

# The Black-White Test Score Differential

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# MOTIVATION

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- Limited evidence (Fryer/Levitt) suggests no cognitive gap between black and white infants
- Most studies find significant test score gap by age 5.
  - Suggests early childhood experiences (parenting, family) are an important source of the gap
- Fryer/Levitt find little gap on kindergarten entrance after controlling for a small number of factors
  - Suggests less of a role for parenting/family

# OBJECTIVE ONE

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Determines whether the discrepancy between Fryer/Levitt and most other studies can be attributed to differences in the tests

We study the test score differential for the children of NLSY on the:

- **The Peabody Individual Achievement Test (PIAT)** in math and reading during school years
- **The Peabody Picture Vocabulary Test-Revised (PPVT-R)**. Cognitive test when children are three and four years of age.

# DATA: Children of NLSY79

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- The National Longitudinal Survey of Youth 1979 (NLSY79) is a sample of 12,686 men and women who were 14 to 21 years of age by December 31, 1978.
- From 1986 the children of the NLSY79 female respondents (CNLSY) have been assessed every two years until they are 14 years old.
- As of 2004, a total of 11,420 children have been identified as having born to the 6,283 female respondents of the NLSY79.

# TESTS

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**The Peabody Individual Achievement Test (PIAT)** in mathematics (PIAT-M), and reading comprehension (PIAT -RC). Administered to kids above 5 years old.

- The PIAT-M measures child's attainment in mathematics as taught in mainstream education.
- The PIAT-RC measures a child's ability to derive meaning from sentences that are read silently.

**The Peabody Picture Vocabulary Test-Revised (PPVT-R)**. Measures an individual's receptive (hearing) vocabulary for Standard American English and provides, at the same time, a quick estimate of verbal ability or scholastic aptitude.

Figure 2a. Black-White PIAT-RC Gap.

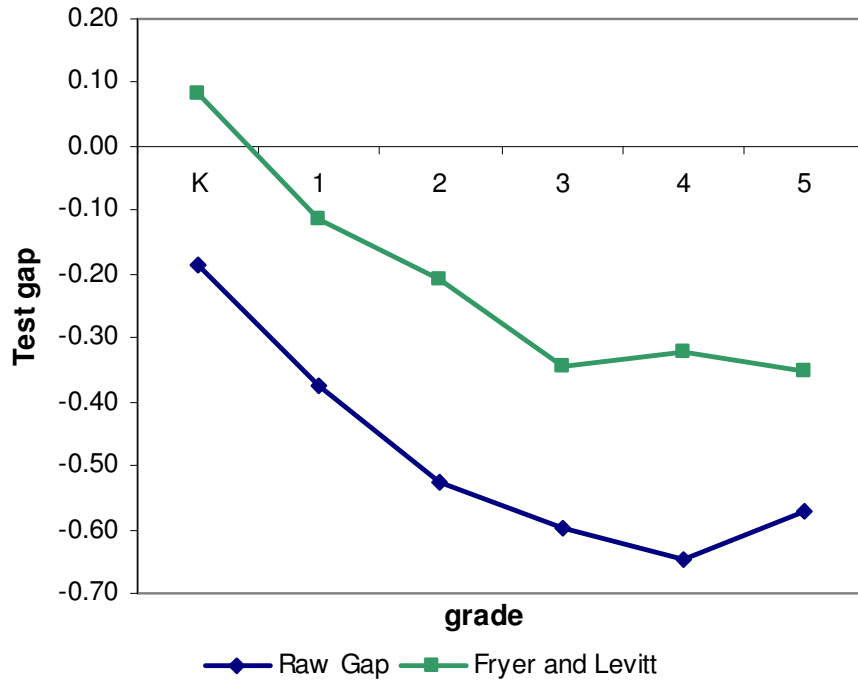
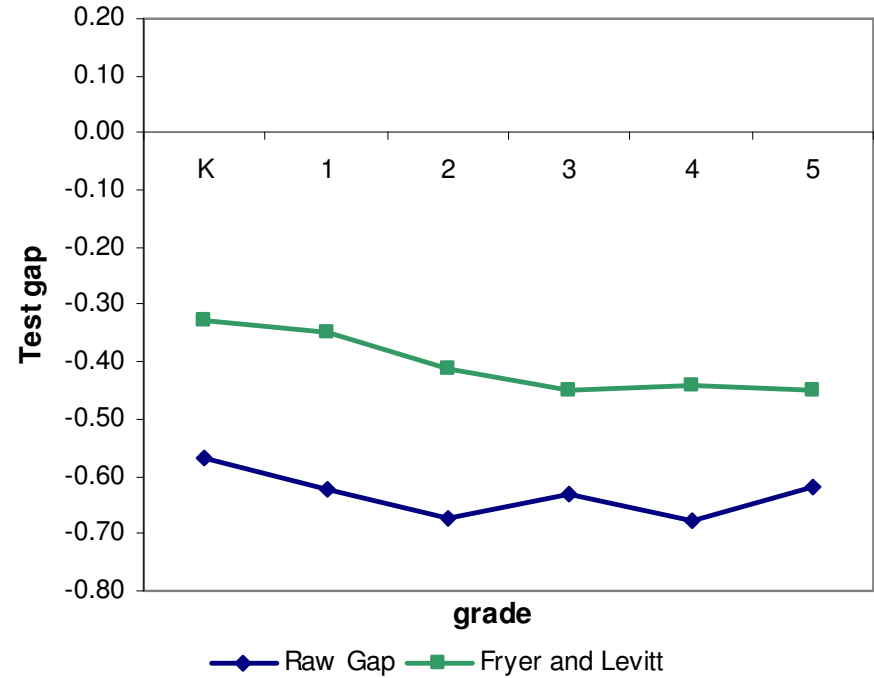


