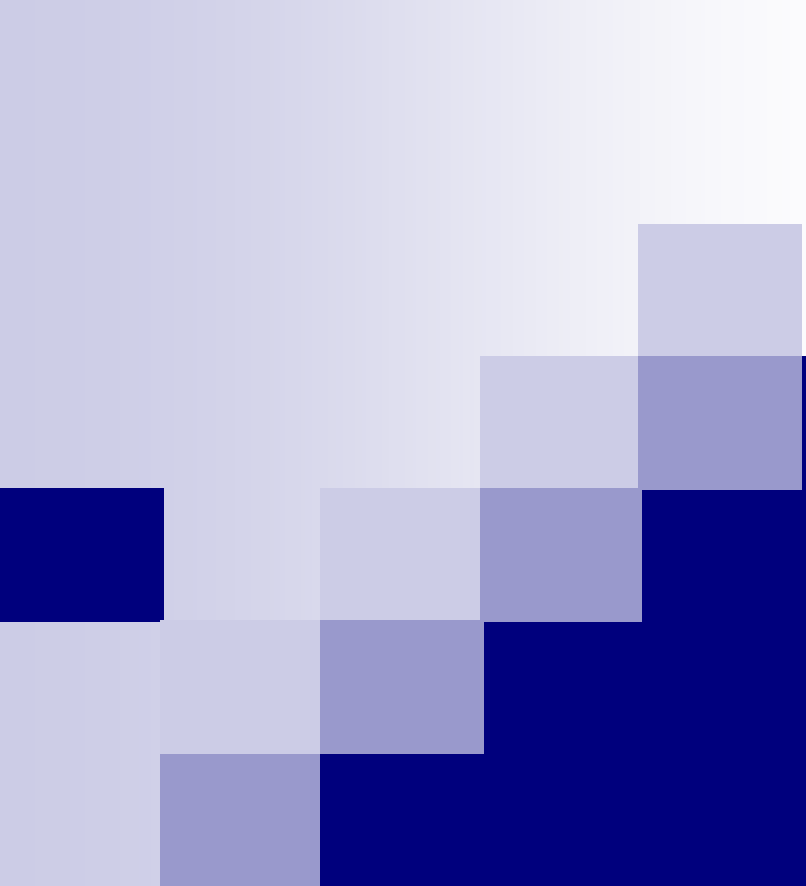




Test Score Gaps and Time Use

By Valerie A. Ramey

Hoover Economic Policy Working Group, Nov. 5, 2025

I am grateful to Megan Liu and Sophia Qin for their outstanding research assistance.

Original motivations for this long gestation paper

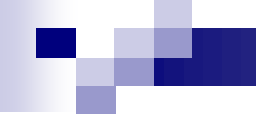
- Personal interest in improving my local public schools led me to analyze CA test scores
- Ramey and Ramey: “The Rug Rat Race” (2010)

Documented the significant increase in time spent in childcare in the U.S. and explored possible explanations.

- My informal observations at the University of California – why did so many student last names start with “Ch”?

In 2010, **Asian Americans** were approximately **12% of high school graduates** but **34%** of admits to the University of California. I wondered whether time use was important and did some simple histograms.

- This led to my initial work on time use by race/ethnic group.
 - Ramey (2011) “Is there a Tiger Mother Effect? Time Use Across Ethnic Groups”
 - Ramey-Shao (2015) “Time Use and Educational Outcomes Across Ethnic Groups” – used ATUS and ELS 2002.



Question: Can time use explain why Asian Americans have higher average educational achievement?

- The distribution of Asian American **test scores** is significantly higher than for other groups, even within schools.
- Many point to “**culture**,” but culture itself is not a direct input into an educational production function.
- What production function inputs are affected by Asian culture? I argue that **time use** is key.



Outline

1. Test score gaps across broad ethnic/racial groups
2. Education production function
3. Time use differences across groups
4. Challenge: causality and quantification



1. Test Score Gaps in California

Standardized Test Scores in California Public Schools

- 28% of all Asian Americans live in California → largest sample of Asian students in any U.S. educational data set.
- In 2025, California public schools administered state-wide standardized tests to 2.9 million students across grades 3 – 8 and grade 11. Of these, 309,000 were Asian American.
- The California public schools standardized tests are highly publicized high stakes tests. Moreover, they are comprehensive, requiring more than three hours for each of the English Language Arts and Math tests.

Details of 2025 Data: CAASPP

- Individual student data is not available, but **test score averages** by school, grade, ethnic group and socioeconomic class are available .
- 10,222 schools, each with multiple grades.
- **Ethnic groups**
 - White
 - Black or African American
 - Hispanic or Latino
 - American Indian
 - Asian
 - Filipino
 - Native Hawaiian or Pacific Islander
 - Two or more Races

Regressions used for Descriptive Statistics

$$M_{sgj} = \sum_{j=1}^J \beta_j D_{sgj} + \theta \vec{X}_{sgj} + \varepsilon_{sgj}$$

- M mean scale score for a particular subject test (e.g. math or English language arts) in school s , for grade g , and for ethnic/racial group j .
- D s are indicator variables for ethnic/racial groups. Whites are the omitted group.
- The $\vec{X}_{sgj}$ denotes a vector of control variables.
- Weighted regression, weights equal to the number of students with scores in each school-grade-ethnic group-socioeconomic group cell, clustered standard errors by school x grade interaction.

