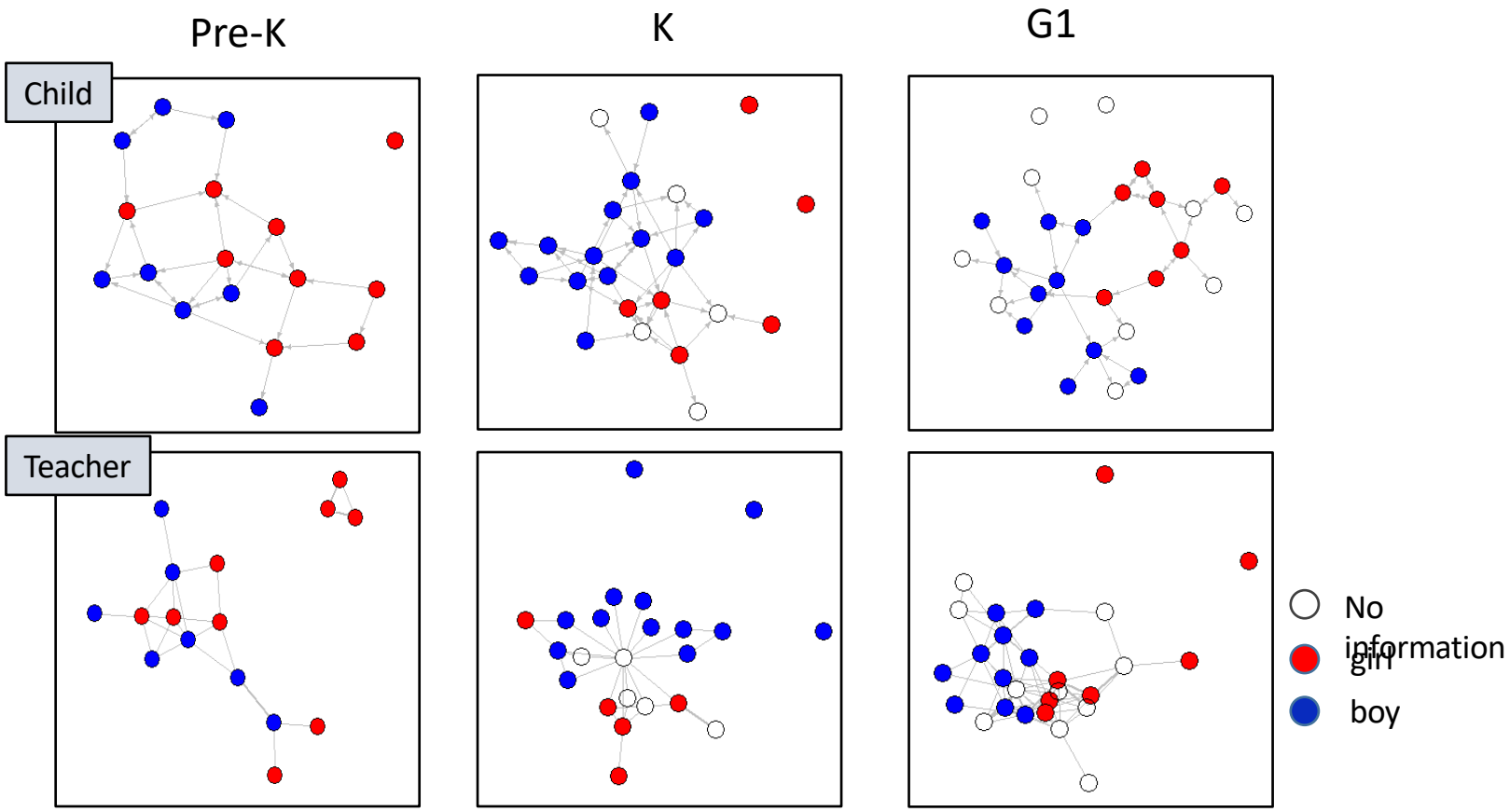


Results: Student Ratings of density

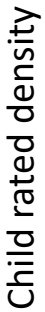
- The same preschool classroom
- Children were asked: “who do you like to play with the most”
- Children with no paths didn’t select anyone and no one selected them.
- Bi-directional arrows are reciprocal friendships.
- Directional arrows show child A likes to play with child B.



Results: Child Report vs Teacher Report



Variability : Child Report vs Teacher Report



Predicting Student Outcomes: Model building

- HLM models nesting students within classrooms.
- Outcomes:
  - Social Skills, Problem Behaviors: TCRS (Hightower, 1986): *Raw Scores*
  - Vocabulary, Reading, Math: Woodcock Johnson III (Woodcock, McGrew, & Mather, 2007): *W Scores*
- Covariates: Pretest, Gender, Age, Grade, Class size
- Predictors of interest:
  1) CLASS composite, Child-rated density, Teacher rated density
  2) Interaction between pretest and density
  3) Interaction between CLASS and density

Results: Main Effects

	SS	BC	PV	LW	AP
Intercept	-0.06	-0.01	0.32	0.19	0.37
Pretest	0.78*	0.79*	0.67*	0.77*	0.67*
CLASS	0.00	0.00	0.02	0.01	0.01
Child Density	0.06	0.03	-0.01	0.00	5.43
Teacher Density	0.16*	0.05	0.00	0.01	-0.01

*$p < .05$, HLMs also included several covariates not pictured here.

