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Racial Diversity in the Teacher Pipeline:
Evidence from Massachusetts
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1. Executive Summary

Partly driven by increasing evidence that minority students benefit from having teachers of their same race, policymakers have developed an interest in how to make the teaching profession better reflect the increasingly diverse student body of US public schools. Nationally, nearly half of the K-12 student population is non-White while only about 20 percent of teachers are non-White. Eleven percent of White college graduates become teachers, compared to only nine percent of Black and Hispanic college graduates. Coupled with racial gaps in college graduation, these gaps in teacher entry result in White adults becoming teachers at two to three times the rate (4.4 percent) as Black adults (1.8 percent) and Hispanic adults (1.5 percent).[1] Prior studies have found that these racial gaps at the start of the teacher pipeline may be driven by barriers that disproportionately impact minority teachers, including certification assessments, GPA cutoffs for teacher certification, and racial disparities in hiring and retention.[2]

Massachusetts' situation is similar to the nation's in that its current teaching workforce is nearly 90 percent White while its K-12 student body is only 60 percent White. In this brief, we describe racial diversity at various stages of the teacher development pipeline in Massachusetts in order to provide guidance for potential interventions to improve teacher workforce diversity. We first construct a data set that tracks all of Massachusetts' prospective teachers starting from their first take of the Massachusetts Tests for Educator Licensure's (MTEL) Communications and Literacy (Comm/Lit) Test, required of all K-12 educators in the state.[3] We then follow such prospective teachers through their potential later employment in schools. We explore racial differences in whether candidates take the MTEL Comm/Lit test, pass the exam, obtain a license, receive a teaching position in a Massachusetts public school, and persist in teaching for at least three years.

Our data reveal that the lack of diversity in Massachusetts' teacher workforce has its origins largely in early stages of the teacher development pipeline. In particular, licensure exam takers are much less diverse than the college-enrolled population, and underrepresented minorities are less likely to pass the exam. Conditional on passing the exam, there are few racial differences in rates of final licensure, initial teaching employment, or retention in teaching after three

Policymakers have developed an interest in how to make the teaching profession better reflect the increasingly diverse student body of US schools. In this brief, we describe racial diversity at various stages of Massachusetts' teacher development pipeline. We show that the lack of diversity in Massachusetts' teacher workforce largely stems from early stages of the teacher development pipeline. Licensure exam takers and passers are substantially less diverse than the college-enrolled population, but among those who pass the exam there are few racial differences in rates of initial teaching employment or retention. Efforts to improve teacher workforce diversity should likely focus on diversifying the initial pool of licensure exam takers and improving pass rates on the exam.

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years. This suggests that efforts to improve teacher workforce diversity should focus on diversifying the initial pool of licensure exam takers and improving pass rates on the exam. Below we provide greater detail on these findings.

2 Findings

Even in recent years, the pool of people taking the Comm/Lit test to begin the teacher licensure process has been substantially less racially diverse than Massachusetts' student body. Figure 1 below shows the racial composition of the pool of Comm/Lit-takers and the state's K-12 student population over the past two decades. While the student body has shifted from nearly 80 percent to just over 60 percent White, the fraction of Comm/Lit-takers who were White decreased only slightly, from about 90 percent in 1998 to 83 percent today. Black, Hispanic and Asian students now comprise nearly 40 percent of the student body,

compared to just over 20 percent two decades ago. Though the diversity of the Comm/Lit-taking pool has increased over time, Black, Hispanic and Asian candidates still account for fewer than 20 percent of Comm/Lit-takers, so that the teacher candidate pool is less racially diverse now than the student body was 20 years ago.

To document diversity at each stage of the teacher development pipeline, we start by noting that the pool of Massachusetts students who might someday become teachers is roughly 65-70 percent White and 30-35 percent non-White. Four-year college enrollees in Massachusetts are slightly more diverse than K-12 students, as seen in columns 1 and 2 of Table 1.[4] These numbers do not account for potential racial differences in college completion rates or migration rates into and out of the state, but nonetheless give us a rough baseline to which we can compare diversity at subsequent stages of the teacher pipeline.