Figure 2b. Black-White PIAT-Math Gap.



**F&L Controls:** Birth weight, age of mother at first birth, number of books at home, mother's education, income, poverty status, hours worked.

**Other controls:** Sex, age, month and year of test, month of birth.

# RESULTS FOR PPVT

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- Gap of 1.13 standard deviations with no controls
- Adding Fryer/Levitt controls reduces gap to .77 standard deviations (about one-third)

## OBJECTIVE TWO: What explains the decline from K - 3?

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- Does PPVT explain increase in PIAT gap from kindergarten to third grade?
- Also consider
  - Fryer/Levitt controls
  - Mother's AFQT
  - Home environment, family structure

Figure 6a. Black-White PIAT-RC Gap.

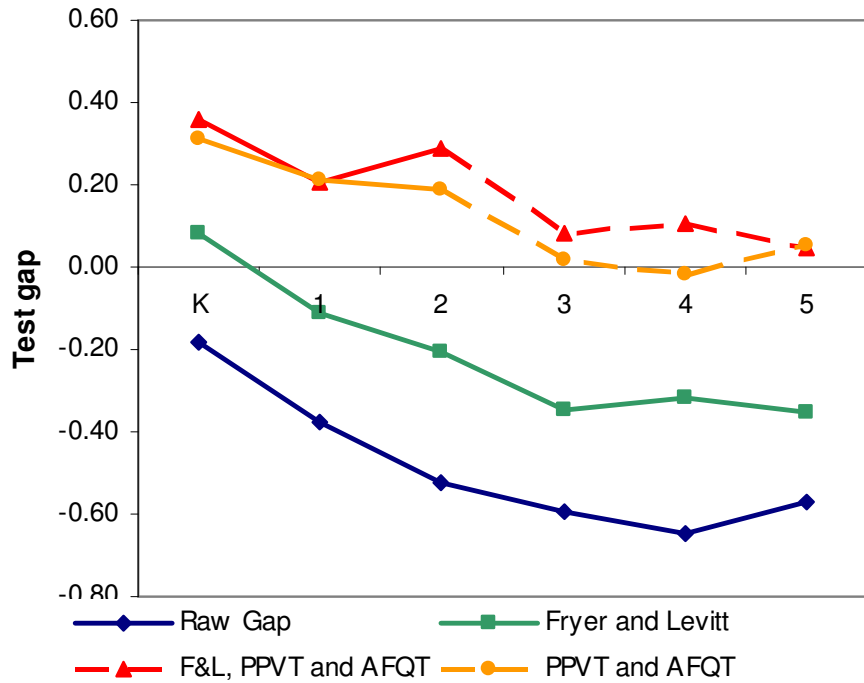
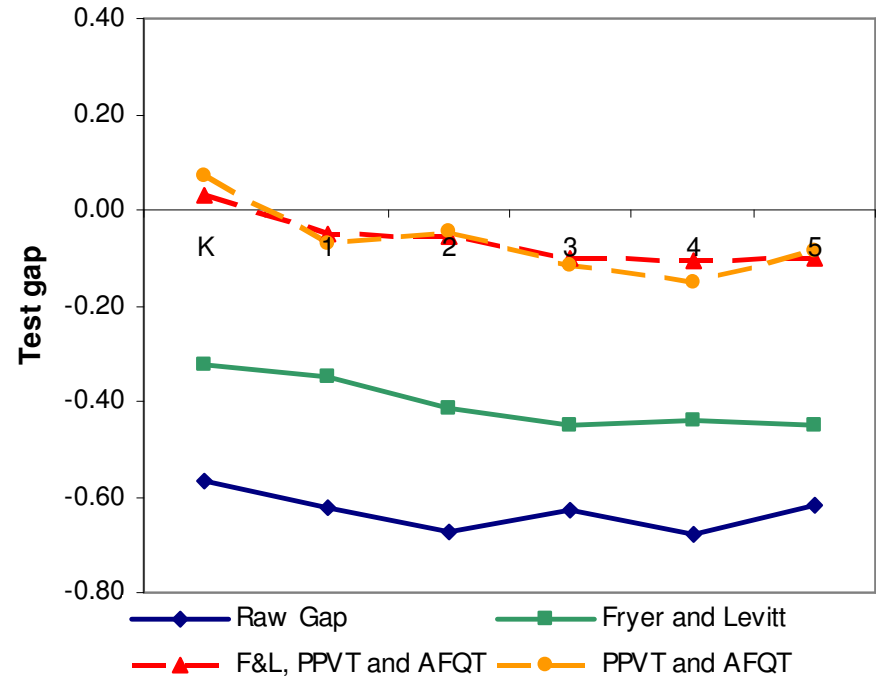