Standardized estimates

Results: Pretest Interaction

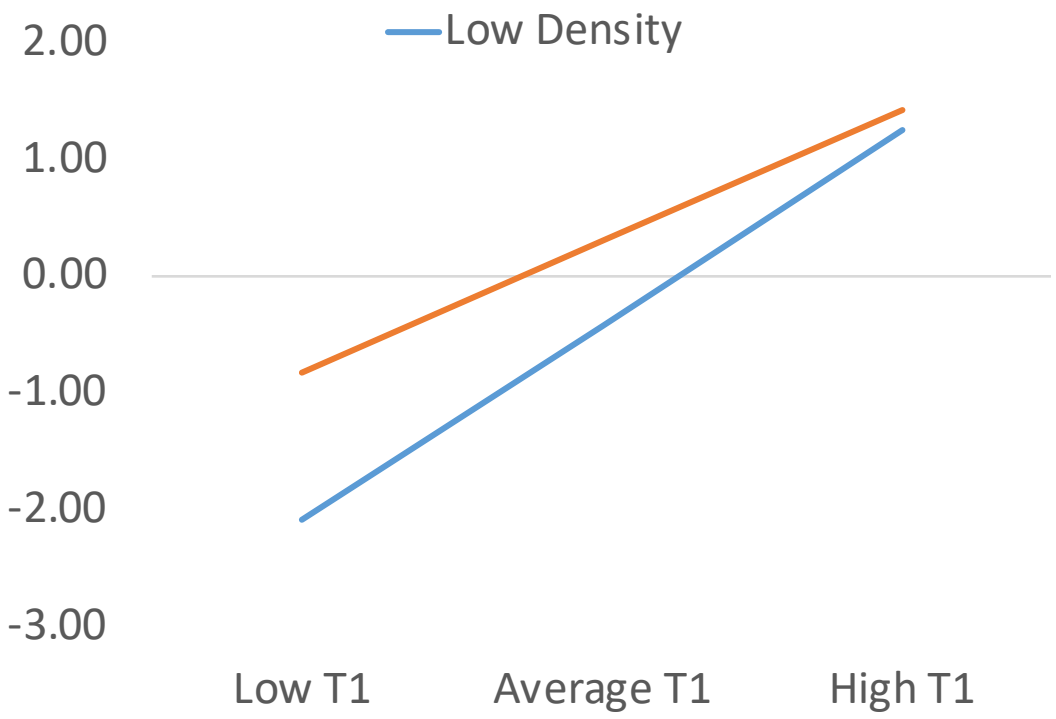
	SS	BC	PV	LW	Ap
Intercept	-0.05	0.01	0.33	0.23	0.38
Pretest	0.77*	0.79*	0.68*	0.67*	0.66*
CLASS	0.00	0.00	0.02	0.01	-0.01
Child Density	0.05	-0.01	-0.01	0.01	0.01
Teacher Density	0.17*	0.05	-0.00	0.01	0.01
Pretest*Teacher Interaction	-0.07*	0.00	-0.02	-0.01	-0.03*

*$p < .05$, HLMs also included several covariates not pictured here.

Denser classrooms matter more for children with a low pretest on Social Skills and Applied Problems

Q3: Interactions of CLASS with density: None were significantly different from zero.

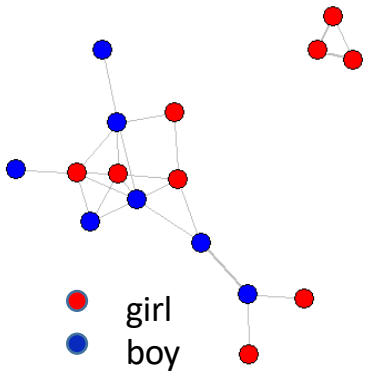
Social Skills interaction



Conclusions

- This is a preliminary look at these data.
  - Data being cleaned on another ~100 classrooms

- Will also examine student-level network information
  - Number of ties a child has
  - Position within the network
  - Experiences with victimization



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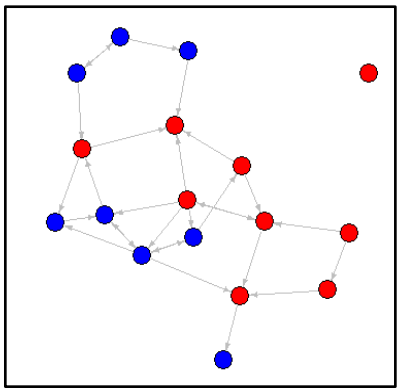
COLLEGE OF
EDUCATION AND HUMAN ECOLOGY

EarlyLearning NETWORK

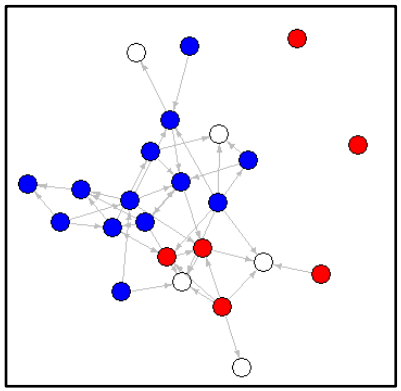
Thank you!

Logan.251@osu.edu

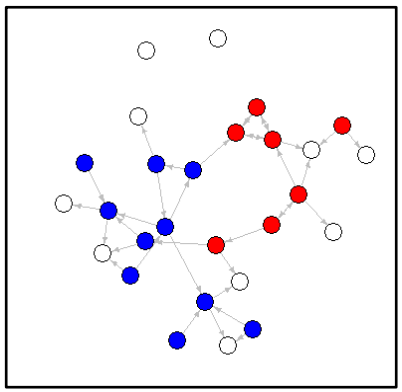
Pre-K



K



G1



Understanding the effects of classroom processes on child outcomes in pre-kindergarten

