

Pipelines and Equity in Gifted and Talented Programs

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AEFP 2024

March 15, 2024

This research was conducted under data-use agreements between MIT, the project's principal investigator, and New York City Public Schools. This paper reflects the views of the authors alone. We acknowledge generous funding from the MIT Integrated Learning Initiative (MITili), the National Science Foundation Graduate Research Fellowship under grant 2141064 (Kocks), the National Bureau of Economic Research Fellowship for Identifying and Developing Mathematical Talent among Youth, and Berkeley Economists for Equity.

- Tracking – such as Gifted and Talented (G&T) programs – often provides accelerated education to promising students.
 - May help tailor instruction to student preparation, and keep high-income families in public schools (Cleveland, 2023)
 - Criticisms: failures to deliver large academic gains in many US settings and potential to exacerbate segregation
- Discussions – in NYC and nationally – frequently emphasize the role of tracking as **pipelines** for future educational opportunities and **equality of opportunity** in accessing these pipelines.
- Limited evidence on potential for elementary school G&T programs to change academic trajectories of talented students
 - Can such programs work by identifying students as early as possible? (Chetty et al., 2011; Heckman, 2006)

Setting and Research Question

- NYC G&T programs group students by ability into separate classrooms and schools beginning in kindergarten.
 - Differs from typical “gifted” programs, which provide enrichment in otherwise integrated classrooms
- In 2022-2023 school year, 85 kindergarten G&T programs, enrolling approximately 3% of NYC kindergarten students (Fadulu, 2022)
- Widespread tracking among other grades in NYC schools, including screened middle schools plus nine specialized high schools
- **Research Question:** What are the pipeline effects of G&T programs? How do G&T programs affect educational trajectories and how do these impacts vary by student group?

NYC G&T Program Structure

- Before the COVID pandemic, students qualified for G&T programs in Grades K-3 by taking a test (OLSAT and NNAT-2) the prior academic year. [Timeline](#)
- Students who received a **90 or higher** were eligible for “districtwide programs” and students who received a **97 or higher** were eligible to apply for seats in more-selective “citywide programs.”
 - We use variation from the districtwide program eligibility cutoff.
 - 2020: switched to a preschool teacher recommendation system
- Many oversubscribed programs, and deferred acceptance used for program assignment among qualified students
- In Fall 2021, Black and Hispanic students made up less than 25% of the G&T population, despite making up 70% of NYC’s student population (Shapiro, 2021).

Parents view G&T programs as pathways into future selective academic opportunities.

- Shapiro (2021): “Many parents, including Black and Latino parents, have sought out gifted classes as an alternative to the city’s struggling district schools, and have come to rely on them as a way to **set their children up for future success**” (*The New York Times*).
- Roda (2015): qualitative research that for parents, G&T programs seem “to be a **feeder for the better middle schools**, which then seems to be a feeder for the better high schools”

Kindergarten G&T attendees and qualifiers are more likely than other students to enroll in specialized high schools.

In Fall 2011- Fall 2013:

- 40.3% of students who attended a Kindergarten G&T program later enrolled in a specialized high school (conditional on remaining in NYC schools in Grade 9).
- 13.7% of students who took the Kindergarten G&T test but did not qualify later enrolled in a specialized high school (conditional on remaining in NYC schools in Grade 9).

Why might G&T programs promote access to future educational opportunity?

- **Academic achievement** – could boost preparedness and qualification for future selective programs
 - Limited short-run standardized test score effects (Cleveland, 2023), but could increase preparedness in ways not measured by short-run tests
- **Information** – could improve information about applying to future selective programs
- **Preferences** – could increase preferences for academic rigor, or indirectly increase preferences for selective or effective programs through a desire to remain with peers

We use the following administrative data for the 2011-12 through 2022-23 school years from NYC Public Schools:

- **G&T applications:** test scores (from 2011-12 through 2020-21) for applicants to G&T Grades K-3
- **Enrollment and demographics:** includes the universe of NYC public school students
- **Middle school and high school admissions:** applications and placement information for students who participate in the centralized assignment process

- Characteristics of middle schools (1) *applied* (ranked as first choice) and (2) *enrolled*:
 - *Specialized High School Share*: historical share of 6th grade students at the school who end up enrolling in a specialized high school for 9th grade
 - *Value-Added*: Effects on standardized test scores, with controls for baseline demographics and lagged scores (Angrist et al., 2017)

- We use first-time applicants for Grades K-3 G&T programs from 2011 through 2020.
- The sample consists of 69% Kindergarten applicants, 17% 1st Grade applicants, 9% 2nd Grade applicants, and 5% 3rd Grade applicants.
- We focus on the $\approx 35,000$ applicants within 5 points of the districtwide qualifying cutoff.

