Trajectories of Achievement Gaps Starting in PreK: Identifying Malleable Factors to Close the Gap for All Learners

Early Learning Network (ELN) Researchers

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

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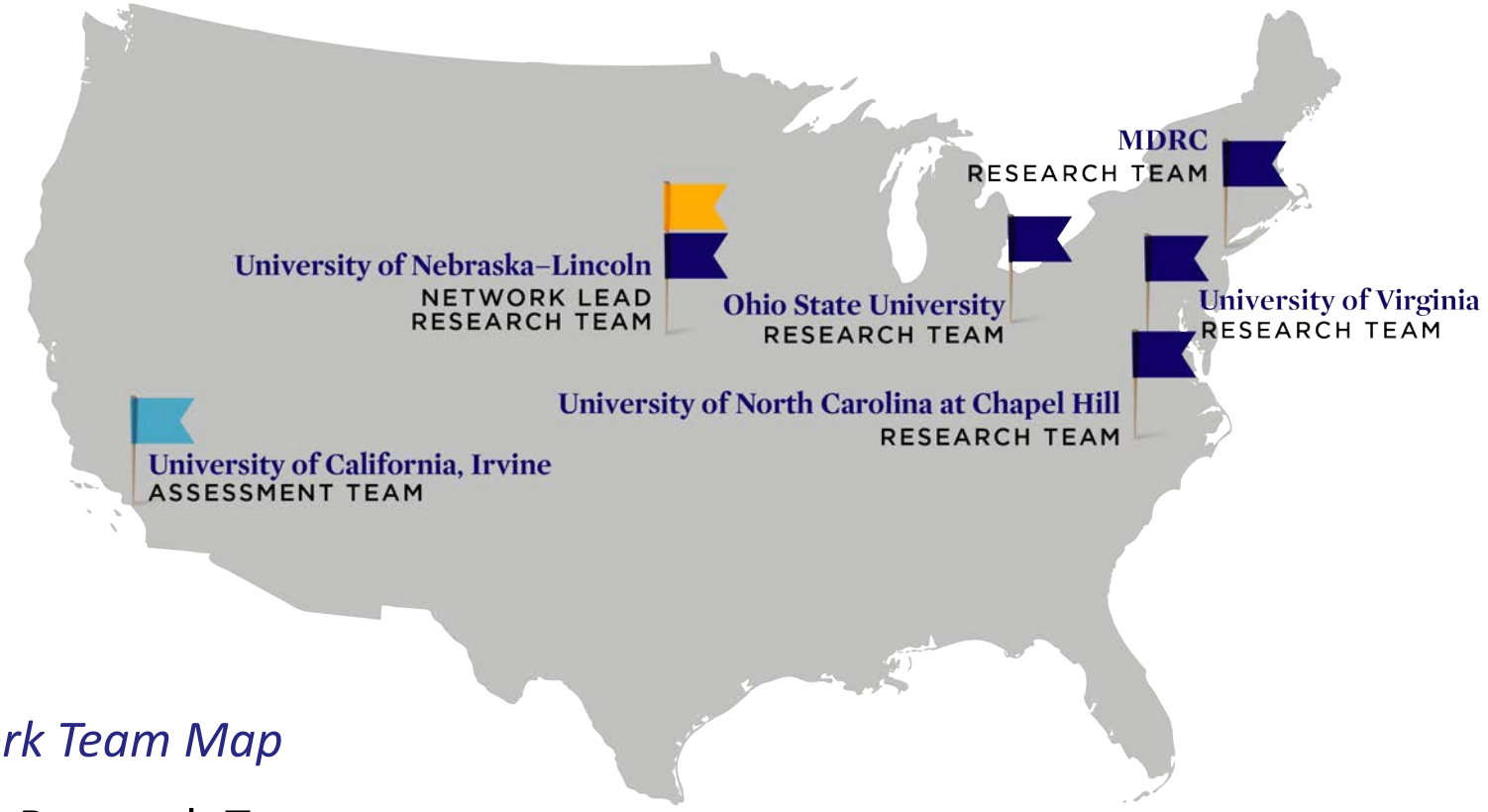
Early Learning Network: Mission

*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.*

Network Team Map



Network Team Map

- Five Research Teams
- One Assessment Team
- Network Lead

Network Research Studies

Each research team is conducting three complementary, prospective studies:

- A *descriptive study* of *systems-level policies and practices* that support early learning;
- A *classroom observation study* to identify *teaching practices and other classroom-level factors* associated with children's school readiness and achievement in preschool and early elementary school; and
- A *longitudinal study* to identify *malleable factors* associated with early learning and school achievement over time from preschool through the early elementary school grades.

ELN and The Achievement Gap

- Gaps between children who are less vs. more advantaged are clearly established and begin early; disparities in both academic and social-behavioral skills are evident
- Research is needed to understand how to improve and sustain learning and behavioral outcomes for children representing diverse backgrounds and experiences:
  - To what extent do PreK programs close achievement gaps that exist by income, race/ethnicity, and language?
  - How do learning and behavior gaps change across academic trajectories into the elementary school years?
  - What are some malleable factors that support academic and behavioral gains? Do they actually close achievement gaps during PreK and beyond?

Presenters

Network Teams:

- Meghan McCormick (MDRC)
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- Peg Burchinal (UNC)
- Ashley Adams (UCI)

Discussant:

- Michael López, National Research Center on Hispanic Children & Families; NORC at the University of Chicago

Shifting from Documenting Achievement Gaps to Closing Them: Evidence from the Boston Public Schools

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Academic achievement gaps at kindergarten entry are substantial and stay stable across schooling

- Work by Reardon & Portilla (2016) has shown that gaps in language and math skills between children from the 90th and 10th income percentiles have closed slightly in recent years but are still about 1 SD at the start of kindergarten.
- Gaps between Black and White students and Hispanic and White students range from about .6 to .4 SDs.
- Work by von Hippel et al. (2018) has shown that income- and race-based achievement gaps shrink slightly in early elementary school but stay consistent for the most part through elementary school (and may grow slightly during summers).

Little evidence about the classroom-level instructional factors in PreK that reduce income- & race-based achievement gaps

- Enrollment in PreK has been identified as one strategy for reducing achievement gaps prior to kindergarten entry (Jenkins et al., 2018; Valentino, 2018).
- Some studies have shown that PreK programs are particularly beneficial for lower-income and Hispanic students (Bloom & Weiland, 2015; Duncan & Magnuson, 2013).
- Yet, other studies of PreK have found no differential benefits by family income and race (Lipsey et al., 2018; Weiland et al., 2019)
- More work is needed to understand the key factors in PreK classrooms that not only benefit all students but might be **particularly important for reducing achievement gaps**.

The BPS prekindergarten program: Opportunity to build evidence on reducing achievement gaps

High-quality public prekindergarten program for four-year olds

- Existing evidence base on the BPS prekindergarten program:
  - Substantial impacts on language, literacy, math, and executive functioning skills at the start of kindergarten identified in a rigorous study (Weiland & Yoshikawa, 2013)
  - Two evidence-based curricula paired with coaching & training
  - Slots in the PreK program allocated via lottery

- BPS PreK model implemented in CBO PreK programs funded with preschool expansion grant (PEG) funds

The current study

Research questions:

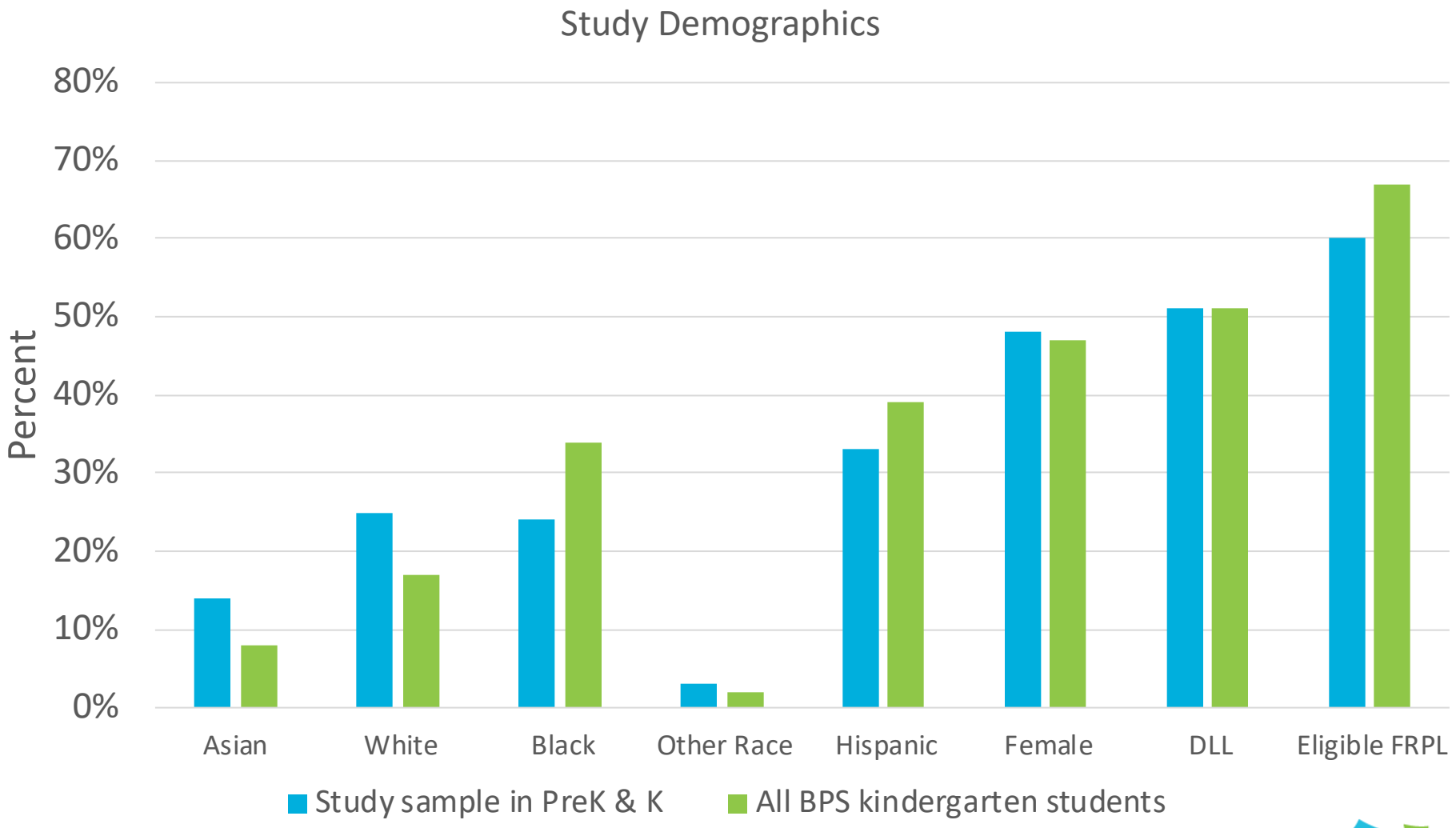
- How large are race- and income-based achievement gaps in language and math skills at PreK entry in a diverse school district?
- How do achievement gaps in language and math skills change (or not) across PreK and kindergarten?
- Do the following classroom-level factors in PreK reduce achievement gaps in PreK and kindergarten?:
  - Classroom process quality?
  - Exposure to more advanced instructional content?
  - More time exposed to unconstrained vs. constrained instructional content?
  - More time spent in small versus large groups?
  - More time spent in math and language/literacy instruction?