Mean Scale Math Scores Relative to Whites

	(1)	(2)	(3)
Asian	64.10	47.20	53.19
	(1.218)	(1.138)	(1.128)
Black	-101.7	-68.23	-59.44
	(1.037)	(1.011)	(1.005)
Hispanic	-72.80	-46.62	-37.66
	(0.595)	(0.651)	(0.590)
Economically disadvantaged			-45.08
			(0.476)
Fixed effects	Grade	Grade x school	Grade x school

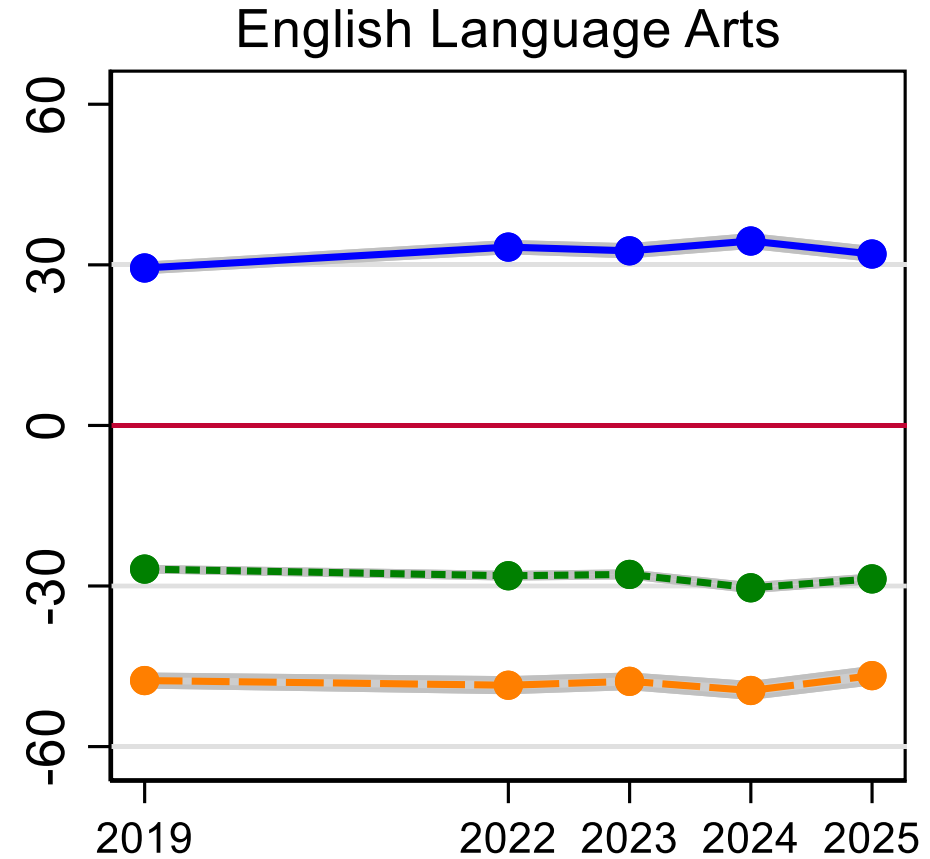
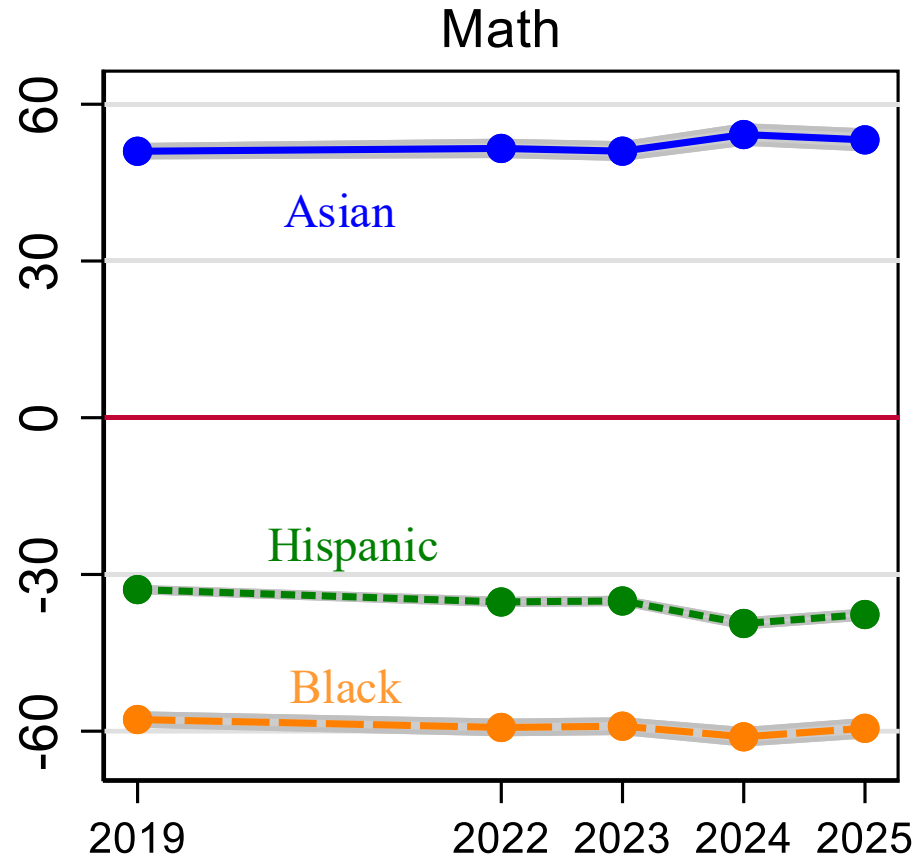
Mean test scores $\approx$ 2500, standard deviation $\approx$ 125, standard errors in parenthesis.

