Estimating the Effects of Segregation and Diversity on Teacher Effectiveness and Mobility: Evidence from Pennsylvania

Introduction

- Despite efforts to diversify the teaching force, American teachers remain predominately White and segregated—in 2016, 52% of public-school students were non-White while only 20% of teachers were non-White.
- Evidence shows that minority teachers improve minority student outcomes (Dee, 2004; Egalite et al., 2015 Gershenson et al., 2018; Grissom & Redding, 2016).
- Racially isolated minority teachers report having fewer opportunities to influence school policy and a higher likelihood of leaving teaching (Bristol, 2018; Bristol & Shirrell, 2019)

Policy Context

- Pennsylvania's Secretary of Education, Pedro Rivera, called Pennsylvania's teaching force the least diverse of any state in the nation.
- Pennsylvania's declining number of teaching candidates is more pronounced for minority teachers. In 2014, there were 8,552 graduates of teacher preparation programs; only 49 were Black or Latinx men.
- To bolster the minority teacher pipeline, the Pennsylvania Department of Education invested $490,000 to create a pilot program that brings together various organizations to recruit and retain more minority teachers in Philadelphia, Pennsylvania's most diverse district.

Research Questions

1. What is the distribution of teacher race at the school-, grade-, subject-, and subject-by-grade levels?
2. Does teacher racial isolation increase mobility rates and decrease effectiveness for minority teachers?
3. Does having more minority colleagues improve White teachers' effectiveness with minority students?

Data

Data include the following for the 2010-11 through the 2017-18 academic years for Pennsylvania:
Teacher Data. Teacher data includes demographic data (race/ethnicity, gender, date of birth), years of educational experience, educational attainment, courses taught, and school/classroom identifiers.
Student Data. Student data includes demographic data (race/ethnicity, gender, date of birth), achievement data on state exams, FRPL participation, ELL participation, and receipt of IEP services.
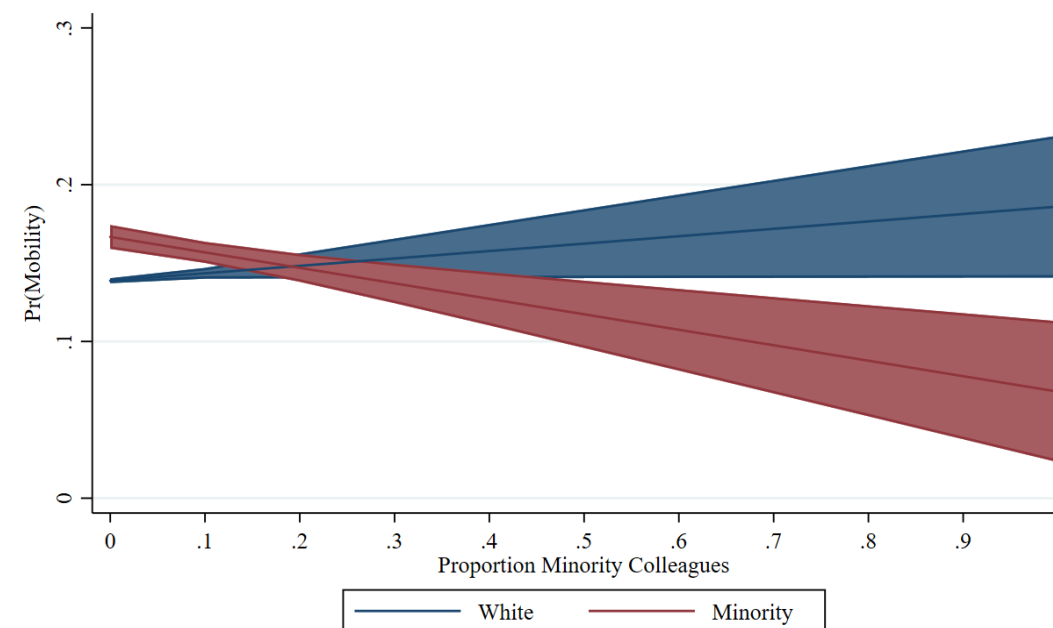
Empirical Approach

- **Mobility** is defined as leaving a given school in a year (1 if yes; 0 otherwise).
- **Racial Isolation** is defined as being the only minority teacher at a school.
- **% Minority Colleagues** is calculated using the number of minority (i.e., Black or Hispanic) teachers at a given school divided by the number of teachers, leaving out a given teacher
- For modeling details that produced Figure 1 and Tables 1 to 3 and details on the empirical approach for research questions 1 to 3, see: http://bit.ly/SREEYang.