Recruitment & enrollment of students/schools

Randomly sampled schools in BPS, PreK classrooms in those schools, and consenting students enrolled in classrooms

- Boston Public Schools (*N* = 20) elementary schools offering the prekindergarten program
  - Free, full-day, available to 4-year-old students via lottery; BPS PreK model implemented with supports from district coaches
- Community-based organizations (*N* = 10) implementing the BPS prekindergarten model

Summary of Student Sample



Classroom & Teacher Participants in PreK

PreK includes public school (*N* = 20) & CBO (*N* = 10) programs

Teacher characteristic	PreK %age/Mean
Teacher age	42.18 (SD = 9.43)
Years teaching	14.83 (SD = 8.86)
Years teaching at current school	8.41 (SD = 7.26)
Teacher has master's degree	71%
Teacher female	96%
Teacher Black	26%
Teacher White	43%
Teacher Hispanic	13%
Teacher Asian or other race	18%
Classrooms per school	1.35 (SD = .42)
N	51

Measures

- Data sources were child assessments, administrative records, parent surveys, classroom observations, and PreK teacher surveys
- Outcomes (measured in fall and spring of PreK & K)
  - Math skills: Woodcock Johnson Applied Problems III raw and standardized scores (Woodcock et al., 2001)
  - Language skills: PPVT IV raw and standardized scores (Dunn & Dunn, 2007)
- Covariates measured in fall of PreK
  - SES (eligible for free/reduced price lunch or not), DLL, race/ethnicity, gender, child's age at time of Fall of prekindergarten assessment, parent age, marital status, parent ed., HH size, & employment, level of the outcome measured in the Fall of prekindergarten

Measures (continued)

Predictors of interest:

- **Classroom quality**: Classroom Assessment Scoring System (Pianta et al., 2008)
- **Advanced versus basic instructional content**: Teacher-reported ECLS-K items taught across grade
- **Exposure to constrained versus unconstrained content**: Individualizing Student Instruction observational measure (Connor et al., 2009)
- **Time spent on math and language/literacy instruction**: Individualizing Student Instruction observational measure (Connor et al., 2009)
- **Time spent in small vs. large group instruction**: Individualizing Student Instruction observational measure (Connor et al., 2009)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Analytic approach

Two types of growth models depending on measurement level of predictor. Interaction is parameter of interest.

Model predicting outcomes from classroom-level predictors:

$$Y_{tij} = B_0 + time\_3_{tij} + CLASSPreK_j + Lowincome_{ij}XCLASSPreK_j + PreKFallscore_{ij} + \eta_{ij} + \zeta_j + \varepsilon_{tij}$$

Model predicting outcomes from student-level predictors:

$$Y_{tij} = B_0 + time\_3_{tij} + ISIscorePreK_{ij} + Lowincome_{ij}ISIscorePreK_{ij} + PreKFallscore_{ij} + \eta_{ij} + \zeta_j + \varepsilon_{tij}$$


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Non-significant results

No evidence that higher scores on CLASS domains in PreK reduce achievement gaps through K.

Spending more time in small group and less time in whole group does not appear to reduce achievement gaps through kindergarten.

Race-based achievement gaps were only affected by exposure to unconstrained skills.

Summary: What PreK classrooms reduce income- and race-based achievement gaps?

- **Income-based achievement gaps may be lessened by exposure to:**
  - More advanced instruction in PreK
  - More time spent in unconstrained math instruction
  - More time spent in unconstrained language instruction
  - More time spent in math instruction in general
- **Race-based achievement gaps may be lessened by exposure to:**
  - More time spent in unconstrained language instruction

Limitations & directions for future research

- **Statistical power and sample size**
  - Having substantial diversity in the sample is critical and in the sample sizes of the racial/ethnic groups in particular
- **Intersectionality of racial/ethnic and low/high income groups**
- **Non-causal analyses; more work is needed to examine robustness of findings and consider intercorrelations between classroom-level factors**
- **Need to continue examining achievement gaps through remaining grades in elementary school**

Implications of findings

- **Pay particularly close attention to PreK approaches that reduce achievement gaps (in addition to those that build global quality)**
- **Consider approaches for building instructional quality to reduce achievement gaps – curricula + PD**
- **It may be important to use such supports to:**
  - Increase time spent in unconstrained instruction
  - Increase the level of content – particularly in math – that PreK students are exposed to
  - Increase time spent in instructional domains of math and language/literacy

Thank You

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Beyond Achievement Gap Gazing: Examining Gap Reducing Mechanisms

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Outline of Presentation

- Take Home Points
- Rationale for Study
- Research Aims of Study
- Methods & Findings
- Discussion & Conclusion

Team

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- Lisa Knoche, co-PI
- Natalie Koziol
- Amanda Witte
- Amanda Prokasky
- Hannah Kerby
- Rachel Schumacher

Take Home Points

- Some gaps still remain even after accounting for SES and PreK attendance and skills, so focus on gap-closing factors still needed
- More supports needed to strengthen home-school connection to reduce Black-White gaps
- Need for more culturally-relevant malleable factors to explain Latino-White gaps (e.g., *familismo, respeto*)
- Need to examine the existence of these gaps beyond kindergarten and whether these or other malleable factors are still relevant over time

Rationale

- While racial gaps have been established, there is need to uncover malleable factors that reduce or eliminate these gaps.
- Children develop in overlapping ecological systems that have influence learning and life outcomes and they may have different meaning across racial groups.
- Affirmative and enriching home and classroom environments and their connection have the potential to reduce achievement gaps.
  - Home/parenting practices, classroom practices, and home-school connection

Research Aims of Study

- **Uncover racial differences in Kindergarten malleable factors of**:
  - Home/parenting practices
  - School/classroom practices
  - Home-school connection, and
- **Discern whether identified malleable factors reduce racial gaps at the end of Kindergarten**

Methodology

- Sample: *N* = 300 **(15% Black, 32% Latino, 54% White)** in urban and rural school district in Midwest state

- Study Variables
  - End of Kindergarten Outcomes: expressive vocabulary, reading achievement, math achievement, social skills, problem behaviors
  - Malleable Factors: home-based practices, home-school connection, and classroom quality (emotional and instructional support)
  - Covariates: PreK attendance, PreK score, gender or age (depending on outcome), maternal education, family income

- Analytical Approach
  - Hierarchical Regression

Measures

- Malleable Factors
  - *Family Involvement Questionnaire* (parent report of Home-based Practices and Home-School Conferencing); *Parent-Teacher Relationship Scale* (parent and teacher report of Joining)
  - *CLASS* (Emotional Support, Instructional Support)

- Student Outcomes (Kindergarten)
  - *Expressive Vocabulary Test*
  - *Woodcock Johnson III* (Broad Reading, Broad Math)
  - *Social Skills Improvement System* (teacher report of Social Skills, Problem Behaviors)

Observed gaps between racial groups: *Outcomes*

Outcomes	Black-White Gap	Latino-White Gap
Expressive Language	W	W
Reading		W
Math	W	W
Social Skills		
Problem Behavior	B	

Black-White and Latino-White gaps in end of Kindergarten outcomes.

Note. B=Black students scored higher, L=Latino students scored higher, W=White students scored higher

Observed gaps between racial groups: *Malleable Factors*

Malleable Factors	Black-White Difference	Latino-White Difference
Home Practices	B	
Classroom Quality		
Home-School Connection (1) Conferencing (2) Joining (Parent report) (3) Joining (Teacher report)	 B W W	 L

Black-White and Latino-White differences exist in malleable factors.

Note. B=Black students scored higher, L=Latino students scored higher, W=White students scored higher

Do malleable factors eliminate/reduce racial disparities where they exist?

Black-White Gap

	EVT	WJ Math	SSIS-PB
Unconditional	-.56*	-.54*	.56*
+ Covariates	-.16	-.24	.31*
+Home Practices ***only***	-.20*	-.22	.29
+Home-School Connection ***only***	-.16	-.16	.17
+Classroom Quality ***only***	-.16	-.23	.24
Final ***all variables***	-.17	-.14	.13

Black-White gaps significantly reduced once covariates included, but gap in problem behaviors remains. Home-school connections effectively reduces gap for problem behaviors and math.

Note. *$p \leq .05$; negative estimates indicate White students' scores are higher than Black students

Do malleable factors eliminate/reduce racial disparities?

Latino-White Gap

	EVT	WJ Reading	WJ Math
Unconditional	-1.25*	-.53*	-.61*
+ Covariates	-.30*	-.02	-.17
+Home Practices ***only***	-.30*	-.02	-.17
+Home-School Connection ***only***	-.31*	-.02	-.17
+Classroom Quality ***only***	-.31*	-.02	-.18
Final ***all variables***	-.31*	-.02	-.18

Latino-White gaps significantly reduced once covariates included, but gap for expressive language still exists even after all factors considered.

Note. *$p \leq .05$; negative estimates indicate White students' scores are higher than Latino students

Summary

- What malleable factors are effective for reducing the ***Black-White gap*** beyond the covariates?
  - Expressive Language: none
  - WJ Math: home-school connections
  - SSIS Problem Behavior: home-school connections, classroom quality

- None of the measured malleable factors were effective at reducing the ***Latino-White gap*** beyond the covariates.

Discussion

- The end of Kindergarten gaps do not exist in every outcome and differ based on racial group (i.e., Black- or Latino-White)
- Racial differences found in parent- or teacher-reported malleable factors, but not classroom quality
- Black-White & Latino-White gaps in expressive language remain largely unchanged beyond covariates
- Home-school connections reduce gaps between Black and White children in math and problem behavior
- No indication identified malleable factors significantly reduce Latino-White gaps

Conclusion

- Indication that consideration of malleable factors, individually and collectively, matter for some Black-White gaps
- Strengthening home-school connection is one potential strategy to reduce Black-White gaps
- Need for more culturally-relevant malleable factors to explain Latino-White gaps (e.g., *familismo, respeto*)
- Need to examine the existence of these gaps beyond kindergarten and whether these or other malleable factors are still relevant over time

Questions?