Figure 1: Diversity of Comm/Lit MTEL Takers And MA Students Over Time
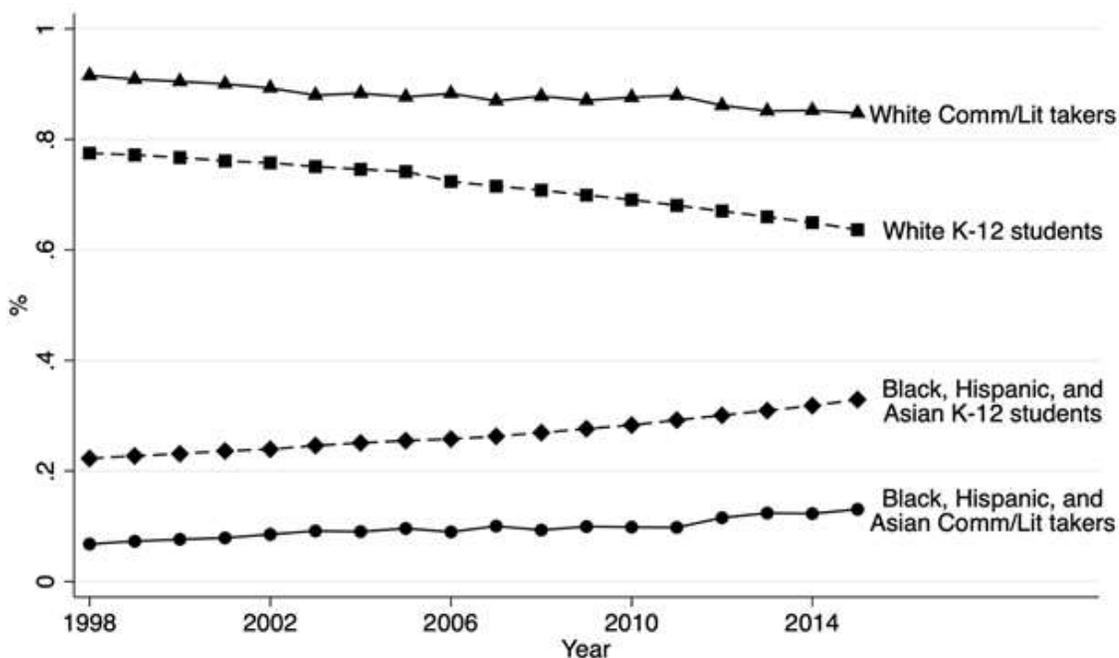
The pool of those who take the Communications and Literacy MTEL, the first step required of all those seeking a Massachusetts teaching license, is substantially less diverse than the four year college student population. Whereas 22 percent of Massachusetts college students are Black, Hispanic, or Asian, only 10 percent of those taking the Comm/Lit test are from those groups. The Comm/Lit-taking population is 87 percent White, a much greater proportion than the 66 percent of college students who are White. The pipeline appears to lose most of its diversity early on, between the point of enrolling in college and the decision to take the Comm/Lit test.

Later stages in the pipeline do not see nearly as large dropoffs in diversity. The pool of those who eventually pass the Communications and Literacy MTEL is only slightly less diverse than the pool of those who take it in the first place. Similarly, those who eventually earn a teaching license, those who are hired as a classroom teacher, and those who remain in the classroom in Massachusetts for at least three years all look roughly as diverse as the pool of Comm/Lit takers. All of this suggests that the largest barrier to improving diversity in the teacher workforce is attracting potential teachers to start the certification process at all.

Even among the relatively non-diverse pool of Comm/Lit-takers, there are substantial racial differences in the probability of becoming a teacher. Table 2 shows the fraction of 2007-2013 Comm/Lit-takers persisting at each stage of the pipeline. Over this time period, 61,000 White candidates took the Comm/Lit MTEL, compared to fewer than 7,500 non-White candidates. The largest racial gap appears early, as 92 percent of White candidates eventually passed the Comm/Lit MTEL, compared to about 70-75 percent of Black and Hispanic candidates and 84 percent of Asian candidates. Ultimately, 21 percent of White Comm/Lit-takers end up teaching for at least three years, compared to only 15 percent of Black Comm/Lit-takers, 19 percent of Hispanic Comm/Lit-takers, and 16 percent of Asian Comm/Lit-takers. In raw numbers, close to 13,000 White Comm/Lit-takers end up teaching for at least three years, compared to barely 1,100 non-White Comm/Lit-takers.