- Fuzzy regression discontinuity design
- First-stage of G&T eligibility (Z_i , defined as $R_i \geq 0$, where R_i is the exam score recentered around the 90 cutoff) on ever being in a K-5 G&T program (D_i):

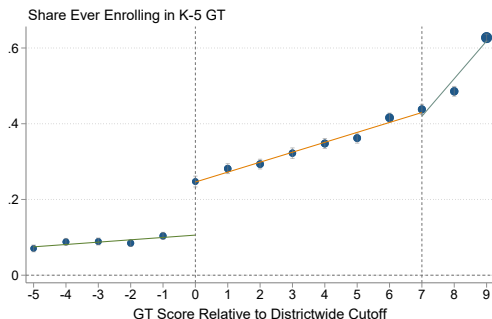
$$D_i = \sum_{g \in \{K, 1, 2, 3\}} 1(G_i = g) \times (\pi_g Z_i + \lambda_{1g} R_i + \gamma_{1g} R_i Z_i) + X_i' \Gamma_1 + \nu_i$$

- Second-stage equation:

$$Y_i = \beta D_i + \sum_{g \in \{K, 1, 2, 3\}} 1(G_i = g) \times (\lambda_{2g} R_i + \gamma_{2g} R_i Z_i) + X_i' \Gamma_2 + \epsilon_i$$

- X_i : controls consisting of demographics, cohort year, interaction terms
- β : causal effect of ever being in an elementary G&T program on future outcomes, among *marginal students*

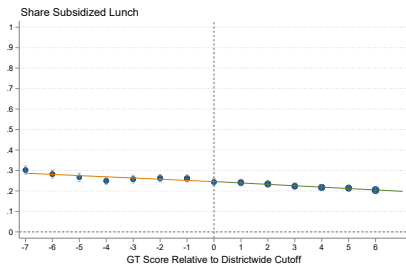
First Stage: Elementary G&T Enrollment



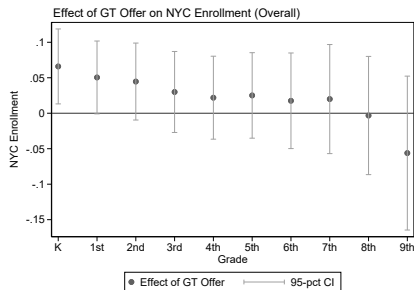
- First-stage effects on ever being enrolled in G&T: ≈ 15 pp., with effects varying substantially by entry grade [Graph](#)
 - Approximately half of the effect size on G&T offers in the following year
- This causes enrollment in classrooms with more white and Asian students, and fewer low-income students. [Graph](#)

Research Design Validity

- Demographic characteristics balanced across the cutoff (example below for subsidized lunch status)
- By Grade 6, no evidence of differential exit from NYC schools as a result of G&T admission