Figure 6b. Black-White PIAT-Math Gap.



**F&L Controls:** Birth weight, age of mother at first birth, number of books at home, mother's education, income, poverty status, hours worked.

**Other controls:** Sex, age, month and year of test, month of birth.

# SUMMARY

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- Conditional on controls -
  - Blacks outperform whites in early grades in reading and perform similarly to whites in later grades
  - Blacks and whites perform similarly in math
- Controls reduce decline K-3 from 42 pp to 25 pp

# Objective Three:

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- Better understand the role of mother's AFQT and other factors in influencing
  - Early PPVT
  - Widening of the test gap in reading

**Table 7a. Black-White PPVT-Gap, 3 and 4 year olds**

<b>Variable</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>	<b>VII</b>	<b>VIII</b>	<b>IX</b>
black	-1.13 (0.03)	-0.89 (0.04)	-0.73 (0.04)	-0.70 (0.04)	-0.55 (0.05)	-0.52 (0.08)	-0.54 (0.06)	-0.49 (0.07)	-0.50 (0.07)
Mother's AFQT			0.38 (0.02)	0.24 (0.02)	0.19 (0.02)	0.15 (0.04)	0.16 (0.03)	0.13 (0.03)	0.12 (0.03)
Fryer and Levitt		Yes		Yes	Yes	Yes	Yes	Yes	Yes
Books and Parents interaction					Yes	Yes	Yes	Yes	Yes
Books and Parents interaction at 0-2						Yes			
Home environment							Yes	Yes	Yes
Pregnancy and early life history								Yes	Yes
Family Structure									Yes
<b>N</b>	4764	3840	4578	3710	2954	1520	2342	1926	1898

**F&L Controls:** Birth weight, number of books at home mother's education, income, poverty status, hours worked, age of mother at first birth  
**Parents interaction :** Sees father daily, how often eats w/parents, how often mother spanked child in last week, how often was child taken to a museum last week  
**Pregnancy History:** for mother: when stopped working during preg, when did return to work, during pregnancy: smoked, drink, had more vitamins, salt, or proteins, diuretic exam, preg length, weight change, cesarean. For child: birth length, ill 1<sup>st</sup> year, breastfed, regular care.  
**Family Structure:** number of children and adults in the household and whether the mother lives with a spouse  
**Other controls:** Sex, age, month interviewed, year.

# CONCLUSION

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- We find a large unexplained gap early as measured by the PPVT but not the PIAT.
- Conditional on early PPVT and mother's AFQT, blacks outperform whites in reading through second grade, and there is no gap in either reading or math through fifth grade

# CONCLUSION

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- We can explain about half of the black-white test score gap on the PPVT at age three or four
- The estimated effect of mother's AFQT on PPVT falls dramatically as we add environmental factors. This suggests that the way skill (as measured by the PPVT) is transmitted across generations is through its effect on parenting and other elements of the home environment.