

# The Impact of Same-Race Teachers on Student Non-Test Academic Outcomes

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## Motivation: the Role of Teachers

Disparities in cognitive and socio-emotional skills between minority and non-minority students:

- often arise in the period of early childhood and
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- Attracting effective teachers (Rivkin et al., 2005; Rockoff, 2004; Chetty et al., 2014);
- Teacher-school and teacher-classroom matches (Aucejo et al., 2020; Jackson, 2013);
- Matching minority students with a same-identity teacher (e.g., Dee, 2004; Lindsay and Hart, 2017)

## Research statement

### This paper examines:

- the effects of a same-race teacher on student-teacher communication effectiveness

#### Why is it important?

- ▶ Teachers who are more effective in enhancing non-test academic outcomes are more likely to improve student long-term outcomes (Jackson, 2018).
- ▶ Student-teacher communication modestly predict students' academic test scores (Hamre & Pianta, 2001; Lippard et al., 2018) but is highly correlated with students' social-behavioral development and long-term outcomes (Ansari, Hofkens, & Pianta, 2020).

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- **the potential explanations** behind the effects of a same-race teacher on communication.

## Relation to the Literature

This paper adds to the literature:

- **the effects of same-identity teachers on student non-test academic outcomes** (Eble and Hu, 2019; Gershenson et al., 2016; Egalite and Kisida, 2018; Lindsay and Hart, 2017; Holt and Gershenson, 2019) by providing:
  - new evidence on the effects of a same-race teacher on **student-teacher communication effectiveness**, which may help to explain the long-run effects of same-race teachers (Gershenson et al., 2018)

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  - new evidence on the effects of a same-race teacher on **student-teacher communication effectiveness**, which may help to explain the long-run effects of same-race teachers (Gershenson et al., 2018)
- **teacher-student match effects** (Jackson, 2013; Aucejo et al., 2019) by shedding more light on the explanations behind the effect of matching minority students with a same-race teacher.



## Preview of Results

1. Matching minority students to a same-race teacher enhances communication effectiveness, which can help to explain the positive effects of a same-race teacher on long-term student outcomes (Gershenson et al., 2018)
2. No evidence supporting zero-sum game effects: Black matched students do not gain at the expense of White and other-race students.

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2. No evidence supporting zero-sum game effects: Black matched students do not gain at the expense of White and other-race students.
3. The effect is likely to be driven by a better understanding of same-race teachers, which is in line with the hypothesis of "culturally relevant pedagogy" literature (Irvine, 1989; Ladson-Billings, 1995; Dee and Penner, 2017).

## Identification Strategy and Data(I)

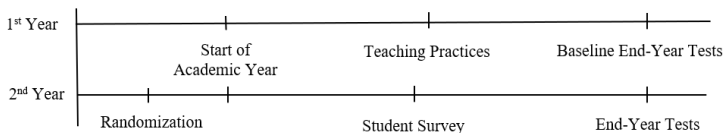
I exploit the **random assignment of teachers** to classes within schools of the Measures of Effective Teaching (MET) project.

### The Random Assignment

- allows me to address the non-random allocation of teachers to classes;
- within-school allocation of teacher - condition on school-grade-subject fixed effects;

Previous studies (Blazar and Kraft, 2017; Aucejo et al., 2019) employed the random assignment of teachers within the MET project to study the impacts of teacher and teacher-class matches on student outcomes.

## The Timeline of MET Project



- Randomization: in the summer of the 2nd year, before start of the academic year
- Teaching Practices: Danielson's (2011) "Framework for Teaching" (FFT) - observational measure
- Student Perception Survey: in the end of Fall semester before state exams

## Identification Strategy and Data(II)

- **The main identification assumption:** the probability of being matched with a same-race teacher is not correlated with observable student characteristics, conditional on school-grade-subject fixed effects. [▶ Balance tests](#)

### Two identification threats:

- **Non-random re-sorting of students** in terms of observable characteristics is not likely to violate the identification assumption and affects the results. [▶ Non-compliance](#)
- **Teacher attrition** - around 10 % of teachers drop out due to the differences in grade/subject they supposed to teach and their choice not to participate (Kane et al., 2013).

