

The Experimental Selection Correction Estimator

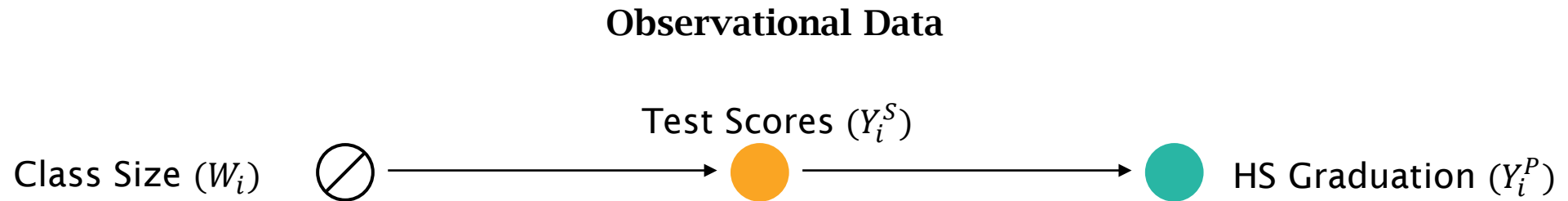
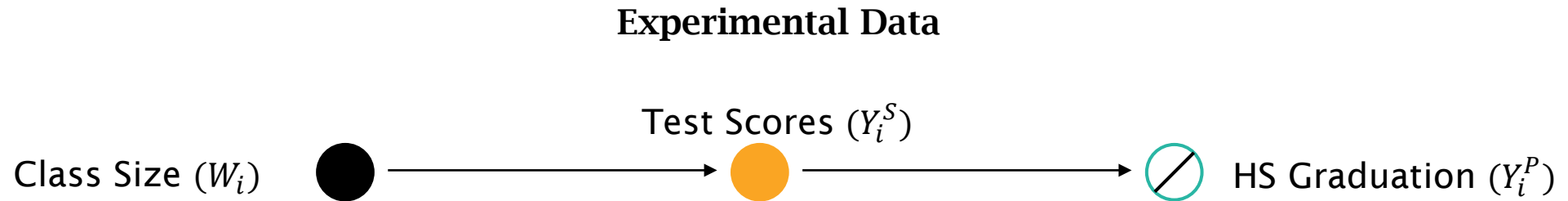
Using Experiments to Remove Biases in Observational Estimates

Susan Athey, Stanford and NBER
Raj Chetty, Harvard, Opportunity Insights, and NBER
Guido Imbens, Stanford and NBER