Thank You

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Achievement Gaps in Rural North Carolina – Pre-Kindergarten through Grade 1

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and the UNC-Chapel Hill Team

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Achievement Gaps

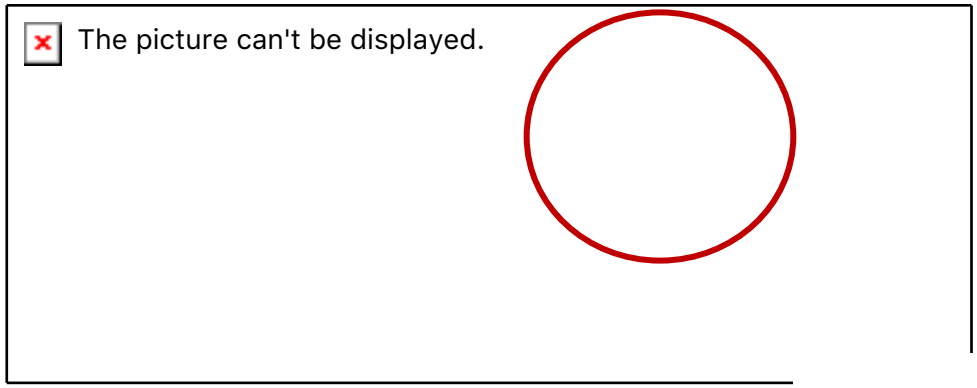
- Emerge early in early childhood
- Racial/ethnic and economic gaps
  - Often confounded
  - Typically not studied in rural areas
- Factors thought to decrease gaps
  - Quality preschool education
  - Less segregation in schools

Research Questions

- At entry to PK serving low-income children, how large are gaps between
  - African-American and white children (AA-W)?
  - Latinx-DLL and white children (L-W)?
- How different are rates of growth from PK through grade 1 between
  - African-American and white children (AA-W)?
  - Latinx-DLL and white children (L-W)?
- What factors appear to account for reduction in gaps over time?
  - School mix (economic, racial/ethnic)
  - Classroom quality

NC ELN Sample

- 6 rural NC counties
- 45 early childhood education programs (62% public school)
- 63 publicly-funded pre-K (NC Pre-K) classrooms: 455 “attenders” (350 with fall and spring pre-K data)

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Child Outcomes (Fall and Spring)

Measures		
Direct Assessments	Language	WJ Picture Vocabulary (WJ PV)
	Reading	WJ Letter-Word Identification (WJ LW)
		DIBELS First Sound Fluency (FSF)
		DIBELS Phoneme Segmentation Fluency (PSF)
	Math	WJ Applied Problems (WJ AP)
	EF	NIH Toolbox Flanker
		NIH Toolbox Dimensional Change Card Sort (DCCS)
Teacher report	Social skills, Self regulation	Teacher-Child Relationship Scale
		Learning Behavior Scale
		Teacher-Child Relationship Scale

Classroom Characteristics

- CLASS – Classroom Assessment Scoring System
- Teacher reported
  - Proportion of classroom – Latinx/Hispanic
  - Proportion of classroom – Black
  - Ethnic match between teacher and child
    - Latinx
    - Black
    - White


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Analysis

- HLM Model 1: Describe change from entry to PK to end of Grade 1
  - Covariates: gender, age at entry to PK, maternal education
  - Accounted for nesting in schools
  - Compared trajectories – B v W and L v W
    - Mean Scores at Entry to PK
    - Gains in PK
    - Gains in summer between PK & K
    - Gain in K
    - Gains in summer between K and G1
    - Gains in G1
    - Mean Scores at Spring of G1

Analysis

- HLM Model 2: Added classroom characteristics to see if they appear to account for gaps
  - T-C Ethnic match
  - Proportion Classroom B or L
  - CLASS total
  - As before
    - Covariates: gender, age at entry to PK, maternal education
    - Accounted for nesting in schools
    - Compared trajectories – B v W and L v W


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Black-White Gap: Summary

	WJ PV	WJ LW	DIBELS PSF	WJ AP	Flanker	DCCS	Social Skills	Self Reg
Fall PK	-0.07 (0.11)	0.04 (0.06)	0.03 (0.06)	-0.16 (0.1)	-0.28* (0.13)	-0.18 (0.12)	0.08 (0.13)	0.03 (0.13)
PK gain	-0.03 (0.07)	-0.05 (0.05)	-0.09 (0.09)	-0.09 (0.07)	0.21 (0.12)	0.02 (0.14)	-0.14 (0.11)	-0.15 (0.1)
PK-K summer	-0.04 (0.07)	0.08 (0.05)	0.00 (0.09)	0.10 (0.07)	-0.05 (0.13)	-0.29 (0.15)	0.12 (0.12)	0.11 (0.11)
K gains	0.04 (0.08)	-0.19*** (0.05)	0.15 (0.1)	-0.03 (0.07)	0.24 (0.13)	0.55*** (0.16)	0.00 (0.13)	0.08 (0.11)
K-G1 summer	-0.09 (0.08)	0.09 (0.05)	-0.04 (0.1)	-0.04 (0.07)	-0.22 (0.14)	-0.20 (0.16)	-0.22 (0.13)	-0.21 (0.12)
G1 gains	-0.05 (0.07)	0.05 (0.05)	-0.02 (0.1)	0.02 (0.07)	0.08 (0.13)	0.05 (0.15)	0.08 (0.13)	0.02 (0.12)
Spring G1	-0.24** (0.08)	0.04 (0.06)	0.04 (0.09)	-0.20** (0.07)	-0.03 (0.09)	-0.05 (0.11)	-0.08 (0.16)	-0.13 (0.16)

Latinx-White Gap: Summary

	WJ PV	WJ LW	DIBELS PSF	WJ AP	Flanker	DCCS	Social Skills	Self Reg
Fall PK Means	-1.60***	-0.19**	0.03	-0.79***	-0.25	0.27*	0.18	0.39**
	(0.11)	(0.06)	(0.06)	(0.1)	(0.13)	(0.12)	(0.13)	(0.13)
PK gain	0.47***	0.11*	-0.07	0.36***	0.03	-0.37**	0.16	0.06
	(0.07)	(0.05)	(0.08)	(0.06)	(0.12)	(0.13)	(0.11)	(0.10)
PK-K summer gains	0.21**	0.04	0.02	0.19**	0.35**	-0.06	-0.17	-0.17
	(0.07)	(0.05)	(0.09)	(0.06)	(0.12)	(0.14)	(0.11)	(0.1)
K gains	0.25***	0.08	-0.09	0.17*	0.09	0.42**	0.18	0.24*
	(0.07)	(0.05)	(0.09)	(0.07)	(0.12)	(0.14)	(0.11)	(0.10)
K-G1 summer gains	0.01	-0.01	0.19*	0.02	-0.09	-0.10	-0.21	-0.19
	(0.07)	(0.05)	(0.09)	(0.07)	(0.12)	(0.14)	(0.12)	(0.11)
G1 gains	0.01	0.07	-0.10	0.01	0.00	-0.11	0.23	0.20
	(0.07)	(0.05)	(0.09)	(0.06)	(0.12)	(0.14)	(0.12)	(0.11)
Spring G1	-0.66***	0.10	-0.01	-0.04	0.13	0.06	0.37*	0.53***

Model 2: Classroom Characteristics

	WJ PV	WJ LW	PSF	WJ AP	Flanker	DCCS	Social Skills	Self Reg
T-C Match	0.00 (0.02)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01 (0.02)	-0.01 (0.02)	-0.03 (0.02)	-0.05* (0.02)
Prop B or L	0.01 (0.02)	0 (0.01)	-0.01 (0.02)	-0.03 (0.02)	-0.04 (0.02)	0.00 (0.03)	0.12*** (0.03)	0.11*** (0.03)
CLASS total	-0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	-0.01 (0.02)	0.03 (0.02)	0.07*** (0.02)	0.04 (0.02)

Black-White Gap- Given Classroom Characteristics

	WJ PV	WJ LW	DIBELS PSF	WJ AP	Flanker	DCCS	Social Skills	Self Reg
Fall PK	-0.08 (0.12)	0.03 (0.06)		-0.13 (0.1)	-0.24 (0.14)	-0.25* (0.12)		
PK gain	-0.02 (0.07)	-0.03 (0.05)		-0.1 (0.07)	0.21 (0.13)	0.09 (0.14)		
PK-K summer	-0.07 (0.08)	0.10 (0.06)		0.19* (0.08)	-0.08 (0.15)	-0.26 (0.16)		
K gains	0.05 (0.09)	-0.28*** (0.06)		-0.01 (0.08)	0.13 (0.16)	0.44* (0.17)		
K-G1 summer	-0.04 (0.1)	0.17* (0.07)		-0.04 (0.10)	-0.04 (0.18)	-0.09 (0.2)		
G1 gains	-0.15 (0.11)	0.01 (0.07)		-0.10 (0.10)	0.07 (0.19)	-0.05 (0.21)		
Spring G1	-0.30** (0.10)	0.00 (0.1)		-0.28** (0.09)	0.04 (0.14)	-0.12 (0.16)		

Latinx-White Gap -Given Classroom Characteristics

	WJ PV	WJ LW	DIBELS PSF	WJ AP	Flanker	DCCS	Social Skills	Self Reg
Fall PK	-1.62***	-0.20**	0.03	-0.79***	-0.18	0.21	0.02	0.22
	(0.12)	(0.06)	(0.07)	(0.1)	(0.14)	(0.13)	(0.14)	(0.14)
PK gain	0.48***	0.11*	-0.07	0.36***	0.05	-0.34*	0.16	0.06
	(0.07)	(0.05)	(0.08)	(0.07)	(0.12)	(0.13)	(0.1)	(0.09)
PK-K summer	0.17*	0.03	0.01	0.22**	0.30*	-0.05	-0.22*	-0.24*
	(0.07)	(0.05)	(0.09)	(0.07)	(0.13)	(0.15)	(0.11)	(0.1)
K gains	0.28***	0.05	-0.03	0.20*	0.00	0.35*	0.13	0.20
	(0.08)	(0.05)	(0.1)	(0.08)	(0.14)	(0.16)	(0.11)	(0.11)
K-G1 summer	0.02	0.04	0.03	-0.07	-0.02	-0.18	-0.03	-0.05
	(0.09)	(0.07)	(0.11)	(0.09)	(0.16)	(0.18)	(0.14)	(0.13)
G1 gains	-0.03	0.1	0.08	-0.04	0.08	-0.04	0.24	0.21
	(0.09)	(0.06)	(0.12)	(0.09)	(0.17)	(0.18)	(0.14)	(0.13)
Spring G1	-0.71***	0.13	0.04	-0.12	0.24	-0.06	0.30	0.40*

Conclusions

- Achievement gaps were smaller and more malleable in this rural sample than in national studies
  - Black-white differences in vocabulary and math apparent by end of Grade 1
  - Latinx-white differences in academic skills declined and disappeared for reading and math by grade 1
- Relatively few association between child outcomes and ethnic composition, T-C ethnic match, and CLASS
  - Not surprising - Little evidence that classroom characteristics accounted for gaps

Observing Learning Opportunities from PK to Grade 3

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Susan Sheridan, University of Nebraska

01/08/2020

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Early Learning Network Mission

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.