Table 1: Diversity at Each Stage of the Teacher Pipeline

	Public School Students (1)	4-year College Students (2)	Took Comm/Lit MTEL (3)	Ever Passed Comm/Lit (4)	Earned Teaching License (5)	Hired as Teacher (6)	Taught for 3+Years (7)
% White	68.5	66.4	87.0	88.8	89.4	89.0	89.4
% Black	8.3	7.1	3.7	2.8	2.5	2.7	2.7
% Hispanic	15.2	7.4	3.7	3.2	3.1	3.5	3.5
% Asian	5.4	7.7	2.9	2.7	2.6	2.4	2.3
% Other	2.7	11.4	2.7	2.5	2.4	2.4	2.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Column 1 data comes from the NCES Common Core of Data and represents a weighted average of enrollment from the 2007-08 through the 2012-13 school year. Column 2 data comes from IPEDS for the 2007-08 through the 2012-13 school year. Columns 3 - 7 use data from the 2007-13 cohorts of Comm/Lit takers. Columns 3 - 5 draw on data retained by Pearson and DESE on Comm/Lit takers and licensure. Columns 6 -7 come from Massachusetts' Education Personnel Information Management System (EPIMS). Appendix Table A.1 shows diversity within different types of teacher licenses.

Table 2: Comm/Lit-Takers' Persistence Rates Through Teaching Pipeline

	Initial Count (1)	Ever Passed Comm/Lit (2)	Earned Teaching License (3)	Hired as Teacher (4)	Taught for 3+ Years (5)	Final Count (6)
White	61,145	92.0	66.8	34.4	20.8	12,690
Black	2,615	68.4	43.7	24.6	14.5	379
Hispanic	2,619	76.4	53.3	31.6	18.7	491
Asian	2,025	83.7	58.3	28.2	15.9	321
Other	1,868	84.4	58.8	30.2	16.9	316

Notes: Data on Comm/Lit takers, teacher licensure, and teaching personnel come from Pearson and DESE. The sample comprises those who took the Comm/Lit exam for the first time between 2007 and 2013 (because 2007 is the earliest year we observe teachers' first year in the classroom and 2013 is the latest year for which we observe retention for at least three years.

Nearly all of the racial differences in ultimate persistence in the teaching pipeline stem from early differences in Comm/Lit-taking and passing rates. Table 3 shows rates of reaching a given stage in the teaching pipeline conditional on having reached the prior stage. Column 1 shows that 73 percent of White Comm/Lit-passers ultimately earn their teaching license, a relatively similar rate to the 64 to 70 percent rate among non-White Comm/Lit-passers. Column 2 shows that, among those who earn a teaching license, Black and Hispanic teaching candidates are more likely to appear in a teaching position than White candidates, and Asian candidates are only slightly less likely to appear as teachers. Column 3 shows that,

among those initially hired, White teachers appear only slightly more likely to be retained for at least three years relative to non-White teachers. This again suggests that diversity-improving interventions may be more fruitful if focused earlier in the pipeline.

Among Comm/Lit-takers with scores in the top two-thirds of the distribution, there are relatively small racial differences in the probability of becoming a classroom teacher and remaining in the classroom for at least three years. Figure 2 shows the likelihood of such persistence by race and tercile of teachers' reading and writing scores from their first take of the Communications and Literacy

Table 3: Conditional Rates of Persistence Through the Pipeline

|	Passed Comm/Lit (N) (1)	% of MTEL Passers Who Earned License (2)	% of Licensed Hired as Teachers (3)	% of Teachers Retained 3+ Years (4)	Final Count (5)
White	56,254	72.6	51.5	60.4	12,690
Black	1,789	63.9	56.1	59.0	379
Hispanic	2,001	69.7	59.3	59.4	491
Asian	1,695	69.7	48.4	56.1	321
Other	1,576	69.7	51.5	55.9	316

Notes: Data on Comm/Lit-takers, teacher licensure, and teaching personnel come from Pearson and DESE. The sample comprises those who took the Comm/Lit exam for the first time between 2007 and 2013 (because 2007 is the earliest year we observe teachers' first years in the classroom and 2013 is the latest year for which we observe retention for at least three years.)