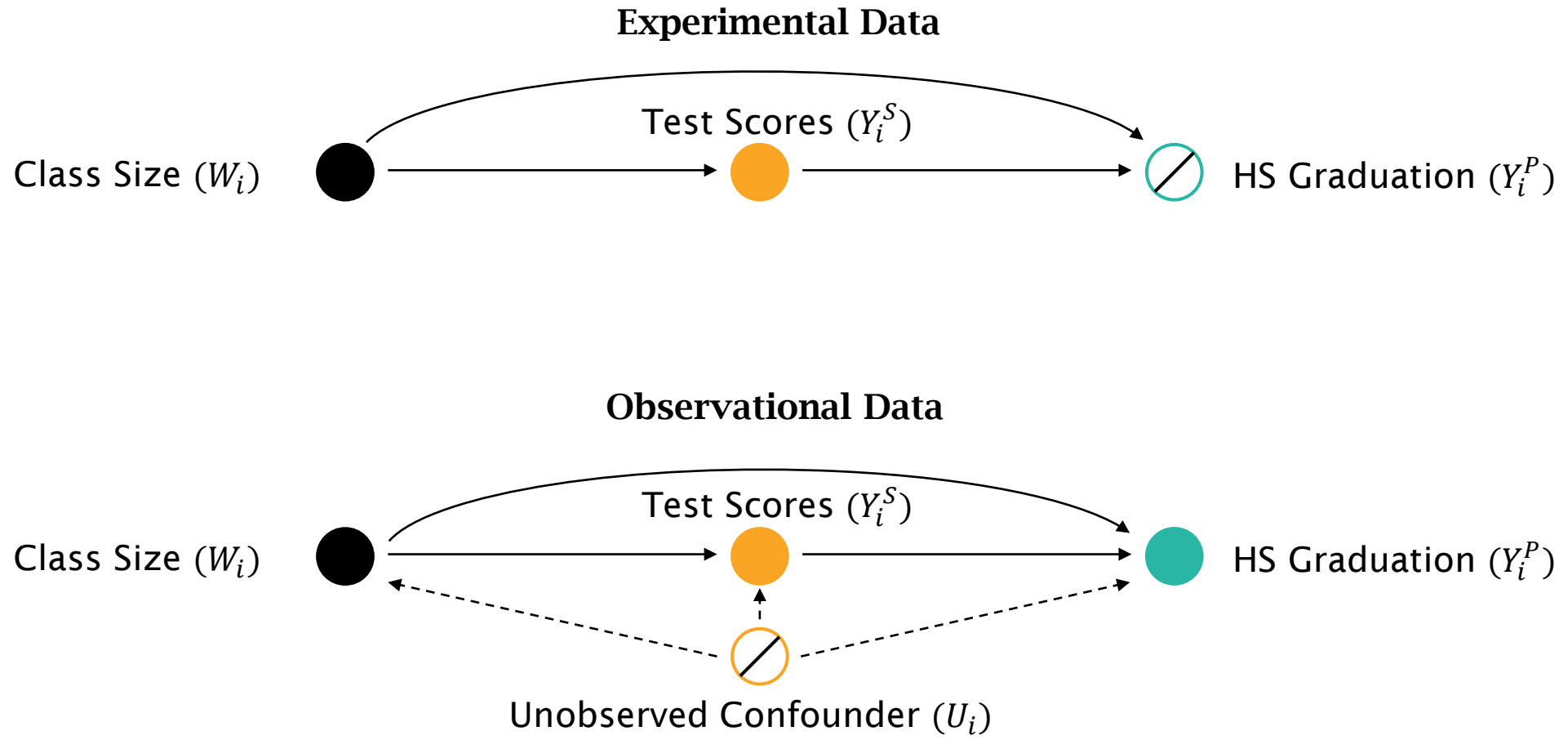
May 2025

We thank Kevin Chen and Yechan Park for excellent research assistance. We are grateful for comments from Gary Chamberlain, Nathan Kallus, Xiaojie Mao, David Ritzwoller, Jonah Rockoff, Dylan Small, and numerous seminar participants. This research was funded through the Chan-Zuckerberg Initiative, Sloan Foundation, Schmidt Futures, ONR grant N00014-17-1-2131 and N00014-19-1-2468, Harvard University, and a gift from Amazon.