Optimizing Learning Opportunities for Students - OLOS

- Created from three validated observation systems
  - ISI/Pathways
  - Quality of the Classroom Learning Environment - Q-CLE
  - Creating Opportunities to Learn from Text – COLT
- Designed to predict language/literacy, math and social-behavioral outcomes
- Designed to be used by practitioners
- Technology – web-based and used on a tablet or laptop

Cycle 2 of 2 | 00:02:34 of 00:15:00 | Undo last action | End early

Is on task	Is off task

Content Area

Literacy	Math	Other	Non-Inst

Context

WC	SmG	Indiv
Teacher	Peers	Alone

Instruction Type

CF	MF	Play

Moves

Non-verbal responding	Verbal response to question	Reading text/problems aloud
Answering questions that require reasoning	Asking on-topic questions	Using text to justify a response	Participating in a discussion
Voicing a disagreement		
In a challenging social situation, uses words to resolve issue	Moves away from difficult social situations	

Is on task	Is off task

Content Area

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Context

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Teacher	Peers	Alone

Instruction Type

Nu	Op	Al	Go	Ap

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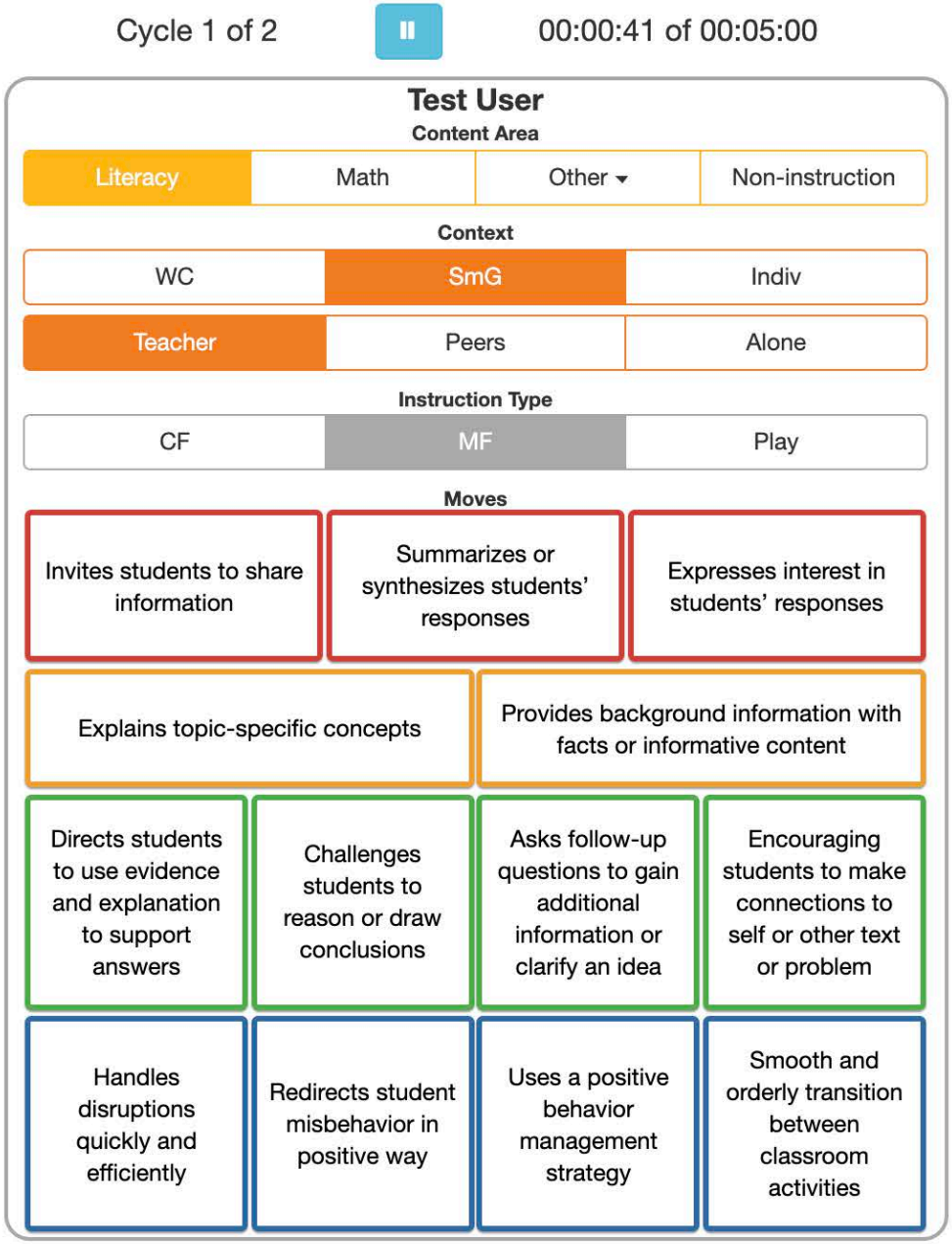
OLOS for Teachers



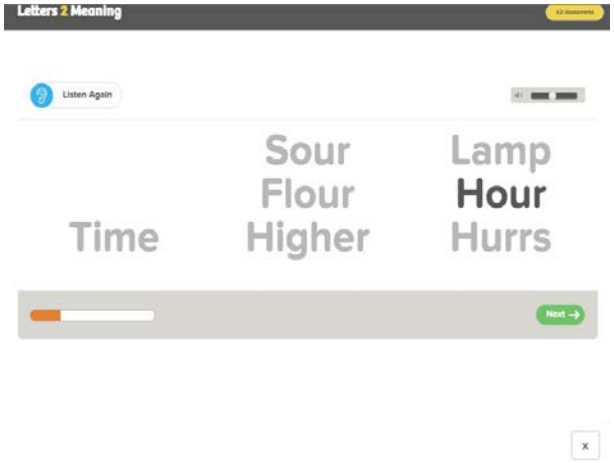
Participants

- Total of 567 students in 56 classrooms with 54 teachers – Diverse SES and Race/Ethnicity. Most of the PK classrooms were Head Start

OSU	UCI	UNL	Total
PreK=0 (*n*=10)	PreK=19 (*n*=191)	PreK=2 (*n*=10)	PreK = 21 (n=211)
K=4 (*n*=33)	K=3 (*n*=38)	K=1 (*n*=6)	K=8 (n=77)
1st=4 (*n*=34)	1st=3 (*n*=41)	1st=3 (*n*=28)	1st=10 (n=103)
2nd=5 (*n*=55)	2nd=2 (*n*=44)	2nd=2 (*n*=16)	2nd=9 (n=115)
3rd=4 (*n*=34)	3rd=1 (*n*=14)	3rd=3 (*n*=23)	3rd=8 (n=71)

Assessments

- Letters2Meaning (L2M)
  - Letter ID
  - Sound ID
  - Word reading
  - Spelling
  - Sentence construction



- Word Match Game (WMG)
  - Vocabulary
  - Semantic Relations

- WJ Applied Problems – Math
- Head Toes Knees Shoulders
  - Self-regulation/Social-behavioral outcome

2018-2019 Data Collection

Fall

- Assessment: Literacy, Language, Math, Socio-behavioral
- Observation

Winter

- Assessment: Literacy, Language, Math
- Observation

Spring

- Observation
- Assessment: Literacy, Language, Math, Socio-behavioral

Procedures

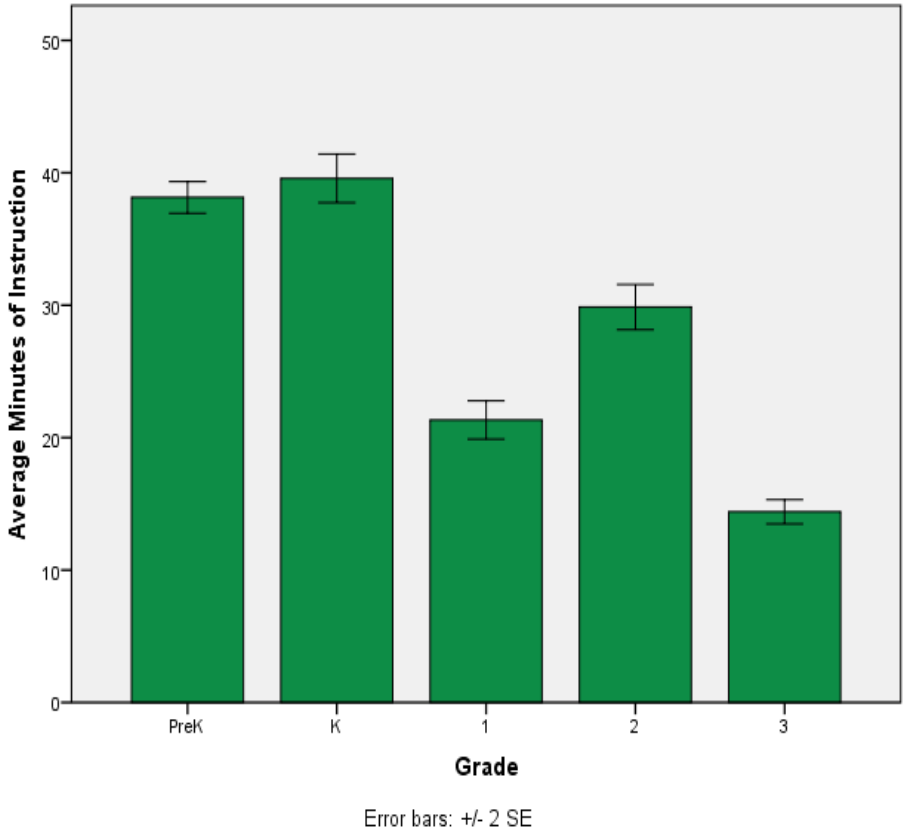
- All children in all classrooms coded (in sets of 3) for the duration of all video observations by UCI reliable coders (OLOS may also be used live)
- All coders were reliable with gold standard videos
- Coders randomly assigned to sites and classrooms