Figure 2: Retention by First Comm/Lit MTEL Tercile

(a) Reading

(b) Writing
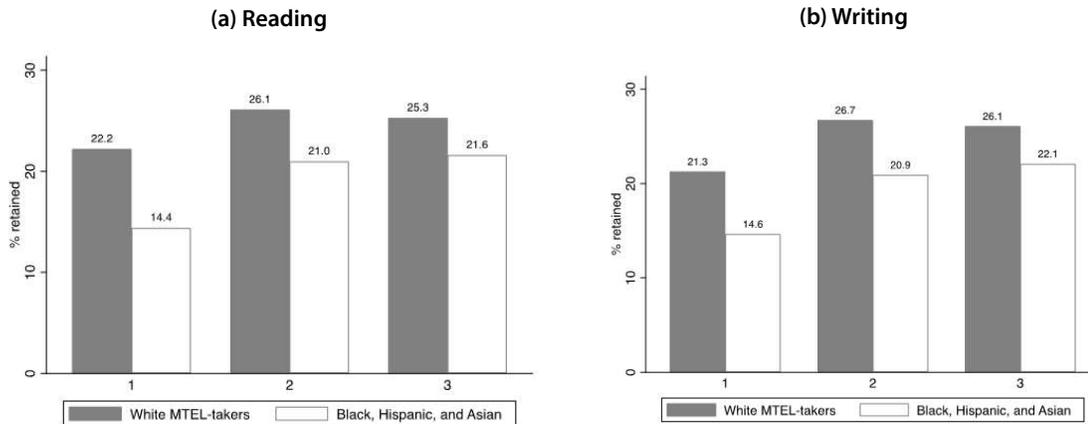
Notes: Figure shows the proportion of Comm/Lit-takers retained through three years of teaching, by race and tercile of first Comm/Lit score. Terciles are constructed within test year.

Figure 3: Retaking by First MTEL Comm/Lit Tercile

(a) Reading

(b) Writing
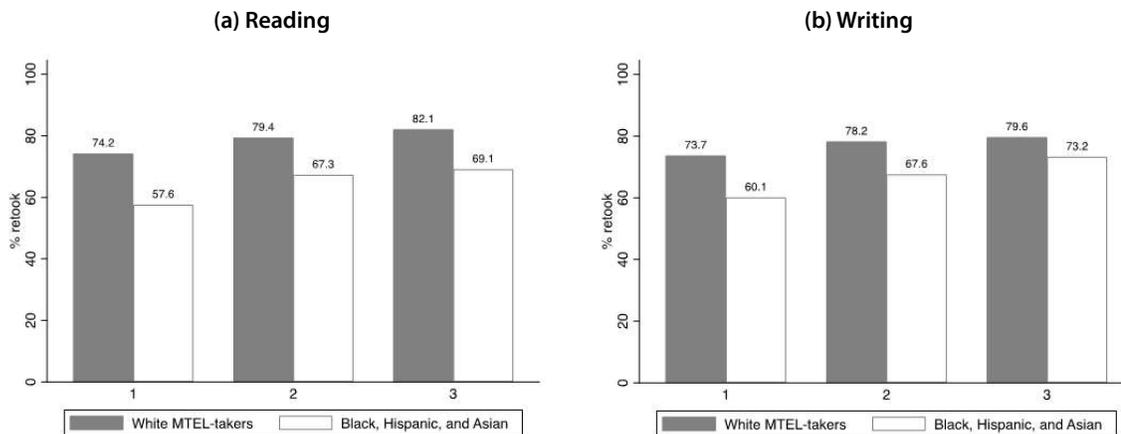
Notes: Figure shows the proportion of MTEL Comm/Lit takers who retake the exam after failing the first time, by race and tercile of first MTEL Comm/Lit score. Terciles are constructed within test years after restricting the sample to teachers who failed the relevant section on their first take.

MTEL. Among those in the middle and top terciles, White test takers are three to five percentage points more likely to persist in teaching than their non-White counterparts, a fairly small difference. There are larger persistence differences among those scoring in the lowest tercile, in part because White Comm/Lit-failers are substantially more likely than non-White Comm/Lit-failers to retake the exam and eventually pass it. Figure 3 plots racial differences in retaking by first Comm/Lit tercile. Within every performance category, Black, Hispanic, and Asian prospective

teachers are less likely to retake the Comm/Lit MTEL than White prospective teachers if they fail the first time.

Finally, we use regression analysis to show that differences in Comm/Lit-passing rates are large and statistically significant, but that smaller, statistically significant racial gaps in pipeline persistence remain even when comparing teaching candidates with similar initial Comm/Lit scores. The first two columns of Table 4 show roughly 10-20 percentage point racial gaps in Comm/Lit-passing rates across all takers and across those for whom we can find a

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Table 4: Persistence Through the Pipeline

	(1)	(2)	(3)	(4)	(5)	(6)
	Passed Comm/Lit MTEL			Passed Other MTEL Test	Earned License	Taught 3+ Years
Black	-0.237*** (0.006)	-0.182*** (0.006)	-0.064*** (0.005)	-0.092*** (0.012)	-0.087*** (0.011)	-0.008 (0.010)
Hispanic	-0.156*** (0.006)	-0.096*** (0.006)	-0.022*** (0.005)	-0.098*** (0.011)	-0.025** (0.011)	0.011 (0.010)
Asian	-0.084*** (0.007)	-0.052*** (0.007)	-0.017*** (0.005)	0.023* (0.013)	-0.038*** (0.012)	-0.040*** (0.011)
MTEL score FE	N	N	Y	Y	Y	Y

