The Career Trajectories of Mathematics Teachers from a Nationally-Prominent Alternative Certification Program

MLDS Center Research Series
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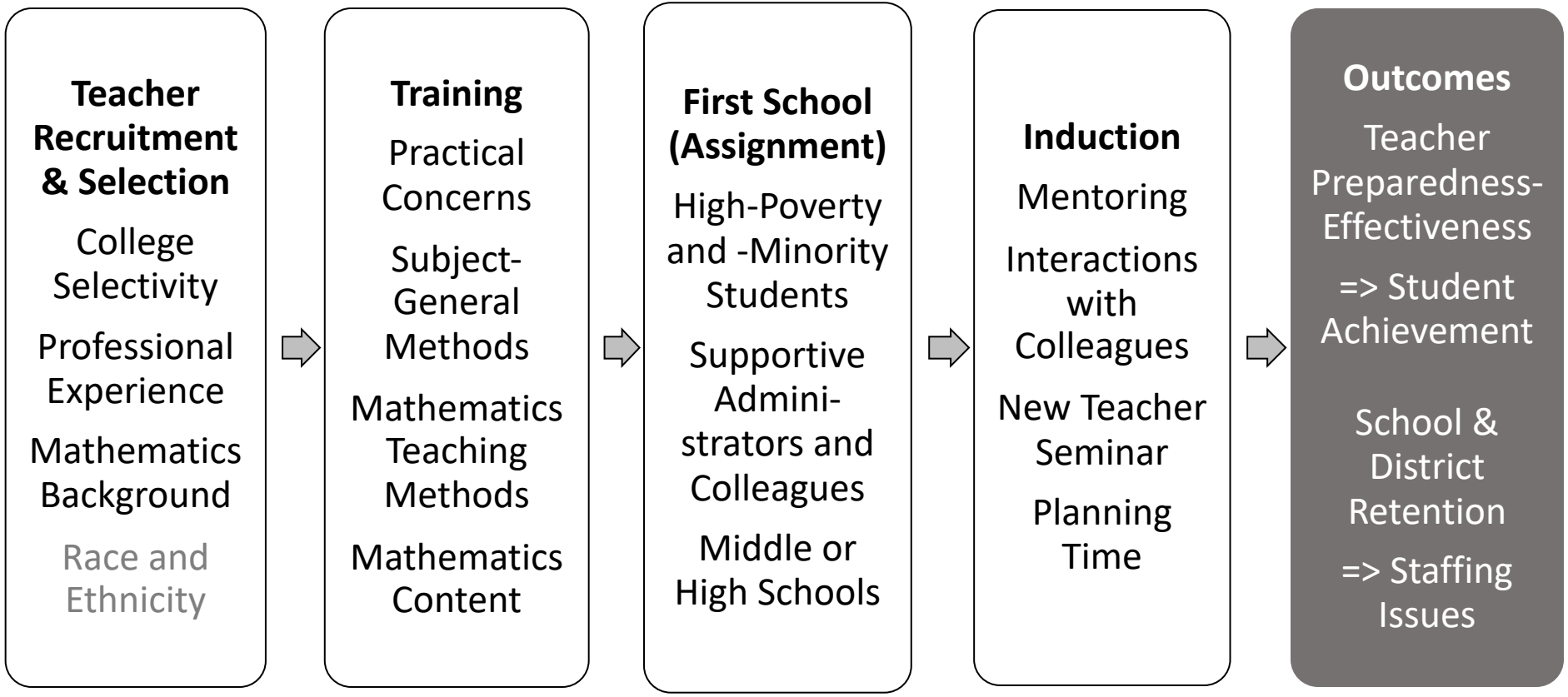
Andrew Brantlinger
University of Maryland
amb@umd.edu

Ashley Grant
Johns Hopkins University
agrant27@jhu.edu

New York City Teaching Fellows (NYCTF)

- Launched in 2000 by TNTP and NYCDOE
  - "High achieving graduates" and "accomplished career changers"
  - Mid-2000s, 3000-6000 teachers annually, 300+ math teachers, in NYC
  - Teaching Fellows program model disseminated to other districts
- Fast track/early-entry pathway to paid teaching
  - Fellows become teachers of record after 200 hours of initial training
  - Alternative certification: Transition B – HQTs
- Master's coursework (subsidized) in Years 1 & 2

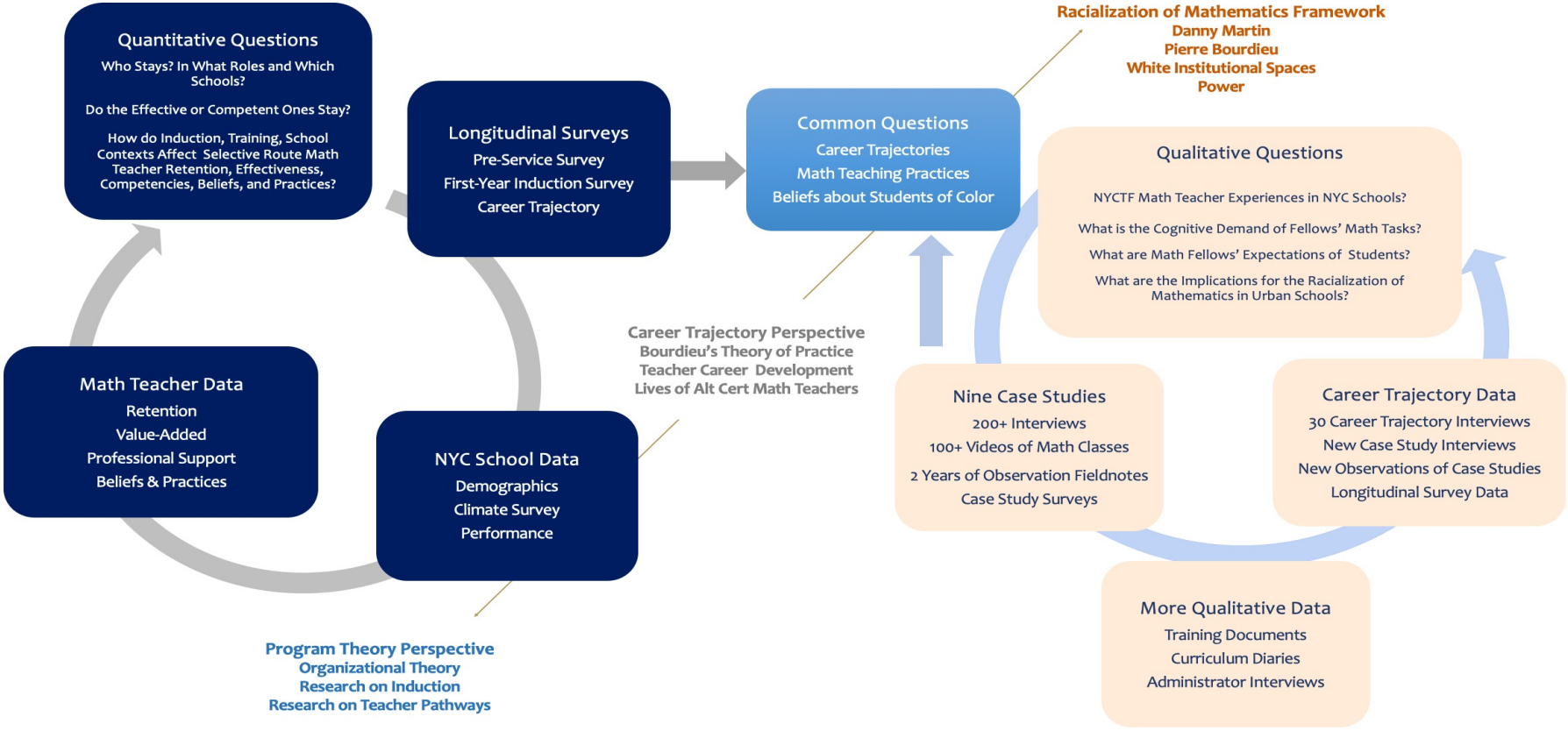
Selective Alternative Teacher Certification Programs (ATCPs): Logic Model and/or Theory of Action