Season	Average observation length
Fall	2 hours, 8 minutes
Winter	2 hours, 17 minutes
Spring	2 hours, 19 minutes

Findings

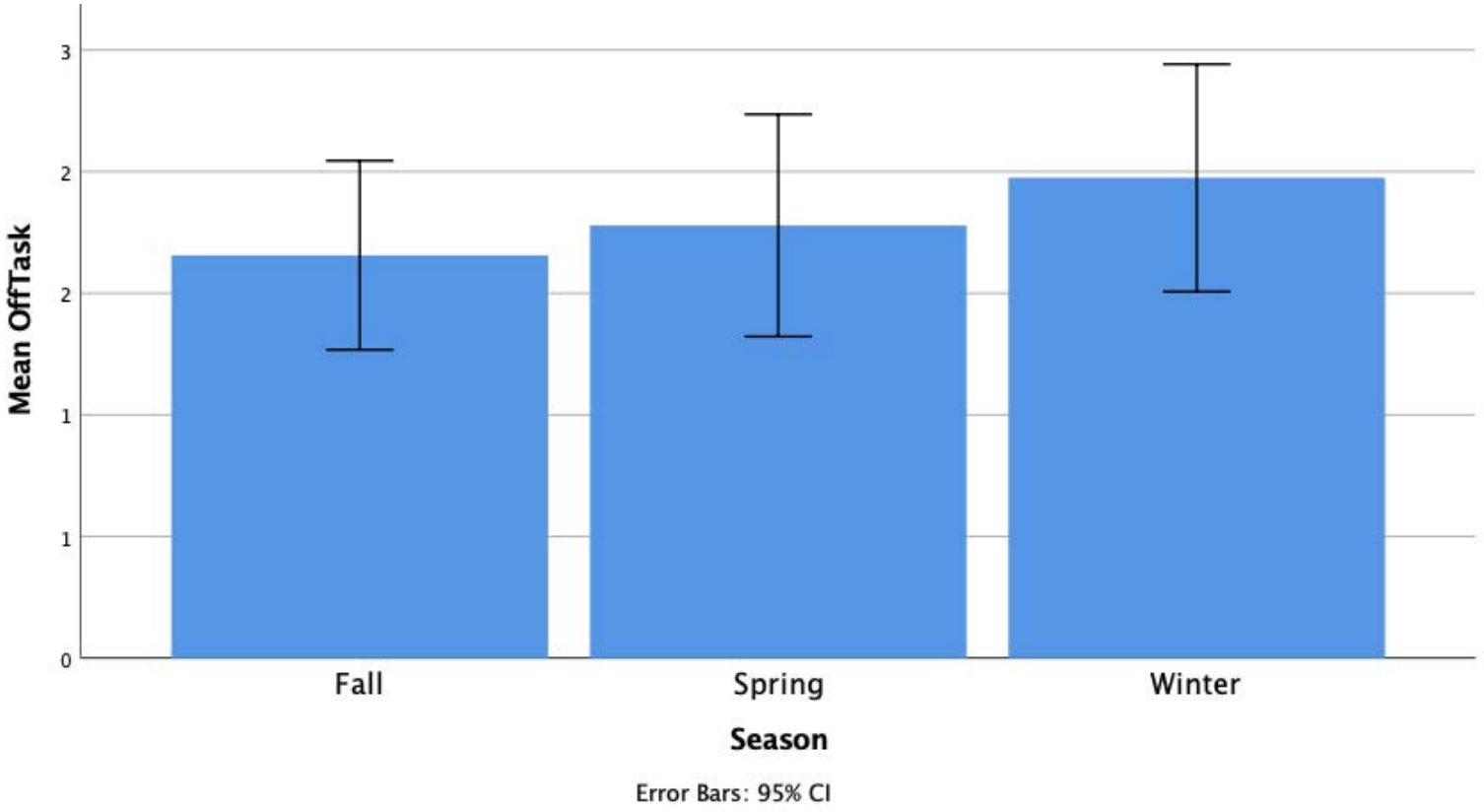
- These are preliminary findings.
- Data collection is continuing next year

Non-Instruction (mean min)



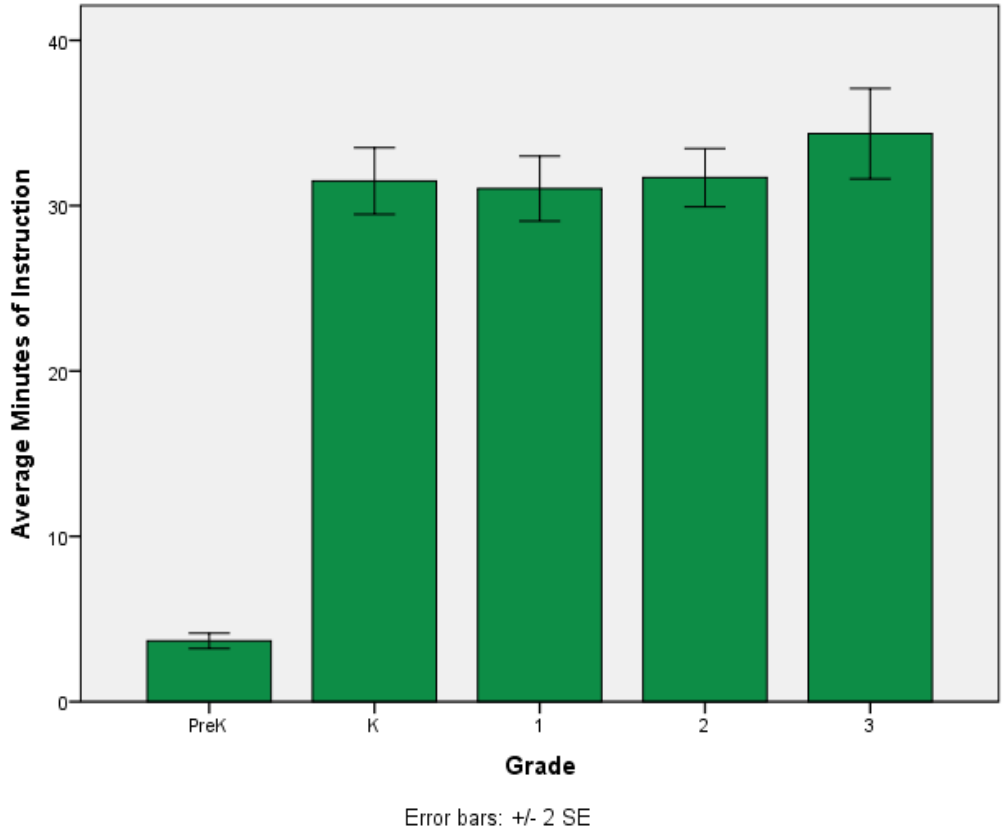
Non-instruction was observed in all grades with PK and K the greatest (about 40 min on average); less in G1 and G3 (from 15 to 20 min); about 30 min on average in G2.

Off Task (mean min)



Relatively small amounts of child off task behavior observed that did not vary by grade or time of year. Range was great – 0 to 74 min

Math (mean min)



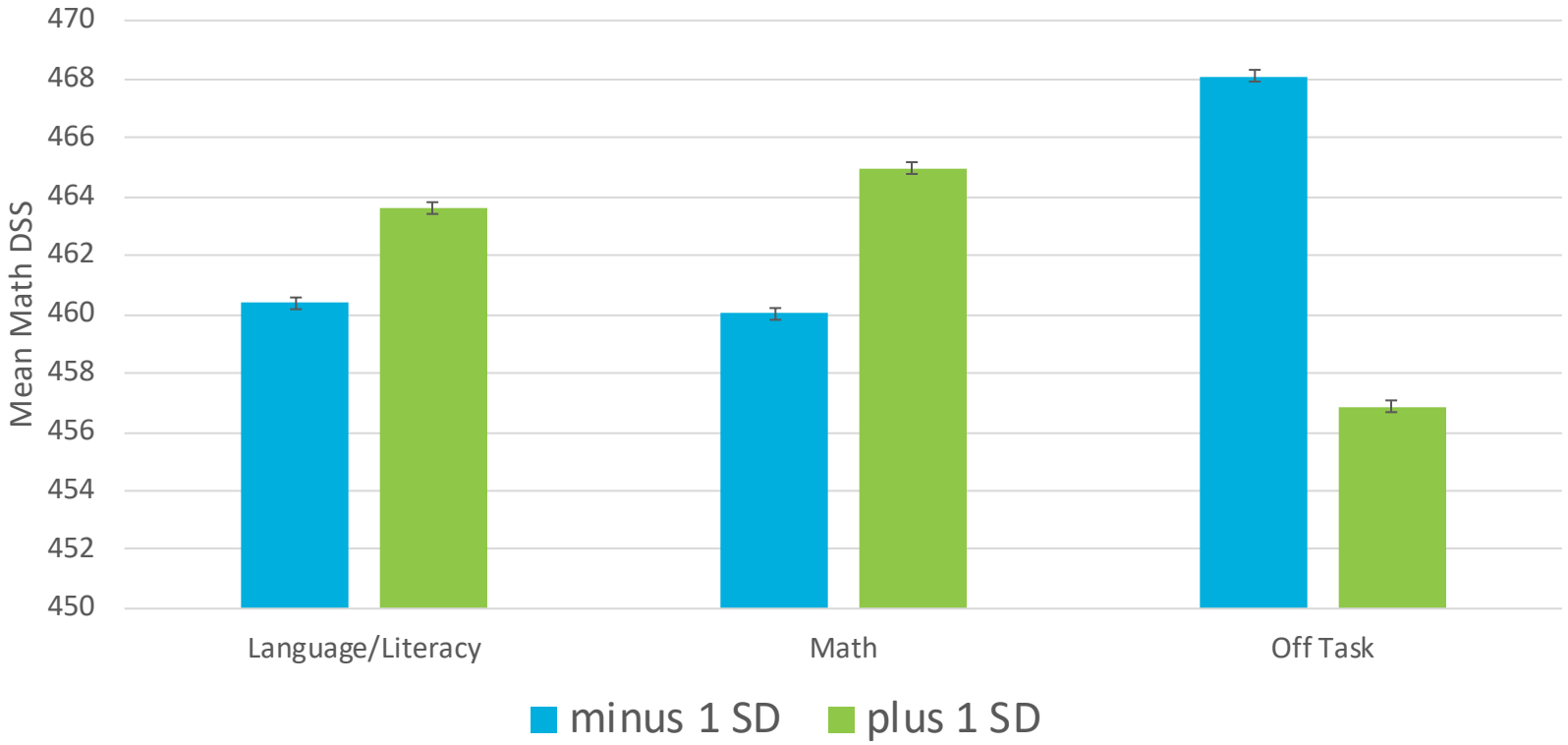
F (4, 1698) = 65.91, *p*<.001

Significantly more time spent in math in K-G3 (about 30 min on average) compared to PK (about 5 min on average).