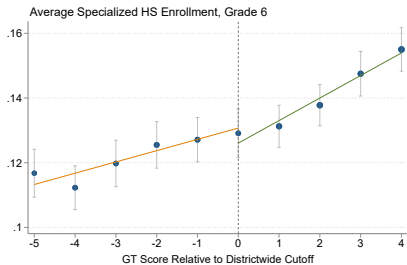


(a) Balance by Subsidized Lunch Status

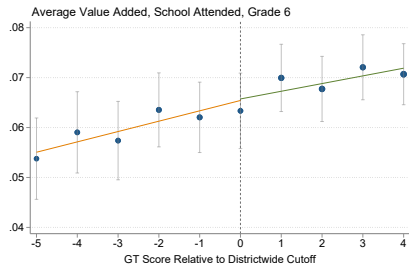


(b) NYC Enrollment Effects by Grade

No G&T effects on Grade 6 schools attended on average



(a) Specialized HS Share

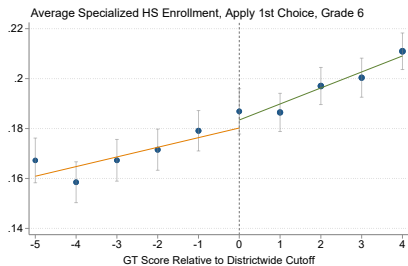


(b) Value-Added

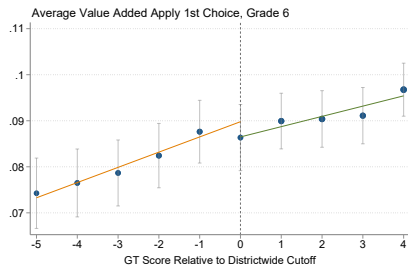
	Specialized HS Share	Value-Added
Estimated Effect	0.035	-0.011
(SE)	(0.030)	(0.026)
N	16500	16443

Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. The first stage corresponds to ever being enrolled in a G&T program.

Similarly, no effects on Grade 6 applications on average



(a) Specialized HS Share



(b) Value-Added

	Specialized HS Share	Value-Added
Estimated Effect	-0.001	0.010
(SE)	(0.025)	(0.027)
N	14919	14390

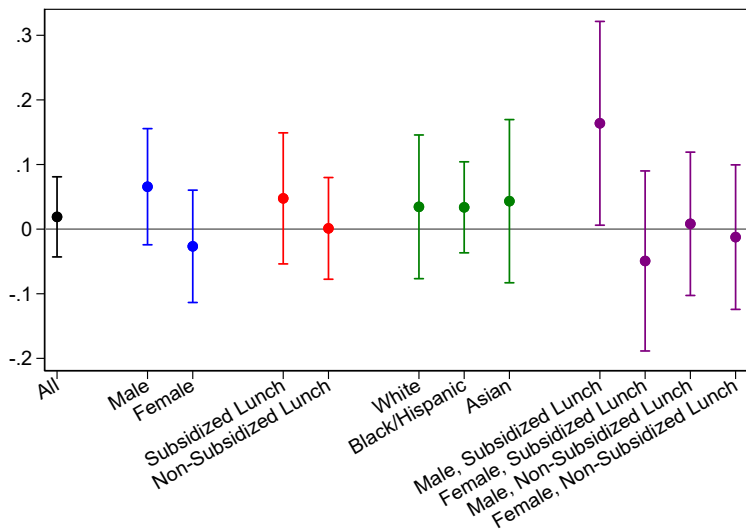
Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. The first stage corresponds to ever being enrolled in a G&T program.

Heterogeneity by Demographics and Time

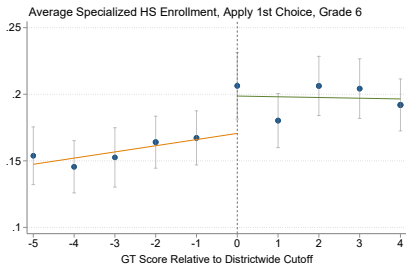
- So far, we have found little overall effects of G&T enrollment, but this may mask heterogeneity.
- *Why might this heterogeneity exist and matter?*
- **Gender:** Carlana et al. (2022) – larger effects of tracking on boys than girls
- **Race/Ethnicity:** Card and Giuliano (2016) and Cohodes (2020) – larger effects of tracking on racial minorities
- **Gender and Income:** large gender gaps in academic achievement among low-SES students (Autor et al., 2019; Bertrand and Pan, 2013; Chetty et al., 2016)
- **Changes over Time:** institutional changes, such as challenges associated with the COVID-19 pandemic and the subsequent removal of screens at many NYC middle schools

Positive Grade 6 application effects concentrated among low-income boys

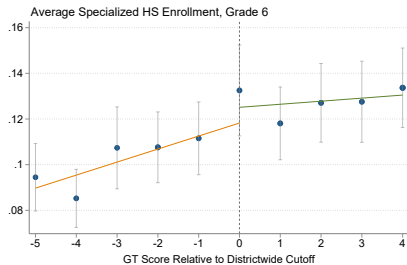
Coefficients: Grade 6 Application, Specialized HS Share