## Measures of Effective Teaching Database: Sample and Measures

- Teachers from 5 urban school districts participated in the MET project; [▶ Summary statistics](#)
- Students of primary (4-5th grades) and secondary school (6-8th grades);
- Only randomized teachers and students who comply with the initial assignment to the classroom;

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- Students of primary (4-5th grades) and secondary school (6-8th grades);
- Only randomized teachers and students who comply with the initial assignment to the classroom;
- 41 percent of students are matched with same-race teachers: White students - at 84 percent, Black students are matched at 51 percent.
- Similarly to Alsan et al. (2019, AER), I use student-reported perceptions of teaching practices from the Student Survey to measure communication. [▶ List of Questions](#) [▶ Distribution of Communication](#)

## Results I: The Effects of a Same-Race Teacher on Test Scores

1. A same-race teacher positively influences the performance of Black students on math test scores. ▶ Test scores
2. However, the effects of a same-race teacher on English test scores are small and insignificant.
3. These findings are consistent with previous findings of the randomized STAR study (Dee, 2004) and more recent evidence from observational studies (Joshi, Doan, and Springer, 2018).



## Results II: The Effects of a Same-Race Teacher on Communication

- Black students taught by a same-race teacher report more effective communication than their unmatched Black schoolmates. ▶ Communication
  - ▶ In-group bias: no supporting evidence that Black students systematically better evaluate same-race teachers ▶ In-group bias
- White, Hispanic and other-race students taught by Black teachers are not worse off, suggesting that there are no negative externalities for them.
- Low-performing and female Black students report the largest gain from the exposure to a same-race teacher. ▶ Heterogeneity
- ▶ Other non-test academic outcomes

## Results III: Evidence on Underlying Mechanisms

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- The effect of same-race teachers is not decreasing in the predominantly Black classes, suggesting that Black teachers do not allocate more attention towards same-race students than non-matched students. [▶ Teacher attention](#)
- The findings on the dimensions of communication suggest that the effect is driven by better student understanding of same-race teachers, which aligns with literature on culturally relevant pedagogy.

[▶ Dimensions of Communication](#)

## Conclusion

- To sum up, I find that the Black teachers improve Math test scores of same-race students and do not diminish the performance of White students.
- Being taught by a same-race teacher enhances student-teacher communication effectiveness.
- The evidence suggests that improved communication between Black students and teachers is driven by better teacher explanations and consequent improved student understanding.
- Overall, findings suggest that training non-minority teachers using a culturally relevant pedagogy may improve the performance of minority students in the short-term by complementing the diversification of the teacher labor force.

## How Much does Communication Explains the Effect of a Same-Race Teacher on Test Scores?

- To answer this question, I conduct a mediation analysis.
- I find that communication explains around 4 % of the effect of a same-race teacher on test scores. [▶ Mediation analysis](#)
- However, these results should be taken with caution due to:
  - ▶ measurement error in communication; [▶ Measurement error](#)
  - ▶ possible bias (Bullock et al., 2010; Glyn, 2012)

## Teacher Characteristics and Quality

|            | Years of<br>Experience<br>(1) | Master<br>Degree<br>(2) | Prior FFT<br>Math<br>(3) | Prior FFT<br>English<br>(4) | Prior VA<br>Math<br>(5) | Prior VA<br>English<br>(6) |
|------------|-------------------------------|-------------------------|--------------------------|-----------------------------|-------------------------|----------------------------|
| Black mean | 6.84                          | 0.49                    | 2.58                     | 2.61                        | 0.035                   | -0.003                     |
| White mean | 8.73                          | 0.21                    | 2.65                     | 2.70                        | 0.009                   | 0.003                      |
| P values   | 0.110                         | 0.000                   | 0.460                    | 0.198                       | 0.217                   | 0.441                      |

Notes: Table reports means of teacher characteristics by race. P-values are taken from the Kolmogorov-Smirnov test.