Mean Scale English Language Scores Relative to Whites

	(1)	(2)	(3)
Asian	40.08	27.41	32.03
	(0.824)	(0.799)	(0.751)
Black	-85.79	-55.45	-46.75
	(0.966)	(0.933)	(0.930)
Hispanic	-62.48	-38.01	-28.67
	(0.517)	(0.568)	(0.511)
Economically disadvantaged			-42.61
			(0.407)
Fixed effects	Grade	Grade x school	Grade x school

Mean test scores $\approx$ 2500, standard deviation $\approx$ 125, standard errors in parenthesis.

Test Score Gaps Pre- and Post-COVID



Gap relative to White students, controlling for school-grade FE and SES
Data: California CAASPP 2019, 2022-2025



Test Score Gaps by Asian Subgroups

- The data reported for more recent tests do not distinguish within the Asian American category.
- However, the data from 2012 and earlier, which had similar test score gaps, did distinguish.
- I will show you some of the test score gaps by subgroup.

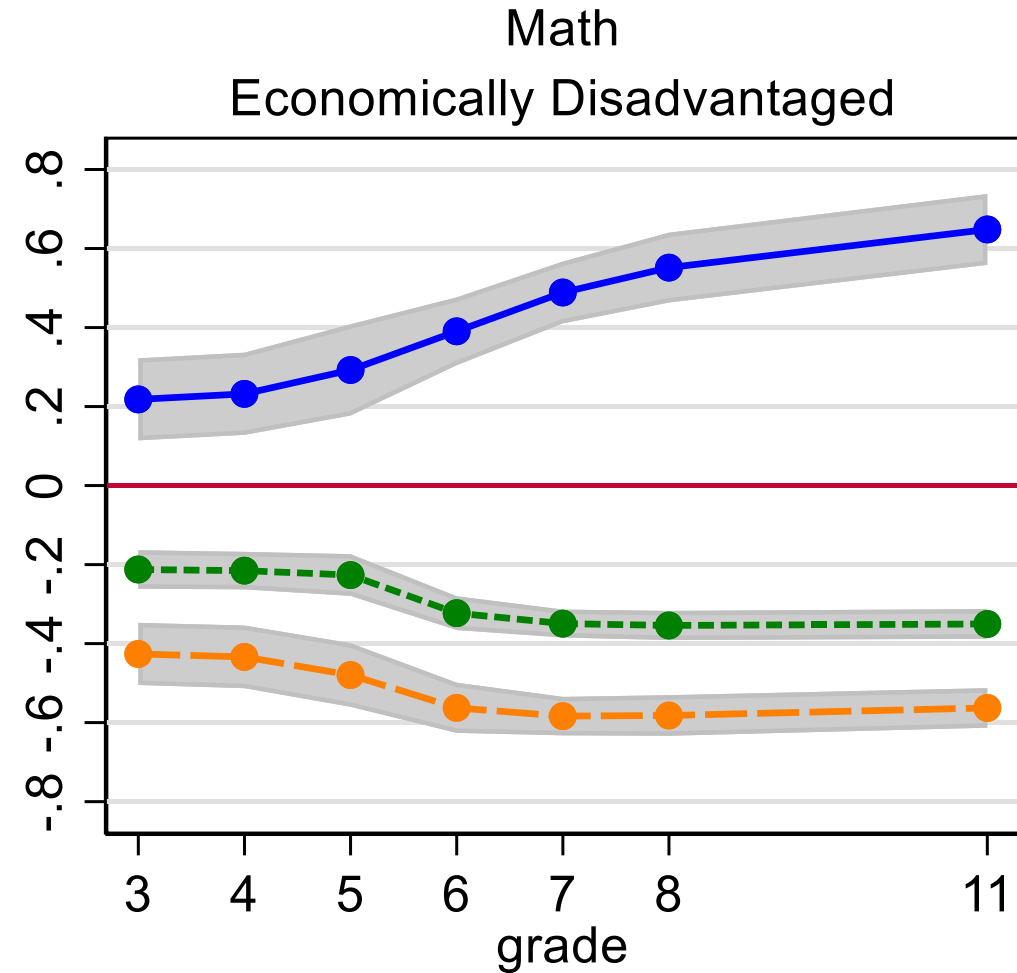
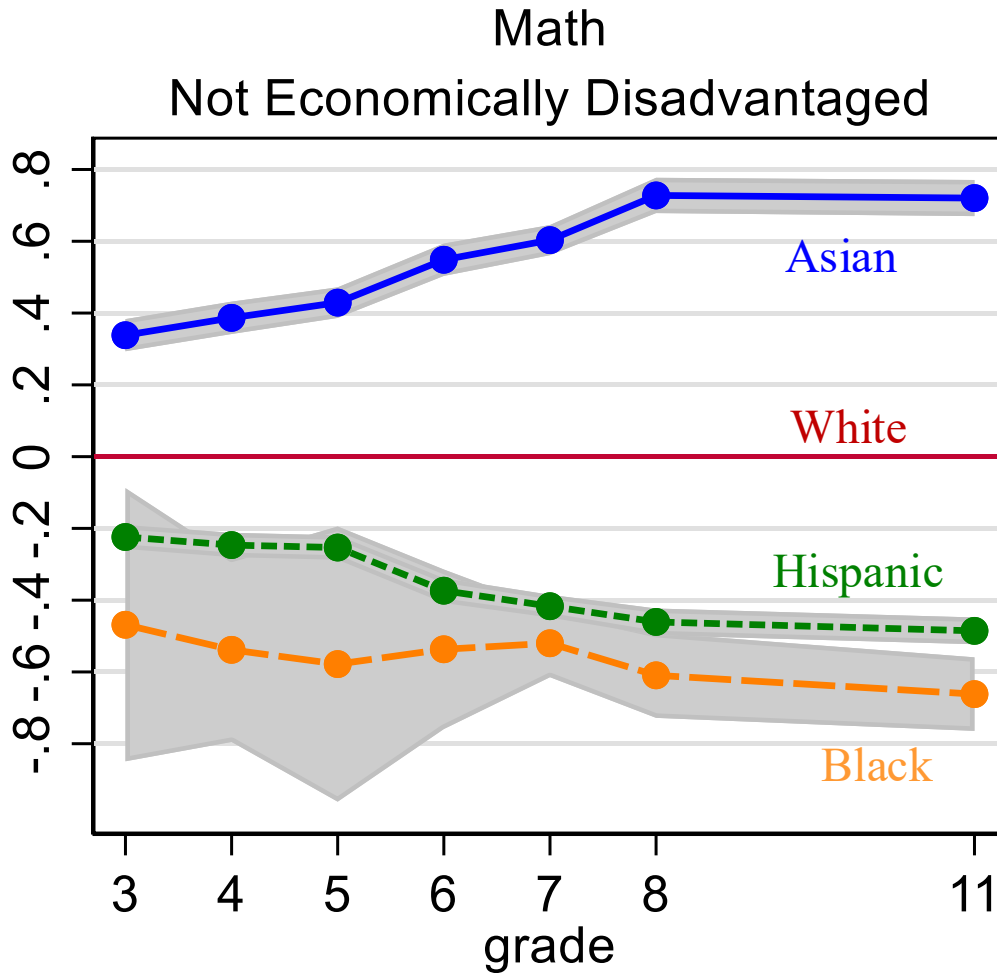
Standardized Test Scores in California, 2012