Selective Alternative Route Programs and The Career Trajectories of Urban Mathematics Teachers

Andrew Brantlinger
University of Maryland

Laurel Cooley
Brooklyn College



Project's Quantitative Data

- District/State Administrative and Survey Data
  - NYCDOE Teacher Service History Data
  - NYSDE School Demographic / Attendance Data
  - NYC School Climate Survey
- Project Survey
  - End of Pre-Service Survey in 2006 or 2007 (n = 435)
  - End of First-Year Survey in 2007 or 2008 (n = 336)
  - Career Trajectories Survey in 2015/2016 (n = 374)

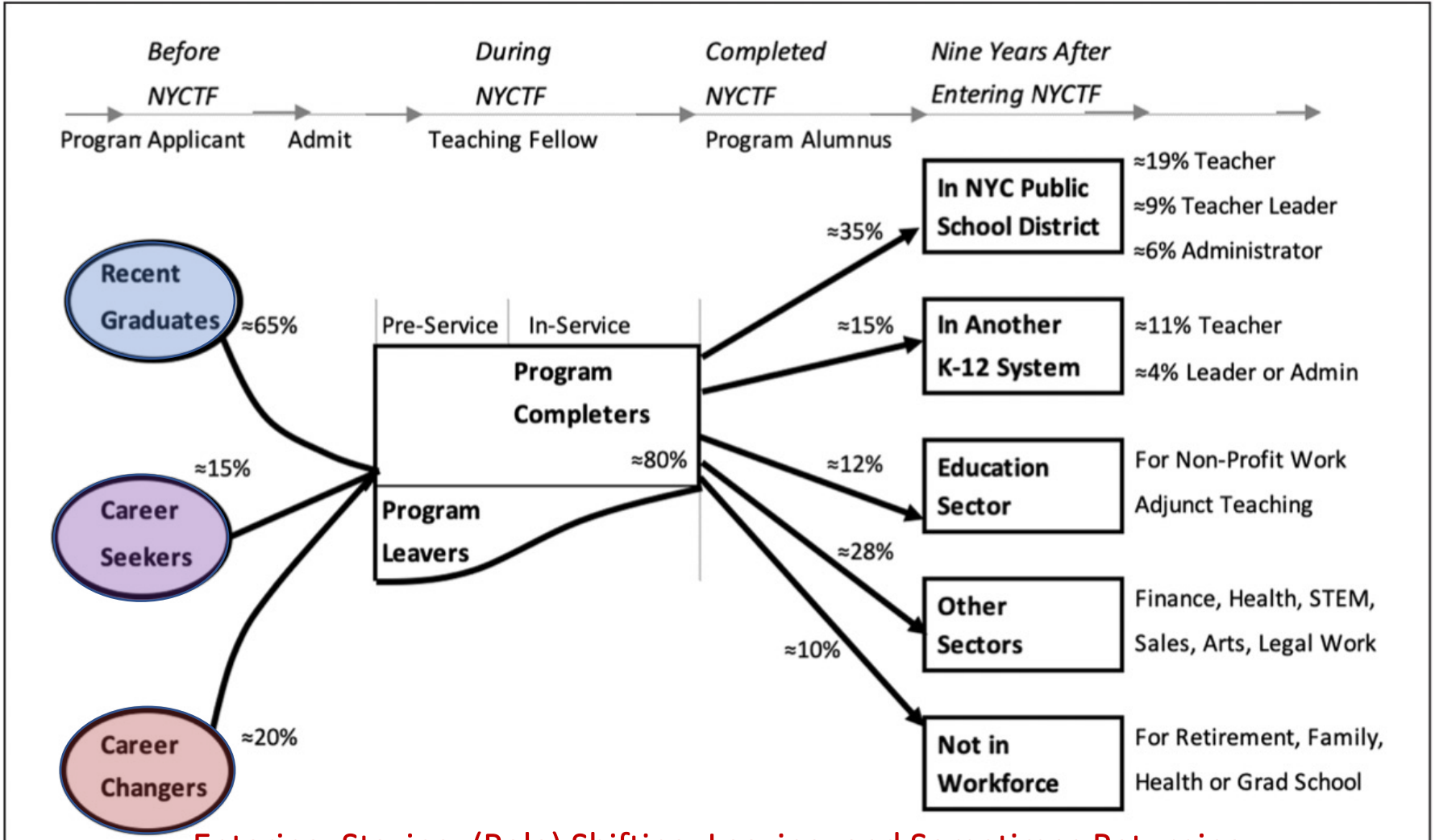
Teacher Sample & Context

- 620 Secondary Mathematics Teachers from NYCTF
  - Entered Paid Teaching in Fall, 2006 or Fall, 2007
- Neighborhood Middle/High Schools throughout NYC
  - Mentoring and Induction varied by school / teacher
- Four NYCTF “Partner” Universities for Secondary Mathematics
  - Subject-general to mathematics-specific training

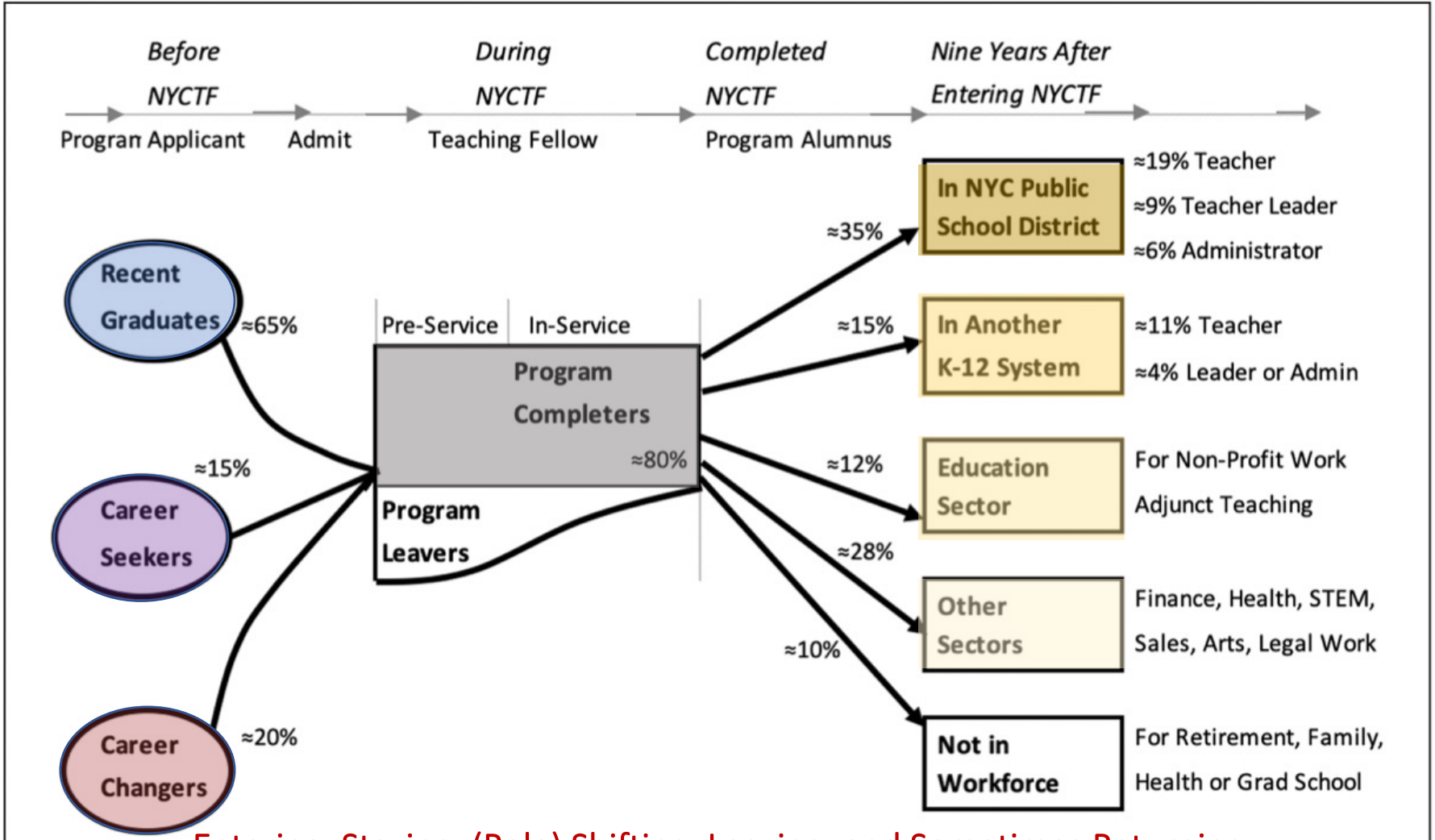
Paper 1: Entering, Staying, (Role) Shifting, Leaving, & Sometimes Returning: Career Trajectories