Ginny Vitiello

June 27, 2018

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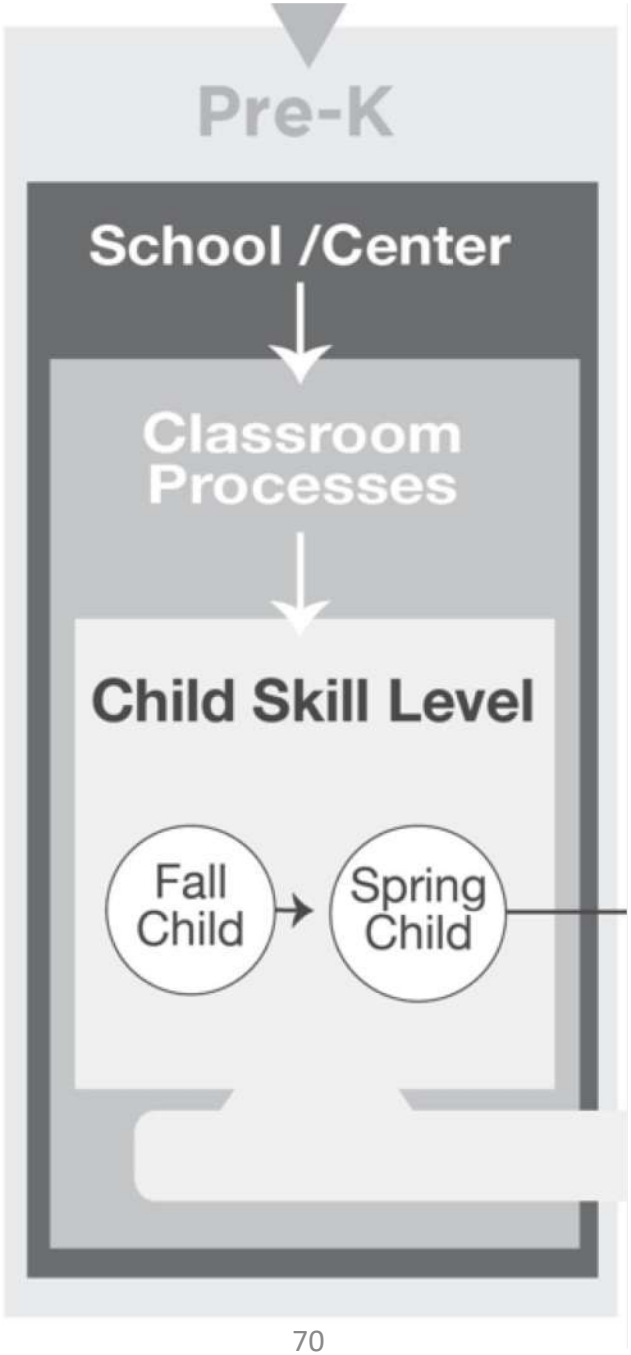
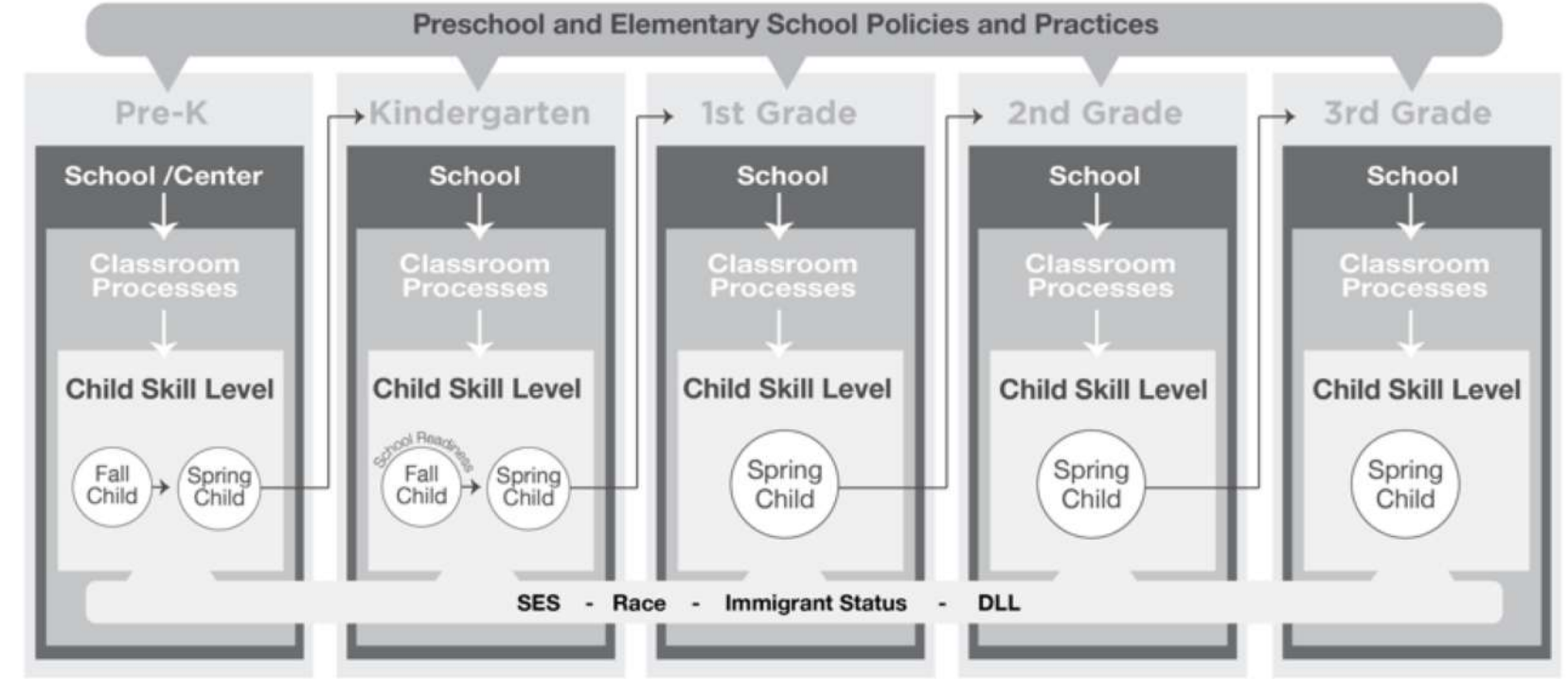
Preschool and Fade-Out