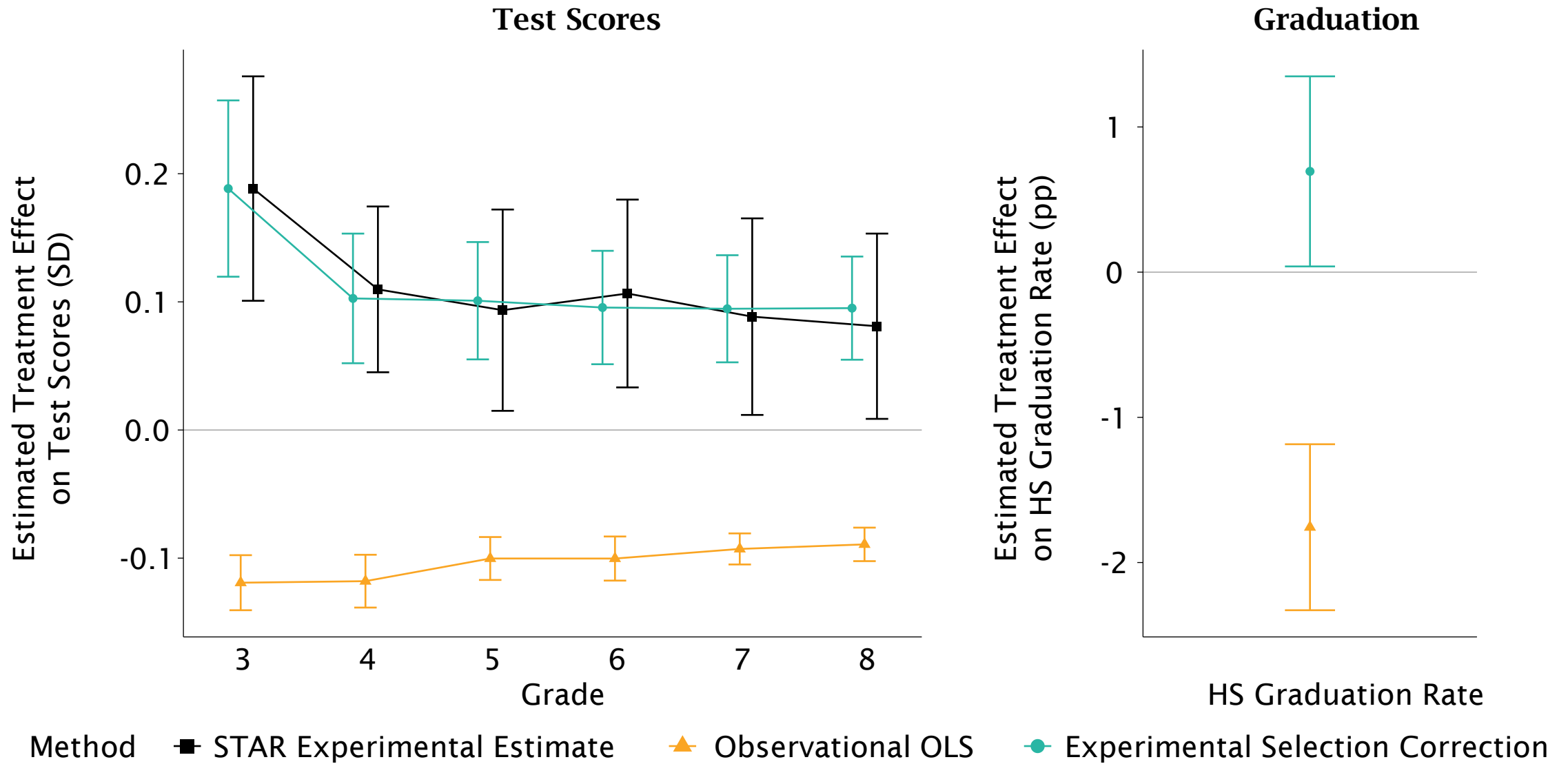
Surrogate Model



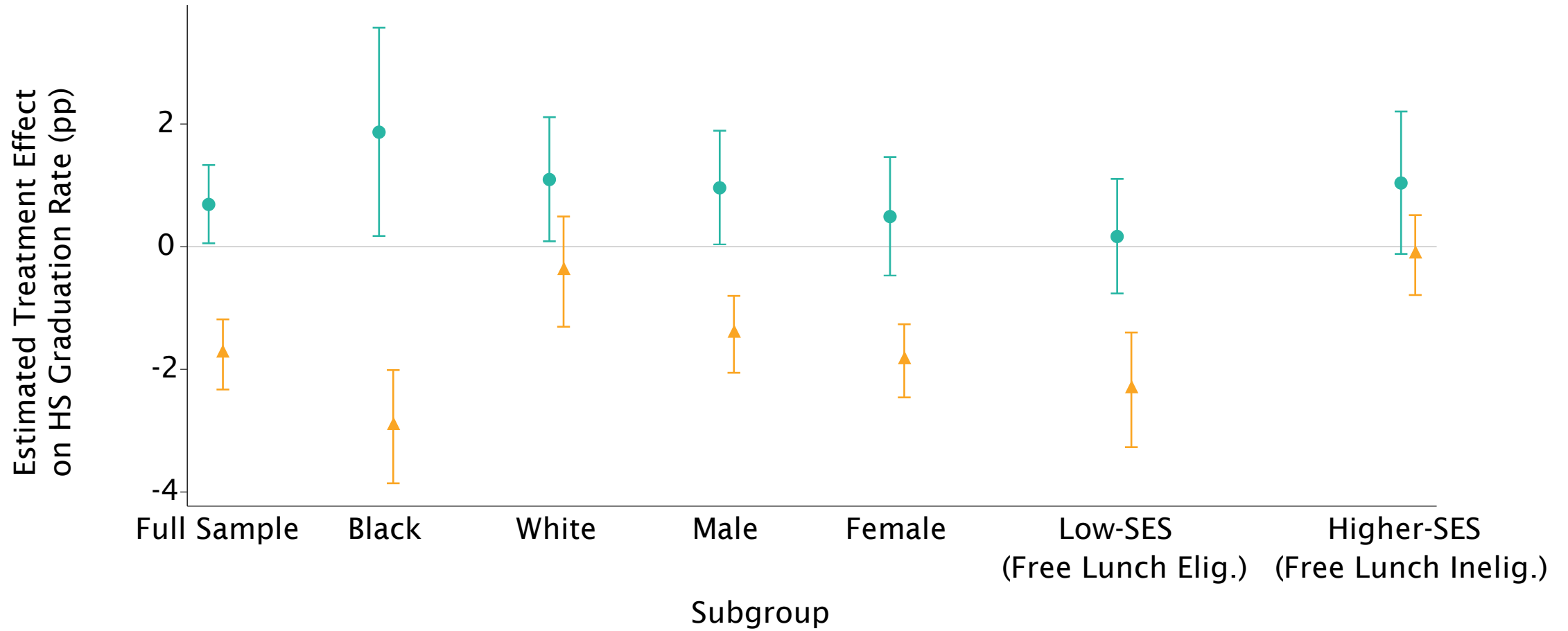
Experimental Selection Correction Model