Preliminary Findings

1. Minority teachers are at schools with higher levels of economic disadvantage and a higher proportion of minority (Black or Hispanic) students.
2. Minority teachers are, on average, more mobile than their White counterparts (Table 1), but less mobile when they have like-race colleagues (Figure 1).
3. Racial isolation may increase the probability of mobility by 2 percentage points, a 7 percent increase (Table 2).
4. Increasing the proportion of minority colleagues is associated with lower mobility rates for minority teachers (Figure 1; Table 3).

Figure 1. Estimated Probability of Mobility, by Teacher Race

Notes. Figure presents the estimated probabilities of mobility (and 95% confidence intervals) for White and Minority (Black or Hispanic) teachers. Model accounts for time-varying school characteristics (% racial minority; % receiving IEP services; and % receiving FRPL) and year and school-level fixed effects. Standard errors clustered at the teacher level.

Haisheng Yang
University of Pennsylvania
yanghais@upenn.edu

Table 1. Teacher Mobility and School Characteristics, by Teacher Race

	All	White	Minority
Mobility Rate	0.14	0.13	0.27***
School Characteristics			
% Female	0.48	0.48	0.49***
	(0.04)	(0.03)	(0.06)
% White	0.71	0.73	0.25***
	(0.29)	(0.27)	(0.31)
% Black	0.13	0.12	0.51***
	(0.22)	(0.2)	(0.36)
% Hispanic	0.09	0.09	0.17***
	(0.16)	(0.15)	(0.24)
% Economically Disadvantaged	0.42	0.41	0.70***
	(0.25)	(0.24)	(0.29)
% IEP	0.17	0.17	0.17***
	(0.06)	(0.06)	(0.07)
Teacher*Years	685,265	589,385	95,880

Notes. Minority teachers are defined as being either Black or Hispanic. Differences between White and Minority teachers significant at *0.10 **0.05 ***0.01

Table 2. Preliminary Effects of Racial Isolation on Minority Teacher Mobility

	(1)	(2)	(3)	(4)	(5)	(6)
Racially Isolation	-0.02**	-0.02**	0.02***	0.02***	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	685,265	685,265	685,265	685,265	664,234	664,229
Year FE		X	X	X	X	X
Staff FE					X	X
School FE				X		X
District FE			X			

Notes. Each cell represents a separate regression. Each regression controls for time-varying teacher- and school-level characteristics. Standard errors are clustered at the teacher level. Coefficients significant at *0.10 **0.05 ***0.01.

Table 3. Preliminary Effects of Minority Colleagues on Teacher Mobility

	(1)	(2)	(3)	(4)	(5)	(6)
Minority Teacher	0.04***	0.04***	0.02***	0.02***	-0.03	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)
% Minority Colleagues	0.42***	0.42***	0.09***	0.05**	0.11***	0.07**
	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)	(0.03)
Minority Teacher*%Minority Colleagues	-0.25***	-0.25***	-0.13***	-0.17***	-0.18***	-0.20***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)	(0.05)
Observations	685,265	685,265	685,265	685,265	664,234	664,229
Year FE		X	X	X	X	X
Staff FE					X	X
School FE				X		X
District FE			X			

Notes. Each cell represents a separate regression. Each regression controls for time-varying teacher- and school-level characteristics. Standard errors are clustered at the teacher level. Coefficients significant at *0.10 **0.05 ***0.01.

Graduate School of Education
Penn GSE