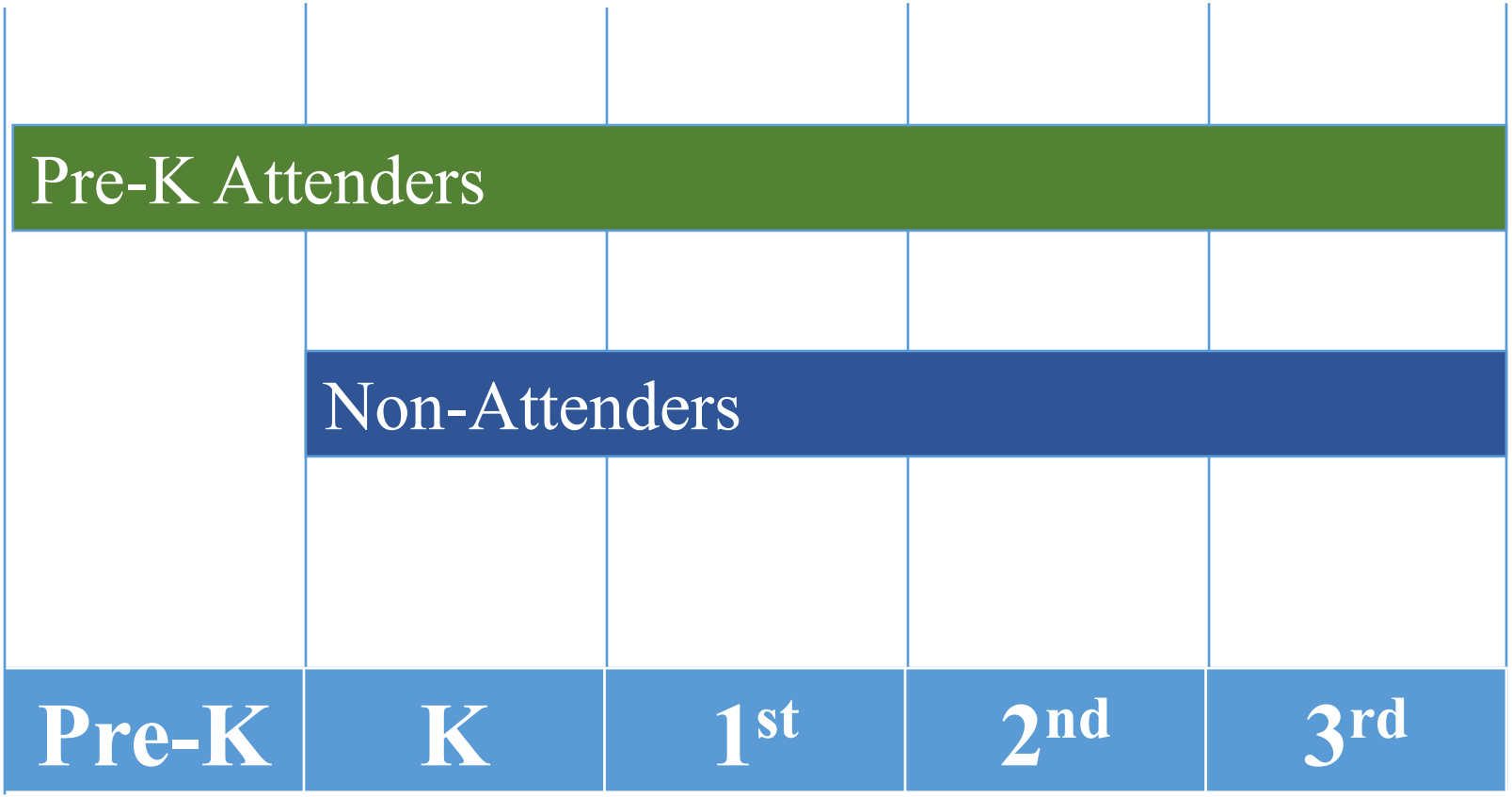
- Record enrollment in public preschool
- Produce measurable advantages
- Quality is variable

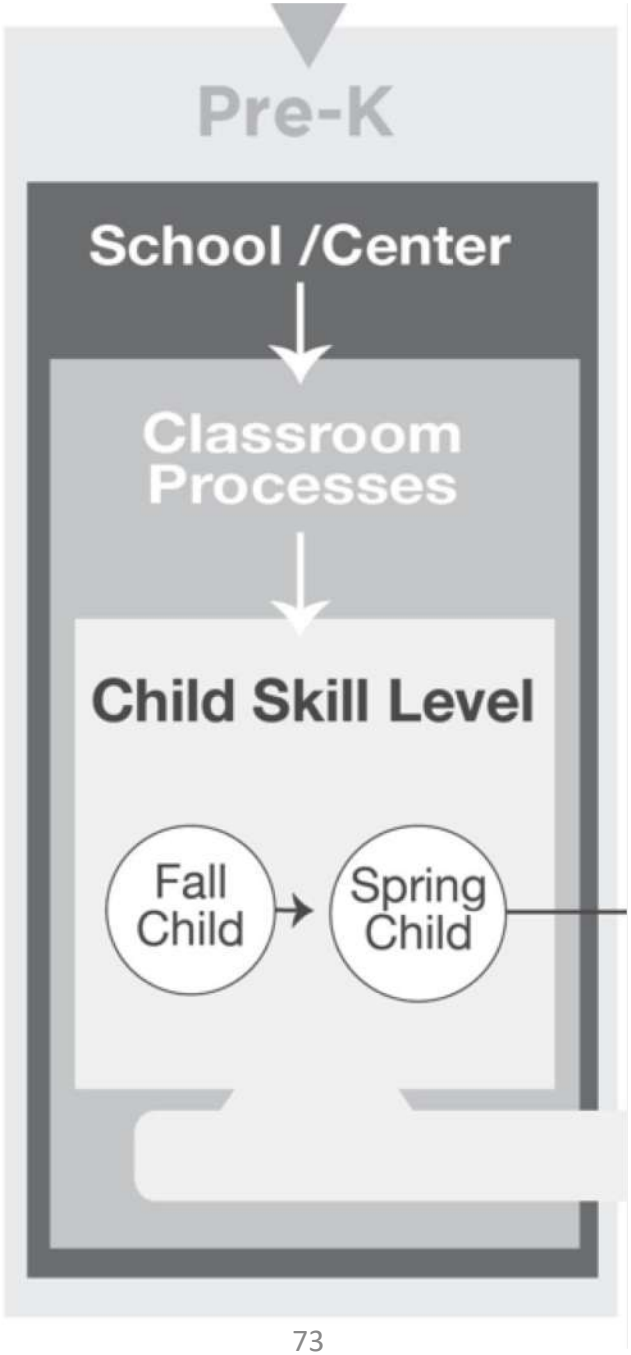
- What are the *active ingredients*?
- Why does fade-out (or catch up) occur?


Pre-K
School /Center
Classroom Processes
Child Skill Level
Fall Child
Spring Child


Preschool and Elementary School Policies and Practices
Pre-K
Kindergarten
1st Grade
2nd Grade
3rd Grade
School /Center
School
School
School
School
Classroom Processes
Classroom Processes
Classroom Processes
Classroom Processes
Classroom Processes
Child Skill Level
Child Skill Level
Child Skill Level
Child Skill Level
Child Skill Level
School Readiness
Fall Child
Spring Child
Fall Child
Spring Child
Spring Child
Spring Child
Spring Child
SES - Race - Immigrant Status - DLL