Treatment Effects of Assignment to Small Class in 3rd Grade



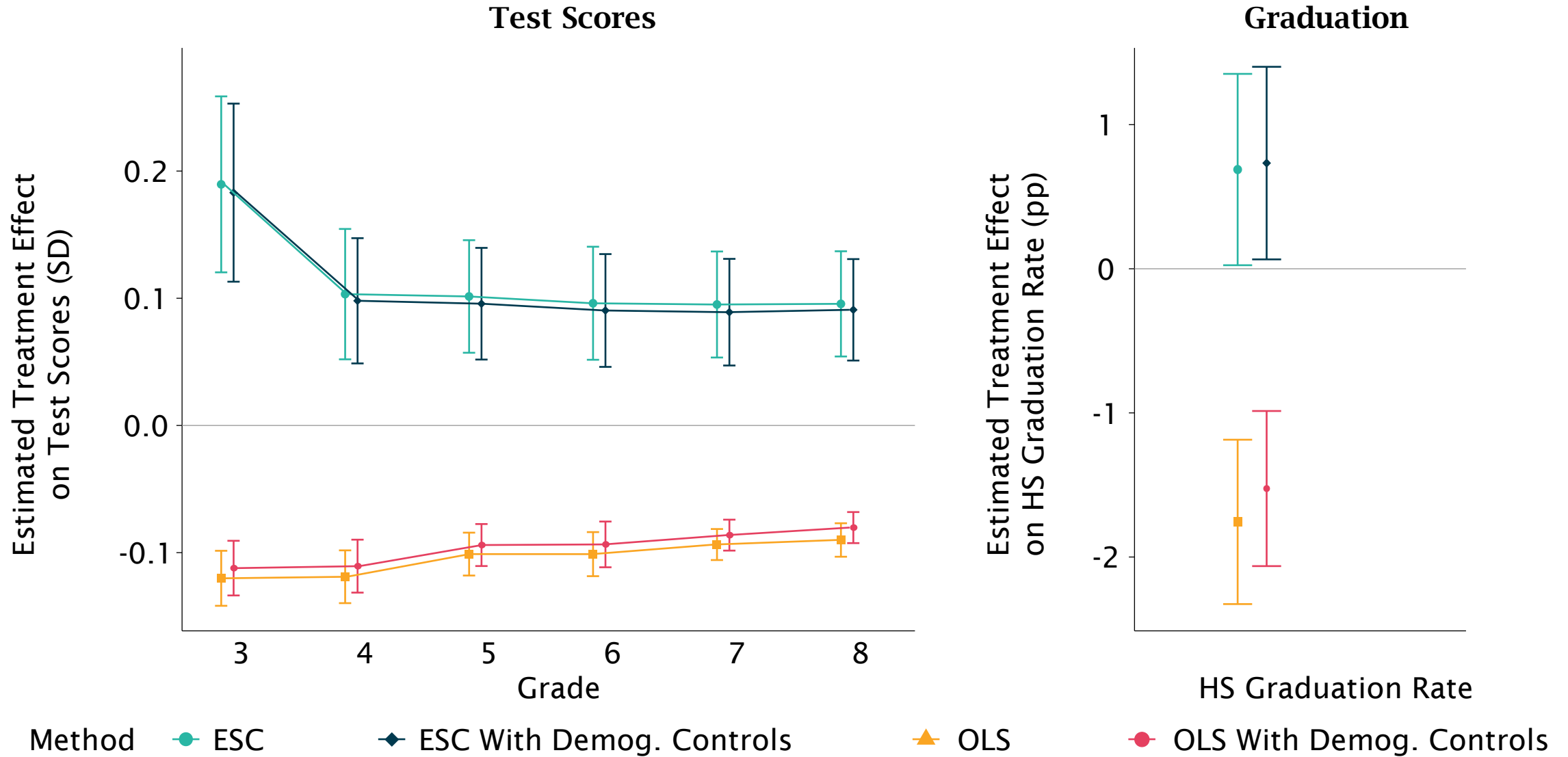
Heterogeneity of Treatment Effect