Notes: Heteroskedasticity robust standard errors are in parentheses (*p<.10 **p<.05 ***p<.01). All regressions include fixed effects for the year teachers first took the Communications and LIteracy test. Columns (3)-(6) include fixed effects for teachers' reading and writing scores on their first take. The table is restricted to teachers who took the Comm/Lit exam for the first time in 2007-2013. The sample size is 79,852 in column 1 and 69,097 in remaining columns.

comparison candidate with identical Comm/Lit scores. Controlling for such initial scores still shows two to six percentage point gaps in pass rates, due to the previously documented racial differences in retake rates.

The remaining columns of Table 4 compare teachers with similar initial Comm/Lit scores. Each column includes the full sample of Comm/Lit takers whom we were able to match to a candidate with identical scores on their first take, which means that the gaps in column (5) represent combined gaps in passing the Comm/Lit MTEL, passing any other MTEL test, and getting a license, and column (6) analogously measures the combined effects of gaps in all stages of the pipeline up to and including teacher retention.

The results show that comparing teaching candidates with similar initial Comm/Lit scores substantially reduces, but does not fully eliminate, gaps in pipeline persistence. Black and Hispanic Comm/Lit takers are 9-10 percentage points less likely to pass other MTEL tests than their White counterparts with similar initial Comm/Lit scores.[5] Black candidates are nine percentage points less likely than White candidates with similar

Comm/Lit scores to ultimately earn their teaching license, while Hispanic and Asian candidates are 3-4 percentage points less likely to be licensed. These Comm/Lit-passing and licensure gaps, however, do not result in large gaps in ultimate retention among those with similar Comm/Lit scores: relative to White candidates, Black and Hispanic teachers are similarly likely and Asian candidates only four percentage points less likely to teach for at least three years. This makes sense given our result in Table 3 that conditional on receiving a license, Black and Hispanic teachers are actually slightly more likely than White teachers to appear in the classroom. Overall, these results again suggest that major progress will require efforts to recruit a more diverse pool of MTEL-takers and to improve the Comm/Lit-passing rates of non-White MTEL-takers.

3 Conclusion

Much of the low diversity among Massachusetts educators can be explained by early gaps in the human capital and teaching pipelines in the state. Black and Hispanic students in Massachusetts are respectively

13 and 18 percentage points less likely to graduate from high school than White students.[6] Although in-state and out-of-state higher education enrollees are about as diverse as students enrolled in K-12, in-state high school graduates who enroll in a four-year college are about 75 percent White, a proportion 25 percent higher than the state's K-12 population.[7] Fixing racial gaps in high school graduation and college enrollment is thus critical to effecting major changes in the diversity of the teacher workforce in Massachusetts.

Interventions to improve Comm/Lit scores, Comm/Lit retake rates, and licensure among those who pass the Comm/Lit MTEL have the potential to improve the diversity of the teacher workforce.

Even so, gaps at other points along the teacher pipeline suggest potential opportunities for improvements. MTEL Comm/Lit takers are nearly 50% more likely to be White than higher education enrollees in Massachusetts. Minority Comm/Lit-takers score lower than White Comm/Lit-takers, and are less likely to retake the test if they fail the first time. Interventions to improve Comm/Lit scores, Comm/Lit retake rates, and licensure among those who pass the Comm/Lit MTEL have the potential to improve the diversity of the teacher workforce. A highly effective program to increase teacher diversity in the state will likely depend not only on ongoing efforts to close racial achievement gaps in K-12 education, but also on retaining minority students in higher education and implementing targeted recruitment programs for minority teaching candidates.

Endnotes

[1] Lindsay, Blom, & Tilsley, 2017, https://www.urban.org/features/diversifying-classroom-examining-teacher-pipeline.

[2] Putnam, Hansen, Walsh, & Quintero, 2016, https://www.brookings.edu/research/high-hopes-and-harsh-realities-the-real-challenges-to-building-a-diverse-teacher-workforce/; Barnum, 2017, https://www.chalkbeat.org/posts/us/2017/09/12/certification-rules-and-tests-are-keeping-would-be-teachers-of-color-out-of-americas-classrooms-heres-how/.

