

Vocabulary gaps at the beginning of kindergarten and reading achievement gaps at the end of 4th grade

Adrienne D. Woods^a, Yangyang Wang^a, Paul L. Morgan^a, George Farkas^b & Marianne M. Hillemeier^a
^aThe Pennsylvania State University, ^bThe University of California, Irvine

Abstract

We used data from the ECLS-K: 2010-11 to examine the extent to which Black- and Hispanic-White oral vocabulary gaps in the fall of kindergarten predicted Black- and Hispanic-White reading achievement gaps by the spring of 4th grade. Kindergarten oral vocabulary strongly predicted 4th grade reading achievement. Kindergarten oral vocabulary gaps accounted for 18% of the Black-White, 62% of the low-income Hispanic-White, and the entire middle income Hispanic-White reading achievement gaps in 4th grade.

Background

Oral vocabulary at the start of kindergarten is positively associated with later reading achievement, possibly because it facilitates listening comprehension as well as decoding skill.^{1,2} Oral vocabulary gaps at kindergarten entry may contribute to reading achievement gaps including between racial and ethnic groups.^{3,4}

Research Question

To what extent do oral vocabulary achievement gaps in fall kindergarten explain 4th grade reading achievement gaps, including between Black- and Hispanic-White students of low and middle SES?

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Data, Measures, and Analyses

Data. Data were from the 2011 Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K), a nationally representative sample of 18,174 kindergarten children attending 1,319 schools who were followed until 4th grade.

Measures. Children completed 2 tasks from the *Preschool Language Assessment Scale (preLAS 2000)* as a language screener. This screener included 20 items. Table 1 shows that the percent of values below 20 varies strongly and systematically varied by race and ethnicity. We coded the preLAS scores as two dummy variables, one for moderate oral language skill (a score of 16-19) and another for low oral language skill (a score of 15 or lower), with the highest possible score of 20 as the base category. We used 16 as the cutoff between the moderate and low oral language groups. The analyses included IRT theta scores of *reading achievement* in the spring of kindergarten and *SES*.

Analyses. Sequential regressions. Model 1 included gender, SES and race/ethnicity predicting 4th grade reading achievement. Model 2 added interactions between SES and race/ethnicity. Model 3 added dummy variables for preLAS scores. We also calculated predicted values of reading achievement for combinations of race/ethnicity and SES before and after adding preLAS scores to the regression. The results show for which groups of students the preLAS most strongly predicted 4th grade reading achievement gaps.

Table 1. *preLAS vocab scores and race/ethnicity*

	<i>preLAS scores, percent by race/ethnicity</i>				
	<12	12-15	16-19	20	Total %
White	0.9	1.4	26.8	70.9	100
Black	1.3	2.8	46.5	49.4	100
Hispanic	13.2	13.9	43.5	29.4	100

Table 2. *preLAS score predicting 4th grade reading*

	Model 1 (n = 8,468)	Model 2 (n = 8,468)	Model 3 (n = 8,463)
	β	β	β
(Constant)	0.12***	0.13***	0.21***
Reading - K	0.41***	0.41***	0.37***
Male	-0.11***	-0.11***	-0.10***
SES	0.20***	0.18***	0.18***
Black	-0.30***	-0.31***	-0.28***
Hispanic	-0.11***	-0.09***	0.02
Black*SES		0.02	0.01
Hisp*SES		0.06*	-0.02
PreLAS <12			-0.57***
PreLAS 12-15			-0.60***
PreLAS 16-19			-0.22***
<i>F Statistic</i>	563.86***	406.88***	319.88***
<i>R</i> ²	.34	.34	.36

Results

- *Table 2's Model 1:* SES and race/ethnicity are strongly related to 4th grade reading. A 1 SD increase in SES predicted an increase of .20 SD in 4th grade reading. Adjusting for SES, Black and Hispanic students averaged .30 SD and .11 SD below White students in 4th grade reading.
- *Model 2:* No SES x Black interaction. The relation with SES was somewhat stronger for Hispanic than for White students.
- *Model 3:* Oral vocabulary explains about .03 SD of the .31 SD (i.e., about 9%) of the 4th grade Black-White reading achievement gap. Kindergarten oral vocabulary gaps entirely explained the Hispanic-White reading achievement gap, and the SES x Hispanic interaction was no longer significant.

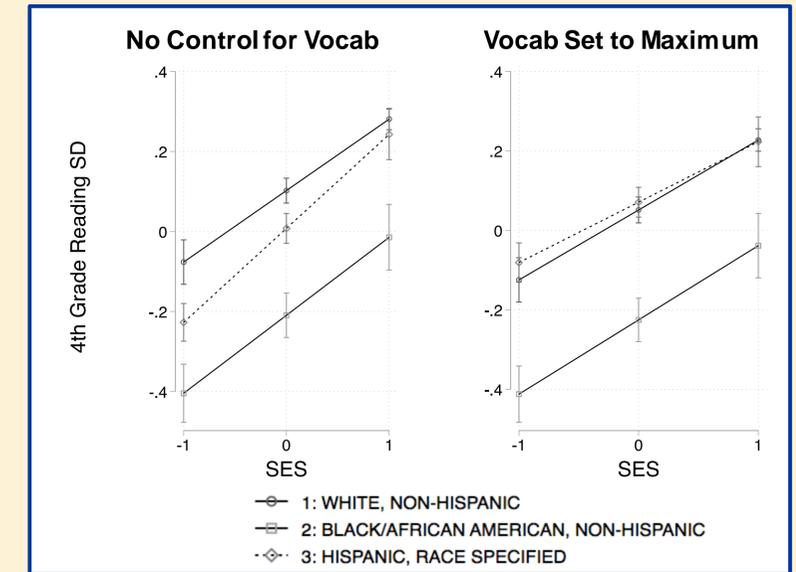


Figure 1. *4th grade reading as a function of race, SES, and vocabulary*

- *Figure 1* shows predicted scores of 4th grade reading for combinations of race/ethnicity and SES (set at -1, 0, and 1 SD) before and after controls for oral vocabulary. Control for oral vocabulary makes the largest difference for Hispanic students 1 SD below the SES mean.

Conclusions

Kindergarten oral vocabulary gaps are strongly related to 4th grade reading achievement gaps between racial and ethnic groups. Oral vocabulary gaps in kindergarten explain 10% of the Black-White reading gap in 4th grade. For low-SES Hispanic students, oral vocabulary gaps explain 65% of the Hispanic-White reading gap in 4th grade, as well as fully explain the Hispanic-White SES achievement gaps.

References

- Perfetti, C. & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading*, 18:22-37.
- Verhoeven, L., van Leeuwe, J., & Vermeer, A. (2011). Vocabulary growth and reading development across the elementary school years. *Scientific Studies of Reading*, 15:8-25.
- Dickinson, D.K., Golinkoff, R.M., & Hirsh-Pasek, K. (2010). Speaking out for language: why language is central to reading development. *Educational Researcher*, 39:305-310.
- Morgan, P.L., Farkas, G., Hillemeier, M.M., Hammer, C.S., Maczuga, S. (2015). 24-month children with larger vocabularies display greater academic and behavioral functioning at kindergarten entry. *Child Development*, 86:1351-1370.