## Main Identification Assumption [▶ Back](#)

**Table 1. Balance tests**

| Outcome =                               | Black students    |                   | White students    |                   |
|---|-------------------|-------------------|-------------------|-------------------|
|   | English           | Math              | English           | Math              |
| Same-Race Teacher                       | (1)               | (2)               | (3)               | (4)               |
| Prior test score                        | -0.024<br>(0.016) | -0.031<br>(0.021) | 0.008<br>(0.09)   | 0.006<br>(0.012)  |
| English language learner status         | -0.107<br>(0.144) | -0.067<br>(0.099) | 0.005<br>(0.09)   | -0.046<br>(0.039) |
| Free or reduced-price lunch eligibility | -0.021<br>(0.026) | 0.001<br>(0.027)  | 0.003<br>(0.024)  | -0.008<br>(0.015) |
| 'Gifted' status                         | 0.038<br>(0.063)  | 0.070<br>(0.063)  | 0.000<br>(0.031)  | 0.031<br>(0.026)  |
| Male Student                            | -0.021<br>(0.020) | 0.013<br>(0.016)  | -0.014<br>(0.018) | 0.003<br>(0.018)  |
| SPED Student                            | 0.001<br>(0.045)  | -0.041<br>(0.056) | 0.014<br>(0.031)  | -0.006<br>(0.019) |
| Observations                            | 1,050             | 875               | 1,032             | 807               |
| R-squared                               | 0.6465            | 0.6975            | 0.5621            | 0.7348            |
| Joint test F-statistics                 | 0.75              | 1.24              | 0.22              | 0.76              |
| [p-value]                               | 0.6125            | 0.2929            | 0.9697            | 0.6064            |

Notes: The dependent variable is an indicator for having a same-race teacher in 2011, regressed on student characteristics, controlling for randomization block or school by grade by subject fixed effects. Standard errors in parentheses are clustered at school level.



# Non-compliance of students to classrooms with randomly assigned teachers

[▶ Back](#)

| Outcome =<br>Non-complier             | Math Classes<br>(1)             | English Classes<br>(2) |
|---------------------------------------|---------------------------------|------------------------|
| Black Teacher                         | 0.025<br>(0.029)                | 0.016<br>(0.023)       |
| Male Teacher                          | 0.012<br>(0.021)                | 0.083<br>(0.064)       |
| Prior Value-Added                     | -0.026<br>(0.051)               | 0.050<br>(0.058)       |
| Teacher Experience                    | <b>0.003*</b><br><b>(0.002)</b> | -0.001<br>(0.001)      |
| Prior Classroom Average Test<br>Score | 0.013<br>(0.038)                | 0.007<br>(0.039)       |
| Fraction of Black students            | 0.031<br>(0.181)                | 0.066<br>(0.198)       |
| Fraction of Hispanic students         | -0.079<br>(0.117)               | 0.003<br>(0.202)       |
| Fraction of Other-race<br>students    | -0.056<br>(0.101)               | 0.328<br>(0.304)       |
| Fraction of ELL students              | -0.099<br>(0.101)               | -0.121<br>(0.130)      |
| Fraction of 'Gifted' students         | -0.119<br>(0.211)               | -0.054<br>(0.106)      |
| Fraction of Male students             | -0.008<br>(0.121)               | -0.020<br>(0.198)      |
| Fraction of FRL students              | 0.117<br>(0.158)                | -0.029<br>(0.090)      |
| Classroom SPED students               | 0.048<br>(0.155)                | 0.138<br>(0.158)       |
| Observations                          | 5,156                           | 5,861                  |
| R-squared                             | 0.7212                          | 0.6426                 |
| F-statistic                           | 0.73                            | 0.42                   |
| p-value                               | 0.7434                          | 0.9656                 |