Math outcomes (G1 reference group)

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	456.688	3.931	116.176	50	<0.001
G23, β_{01}	23.469	4.831	4.858	50	<0.001
K, β_{02}	-25.127	6.030	-4.167	50	<0.001
PK, β_{03}	-56.764	5.334	-10.640	50	<0.001
For OFFTASK slope, π_1					
INTRCPT2, β_{10}	-0.337	0.135	-2.502	963	0.013
For LIT_DUR slope, π_2					
INTRCPT2, β_{20}	0.088	0.034	2.603	963	0.009
For MATH_DUR slope, π_3					
INTRCPT2, β_{30}	0.108	0.054	1.967	963	0.049
For NON_DUR slope, π_4					
INTRCPT2, β_{40}	0.050	0.073	0.686	963	0.493
For SEL_DUR slope, π_5					
INTRCPT2, β_{50}	-0.058	0.242	-0.240	963	0.810
For TIME slope, π_6					
INTRCPT2, β_{60}	5.836	1.442	4.046	963	<0.001
G23, β_{61}	-0.630	1.796	-0.351	963	0.726
K, β_{62}	1.686	2.374	0.710	963	0.478
PK, β_{63}	0.496	1.769	0.281	963	0.779

Effect of learning opportunities on spring math outcomes



More time in math and literacy instruction was associated with stronger spring scores on the WJ Applied Problems assessment. More time off task was associated with weaker math outcomes.

HTKS self-regulation outcomes

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	45.613	2.203755	20.698	50	<0.001
G23, β_{01}	4.369	2.700222	1.618	50	0.112
K, β_{02}	-18.849	3.429438	-5.496	50	<0.001
PK, β_{03}	-35.517	2.906403	-12.220	50	<0.001
For OFFTASK slope, π_1					
INTRCPT2, β_{10}	-0.263	0.091090	-2.883	965	0.004
For NON_DUR slope, π_2					
INTRCPT2, β_{20}	-0.048	0.044584	-1.076	965	0.282
For SEL_DUR slope, π_3					
INTRCPT2, β_{30}	0.033	0.152641	0.220	965	0.826
For TIME slope, π_4					
INTRCPT2, β_{40}	3.264	0.974463	3.350	965	<0.001
G23, β_{41}	-2.018	1.214287	-1.662	965	0.097
K, β_{42}	-1.570	1.595868	-0.984	965	0.325
PK, β_{43}	0.140	1.199735	0.117	965	0.907

Language/Literacy: Code- and Meaning-Focused Instruction

Code-focused

The picture can't be displayed.

Significantly more code-focused time in K (about 20 minutes on average) compared to other grades, with very little (<5 min) in G3

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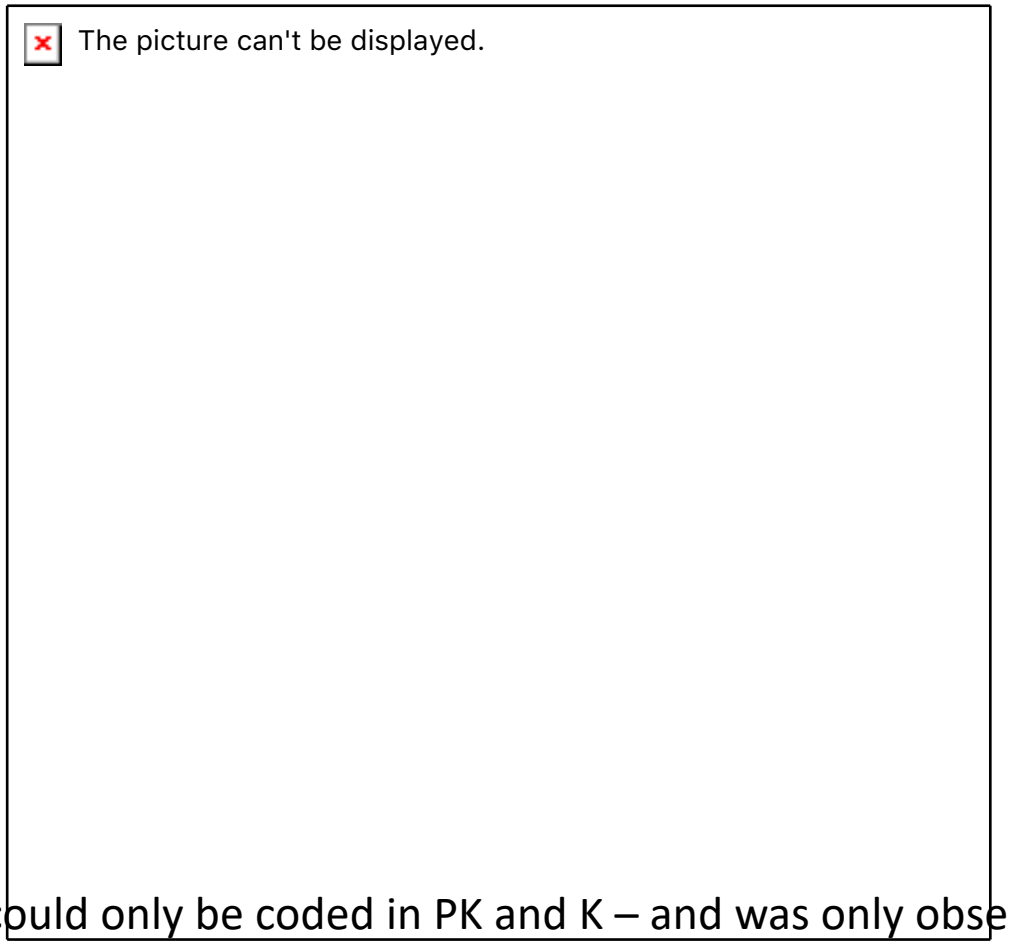
PK children spent significantly less time in meaning-focused instruction (about 15 min) than the other grades (about 40 min).

Language/Literacy Play



Play could only be coded in PK and K – and was only observed in PK (about 35 min on average).

Distance from recommended amount of instruction = observed amount – recommended amount

Algorithms and Classroom View

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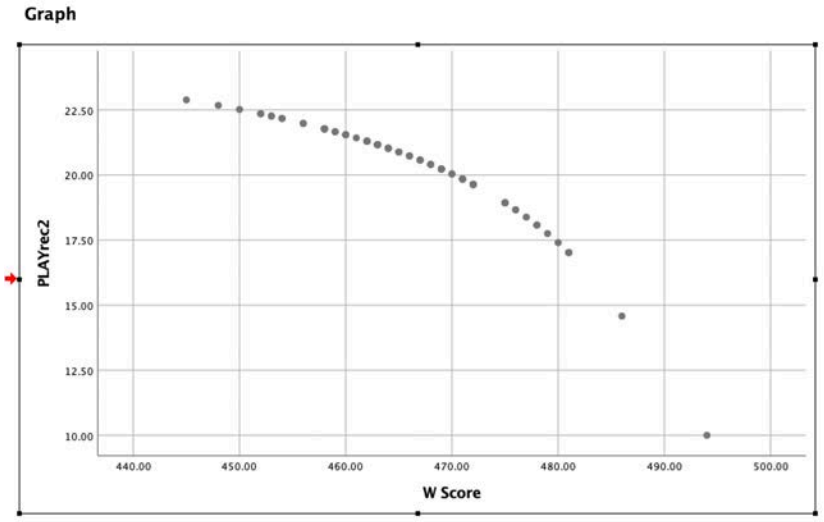
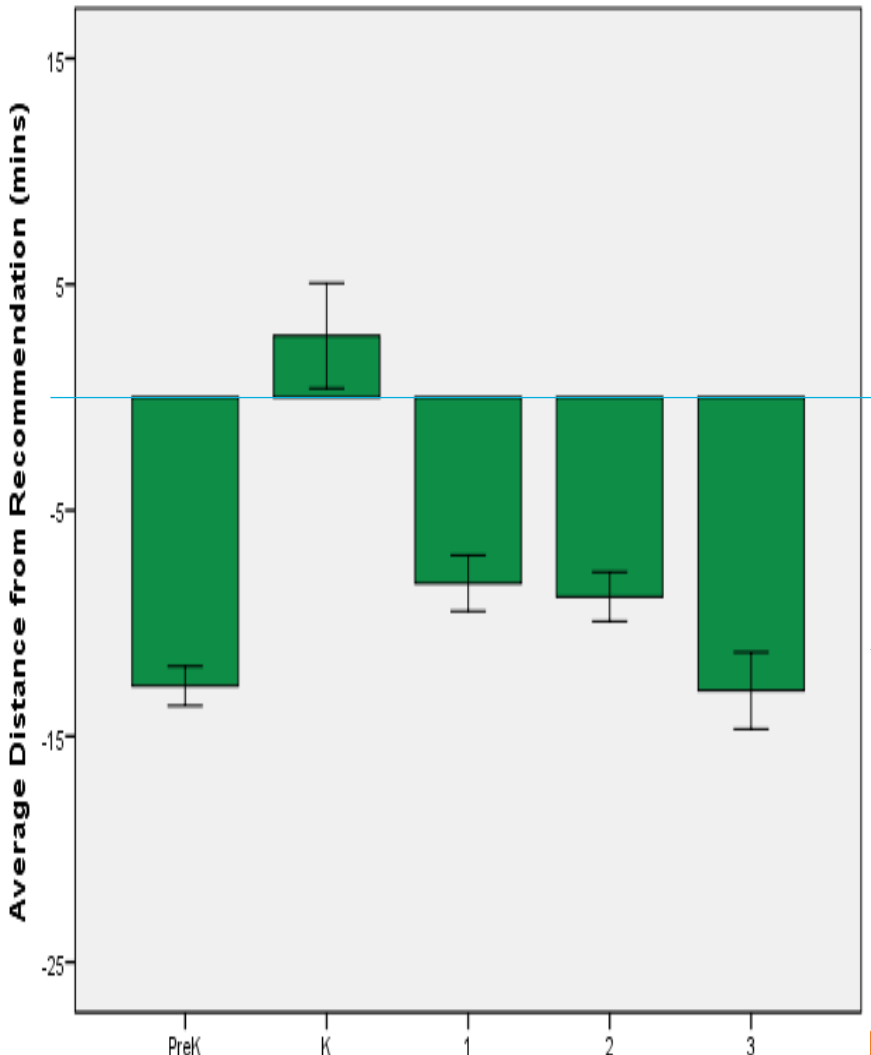
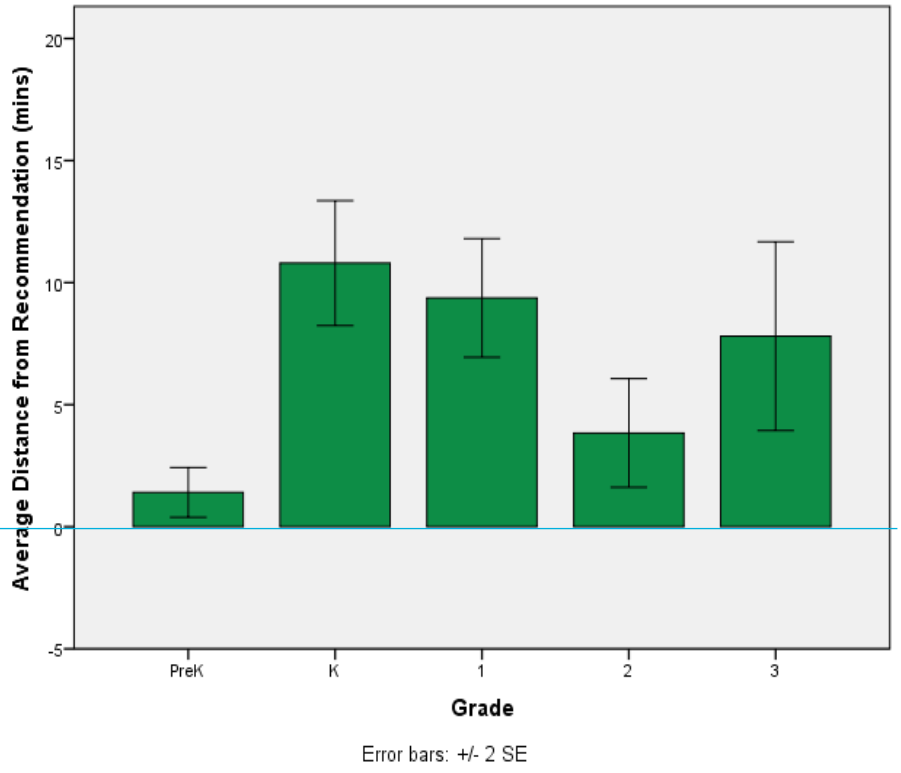