Estimates on HS Graduation



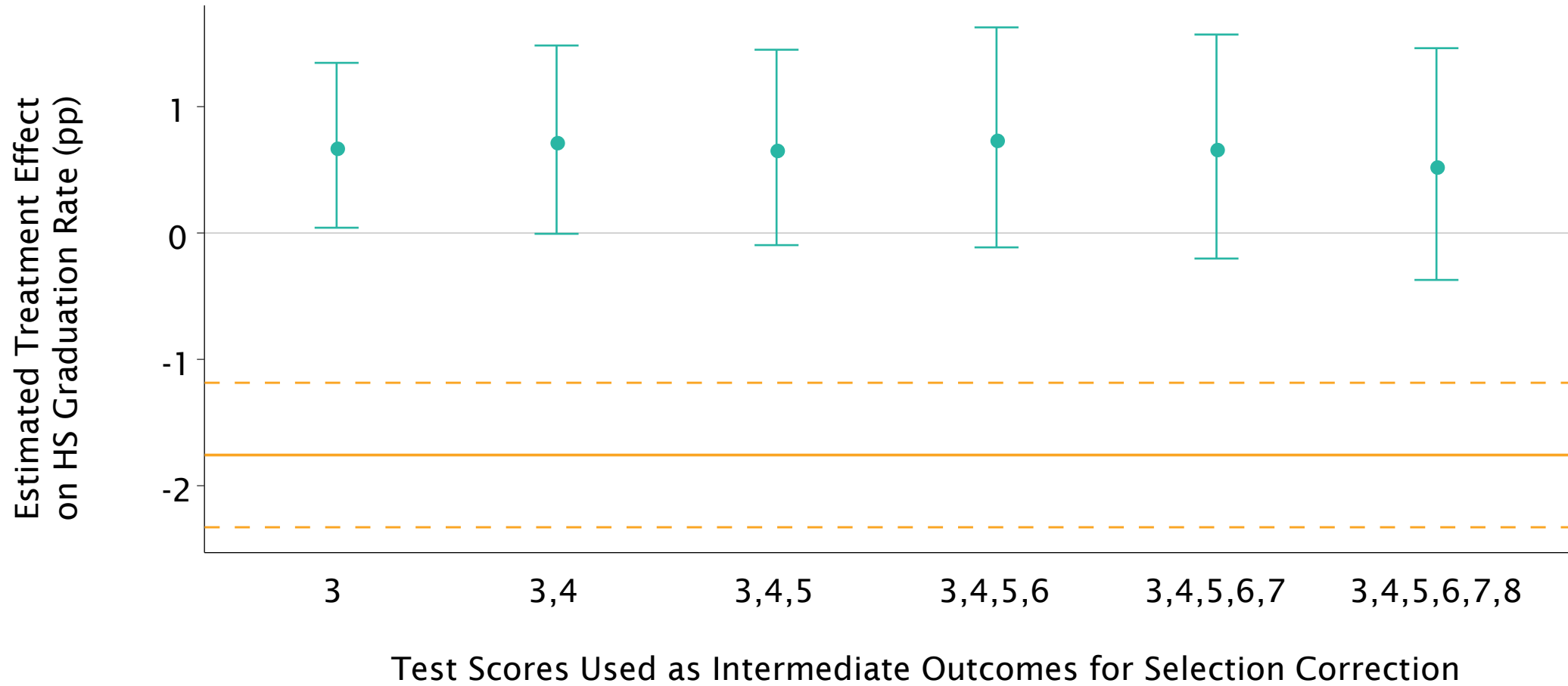
Method ● Experimental Selection Correction ▲ Observational OLS