**Note:** This table reports the results from the one regression in which the outcome variable is non-compliance status of students, which equals one if student is a non-complier and zero otherwise. Non-compliers are students who were initially assigned to a class with randomly assigned teachers but specifically opted out for another class or school. Students who were initially assigned to classes taught by teachers with more experience are more likely to be non-compliers. The impact

## The Impacts of a Same-Race Teacher on Test Scores [▶ Back](#)

| Subjects                   | Math    |         | English |         |
|----------------------------|---------|---------|---------|---------|
| Black T × Black S          | 0.199*  | 0.181*  | -0.005  | -0.033  |
|                            | (0.111) | (0.107) | (0.071) | (0.076) |
| Black T × White S          | 0.085   | 0.065   | -0.093  | -0.123  |
|                            | (0.102) | (0.101) | (0.101) | (0.110) |
| White T × White S          | 0.054   | 0.055   | -0.001  | -0.007  |
|                            | (0.049) | (0.049) | (0.045) | (0.046) |
| Male Teacher               |         | -0.058  |         | -0.089  |
|                            |         | (0.060) |         | (0.083) |
| Prior Teacher Value-Added  |         | 0.313*  |         | -0.005  |
|                            |         | (0.187) |         | (0.191) |
| Within-District            |         | -0.001  |         | 0.006** |
| Teacher Experience         |         | (0.003) |         | (0.003) |
| Prior Teaching Practices   |         | -0.064  |         | -0.159* |
| FFT Communication          |         | (0.079) |         | (0.095) |
| Prior Classroom Perception |         | 0.027   |         | 0.025   |
| of Teaching Practices      |         | (0.021) |         | (0.025) |
| R-squared                  | 0.739   | 0.741   | 0.685   | 0.687   |
| Observations               | 1,504   | 1,504   | 1,972   | 1,972   |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and

## Results II: The Impacts of a Same-Race Teacher on Student-Teacher Communication Effectiveness [▶ Back](#)

| Outcome = Communication | English classes    |                    | Math classes       |                    |
|-------------------------|--------------------|--------------------|--------------------|--------------------|
| Black T × Black S       | 0.329**<br>(0.166) | 0.338**<br>(0.156) | 0.348**<br>(0.141) | 0.294**<br>(0.144) |
| Black T × White S       | 0.102<br>(0.174)   | 0.098<br>(0.155)   | 0.047<br>(0.161)   | 0.011<br>(0.153)   |
| White T × White S       | -0.003<br>(0.071)  | -0.010<br>(0.072)  | 0.028<br>(0.095)   | 0.027<br>(0.094)   |
| Black T × Hispanic S    | -0.073<br>(0.164)  | -0.034<br>(0.157)  | 0.063<br>(0.145)   | 0.015<br>(0.139)   |
| Black T × Other-race S  | 0.060<br>(0.144)   | 0.081<br>(0.125)   | -0.058<br>(0.218)  | -0.101<br>(0.212)  |
| Teacher controls        | No                 | Yes                | No                 | Yes                |
| R-squared               | 0.193              | 0.204              | 0.194              | 0.195              |
| Observations            | 2,970              | 2,970              | 2,364              | 2,364              |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and randomization block fixed effects. Standard errors in parentheses are clustered at the level of randomization block. \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

## In-group bias [▶ Back](#)

| Math-specific outcomes | Happiness         |                   | Like Classes       |                    |
|------------------------|-------------------|-------------------|--------------------|--------------------|
|                        | (1)               | (2)               | (3)                | (4)                |
| Black T × Black S      | 0.018<br>(0.162)  | -0.049<br>(0.166) | 0.027<br>(0.110)   | -0.008<br>(0.115)  |
| Black T × White S      | -0.139<br>(0.153) | -0.186<br>(0.148) | -0.089<br>(0.147)  | -0.115<br>(0.139)  |
| White T × White S      | 0.089<br>(0.089)  | 0.092<br>(0.089)  | -0.120*<br>(0.071) | -0.121*<br>(0.072) |
| Teacher controls       | No                | Yes               | No                 | Yes                |
| R-squared              | 0.151             | 0.157             | 0.191              | 0.196              |
| Observations           | 2,333             | 2,333             | 2,364              | 2,364              |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices and randomization block fixed effects. Standard errors in parentheses are clustered at the level of randomization block. \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