Algorithm function for play

Teacher-Managed Code- and Meaning-Focused Instruction DFR

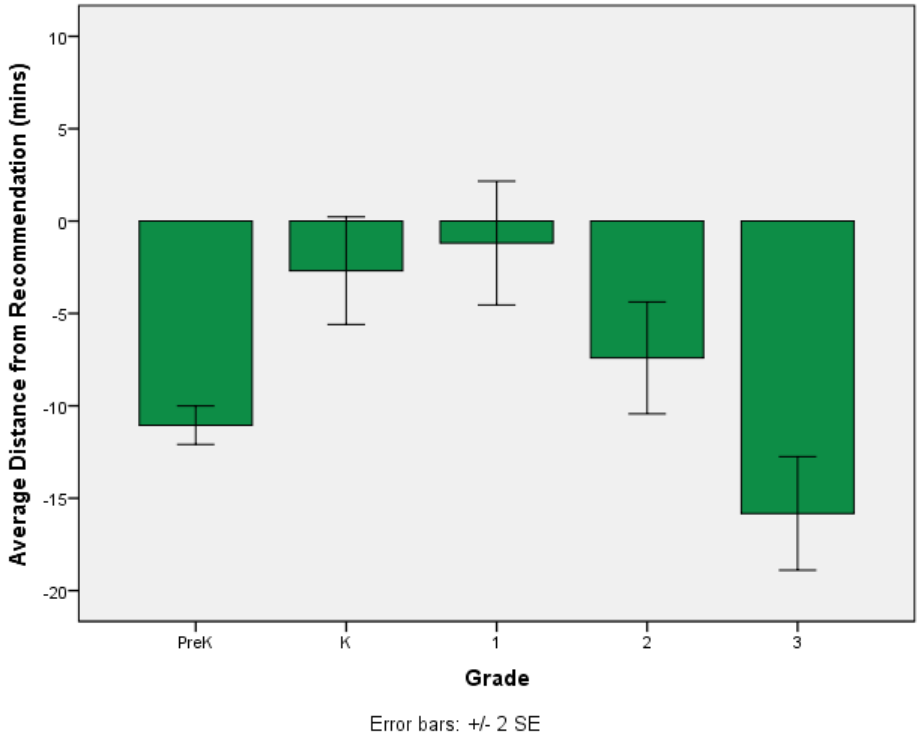
Code-Focused DFR



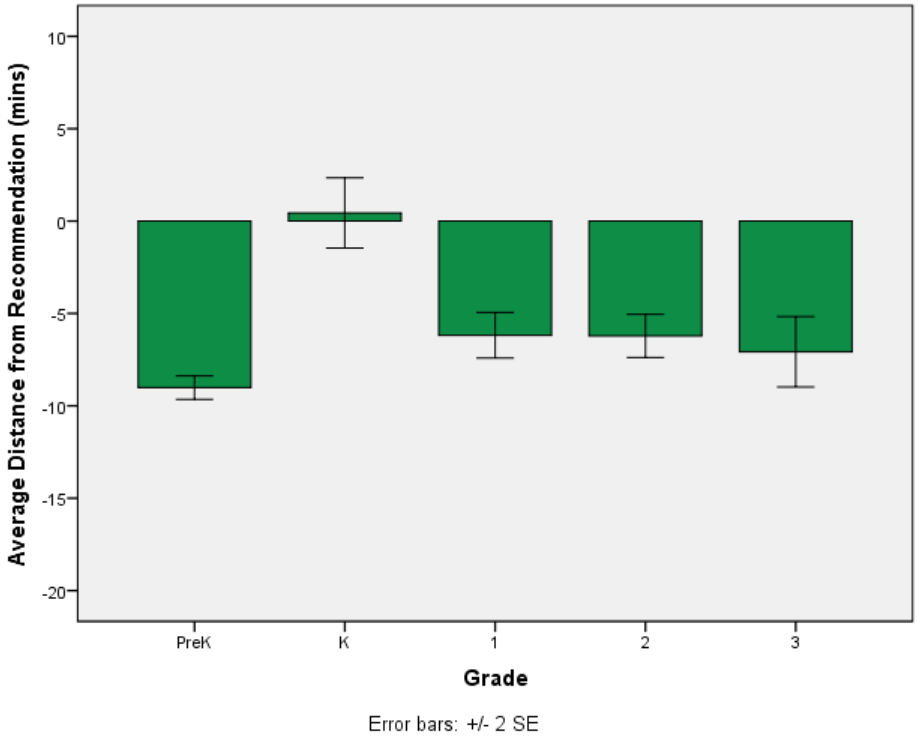


Meaning Focused DFR

Child-Managed Code- and Meaning Focused Instruction DFR



Code-Focused DFR

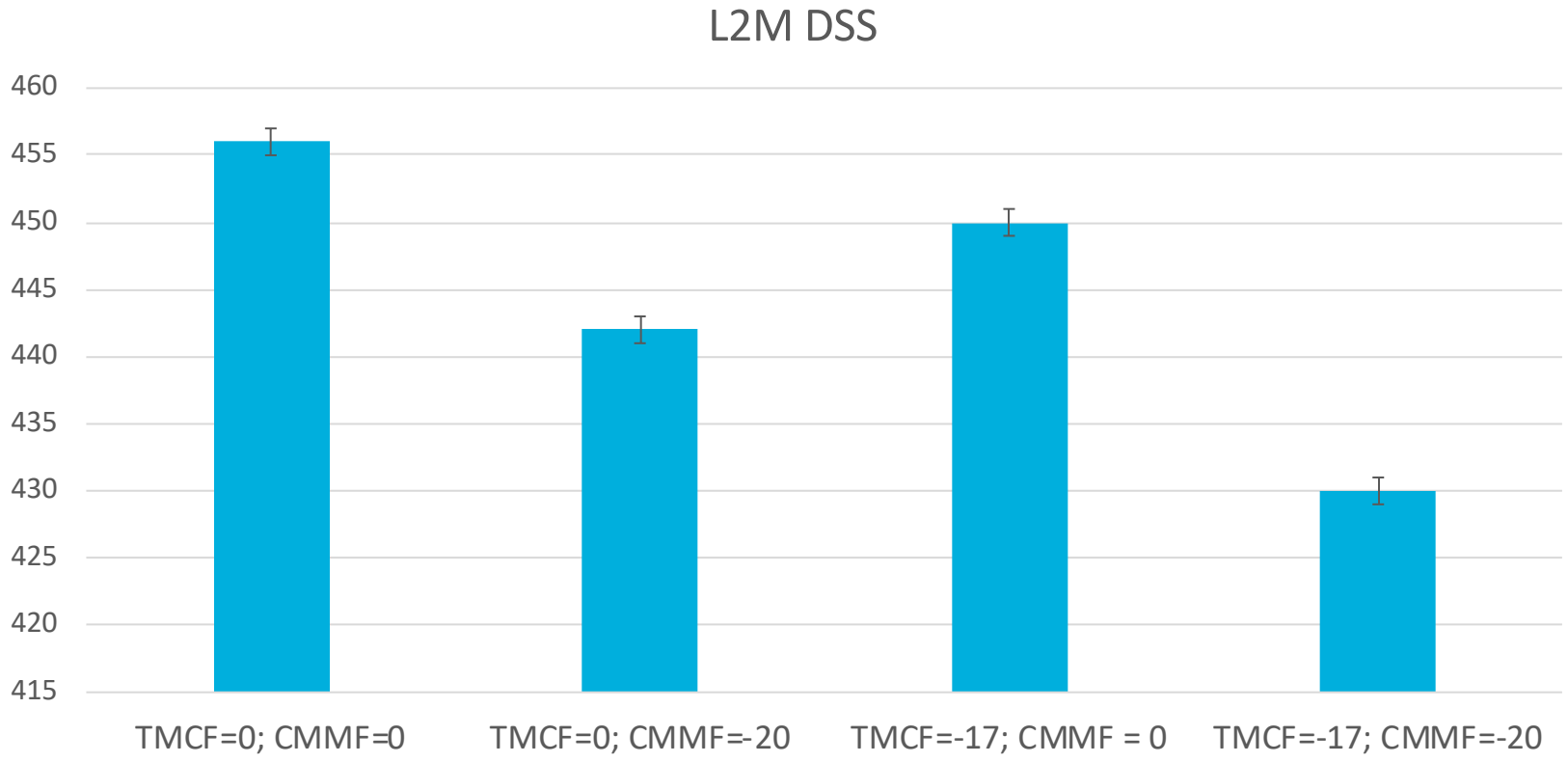


Meaning-Focused DFR

HLM – Literacy DSS – G1 reference group

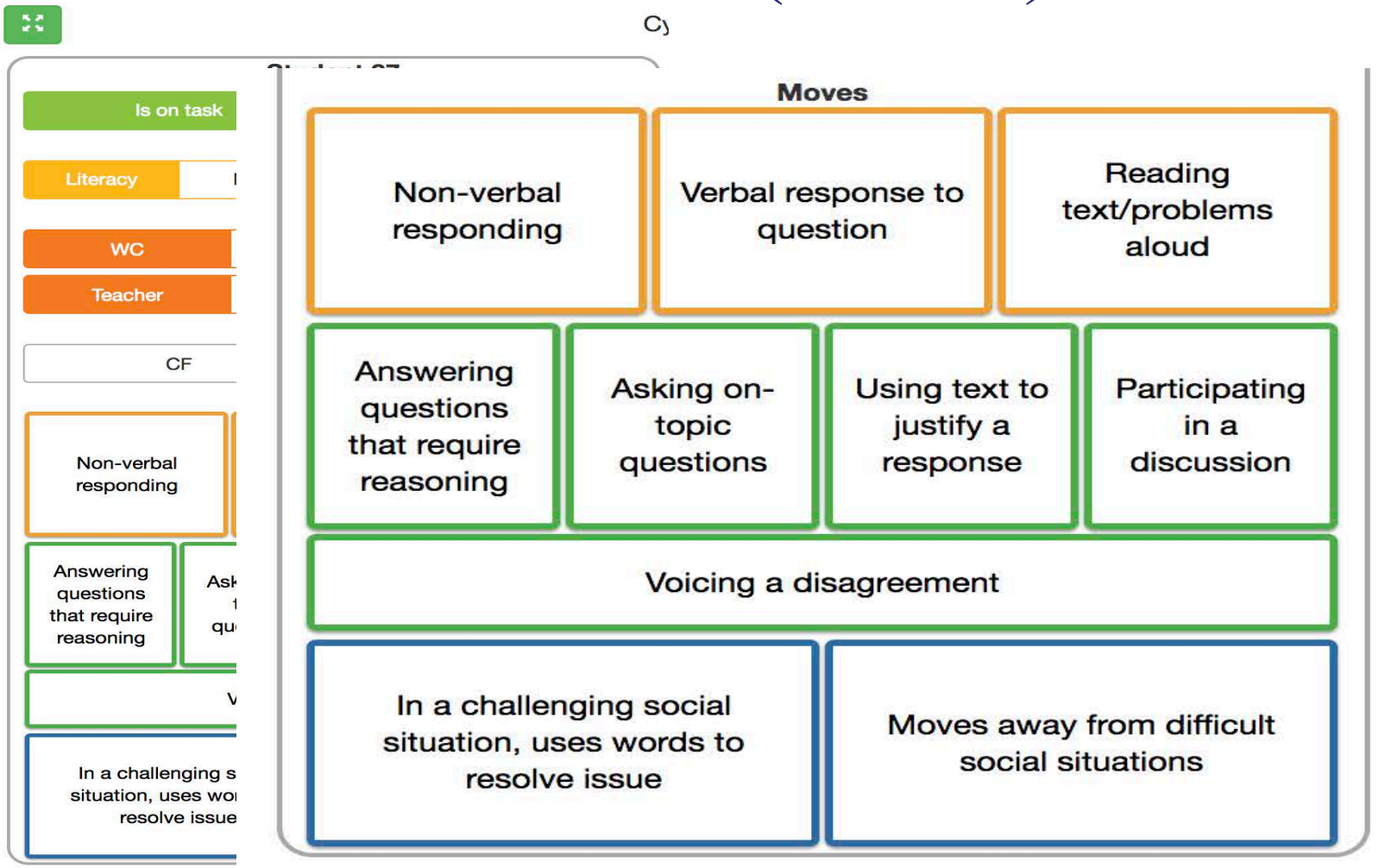
Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	461.516	15.913	29.002	48	<0.001
G23, β_{01}	131.677	19.220	6.851	48	<0.001
K, β_{02}	-89.559	23.909	-3.746	48	<0.001
PK, β_{03}	-157.674	19.737	-7.989	48	<0.001
For OFFTASK slope, π_1					
INTRCPT2, β_{10}	-0.929	0.352	-2.637	1426	0.008
For TMCF_DFR slope, π_2					
INTRCPT2, β_{20}	0.506	0.215	2.350	1426	0.019
For TMMF_DFR slope, π_3					
INTRCPT2, β_{30}	0.012	0.145	0.087	1426	0.931
For CMCF_DFR slope, π_4					
INTRCPT2, β_{40}	0.245	0.240	1.022	1426	0.307
For CMMF_DFR slope, π_5					
INTRCPT2, β_{50}	0.775	0.141	5.495	1426	<0.001
For PLAY_DFR slope, π_6					
INTRCPT2, β_{60}	0.110	0.184	0.599	1426	0.549
For TIME slope, π_7					
INTRCPT2, β_{70}	30.638	4.985	6.145	1426	<0.001
G23, β_{71}	-12.816	6.094	-2.103	1426	0.036
K, β_{72}	-2.522	7.610	-0.331	1426	0.740
PK, β_{73}	-24.994	6.168	-4.052	1426	<0.001
For MATH1 slope, π_8					
INTRCPT2, β_{80}	2.593	9.714	0.267	1426	0.790

Effect of learning opportunities on Language/Literacy – varying DFR

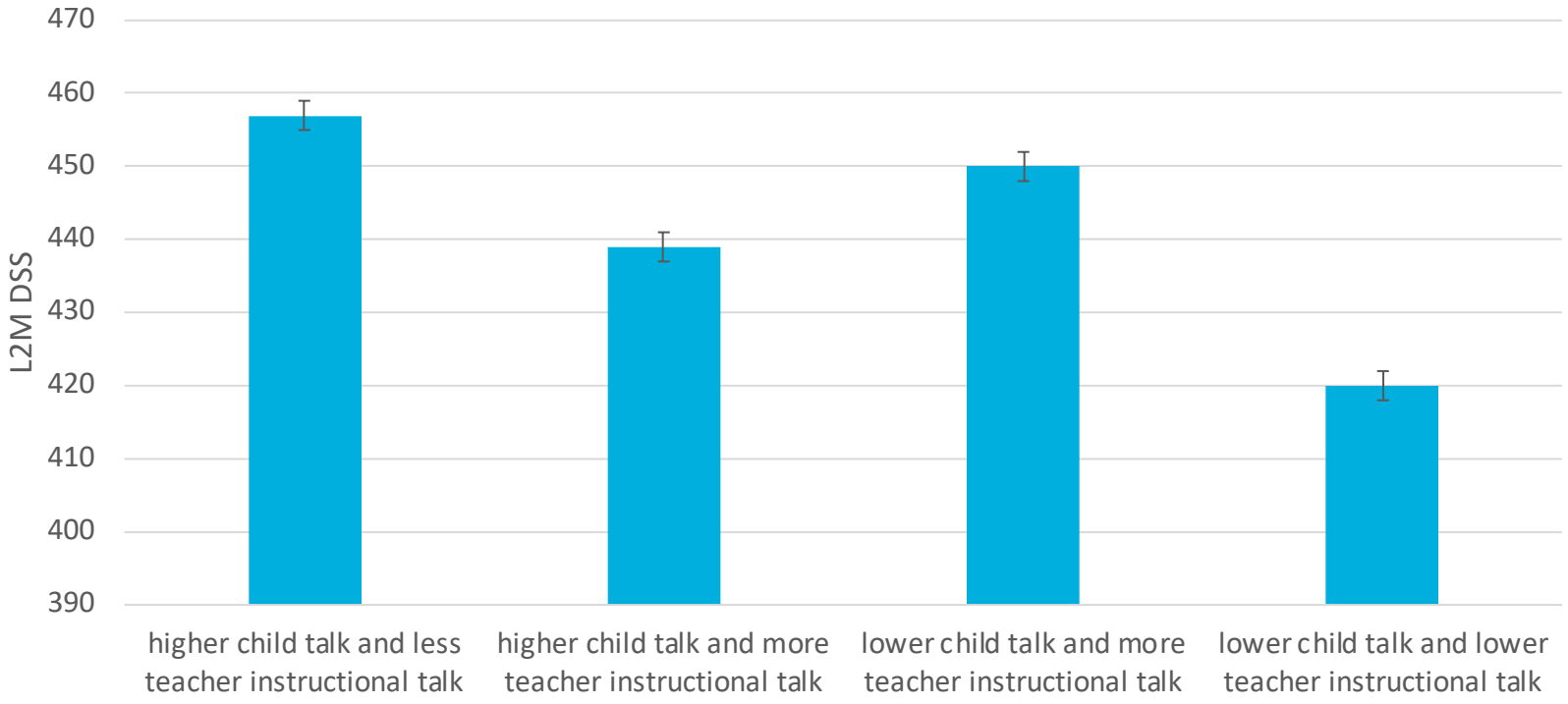


Outcomes modeled at DFR = 0 and DFR = - 1 SD. Mean DFR for both TMCF and CMMF were negative -8.95 and -7.61 respectively. Strongest outcomes predicted when both observed TMCF and CMMF were at recommended amounts