Effect of Controlling for Observables on Treatment Effect Estimates



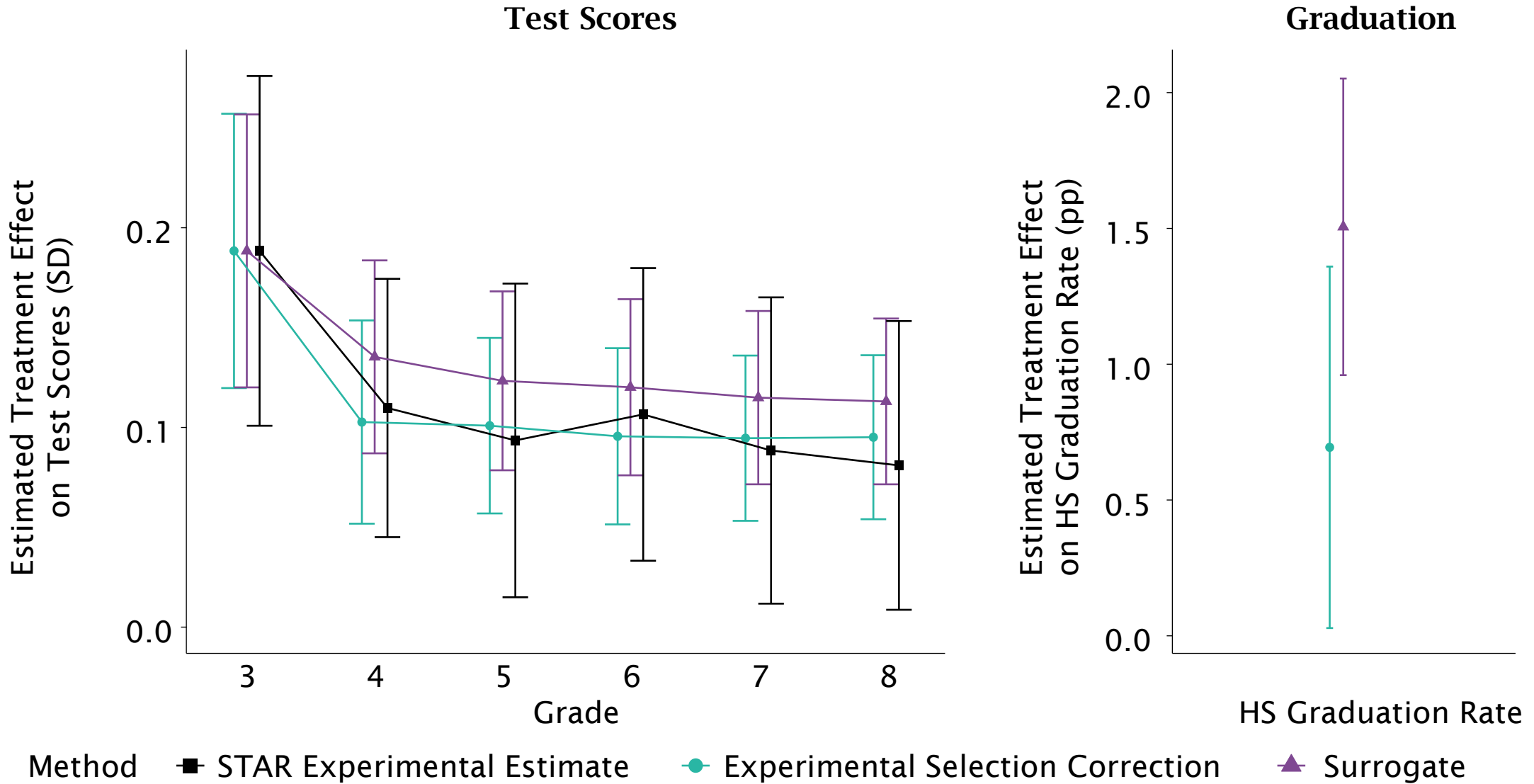
Robustness of ESC Estimates to Choice of Intermediate Outcomes