Longitudinal Cohort Study



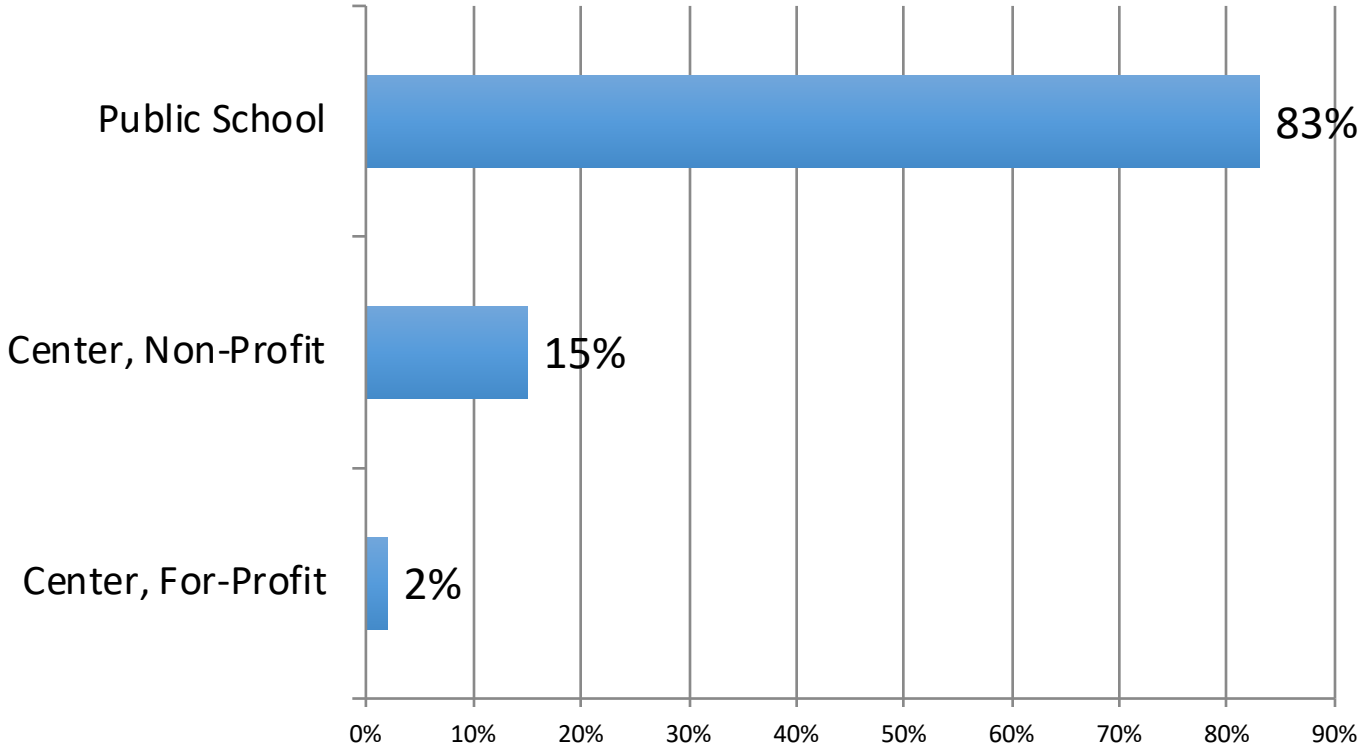

Pre-K
School /Center
Classroom Processes
Child Skill Level
Fall Child
Spring Child

Research Question

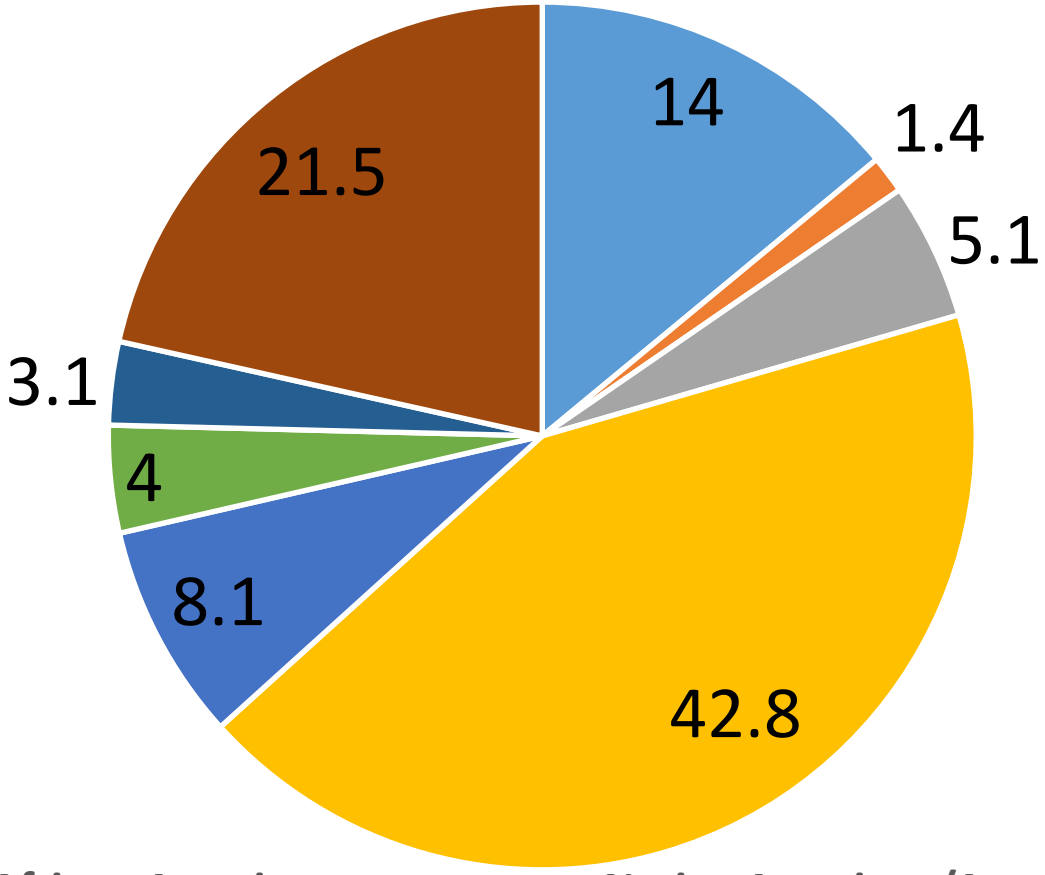
How are classroom process variables associated with children's gains within preschool?