Mean Scale Scores Relative to Whites: Detailed Categories

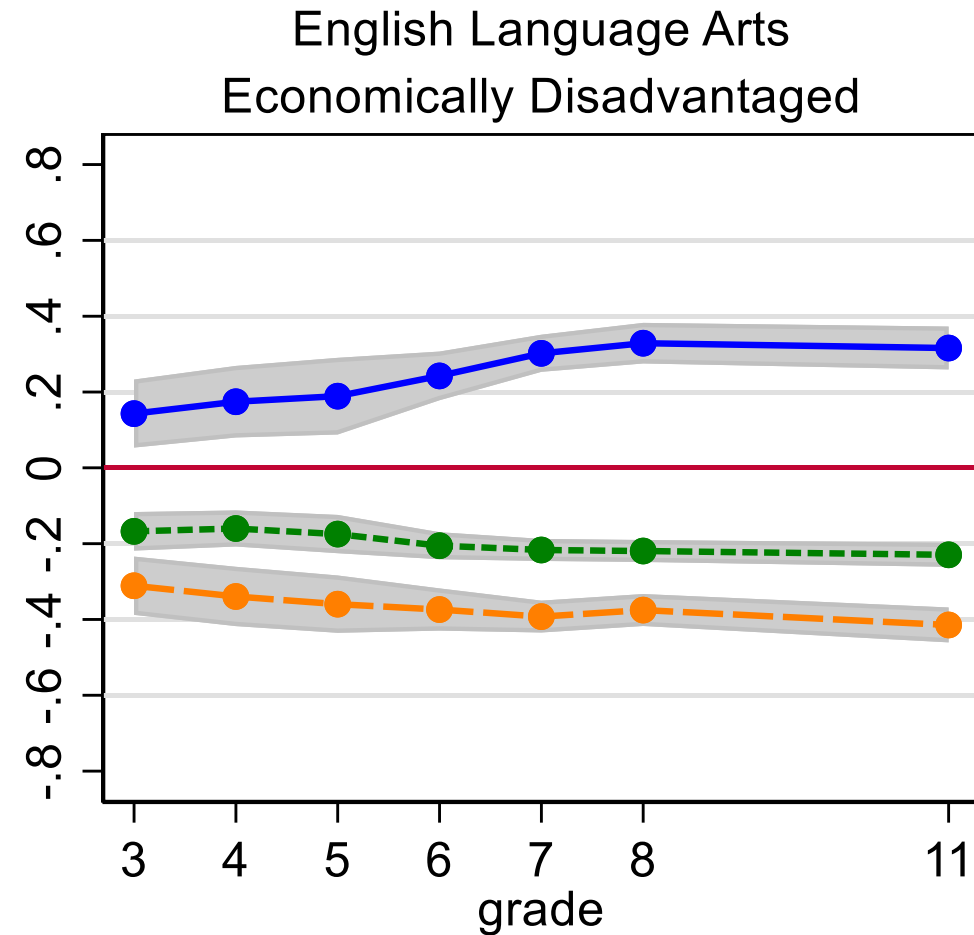
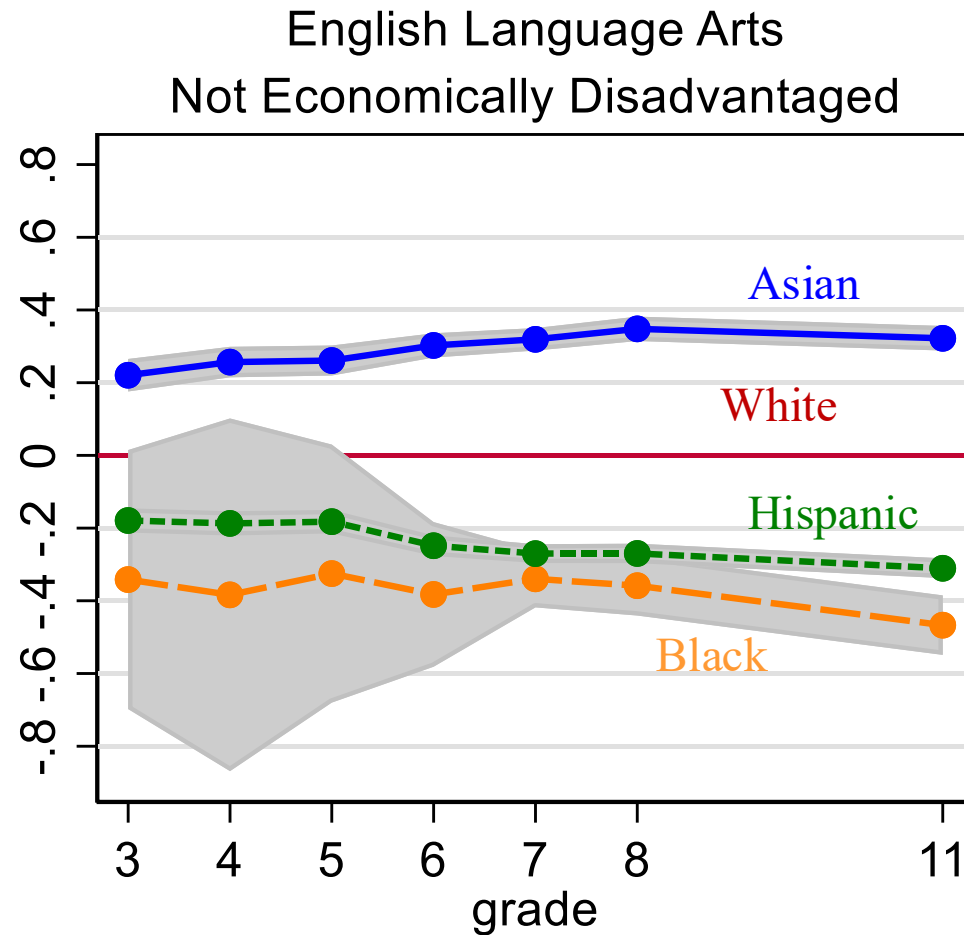
	Math	English Language Arts			Math	English Language Arts
Chinese	60.64 (0.89)	22.57 (0.71)		Other Asian	26.72 (1.64)	7.101 (1.27)
Korean	50.7 (1.06)	14.33 (0.92)		Filipino	6.59 (0.58)	2.24 (0.44)
Asian Indian	44.41 (1.70)	17.18 (0.92)		Laotian	-2.06 (2.30)	-10.17 (3.51)
Vietnamese	40.19 (0.92)	12.42 (0.76)		Hmong	-6.51 (1.40)	-22.27 (1.43)
Japanese	33.79 (2.11)	-2.010 (2.34)		Cambodian	-12.50 (2.21)	-15.49 (2.14)

Math Test Score Gaps Grow with Each Grade

(Relative to Whites, fraction of 3rd grade SD)



ELA Test Score Gaps Grow a Little with Each Grade (Relative to Whites, fraction of 3rd grade SD)



Summary of California Test Results

- There are significant differences in test scores across ethnic groups.
- When I control for school and SES, the Black and Hispanic test score gaps fall by 40 - 50%, but the Asian American test score gaps fall by only 20 - 25%.
- The gaps grow with each grade.



Why is Average Asian American Achievement So High?

2. Understanding the achievement gap through an education production function and endogenous choices

$$K_{ig} = G(K_{i,g-1}, S_{ig}, A_{ig}, H_{ig}^c, H_{ig}^{hw}, F_{ig}, \varepsilon_{ig})$$

where

K_{ig} = knowledge of student i at the end of grade g .