[3] Because the Comm/Lit test is required of all teachers, and most teachers take it prior to completing a teacher preparation program, we define the start of the teacher pipeline in our data as the point at which teachers take the Comm/Lit test. More information about the certification testing requirements for Massachusetts teachers can be found here: http://www.mtel.nesicn.com/PageView.aspx?f=GEN_WhatTestsDoINeedToTake.html.

[4] Data from 2007-13. As of 2018-19, Massachusetts K-12 students and four-year college enrollees were both roughly 60 percent White.
5 Our measure of whether Comm/Lit takers passed another test excludes ESL and Spanish and Chinese language exams. When language exams are included, the gap for Black teachers is unchanged, but Hispanic and Asian teachers are significantly more likely than White teachers to have passed an additional test.

[6] Data retrieved from http://profiles.doe.mass.edu/grad/grad_report.sapx?orgcode=00000000&orgtypecode=0&.

[7] Data retrieved from http://profiles.doe.mass.edu/nsc/gradsattendingcollege_dist.aspx?orgcode=00000000&fycode=2017&orgtypecode=0&.
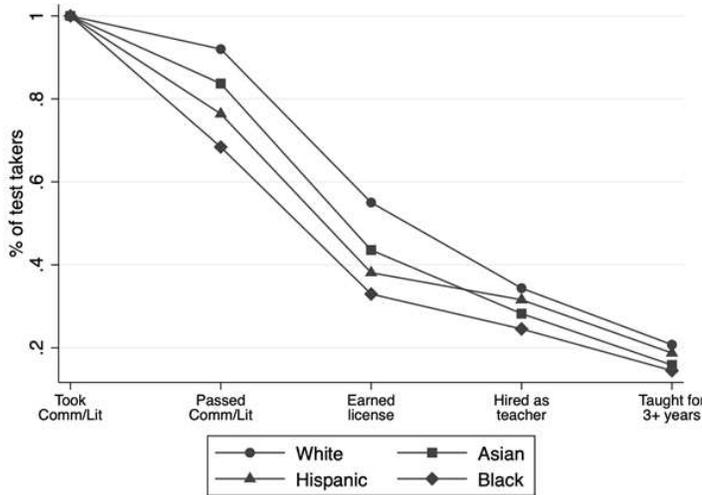
A: Additional Tables and Figures

Figure A.1: Diversity at Each Stage of the Pipeline
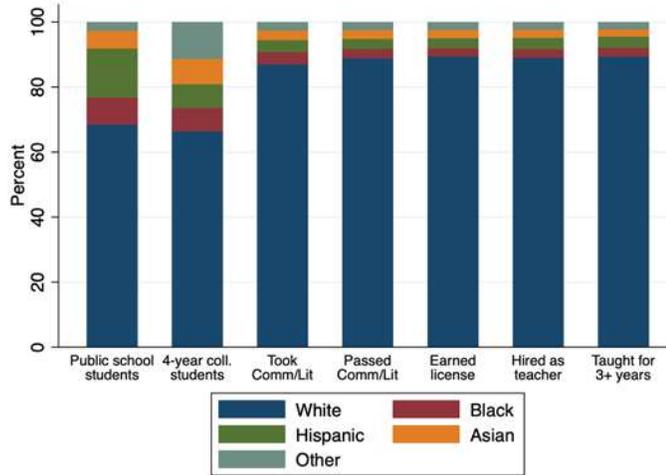
Notes: Figure shows the percentage of candidates at each stage of the pipeline who are identified as White, Black, Hispanic, Asian, or some other race (as shown in Table 1).

Figure A. 2: Persistence of MTEL Comm/Lit Takers Through the Pipeline

Notes: Figure shows the persistence of MTEL Comm/Lit takers through the pipeline, separated by race, as shown in Table 2.

Table A. 1: Diversity Within Different Licensure Types

	Took MTEL (Comm/Lit)	Passed Comm/Lit	Professional License	Initial License	Provisional/ Preliminary	Temporary License
	(1)	(2)	(3)	(4)	(5)	(6)
% White	87.0	88.8	93.5	90.3	86.8	89.0
% Black	3.7	2.8	1.6	2.3	3.1	3.9
% Hispanic	3.7	3.2	1.7	2.7	4.3	2.9
% Asian	2.9	2.7	1.5	2.4	3.1	2.2
% Other	2.7	2.5	1.8	2.2	2.9	2.0

Notes: Data are drawn from Pearson and DESE.