Purposes

- Identify main patterns in NYCTF math teacher career trajectories - before, during, and after completing NYCTF.
- To provide insights into the short- and long-term impacts of mathematics teachers on district middle/high schools.
- To compare the career trajectories who entered NYCTF/teaching as *recent college graduates* and *career changers*?



Entering, Staying, (Role) Shifting, Leaving, and Sometimes Returning



Entering, Staying, (Role) Shifting, Leaving, and Sometimes Returning

Factor	Reasons for Entry (Survey) Items	Recent Grad.	Career Seeker	Career Changer
Meaningful Job	I wanted a job with purpose or meaning.	4.37	4.29	4.35
	I wanted to try teaching out.	3.66	3.26*	3.65
Altruism	I wanted to make a social difference.	4.16	3.94	3.97
Alternative Certification	I liked the subsidized Master's degree.	3.94	4.13	4.12
Job Benefits	I needed a job with a decent salary.	3.52	3.73	3.26
Additional Reasons (No Factor)	My passion for mathematics	3.01**	3.43	3.51**
	I wanted to become a career teacher or teach until retirement.	2.67**	3.09	3.30**
	I was seeking a route to career advancement	2.50	2.97**	2.17**
	I thought that being a Teaching Fellow would look good on my resumé.	2.47**	1.97	1.94

Likert scale: 5 = Absolutely Essential (Reason) 4 = Very Important 3 = Of Average Importance; 2 = Of Little Importance 1 = Not Important At All or Non-Applicable.

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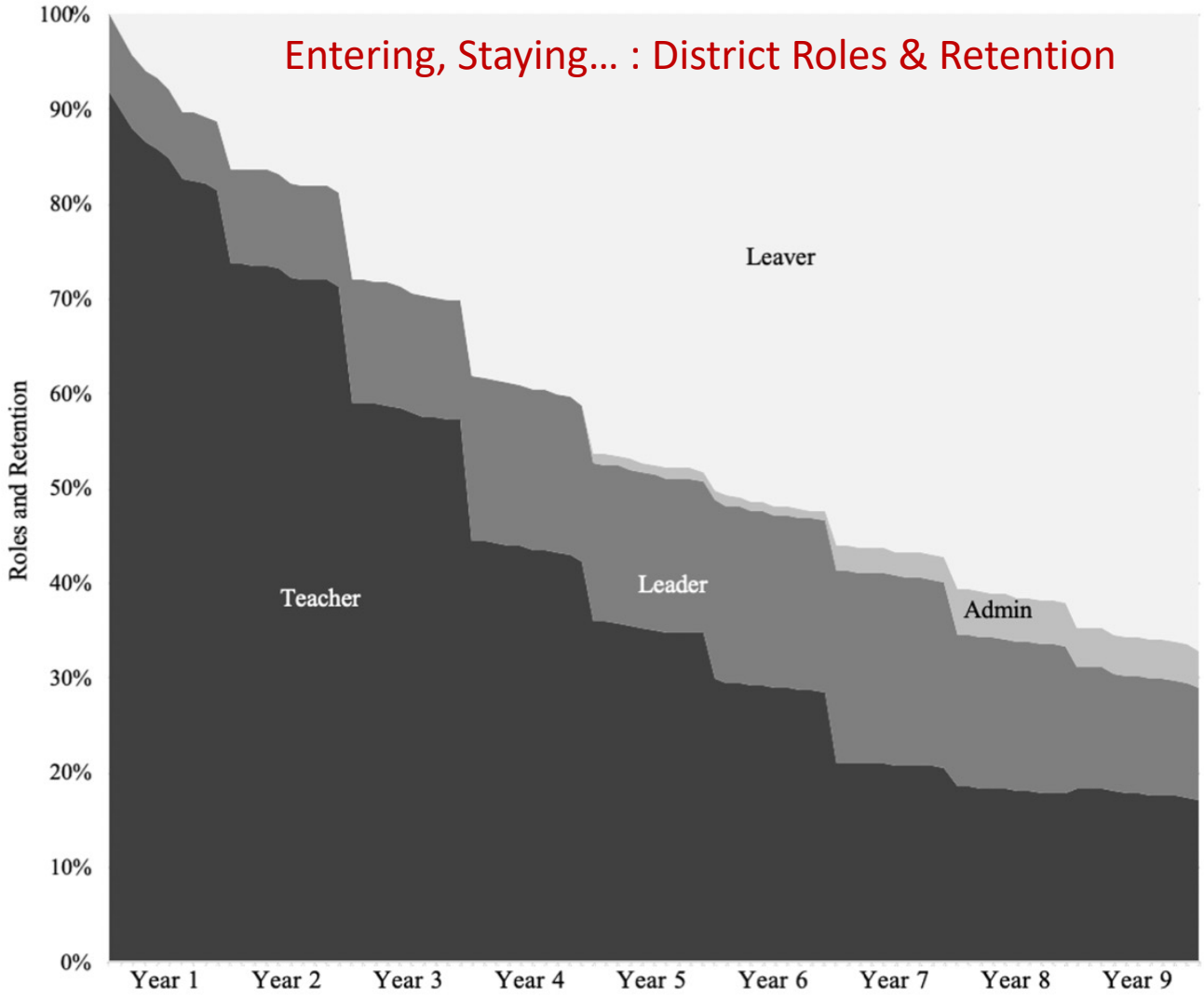
Entering, Staying… : District Roles & Retention



What do you notice and wonder about?