$G(\cdot)$ = production function for knowledge.

S_{ig} = an index of the quality-adjusted school inputs

A_{ig} = student's innate cognitive ability (e.g. speed of learning)

H_{ig}^c = student's hours devoted to class attendance

H_{ig}^{hw} = student's hours devoted to studying and homework

F_{ig} = family inputs, such as parental time spent on education

ε_{ig} = idiosyncratic student-grade shock

Assumptions and Comments

- I lump all **school inputs** (class size, teacher quality, classroom effects of peers) into a single index S since I am focused on non-school inputs.
- **Culture** is not a direct input into the educational production function.
 - It can affect achievement only through its effect on direct inputs.
- I submit that the key non-school input is **student hours** devoted to class time and studying.

Assumptions and Comments (cont.)

- School inputs S , cognitive ability A , and family inputs F can affect the **productivity of student study hours**.
- Observed time spent on studying is an **endogenous outcome** depending on S , A , and F .
- Relevant paper: Cotton, Hickman, List, & Price (forthcoming JPE) :

“Why Don’t Struggling Students Do their Homework? Disentangling Motivation and Study Productivity as Drivers of Human Capital Formation.”
- At this point, I can only show a correlation, not a causal relationship.

Measuring student hours inputs

American Time Use Survey (ATUS) from the BLS.

- Nationally representative sample, based on time diaries, subsample of the Current Population Survey (CPS).
- This survey covers individuals ages 15 and up.
- I combine 2003-19, 2022-2024 in order to obtain enough observations for each group. I study high schools students, ages ≤ 18 .

observations

White	5,308		Hispanic	1,606
Black	935		Asian	352



Definitions of Key Activities

Class – taking class for degree, certification, license, or test prep.

Studying – research or homework for class for degree, other research not related to personal interest class.

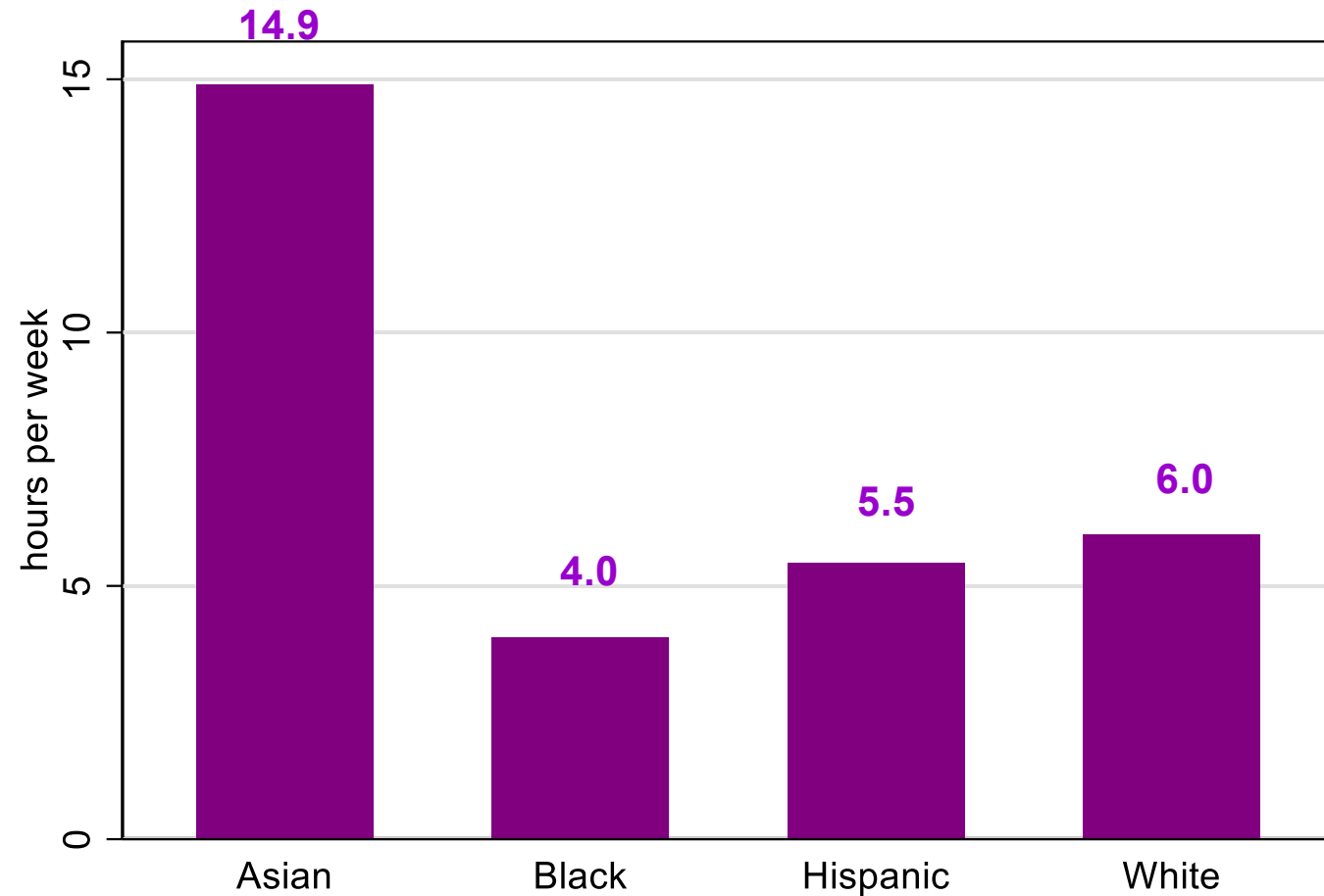
Chores – household chores, care for household members, shopping for groceries or gas.

