Tulsa SEED Study

STUDY OF SCHOOL EXPERIENCES AND EARLY DEVELOPMENT
GEORGETOWN UNIVERSITY & UNIVERSITY OF OKLAHOMA-TULSA

The Tulsa SEED Study is led by Principal Investigators Dr. Anna Johnson and Dr. Deborah Phillips at Georgetown University; Dr. Diane Horm at University of Oklahoma - Tulsa; and Dr. Gigi Luk at McGill University.

Do State Tests and Direct Assessments of Math and Language Skills Measure the Same Things?

Douglas Hummel-Price, Anna D. Johnson, Anne Martin, and the Tulsa SEED Study Team

Nationally, students in public schools begin taking state tests to assess proficiency in math and language (English Language Arts [ELA]) skills in 3rd grade. Federal and state governments use these test scores to assess student, school, and district performance. Results inform consequential decisions about individual students' grade promotion and school funding, and are currently being used to understand COVID-19-related learning gaps. Despite the gravity of such decisions, little is known about the extent to which state tests capture the skills developmental experts know to be key to future learning.

In Oklahoma, the Tulsa SEED Study has been measuring these skills annually from pre-k through 4th grade in a large cohort of students from low-income families in the Tulsa Public Schools (TPS). This presents a unique opportunity to compare their 3rd grade Oklahoma State Testing Program (OSTP) state test scores to one-on-one researcher-administered normed tests of specific skills within the math and language domains.

In the math domain, these tests tap language-free numeracy skills – comparing number symbols quickly to determine which is larger (numeral comparison) and placing numbers in order of magnitude (number ordering) – as well as the ability to solve math word problems (applied problem-solving).

In the language domain, these tests tap expressive oral vocabulary – which captures the number and complexity of words children know by asking them to verbally label pictures – as well as letter and word identification, and reading (passage) comprehension, which assess reading skills.

This brief explores the degree to which scores on the OSTP math and language tests and researcher-administered math and language tests correlate both within and across domains.

Correlation Matrix		Math				ELA			
		Num Comp	Num Ord	AP	OSTP	Exp Vocab	LW	PC	OSTP
Math	Num Comp	-							
	Num Ord	0.51	-						
	AP	0.45	0.47	-					
	OSTP	0.42	0.48	0.62	-				
ELA	Exp Vocab	0.32	0.35	0.52	0.48	-			
	LW	0.32	0.36	0.55	0.62	0.40	-		
	PC	0.38	0.40	0.58	0.61	0.48	0.87	-	
	OSTP	0.32	0.38	0.48	0.71	0.42	0.70	0.69	-

Scale

0.90	
0.80	
0.70	
0.60	
0.50	
0.40	
0.30	
0.20	
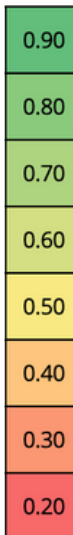
Math	
Abbreviation	**Assessment Name**
Num Comp	Numeracy Comparison
Num Ord	Numeracy Ordering
AP	Woodcock Johnson Applied Problems*
OSTP	Oklahoma State Testing Program Math

ELA	
Abbreviation	**Assessment Name**
Exp Vocab	CELF Expressive Vocab
LW	Woodcock Johnson Letter-Word ID*
PC	Woodcock Johnson Passage Comprehension
OSTP	Oklahoma State Testing Program ELA

Notes. All correlations are statistically significant at p < .0001. Correlations range from 0-1.00; .10 is considered weak, 0.30 is considered moderate, and .50 and above is considered strong (Cohen, 1988).
CELF = Clinical Evaluation of Language Fundamentals.
*All assessments occurred in the spring of 3rd grade, with the exception of WJ Applied Problems and Letter-Word ID, which occurred in the fall of 3rd grade.

What Have We Learned?

State Tests vs. Direct Assessments of Math

- OSTP math is **strongly associated** with measures of children's ability to understand what they read
  - OSTP math is strongly associated with applied problems (solving math word problems; $r = .62$)
  - OSTP math is strongly associated with letter-word identification ($r = .62$) and passage comprehension ($r = .61$)

- OSTP math is more **modestly associated** with measures of numeracy and expressive vocabulary
  - OSTP math is moderately associated with both numeral comparison ($r = .42$) and number ordering ($r = .48$)
  - OSTP math is moderately associated with expressive vocabulary ($r = .48$)

State Tests vs. Direct Assessments of ELA

- OSTP ELA is **strongly associated** with measures of children's ability to understand what they read
  - OSTP ELA is strongly associated with letter-word identification ($r = .70$) and passage comprehension ($r = .69$)

- OSTP ELA is more **modestly associated** with expressive vocabulary ($r = .42$)

What are the Implications?