Method ● Experimental Selection Correction ▲ Observational OLS



Comparison of Surrogate vs. ESC Estimates



Estimated Effects of Small Class Assignment in STAR vs. NYC Data

Outcome	Exp. (STAR)	Obs. (New York)	Exp. + Obs. (STAR + NYC)
Estimator:	OLS	OLS	ESC
3rd Grade Test Score (secondary outcome)	0.19 (0.04)	-0.12 (0.01)	0.19 (0.04)
HS Graduation (primary outcome)	?	-1.76 (0.29)	0.69 (0.34)



Treatment Effects on HS Graduation: Comparison of Estimators

	OLS	OLS w/Controls	ESC	ESC w/Controls
Assigned to Small Class in 3rd Grade (W_i)	-1.76 (0.29)	-1.53 (0.28)	0.69 (0.34)	0.74 (0.34)
N	368,339	368,339	368,339	368,339



Summary Statistics

Category	Variable	STAR Mean	STAR Std. Dev.	New York Mean	New York Std. Dev.
A. Student Background Variables	Female (%)	47.1	49.9	50	50
	Eligible for Free or Reduced-Price Lunch (%)	60.6	48.9	80.8	39.4
	Missing Free Lunch Indicator (%)	1.5	12.2	43.2	49.5
	Graduated from NYC Public High School (%)	-	-	51.4	50
A. Student Background Variables – Race/Ethnicity (%)	White	62.8	48.3	15.7	36.3
	Black	36.4	48.1	33.9	47.3
	Asian	0.28	5.3	11.9	32.4
	Hispanic	0.18	4.3	38.1	48.6
	Native American	0.1	3.5	0.3	5.8
	Other	0.17	4.2		
B. Classroom Characteristics	Class Size in Grade 3	21.3	4.4	25.1	4.5
	In Small Class at Grade 3 (%)	18.7	39	58.9	49.2
	Size Given Large Class	23.9	2.4	29.2	2.2
	Size Given Small Class	15.7	1.7	22.2	3.2
	Initial Assignment to Small Class Size (%)	26.1	43.9	-	-
	Size Given Large Class Assignment	23	3.3	-	-
	Size Given Small Class Assignment	16.3	2.9	-	-
Overall	Number of Observations	11599		1758838	