Study Context & Participants

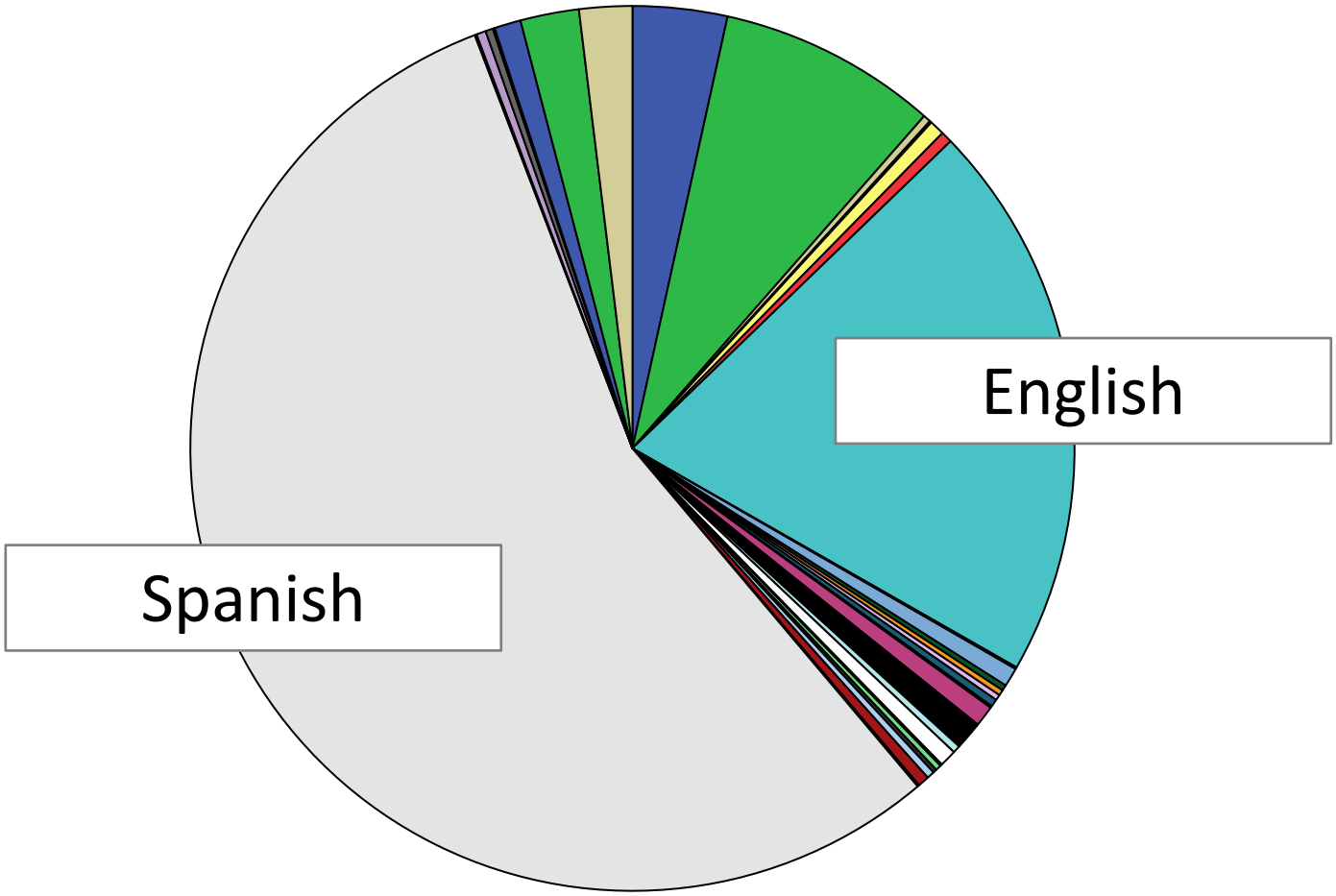
Auspice


Public School
83%
Center, Non-Profit
15%
Center, For-Profit
2%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%