Work – work for pay, associated travel.

Leisure – socializing, sports, TV/computer, etc.

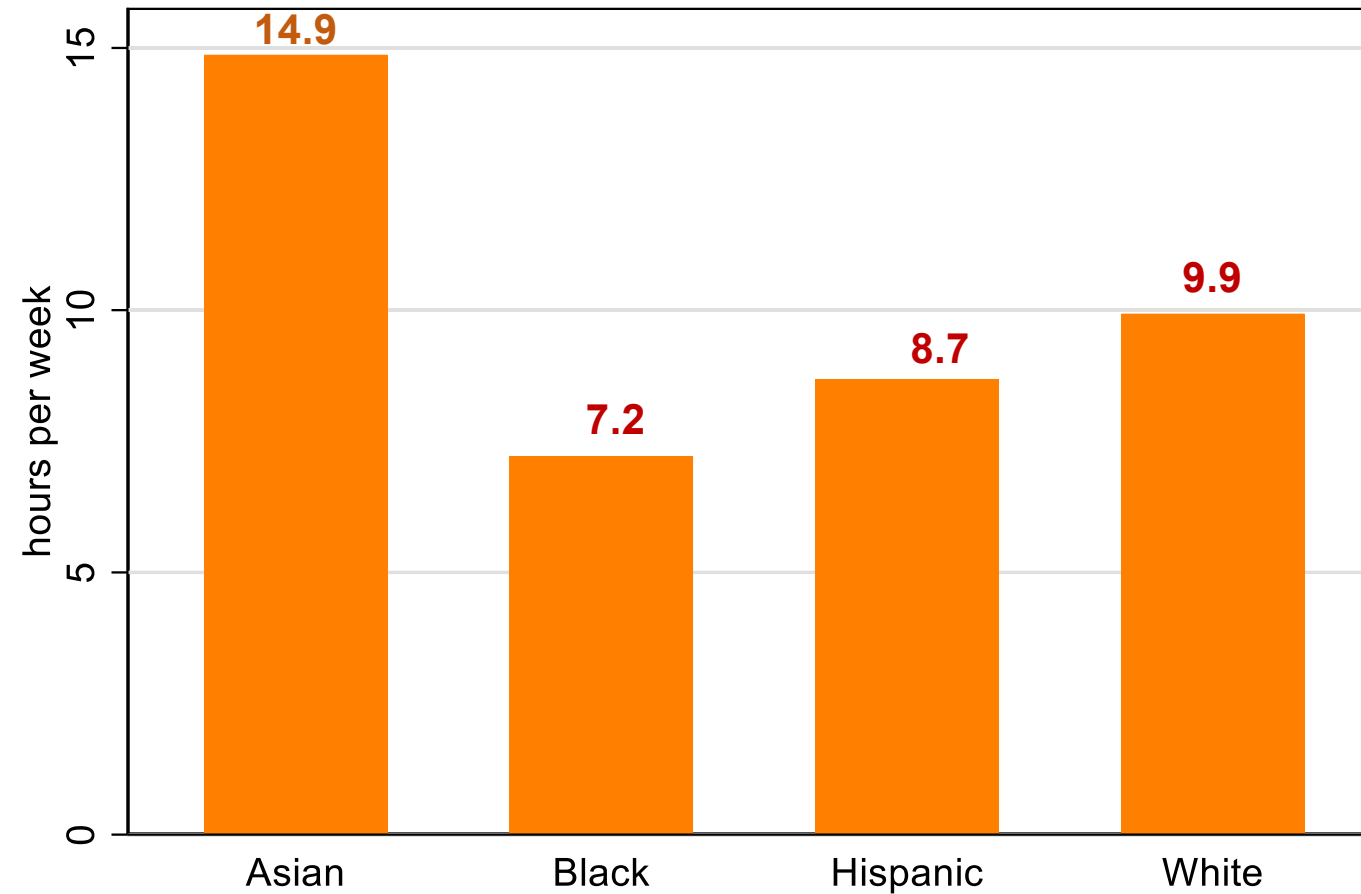
Sleep, extracurricular, volunteering, religious activities

Weekly Hours Spent Studying by High School Students



Data from the ATUS: 2003 – 2019, 2022-2024. The sample consists of 15-18 year olds enrolled in high school.

Weekly Hours Spent Studying by College Students



Data from the ATUS: 2003 – 2019, 2022-2024. The sample consists of full-time college students.