Entering, Staying… : District Roles & Retention

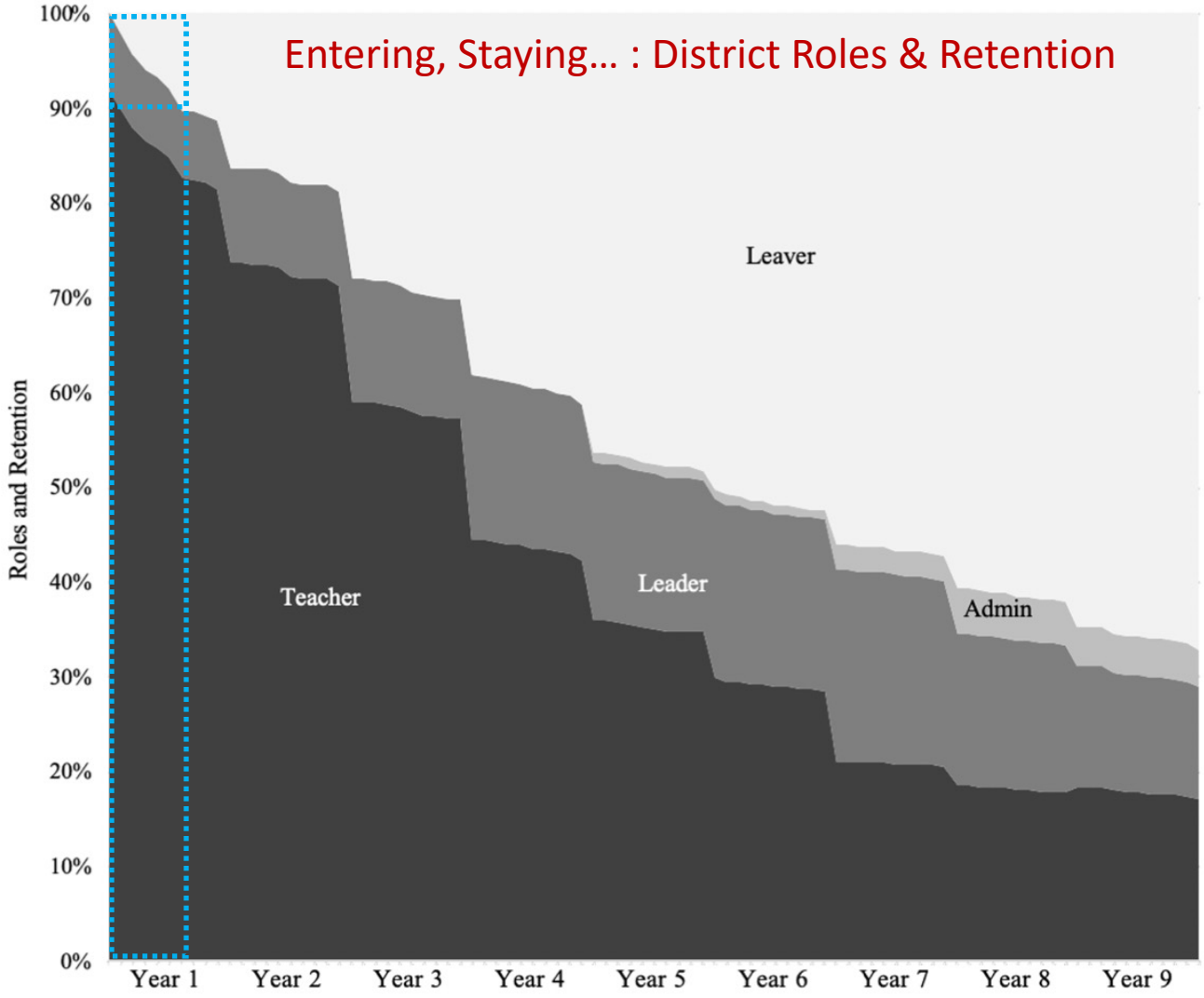


Table 3. First-School Leavers' Reasons for Leaving by Time of Exit.

Reasons for leaving	Left during Year 1 (%)	Left after Year 1 (%)
Student discipline problems were an issue	53**	31
I was dissatisfied with the principal	37	35
I was dissatisfied with workplace conditions (e.g., facilities, classroom resources)	35**	24
I became disenchanted with teaching mathematics	33**	15
I was dissatisfied with administrator(s) other than the principal	27	28
I was dissatisfied with staff dynamics or teacher professionalism	25	23
I was concerned about my safety	24**	8
I was dissatisfied with the support I received for preparing my students for standardized tests	24**	8
I had a change in residence or wanted to work in a school more convenient to my home	7*	22
	$n = 41$	$n = 266$

Note. Analysis used a dichotomous variable, where 1 = *strongly agree or agree*, and 0 = *strongly disagree, disagree, or neither agree nor disagree*.
Significance is based on chi-square tests of independence with one degree of freedom ($n = 301$), where asterisks indicate the following: *significance at the .05 level and **significance at the .01 level.

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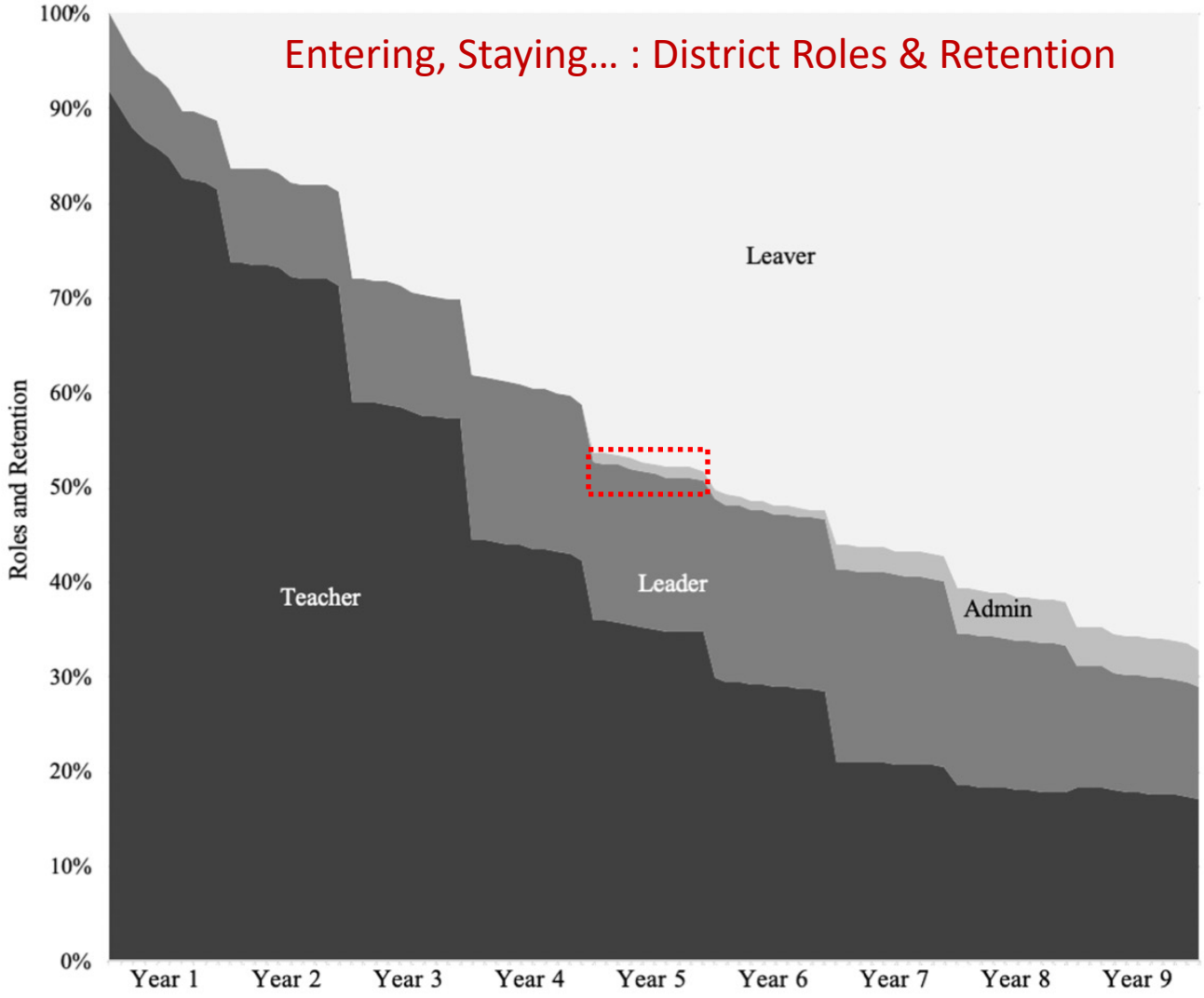