Optimizing Learning Opportunities for Students (OLOS)



Child talk and teacher instructional talk predicting literacy



Child X teacher talk interaction effect: Strongest outcomes when there is more child talk and less teacher instructional talk but weakest scores if both child talk and teacher talk are low (modeled at the 25th and 75th percentiles of the sample).


EarlyLearning
NETWORK

Achievement Gaps

- Inequitable opportunities to learn
- PK made weaker gains in academic skills compared to other grades
  - There were also fewer math and literacy learning opportunities
- Both literacy and math learning opportunities predicted math outcomes
- Literacy code-focused instruction with the teacher DFR predicted literacy outcomes (total amount did not)
  - Many more opportunities for literacy meaning-focused instruction with the teacher than code focused.
    - Meaning focused did not predict –threshold? Less variability?
  - Only in K were recommended amounts provided on average but there was still child-level variability
  - Are we forgetting about how important foundational skills are?
- Meaning focused literacy opportunities alone or with peers DFR predicted literacy outcomes
  - Support for independent reading and other kinds of meaning focused child- and peer-managed activities
  - Only in K were recommended amounts provided on average and there was child-level variability
- Child talk predicted literacy, vocabulary, and math outcomes.
  - Child talk interacted with teacher talk for literacy and vocabulary outcomes

Thank You

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Discussant

Michael López, National Research Center on Hispanic Children & Families; NORC at the University of Chicago