However, little enrollment effect among low-income boys



(a) App., Specialized HS Share



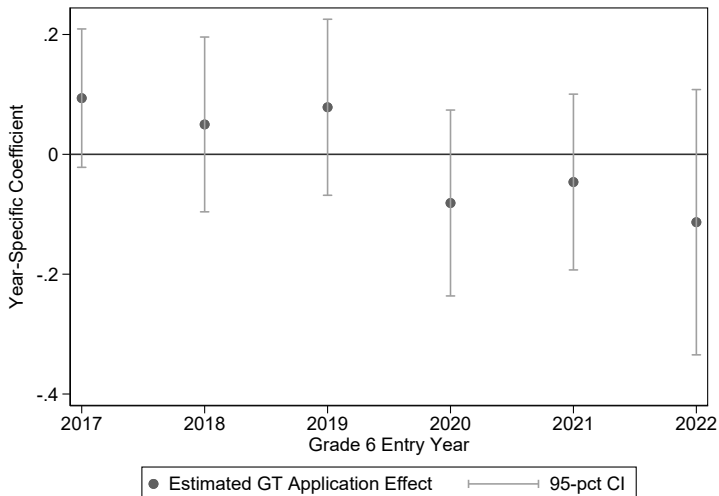
(b) Enroll, Specialized HS Share

	App., Specialized HS Share	Enroll, Specialized HS Share
Estimated Effect	0.159**	0.038
(SE)	(0.076)	(0.059)
N	2723	2543

Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. The first stage corresponds to ever being enrolled in a G&T program.

Some evidence of overall positive effects on Grade 6 applications until Fall 2020 middle school admissions

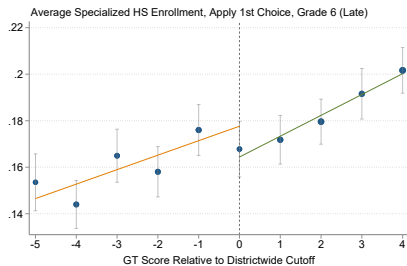
Coefficients: Grade 6 Application, Specialized HS Share



Positive effects on Grade 6 applications for early cohorts



(a) Grade 6 Admissions 2017-2019

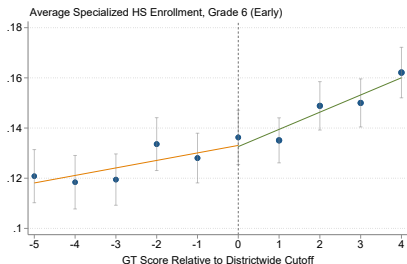


(b) Grade 6 Admissions 2020-2022

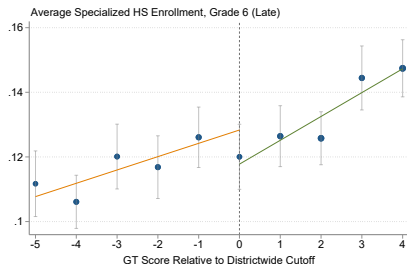
	Early App (2017-2019)	Late App (2020-2022)
Estimated Effect	0.109***	-0.075
(SE)	(0.039)	(0.048)
N	8667	7833

Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. The first stage corresponds to ever being enrolled in a G&T program.

Early application effects still do not translate to enrollment.



(a) Grade 6 Admissions 2017-2019



(b) Grade 6 Admissions 2020-2022

	Early Enroll (2017-2019)	Late Enroll (2020-2022)
Estimated Effect	0.030	-0.042
(SE)	(0.033)	(0.037)
N	7977	6942

Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. The first stage corresponds to ever being enrolled in a G&T program.

Conclusion

- Overall, we find little evidence of large G&T program effects on future schooling outcomes for marginal students.
 - This suggests that the large representation of G&T students in specialized high schools is driven by selection rather than causal effects of G&T programs.
- Evidence of positive effects on application behavior during pre-COVID years and among low-income boys (but little resulting enrollment effects).
- On their own, G&T programs may not be sufficient to substantially change academic trajectories within a broader tracked system.

- Results presented today are *aggregate across programs* and for *marginal* students who just meet the qualification score for districtwide enrollment.
 - Results may differ for non-marginal students.
 - Results may vary across individual G&T programs.
- Potential for effects to differ in recent years due to changes in G&T program design, such as the use of teacher recommendations rather than exams for admission.
 - Models of application and enrollment decisions can be used to estimate counterfactuals beyond the current policies.

Thank you for listening!

- Questions?
- Email: `gkocks@mit.edu`

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<https://www.nytimes.com/2021/10/08/nyregion/gifted-talented-nyc-schools.html>.