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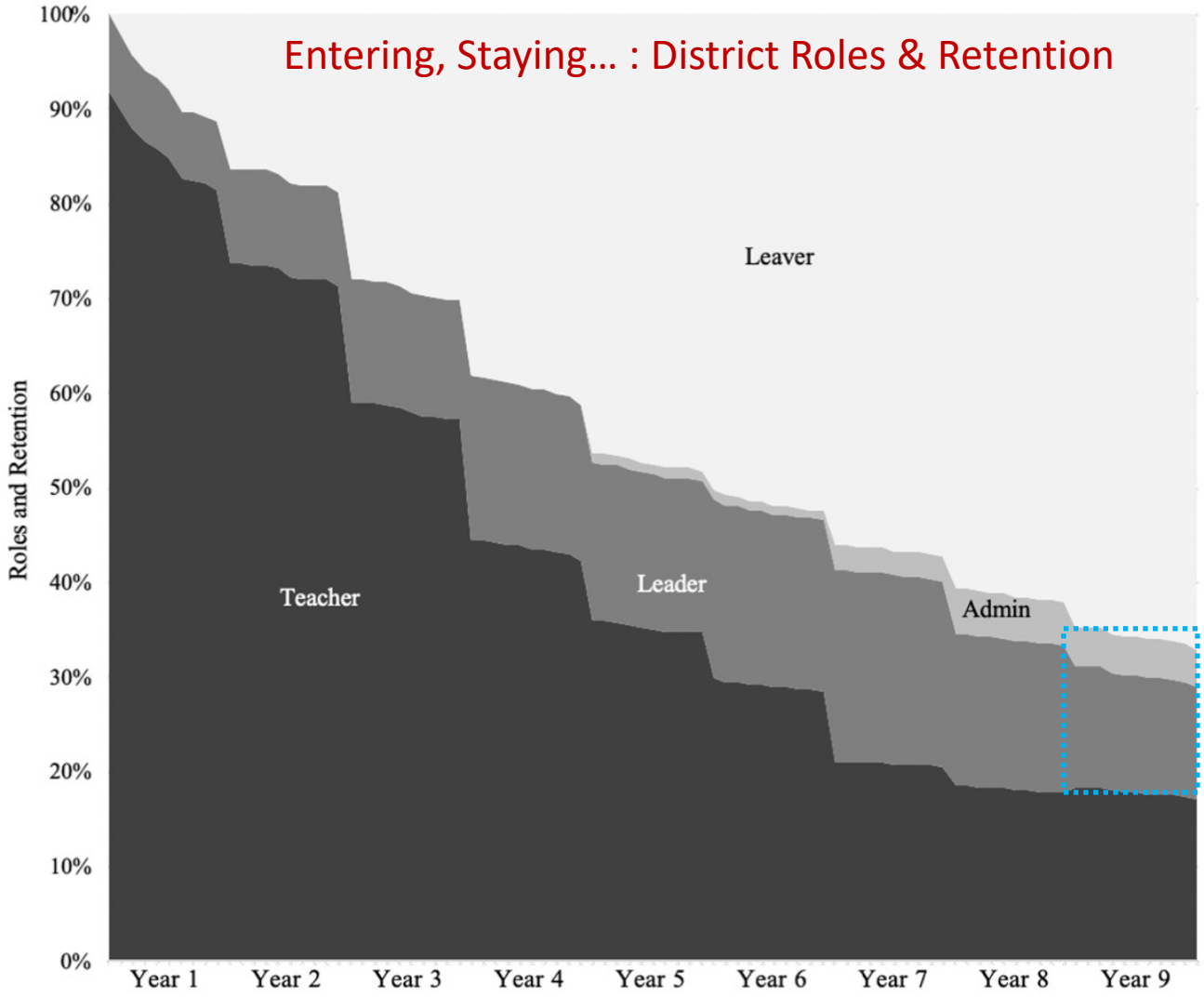

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Table 4. Most Recent Jobs, 9 Years After Starting as NYCTF Mathematics Teachers.

Most recent job	Recent graduate (%)	Career seeker (%)	Career changer (%)
Teacher in NYC public schools	20.8	25.8	32.9
Teacher leader in NYC public schools	11.6	6.5	14.5
Administrator in NYC public schools	8.4	6.5	9.2
Teacher in other *K*−12 system	10.8	14.5	6.6
Teacher leader in other *K*−12 system	2.4	6.5	1.3
Administrator in other *K*−12 system	1.6	1.6	1.3
Education sector (non-K−12)	10.4	16.1	5.3
Work outside of education	26.0	14.5	18.4
Graduate school	4.8	4.8	0
Out of the labor force	3.2	3.2	10.5
	$n = 250$	$n = 62$	$n = 76$

Note. A chi-square test of independence showed that the group-based outcomes—with all outcomes included in one test—were significantly different: $\chi^2(18, N = 388) = 30.0$, $p = .037$. NYCTF = New York City Teaching Fellows; NYC = New York City.

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Paper 1, Entering, Staying… Career Trajectories: Some Implications

- *Career changers* and *recent college graduates e*nter and leave teaching for largely similar reasons but at different rates
  - Career changers more committed to staying in the long run (plan to teach until retirement)
- First year mathematics teachers exhibit considerable *mid-year turnover.* Particularly harmful to neighborhood schools.
  - Due to limited (fast-track) initial training and, perhaps, the inattention to methods for teaching mathematics?
- Within-program comparisons, for example between subgroups like recent grads and career changers, productive line of inquiry

Paper 2: Ties That Bind? The Trajectories of Black and Latino/a Community Insiders and Elite College Graduates

This study analyzes the career trajectories of *Elite College Graduates (ECGs)* and *Black and Latino/a community insiders (BLIs)* in comparison to other NYCTF mathematics teachers.

- What are the background characteristics of *ECGs* and *BLIs* and how do they compare?
- What motivates *ECGs* and *BLIs* to become mathematics teachers through programs like NYCTF?
- How long do *ECGs* and *BLIs* stay in their first schools, the district, and K-12 education in any role?
- What reasons do ECGs, BLIs and other NYCTF math teachers cite for staying, leaving, or migrating?
- What occupations are *ECGs* and *BLIs* working in a decade after entering?