## Summary Statistics

|   | Mean  | St. deviation | Min   | Max   |
|---|-------|---------------|-------|-------|
| <b>Panel A: Student Characteristics</b> |       |               |       |       |
| Black                                   | 0.21  | 0.41          | 0.00  | 1.00  |
| Hispanic                                | 0.40  | 0.49          | 0.00  | 1.00  |
| White                                   | 0.28  | 0.45          | 0.00  | 1.00  |
| Other race                              | 0.11  | 0.31          | 0.00  | 1.00  |
| Male                                    | 0.48  | 0.50          | 0.00  | 1.00  |
| ELL                                     | 0.14  | 0.34          | 0.00  | 1.00  |
| Gifted Status                           | 0.10  | 0.30          | 0.00  | 1.00  |
| Special Education Status                | 0.07  | 0.25          | 0.00  | 1.00  |
| FRL                                     | 0.60  | 0.49          | 0.00  | 1.00  |
| Age                                     | 10.48 | 1.51          | 7.62  | 14.56 |
| Prior Math Test Scores                  | 0.25  | 0.91          | -3.00 | 3.17  |
| Prior English Test Scores               | 0.25  | 0.94          | -2.93 | 2.87  |

## Summary Statistics [▶ Back](#)

|   | Mean | St. deviation | Min   | Max   |
|---|------|---------------|-------|-------|
| <b>Panel B: Teacher Characteristics</b> |      |               |       |       |
| Black                                   | 0.26 | 0.44          | 0.00  | 1.00  |
| White                                   | 0.74 | 0.44          | 0.00  | 1.00  |
| Male                                    | 0.17 | 0.37          | 0.00  | 1.00  |
| Experience within district              | 8.26 | 7.34          | 0.00  | 41.00 |
| Master degree                           | 0.27 | 0.45          | 0.00  | 1.00  |
| Prior Teaching Practices                | 2.62 | 0.35          | 1.59  | 3.50  |
| FFT: Communication                      |      |               |       |       |
| Prior Value-Added                       | 0.09 | 0.216         | -1.06 | 0.67  |
| <b>Panel C: Outcomes</b>                |      |               |       |       |
| Communication                           | 0.06 | 0.91          | -4.49 | 1.77  |
| Clarify                                 | 0.04 | 0.59          | -3.31 | 1.43  |
| Confer                                  | 0.02 | 0.68          | -3.62 | 1.36  |
| Care                                    | 0.06 | 0.79          | -3.27 | 1.44  |
| Consolidate                             | 0.05 | 0.79          | -2.54 | 1.20  |
| Captivate                               | 0.03 | 0.79          | -2.51 | 1.24  |
| Challenge                               | 0.03 | 0.68          | -3.5  | 0.95  |
| Control                                 | 0.05 | 0.70          | -2.49 | 1.37  |

Notes: The sample comprises data on the 2010-2011 school year in which teachers were randomly assigned to classes within randomization blocks.

## Student Perception Survey: Questions Related to Student-Teacher Communication Effectiveness

- If you don't understand something, my teacher explains it another way (Teacher Explanation).
- My teacher has several good ways to explain each topic that we cover in this class (Teacher Explanation: Several Ways)
- My teacher explains difficult things clearly (Clear Explanation).
- My teacher knows when the class understands, and when we do not (Class Understanding).
- My teacher asks questions to be sure we are following along when he/she is teaching (Clarifying Questions).
- My teacher checks to make sure we understand what he/she is teaching us (Checking Understanding).
- My teacher wants us to share our thoughts (Thoughts Sharing).