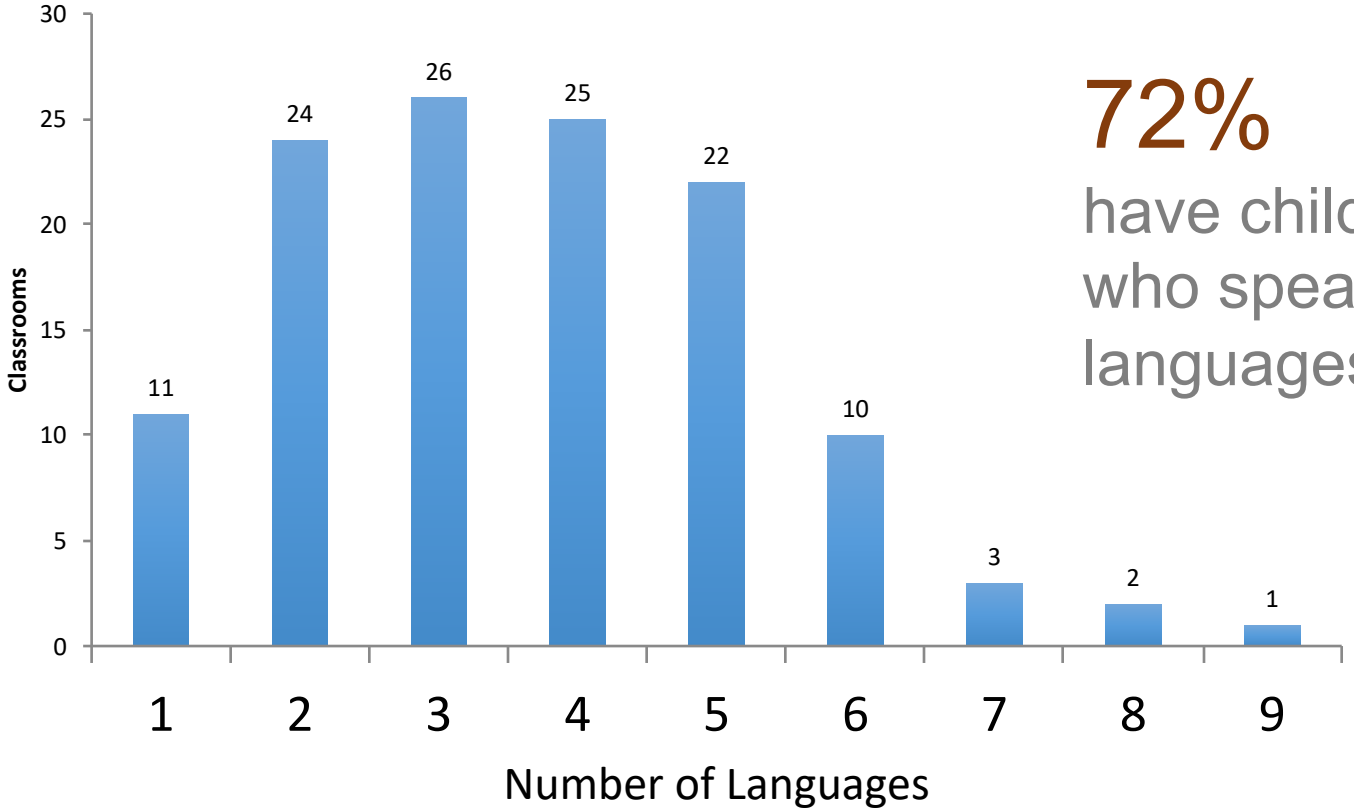
Children's Race/Ethnicity



Primary Language Spoken at Home



Multi-Lingual Classrooms

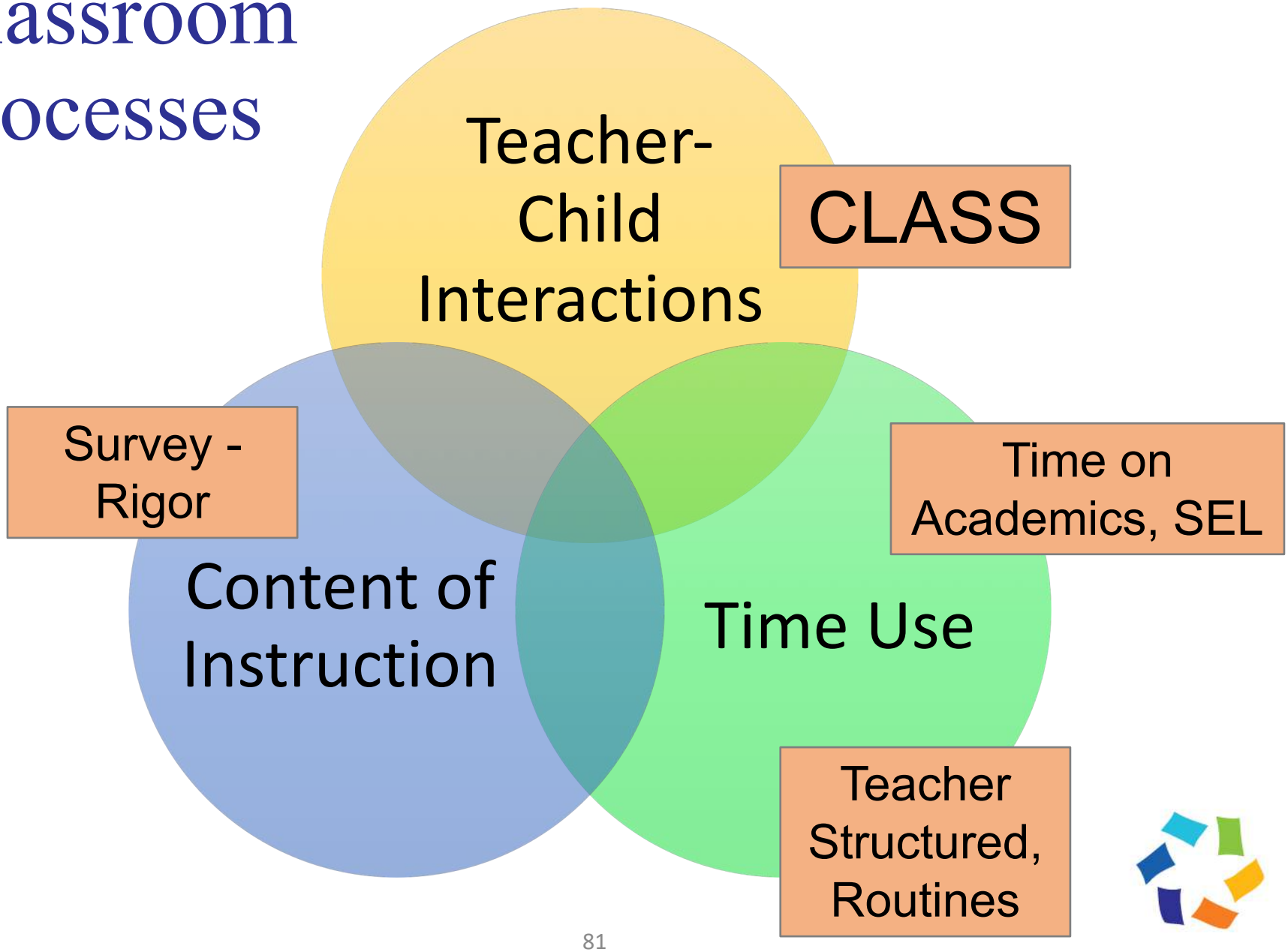


72%

have children who speak 3+ languages

Measures & Procedures

Classroom Processes



Classroom Process Data

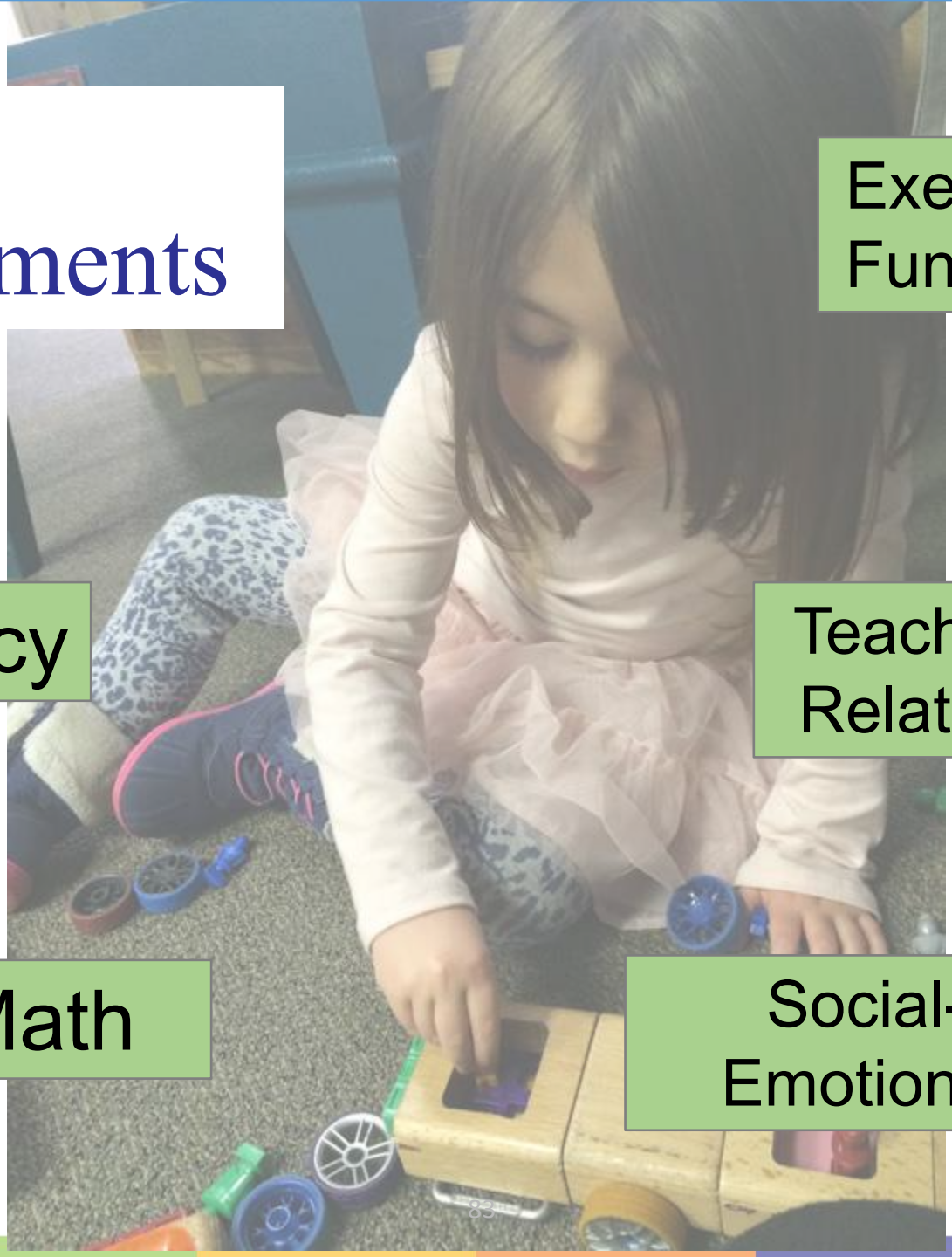
2-3 days of classroom observation

- CLASS (teacher-child interactions)
- Behavioral Coding System (use of class time)

Teacher questionnaire adapted from ECLS-K

- Literacy content coverage
- Math content coverage

Child Assessments



Executive Functions

Literacy

Teacher-Child Relationships

Math

Social-Emotional

Child Assessments

Literacy and Math: Woodcock-Johnson III

- Letter-Word ID
- Picture Vocabulary
- Applied Problems
- Quantitative Concepts

Executive Functions

- Head-Shoulders-Knees-Toes Task
- Pencil Tap
- Backwards Digit Span

Social-Emotional Skills: STRS & TCRS teacher ratings

- Teacher-child conflict
- Teacher-child closeness
- Social Skills
- Conduct Problems

Analyses

Hierarchical linear models (nesting students in classrooms)

Models control for:

- Baseline measure of each outcome in the fall
- Student characteristics (gender, age, race/ethnicity, SES, language)
- Classroom characteristics (aggregated student gender, age, race/ethnicity, income, special needs,
- Teacher characteristics (race, education, experience, beliefs about children)
- Program type

Results

Academic Skills

		Letter-Word			Picture Vocab			Applied Problem			Quant. Concepts		
		Estimate	*p*	S.E.	Estimate	*p*	S.E.	Estimate	*p*	S.E.	Estimate	*p*	S.E.
Fall Pretest		.714	***	.028	.759	***	.026	.680	***	.022	.706	***	.016
Teacher-Child Interactions	Overall Quality										.418	**	.146
Content Dosage	Proportion Academics	.254	*	.135									
	Proportion SEL												
Activity Setting	Proportion Teacher-Structured	.376	**	.134							.338	*	.153