Ties That Bind? Descriptive Stats		Elite College Grad.	Black- Latino/a Insider	White Asian Insider	Non-Elite Outsider	Total
	N =	205	83	55	274	617
College Selectivity**	Very Selective	**100%**	0%	0%	0%	33%
	Moderately Select.	0%	29%	44%	42%	26%
	Less Selective	0%	71%	56%	58%	41%
High School Loc.**	In NYC	16%	**100%**	**100%**	0%	28%
	< 150 Miles to NYC	29%	0%	0%	40%	27%
	≥ 150 Miles to NYC	55%	0%	0%	60%	44%
Race / Ethnicity**	White	55%	0%	**69%**	66%	54%
	Asian	21%	0%	**31%**	14%	16%
	Black	18%	**66%**	0%	14%	21%
	Latino/a	6%	**34%**	0%	6%	9%
Gender **	Female	51%	60%	57%	48%	51%
Age at Entry *	Mean / Median (Years)	28 / 24	30 / 26	32 / 26	29 / 25	29 / 25
Career Status **	Recent College Graduate	70%	56%	51%	67%	65%
	Career Changer	30%	44%	49%	33%	35%

Ties that Bind? Reasons for Entry	Elite College Graduate	Black-Latino/a Insider	White-Asian Insider	Non-Elite Outsider
N =	125	55	37	172
Altruism subscale	**0.00 (.95)**	**0.71* (.94)**	**-0.20* (.99)**	**-0.18* (.98)**
I wanted to make a social difference.	4.14	4.33	3.92	3.96*
I wanted to work with students of color.	3.25	3.95**	2.76*	2.99
I wanted to give back to my community.	2.86	4.25**	3.35	2.74**

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Ties That Bind? Descriptive Rates of First- and Second-Year Turnover

		Elite College Grad.	Black-Latino/a Insider	White-Asian Insider	Non-Elite Outsider	Total
	N =	205	83	54	273	615
< 1 Year	Exited First School	19.0%*	8.4%	7.4%	15.8%	15.1%
	- and Exited District	17.6%*	7.2%	5.6%	10.6%	12.0%
	- and Stayed in District	1.4%*	1.2%	1.8%	5.2%*	3.1%
< 2 Years	Exited First School	37.1%*	26.5%	22.2%	29.3%	30.9%
	- and Exited District	27.8%*	12.0%	9.3%*	17.2%	19.3%
	- and Stayed in District	9.3%	14.5%	12.9%	12.1%	11.6%

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	- and Stayed in District	1.4%*	1.2%	1.8%	5.2%*	3.1%
< 2 Years	Exited First School	37.1%*	26.5%	22.2%	29.3%	30.9%
	- and Exited District	27.8%*	12.0%	9.3%*	17.2%	19.3%
	- and Stayed in District	9.3%	14.5%	12.9%	12.1%	11.6%

	First School Retention	District Retention	K-12 Retention
Elite College Graduate (Non-Elite Outsider)	0.630*	0.528**	0.487**
Black-Latino/a Insider (Non-Elite Outsider)	1.851*	1.977*	1.728
White-Asian Insider (Non-Elite Outsider)	1.262	1.629	0.887
Age, Mean Centered	0.994	0.997	1.025
Male (Female)	1.337	1.035	0.657$^{\Delta}$
STEM Degree (Other Degree)	1.053	0.809	1.014
School Leadership	1.013	1.013	0.898
Teacher Collegiality	1.100$^{\Delta}$	1.100	1.239
School Safety	1.041	1.042	1.027
Student Attendance (%)	1.044*	1.008	0.995
Subsidized Lunch (%)	1.006	0.996	0.998
Black Student (%)	0.986*	0.998	0.991
Latino/a Student (%)	0.982**	0.994	0.990
Constant	1.356	1.356	1.878**
N =	598	598	384

Nine Years After Entry	Elite College Graduate	Black-Latino/a Insider	White-Asian Insider	Non-Elite Outsider
N =	126	55	37	171
Paid Role in District, Fall, 2016	**31.0%****	**63.6%****	**62.1%****	**42.8%**
- Teacher	14.3%**	32.7%	45.9%**	24.0%
- Teacher Leader	11.1%	18.2%	10.8%	9.4%
- School Administrator	5.6%	12.7%	5.4%	9.4%
In Other K-12 Setting	**18.3%**	**9.1%**	**8.1%**	**15.8%**
- Teacher	11.9%	7.3%	8.1%	11.1%
- Teacher Leader	4.0%	1.8%	0%	2.9%
- School Administrator	2.4%	0%	0%	1.8%
Ed Sector (Non-K-12)	**10.3%**	**7.3%**	**2.7%**	**12.9%**
Working Outside of Education	**31.7%****	**14.5%**	**21.6%**	**18.7%**
Not in Workforce	**8.7%**	**5.5%**	**5.5%**	**9.8%**

Paper 2, Ties That Bind: Some Implications

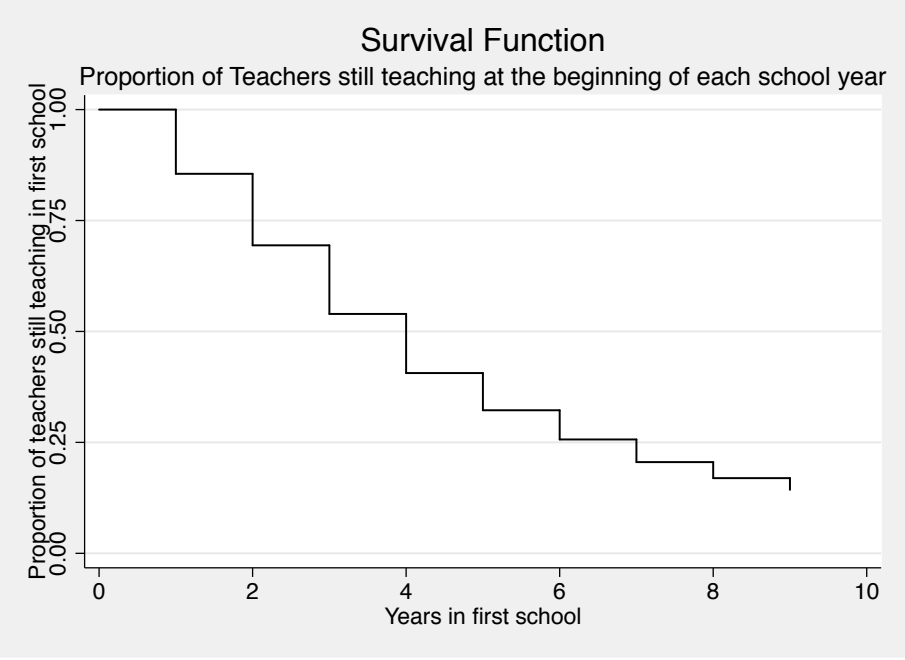
- Ties that Bind? Yes, apparently as *community insiders* (i.e., graduates of local schools) have better rates of retention than *elite college graduates* (recruited nationally) and other "outsider" subgroups
  - Black/Latinx and White/Asian Insiders enter for different reasons but have similar rates of retention in the district (NYC Public Schools)
  - Elite College Graduates have much higher rates of turnover and contribute disproportionately to mid-year turnover. (Implications for their students and those schools.)
- Longitudinal research provides insights about retention and career trajectories that cross-sectional (snap-shot) research does not
- Contributes to research that conceptualizes teacher preparation and program-level outcomes like retention as based in an interaction between person, program, schools