OSTP math seems to tap math skills that themselves rely on language skills. It is less strongly correlated with numeracy skills that don't require any language.

OSTP ELA taps understanding of sentence structure and meaning but does a poorer job of capturing expressive vocabulary, all of which are important for reading comprehension.

This tells us that state tests capture some but not all of the skills that developmental experts know to be key to future learning. These results are also important for the many past and ongoing pre-k impact evaluations, which often use state test scores to estimate lasting benefits of pre-k. If state test scores do not fully capture student learning outcomes, pre-k evaluations may be missing some important enduring benefits of pre-k. In fact, the Tulsa SEED Study has found longer-lasting pre-k impacts on numeral comparison and expressive vocabulary than on applied word problems and letter-word identification, the tests that overlap most with OSTP.
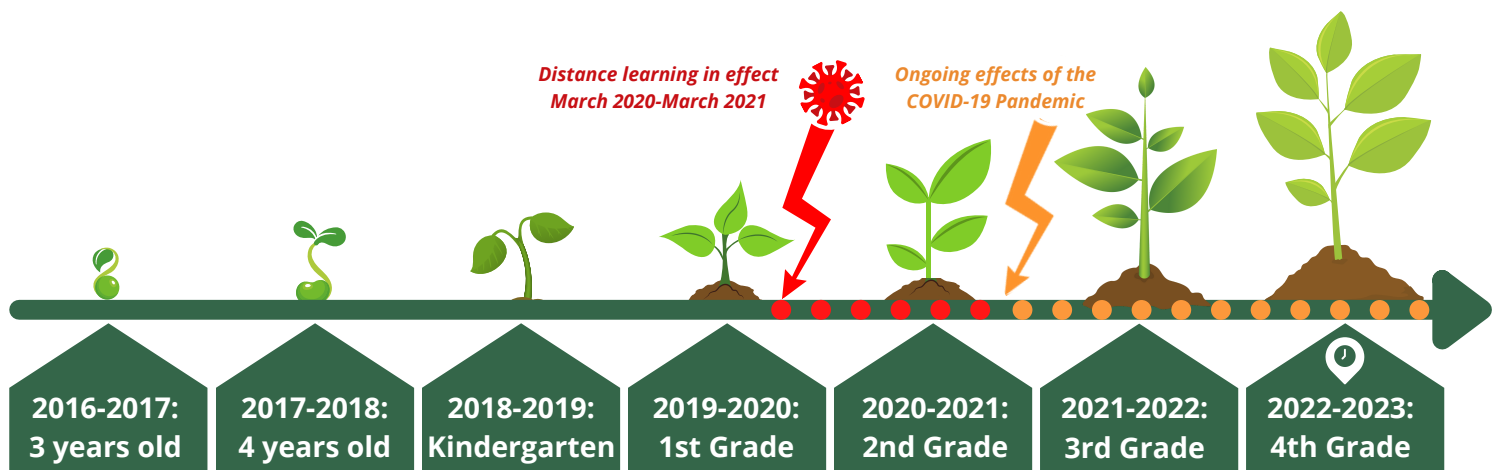
Relying only on state tests for making consequential student promotion and school funding decisions, evaluating pre-k benefits, and understanding COVID-19 impacts on learning risks painting an incomplete picture of what students know and can do.

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What is Tulsa SEED?

The Tulsa SEED Study is led by Principal Investigators Drs. Anna Johnson and Deborah Phillips at Georgetown University, Dr. Diane Horm at the University of Oklahoma – Tulsa, and Dr. Gigi Luk at McGill University. The full SEED study team includes Dr. Sherri Castle, Dr. Anne Martin, April Dericks, Anne Partika, Anna Wright, Dr. Jane Hutchison, Dr. Owen Schochet, Ayush Lahiri, Evan Bianchi, and Margaret Wu. Tulsa SEED is made possible through funding from the Heising-Simons Foundation, the George Kaiser Family Foundation, the University Strategic Organization Initiative at the University of Oklahoma, the Foundation for Child Development, the Spencer Foundation, the National Institutes of Health (NIH), and the Administration for Children and Families (ACF) of the U.S. Department of Health and Human Services. For more information, visit https://www.cdsplab.org/.

Distance learning in effect March 2020-March 2021

Ongoing effects of the COVID-19 Pandemic

| 2016-2017: 3 years old | 2017-2018: 4 years old | 2018-2019: Kindergarten | 2019-2020: 1st Grade | 2020-2021: 2nd Grade | 2021-2022: 3rd Grade | 2022-2023: 4th Grade |

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