How high school students spend their time

(hours per week; red=max across groups, green=min across groups)

	White	Asian	Black	Hispanic
Class	23.0	25.3	23.4	24.1
Study	6.01	14.9	3.99	5.45
Work	5.09	1.71	3.66	2.57
Chores	5.61	4.92	4.71	6.40
Sleep	64.8	64.4	68.2	67.3
Socialize	8.21	5.89	6.89	7.57
TV/Computer	20.3	18.6	23.4	20.6
Read/Write	1.11	1.13	0.60	0.44
Sports	5.87	3.43	5.50	5.34
Extracurricular	0.58	0.39	0.25	0.41
Volunteer	1.40	1.73	0.77	1.00
Religious	0.87	0.71	1.03	0.89

How much of the 9-hour study gap is explained by family background?

The following shows results of a regression that also controls for parents' education, income, and whether foreign-born.

Study hours gaps with family controls

Asian	6.85***	Mom grad degree	1.26*
	(1.25)		(0.60)
Black	-1.19**	Dad grad degree	1.62**
	(0.43)		(0.55)
Hispanic	-0.24	Foreign parent	1.28*
	(0.51)		(0.52)
Male	-1.59***	Foreign-born	2.15**
	(0.30)		(0.72)
Mom college only	1.08*	Ln(family income)	0.87***
	(0.44)		(0.17)
Dad college only	2.11***	# of observations	7,666
	(0.55)		

** indicates statistically significant at 5% level; * 10% level.

Summary of study time results

- On average, Asian American high school students study:
 - 9 more hours per week than White and Hispanic students.
 - 11 more hours than Black students.
- Only 23% of the Asian-White gap can be explained by parental education, income, and foreign-born status.

How Important are Parental Time Inputs Across Groups?

- To answer this question, I use the same American Time Use Survey to measure how parents spend their time.
- I study only parents with children under the age of 18 years old.
- The time spent with children is for all ages of children up to 18 years.

Parent Time Use by Ethnicity, hours per week

	White	Asian	Black	Hispanic
Mothers				
Primary childcare	14.6	15.4*	10.9**	13.0**
Educational childcare	1.5	2.2**	1.2**	1.2**
Secondary childcare	33.4	35.0**	30.5**	39.7**
Time with child	43.6	43.1	35.6**	48.0**
Fathers				
Primary childcare	7.8	8.5**	5.8**	5.9**
Educational childcare	0.7	1.1**	0.7	0.5**
Secondary childcare	23.8	25.7**	21.9**	24.8*
Time with child	29.9	31.8**	23.7**	31.3**

red=max across groups, green=min across groups

** indicates statistically different from Whites at 5% level; *, 10% level.

Parent Time Use, Asian gaps relative to Whites

	No controls	Controls for #, age of children, educ, foreign
	Mothers	
Primary childcare	0.8*	-0.5
Educational childcare	0.6**	0.3*
Secondary childcare	1.7**	-0.8
Time with child	-0.5	-3.2**
	Fathers	
Primary childcare	0.8**	0.3
Educational childcare	0.4**	0.3**
Secondary childcare	1.8**	2.0**
Time with child	1.8**	0.7

** indicates statistically different from Whites at 5% level; *, 10% level.

Bottom Line

- Asian parents each spend roughly **an extra half hour** a week on educational activities with their children.
 - This is a small amount so the productivity enhancements to student study are likely small.

- Ramey (2011):

“Thus, these Tiger Mothers seem to be able to make their children spend much more time studying without having to spend more of their own time. Perhaps this is what Chua’s “Chinese discipline” is all about.”



4. Causality and Quantification:

Does the extra time spent studying cause the higher test scores?

- Summary of some existing evidence from the literature on causal effects of studying.
- Possibility of estimating effects with data from a recent RCT

Evidence on Returns to Doing Homework

- Betts (1997)
 - Uses LSAY
 - Finds that an extra $\frac{1}{2}$ hour of math homework assigned per night ($3\frac{1}{2}$ hours per week) boosts math achievement by almost 2 grade equivalents.
- McMullin (2011)
 - Use NELS 88, regressions with student fixed effects.
 - Uses homework assigned as instrument for student reported homework hours.
 - Finds 1 extra hour of math homework per week raises test scores by 0.18 standard deviations at the mean.

Evidence on Returns to Doing Homework (cont.)

- Stinebrickner and Stinebrickner (2004)
 - Conduct own time use study at Berea College
 - Find that an extra one hour of studying per day is associated with increase in GPA of 0.4.
- Stinebrickner and Stinebrickner (2008)
 - Use random assignment of roommates in college
 - Being assigned to a roommate who brings an X-Box from home reduces study time by 45 minutes per day and reduces GPA by 0.25.

Potential RCT Evidence

Cotton, Hickman, List, and Price (forthcoming JPE) : “Why Don’t Struggling Students Do their Homework? Disentangling Motivation and Study Productivity as Drivers of Human Capital Formation.”

- RCT on 5th and 6th graders, **monetary awards** for successful completion of math problems, several treatments, pre- and post standardized math assessments.
- The RCT data is ideal for my purposes because it shows the effect of **varying the rewards** on (i) successful completion of homework and (ii) achievement.

It is likely that culture has its effect through the students’ perception of rewards.



Conclusions

- Test score gap between Asian Americans and other groups is large, even after controlling for school and grade.
- Time use evidence suggests that Asian American high school students spend much more time studying.
- Asian parents spend a little more time in educational activities, but the difference is small.
- Auxiliary evidence suggests a causal link between time use and test scores, but I need to do more work to quantify the effect.