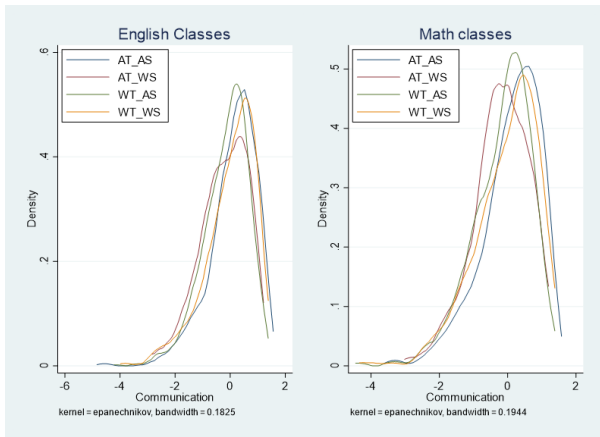
## Student Perception Survey: Questions Related to Student-Teacher Communication Effectiveness

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- Students speak up and share their ideas about class work (Students Speak Up).
- My teacher gives us time to explain our ideas (Time to Explain).
- My teacher wants me to explain my answers – why I think what I think (Student Explanation).
- My teacher takes the time to summarize what we learn each day (Teacher Summarizing).
- In this class, we learn to correct our mistakes (Correcting mistakes).
- My teacher in this class makes me feel that she/he really cares about me (Care).
- My teacher seems to know if something is bothering me (Understanding of feelings).



## Distribution of Communication by Racial Group [▶ Back](#)



Notes: AT\_AS stands for Afro-American student taught by Afro-American teacher.

AT\_WS refers to White students taught by Afro-American teacher.

WT\_WS and WT\_AS stand for White and Afro-American students taught by White teachers.

## Results III: Impact of a Same-Race Teacher on Dimensions of Teacher-Student Communication [▶ Back](#)

| Components of Communication          | Black T ×<br>Black S<br>(1) | Black T ×<br>White S<br>(2) | White T ×<br>White S<br>(3) | $R^2$<br>(4) |
|--------------------------------------|-----------------------------|-----------------------------|-----------------------------|--------------|
| Teacher Explanation                  | 0.254**<br>(0.108)          | -0.012<br>(0.124)           | 0.012<br>(0.063)            | 0.155        |
| Teacher Explanation:<br>Several ways | 0.347***<br>(0.113)         | 0.130<br>(0.143)            | -0.042<br>(0.060)           | 0.148        |
| Clear Explanation                    | 0.302***<br>(0.109)         | 0.153<br>(0.120)            | 0.012<br>(0.054)            | 0.169        |
| Class Understanding                  | 0.285***<br>(0.092)         | 0.104<br>(0.131)            | -0.017<br>(0.063)           | 0.137        |
| Clarifying Questions                 | 0.175**<br>(0.070)          | 0.095<br>(0.100)            | 0.032<br>(0.058)            | 0.131        |
| Checking Understanding               | 0.139<br>(0.092)            | 0.035<br>(0.102)            | -0.005<br>(0.054)           | 0.176        |
| Thoughts Sharing                     | 0.268*<br>(0.151)           | 0.131<br>(0.112)            | -0.001<br>(0.069)           | 0.169        |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and

## Results III: Impact of a Same-Race Teacher on Components of Teacher-Student Communication [▶ Back](#)

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|-----------------------------|----------------------------|----------------------------|----------------------------|--------------|
| Students Speak Up           | 0.316**<br>(0.133)         | 0.159<br>(0.139)           | -0.023<br>(0.072)          | 0.129        |
| Student Explanation         | 0.270***<br>(0.102)        | 0.187*<br>(0.112)          | 0.102*<br>(0.059)          | 0.121        |
| Time to Explain             | 0.211*<br>(0.117)          | 0.088<br>(0.137)           | 0.024<br>(0.066)           | 0.161        |
| Teacher Summarizing         | 0.195*<br>(0.117)          | -0.041<br>(0.137)          | -0.061<br>(0.079)          | 0.160        |
| Correcting mistakes         | 0.173*<br>(0.096)          | 0.048<br>(0.104)           | -0.111**<br>(0.048)        | 0.167        |
| Care                        | 0.371***<br>(0.137)        | 0.149<br>(0.156)           | 0.142*<br>(0.079)          | 0.208        |
| Understanding of feelings   | 0.176<br>(0.174)           | 0.088<br>(0.164)           | 0.041<br>(0.084)           | 0.121        |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and