Appendix

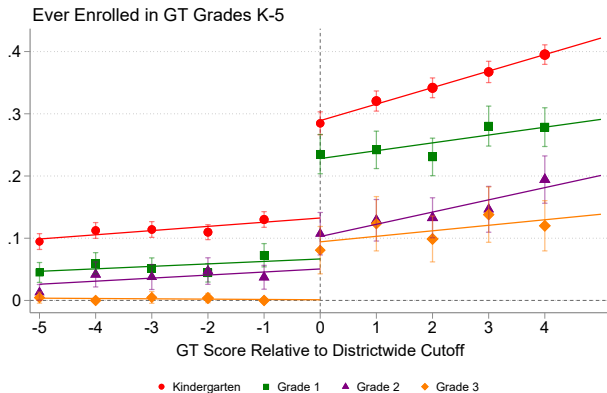
Kindergarten G&T Application Timeline, Fall 2020



- **November 2019:** deadline to apply for G&T qualification test
- **January 2020:** G&T qualification test administration
- **April-May 2020:** G&T qualification test scores received, and program application deadline
- **June 2020:** G&T application results, with decision to accept or decline offers
- **Fall 2020:** beginning of school year

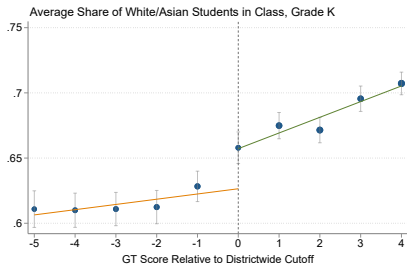
Source: 2020 NYC Gifted and Talented Admissions Guide

First Stage, Separately by Entry Grade

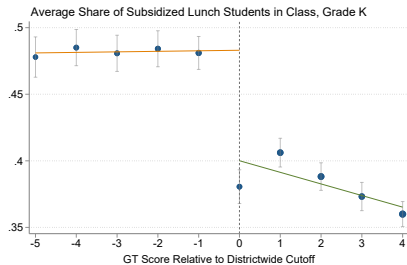


- **1. Tracking and educational outcomes** (Abdulkadiroğlu et al., 2014; Bui et al., 2014; Card and Giuliano, 2016; Carlana et al., 2022; Cleveland, 2023; Cohodes, 2020; Dobbie and Fryer, 2013; Duflo et al., 2011)
 - Our contribution: Longer-run consequences of a tracking program that begins in early grade levels
- **2. Preference formation in school choice** (Ajayi et al., 2017; Corcoran et al., 2018; Hahm and Park, 2022; Hastings and Weinstein, 2008)
 - Our contribution: Effects of elementary school programs on future schooling decisions
- **3. Gaps in access to educational opportunities** (Corcoran and Baker-Smith, 2018; Lu and Weinberg, 2016; Lu et al., 2020; Plucker et al., 2010)
 - Our contribution: G&T programs as a potential lever to facilitate access to opportunities in later grades

G&T Effects on Kindergarten Classroom Characteristics



(a) White/Asian Student Share



(b) Subsidized Lunch Student Share

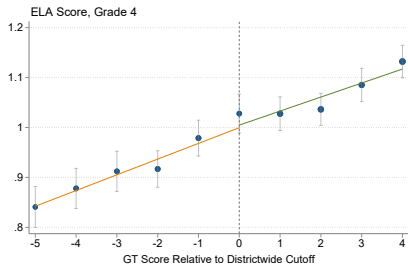
White/Asian Share

Free Lunch Share

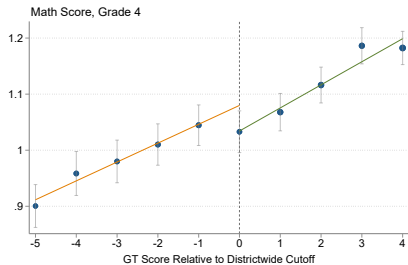
2SLS Est.	0.132***	-0.249***
(SE)	(0.020)	(0.023)
N	20854	20854

Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. 2SLS use a first stage of kindergarten G&T enrollment.

G&T Effects on Grade 4 Standardized Test Scores



(a) ELA



(b) Math

	ELA	Math
2SLS Est.	-0.009	-0.246***
(SE)	(0.137)	(0.138)
N	14623	14619

Notes: *: p-value < 0.1, **: p-value < 0.05, ***: p-value < 0.01. 2SLS use a first stage of any G&T enrollment.