Study 3: Demography as Destiny

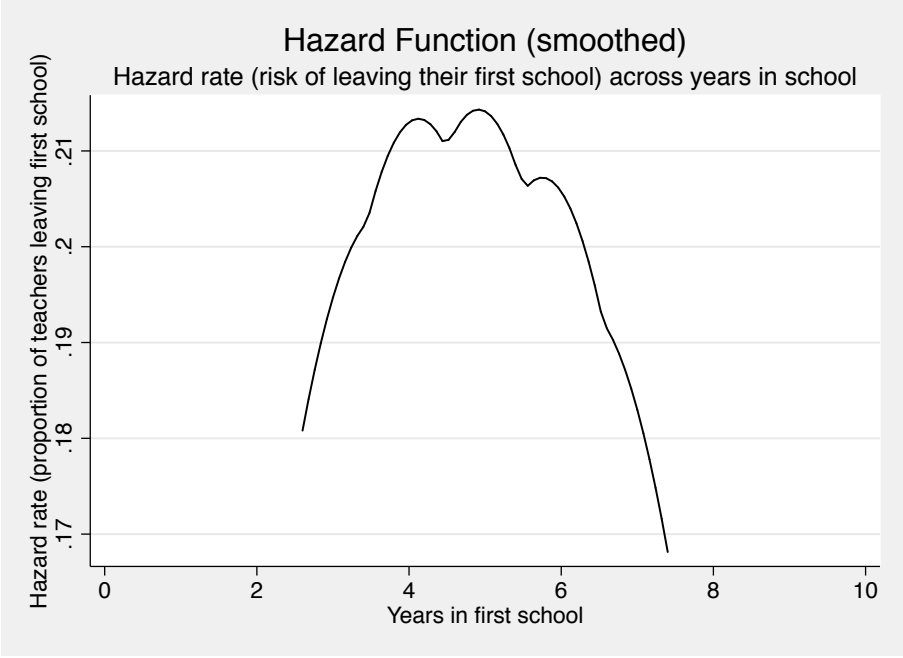
- **Purpose:** Examine NYCTF teachers' risk of leaving their first school in their first 9 years. Describe both the patterns in leaving and examines how school demographics and school climate predict these leaving patterns.
- **Hypotheses from the field tested:**
    1. Timing: Teachers' risk of leaving their first school declines after the first 2 years
    2. Demographics vs. School climate: school climate explains the relationship between student demographics (e.g., % racial minority) and teacher retention
    3. Whose perception matters more? Teachers' individual ratings of school climate are more predictive of their turnover than the school-level climate ratings of their teacher colleagues.

Hypothesis 1: Teachers' risk of leaving their first school declines after the first 2 years (through the initial decade).

- Loss of teachers over time



Risk of leaving over time



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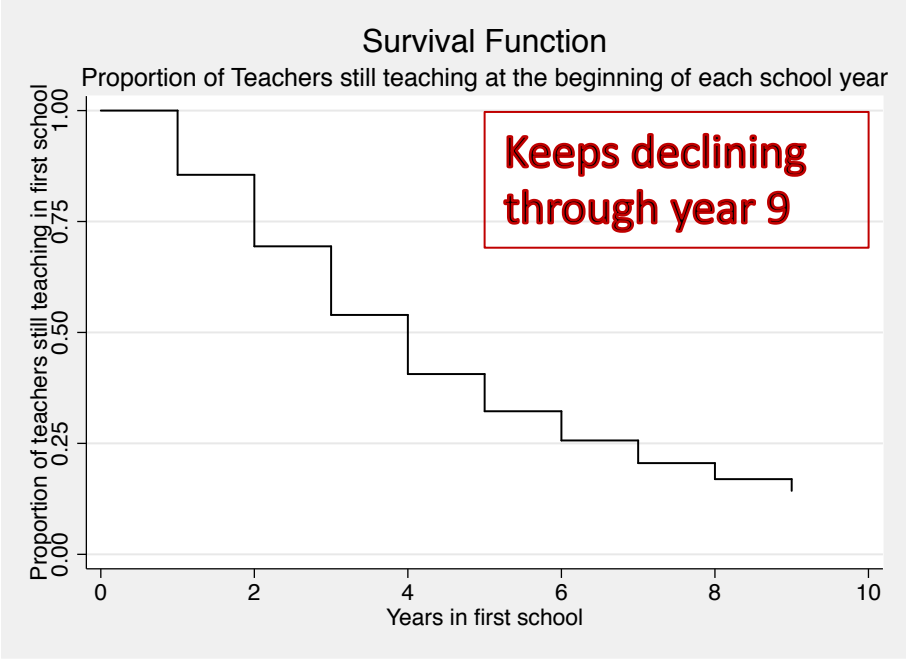

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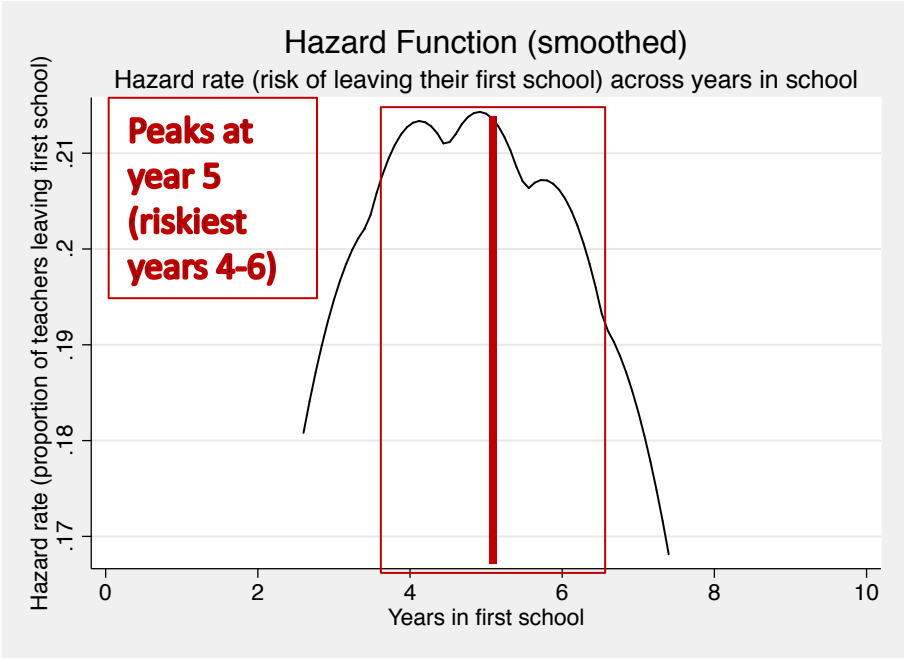
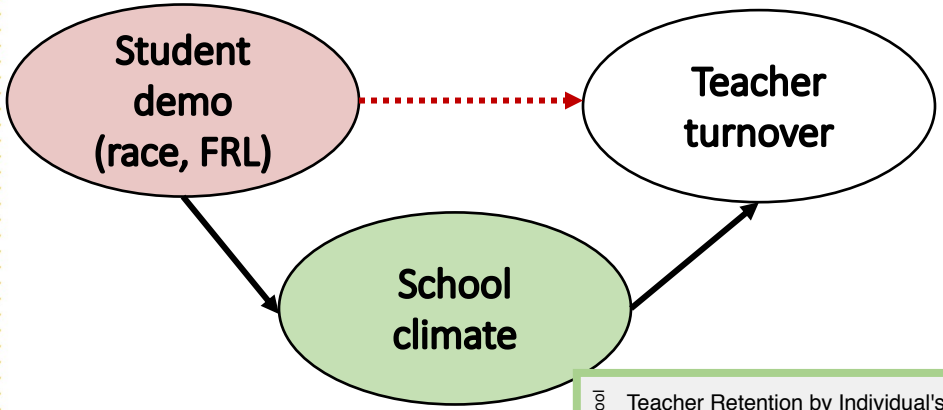
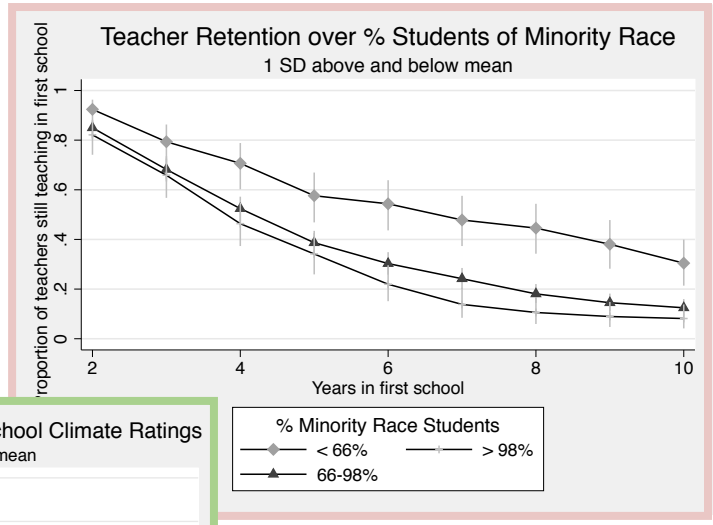
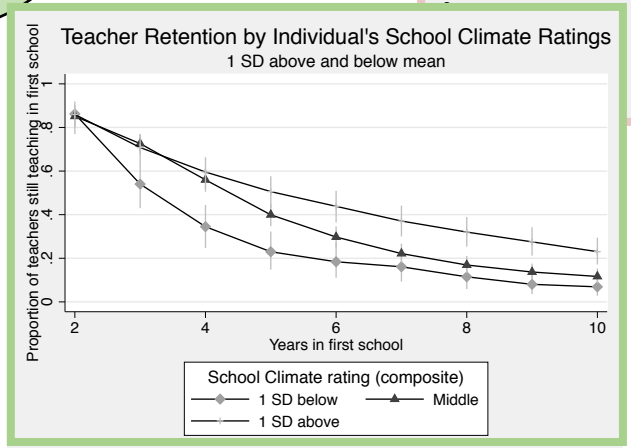