## Mediation analysis [▶ Back](#)

| Outcome = Math test scores | (1)               | (2)                | (3)              | (4)                |
|----------------------------|-------------------|--------------------|------------------|--------------------|
| Black T × Black S          | 0.229*<br>(0.132) | 0.220*<br>(0.129)  | 0.219<br>(0.136) | 0.213<br>(0.133)   |
| Black T × White S          | 0.064<br>(0.114)  | 0.065<br>(0.111)   | 0.050<br>(0.113) | 0.050<br>(0.110)   |
| White T × White S          | 0.061<br>(0.053)  | 0.059<br>(0.054)   | 0.064<br>(0.054) | 0.063<br>(0.054)   |
| Communication              |                   | 0.044**<br>(0.017) |                  | 0.043**<br>(0.017) |
| Teacher Characteristics    | No                | No                 | Yes              | Yes                |
| R-squared                  | 0.742             | 0.744              | 0.744            | 0.746              |
| Observations               | 1,241             | 1,241              | 1,241            | 1,241              |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and randomization block fixed effects. Standard errors in parentheses are clustered at the level of randomization block. \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Reverse regression [▶ Back](#)

| Outcome = Communication | (1)                 | (2)                | (3)                 | (4)                 |
|-------------------------|---------------------|--------------------|---------------------|---------------------|
| Black T × Black S       | 0.169<br>(0.164)    | 0.118<br>(0.142)   | 0.308**<br>(0.127)  | 0.241**<br>(0.116)  |
| Black T × White S       | -0.037<br>(0.213)   | -0.016<br>(0.209)  | -0.000<br>(0.161)   | -0.006<br>(0.161)   |
| White T × White S       | 0.026<br>(0.107)    | 0.010<br>(0.108)   | -0.001<br>(0.086)   | -0.013<br>(0.087)   |
| Math test score         | 0.167***<br>(0.061) | 0.160**<br>(0.062) | 0.118***<br>(0.036) | 0.107***<br>(0.035) |
| Teacher Characteristics | No                  | No                 | Yes                 | Yes                 |
| R-squared               | 0.251               | 0.266              | 0.183               | 0.194               |
| Observations            | 1,241               | 1,241              | 2,848               | 2,848               |

Notes: The first two columns present the results of sample limited to White and Black students, while Columns 3-4 include also Hispanic and other-race students. Standard errors in parentheses are clustered at the level of randomization block.

\*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The results suggest that under assumption of CME the effect of communication on test scores is downward biased due to measurement error in communication.

# The Effects of a Same-Race Teacher on Other Non-Test Academic Outcomes

[▶ Back](#)

| Math-specific outcomes  | Grit    |         | Effort  |         | Skills maleability |         |
|-------------------------|---------|---------|---------|---------|--------------------|---------|
|                         | (1)     | (2)     | (3)     | (4)     | (5)                | (6)     |
| Black T × Black S       | 0.263*  | 0.260*  | 0.130   | 0.128   | -0.042             | -0.030  |
|                         | (0.151) | (0.150) | (0.130) | (0.129) | (0.139)            | (0.136) |
| Black T × White S       | 0.035   | 0.046   | -0.041  | -0.033  | -0.236             | -0.229  |
|                         | (0.150) | (0.150) | (0.137) | (0.142) | (0.165)            | (0.166) |
| White T × White S       | -0.099  | -0.104  | -0.133* | -0.139* | -0.132             | -0.135* |
|                         | (0.097) | (0.099) | (0.071) | (0.071) | (0.081)            | (0.081) |
| Black T × Hispanic S    | -0.151  | -0.150  | -0.183  | -0.175  | -0.028             | -0.009  |
|                         | (0.141) | (0.138) | (0.114) | (0.111) | (0.119)            | (0.118) |
| Black T × Other-Race S  | 0.081   | 0.078   | -0.031  | -0.041  | -0.303             | -0.299  |
|                         | (0.194) | (0.195) | (0.180) | (0.186) | (0.211)            | (0.208) |
| Teacher Characteristics | No      | Yes     | No      | Yes     | No                 | Yes     |
| R-squared               | 0.168   | 0.169   | 0.113   | 0.117   | 0.172              | 0.174   |
| Observations            | 2,036   | 2,036   | 2,284   | 2,284   | 2,229              | 2,229   |