	Proportion Routines	.354	**	.138							.385	*	.178
Rigor	Literacy Level												
	Math Level												

*p<.10, **p<.05, ***p<.01

Executive Function Skills

		Backward Digit Span			HTKS			Pemcil Tap		
		Estimate	*p*	S.E.	Estimate	*p*	S.E.	Estimate	*p*	S.E.
Fall Pretest		.200		.152	.579	***	.092	.644	***	.094
Teacher-Child Interactions	Overall Quality	.334	*	.154						
Content Dosage	Proportion Academics									
	Proportion SEL									
Activity Setting	Proportion Teacher-Structured									
	Proportion Routines									
Rigor	Literacy Level									
	Math Level									

*p<.10, **p<.05, ***p<.01

Teacher-Child Relationships

		Closeness			Conflict		
		Estimate	p	S.E.	Estimate	p	S.E.
Fall Pretest		.675	***	.026	.715	***	.020
Teacher-Child Interactions	Overall Quality				-0.38	**	0.11
Content Dosage	Proportion Academics						
	Proportion SEL						
Activity Setting	Proportion Teacher-Structured						
	Proportion Routines						
Rigor	Literacy Level						
	Math Level						

*p<.10, **p<.05, ***p<.01

Social and Emotional Skills

		Task Orientation			Social Skills			Conduct Problems		
		Estimate	*p*	S.E.	Estimate	*p*	S.E.	Estimate	*p*	S.E.
Fall Pretest		.726	***	.018	.714	***	.025	.728	***	.023
Teacher-Child Interactions	Overall Quality									
Content Dosage	Proportion Academics									
	Proportion SEL									
Activity Setting	Proportion Teacher-Structured	-.241	*	.118						
	Proportion Routines									
Rigor	Literacy Level							-.263	*	.133
	Math Level				.281	*	.122			

*p<.10, **p<.05, ***p<.01

Note:

- Very little variance in academic gains
  - 0 – 3.4%
- Classrooms made gains, but at similar rates

Conclusions

- Some early evidence that exposures to effective teacher-child interaction and educational content and structured setting promote greater performance in EF and academic skills
- Focus on examining moderated effects
- In Kindergarten, increase observation of child experience

Thank You