Hypothesis 2: School climate explains the impact of student race on turnover.







Hypothesis 2: ~~School climate explains the impact of student race on turnover.~~

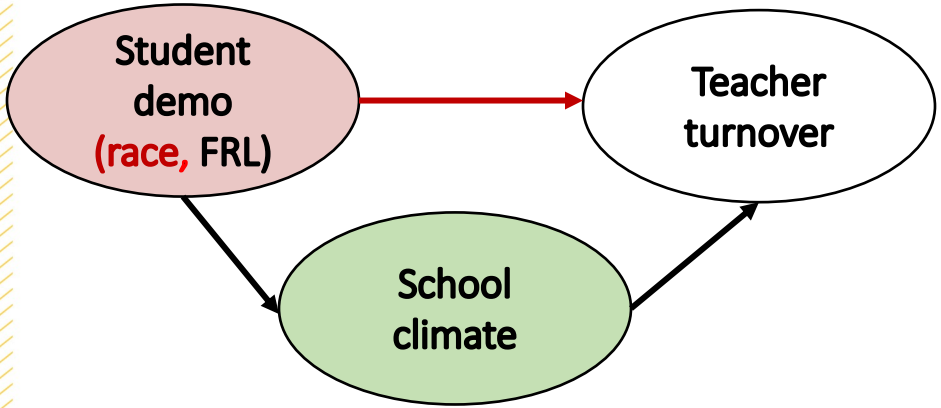
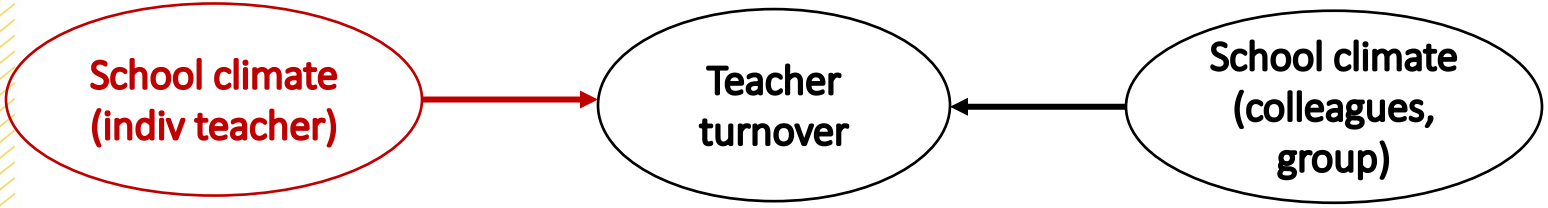


Table 3. Hazard Model Predic

Variables		Model 6 Final model	
Time: Pre-Year 5		1.65	(0.13)**
Post-Year 5		0.91	(0.05)†
Sex (*female*)		1.18	(0.14)
Race: Black		0.95	(0.15)
Asian		1.38	(0.23)†
Hispanic		1.11	(0.23)
Age (≤*30*)		0.99	(0.13)
SES background: Middle		1.21	(0.17)
High		1.05	(0.19)
Mathematics major		1.33	(0.23)†
Middle grades		1.07	(0.16)
Student attendance (%)[a]		0.98	(0.01)
Low-income students (%)[a]		1.00	(0.00)
Minority race students (%)[a]		1.01	(0.00)**
SC: Colleagues' perceptions	Leadership[a]	0.97	(0.05)
	Collaboration[a]	0.80	(0.06)**
	Facilities[a]	1.20	(0.09)*
	Student Behavior[a]	1.08	(0.09)
SC: Individual perceptions	Administration[a]	0.91	(0.11)
	Collegiality[a]	1.03	(0.11)
	Facilities[a]	0.80	(0.08)*
	Student Behavior[a]	0.75	(0.11)*

Hypothesis 3: Teachers' individual school climate perceptions more influential for turnover than colleagues (group measure)

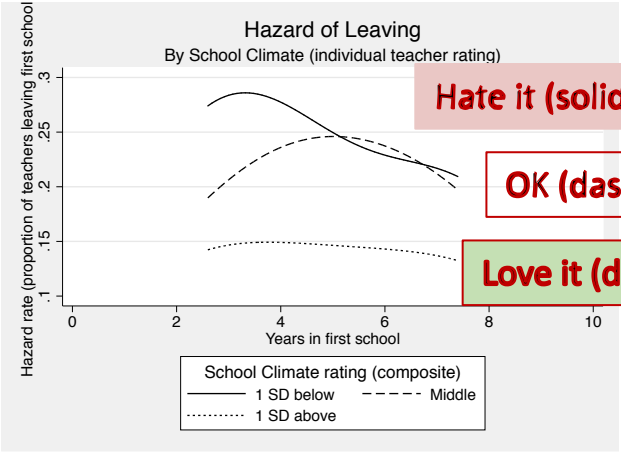


Hypothesis 3: Teachers' individual school climate perceptions more influential for turnover than colleagues (group measure)

School climate (indiv teacher) → Teacher turnover ← School climate (colleagues, group)

- Facilities
- Student behavior

- Collaboration
- Facilities (negative)



Hate it (solid) = high initial risk

OK (dashes) = curvilinear, peak 5 years

Love it (dots) = low risk

Implications

- Longitudinal look at teachers' careers
  - Tracking school instability (of teachers) – cumulative turnover
- Coordinating data from multiple sources
- Big picture of education field perspective of turnover

Our Questions Vis a Vis Retention

- MLDS has a database for teacher pathways/retention research?
  - MD teachers who graduated/attended MD high school
  - MD teachers from Maryland colleges
  - Track their migration from public school to public school?
- Maryland longitudinal data on teacher retention
  - Collected by state and/or districts?
- School survey data from teachers
  - Collected by state and/or districts?
- Data on teacher certification pathways / preparation
- Data on mentoring, induction, professional development
  - At teacher- or school-level?

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Thanks!

Andrew Brantlinger
University of Maryland
amb@umd.edu

Ashley Grant
Johns Hopkins University
agrant27@jhu.edu