Notes: The comparison group is Black students taught by White teachers. Models control for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and randomization block fixed effects. Standard errors in parentheses are clustered at the level of randomization block. \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

## Results V: Heterogeneity of the Effect of a Same-Race Teacher on Communication: by Student Characteristics [▶ Back](#)

| Outcome =<br>Communication               | All classes<br>(1)  | English classes<br>(2) | Math classes<br>(3) |
|--|---------------------|------------------------|---------------------|
| Black T × Black S<br>(Same-race teacher) | 0.394***<br>(0.127) | 0.393**<br>(0.161)     | 0.351**<br>(0.176)  |
| Same-race teacher ×<br>Prior Test Score  | -0.045<br>(0.052)   | -0.102*<br>(0.059)     | -0.047<br>(0.076)   |
| Same-race teacher ×<br>Male Student      | -0.125*<br>(0.069)  | -0.142<br>(0.104)      | -0.143<br>(0.122)   |
| Observations                             | 5,369               | 2,970                  | 2,364               |
| R-squared                                | 0.191               | 0.204                  | 0.200               |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and randomization block fixed effects. Standard errors in parentheses are clustered at the level of randomization block. \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

## Results IV: Heterogeneity of the Effect of a Same-Race Teacher on Communication: by Racial Composition of Class [▶ Back](#)

| Outcome =<br>Communication                         | All classes        | English classes   | Math classes       |
|--|--------------------|-------------------|--------------------|
| Black T × Black S                                  | 0.364**<br>(0.142) | 0.367*<br>(0.206) | 0.356**<br>(0.172) |
| Black T × Black S ×<br>Predominantly Black Classes | -0.045<br>(0.177)  | -0.073<br>(0.234) | -0.025<br>(0.206)  |
| Black T × White S                                  | 0.104<br>(0.136)   | 0.115<br>(0.181)  | 0.050<br>(0.163)   |
| White T × White S                                  | 0.017<br>(0.057)   | 0.006<br>(0.071)  | 0.029<br>(0.094)   |
| Predominantly Black Classes                        | 0.316<br>(0.645)   | 0.305<br>(0.660)  | 0.423*<br>(0.216)  |
| Observations                                       | 5,372              | 2,970             | 2,364              |
| R-squared  | 0.186              | 0.194             | 0.194              |

Notes: The comparison group is Black students taught by White teachers. Models include controls for predetermined student characteristics, including prior test scores, student ELL status, SPED status, 'gifted' status, free and reduced-price lunch eligibility, gender, age; teacher gender, prior value-added, prior observed teaching practices in communication and randomization block fixed effects. Standard errors in parentheses are clustered at the level of randomization block. \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$



## References

- Alsan, M., Garrick, O., Graziani, G. (2019). Does diversity matter for health? experimental evidence from oakland. *American Economic Review*, 109 (12), 4071-4111.
- Aucejo, E. M., Coate, P., Fruehwirth, J. C., Kelly, S., Mozenter, Z., White, B. (2019). Match effects in the teacher labor market: Teacher effectiveness and classroom composition.
- Blazar, D., Kraft, M. A. (2017). Teacher and teaching effects on students' attitudes and behaviors. *Educational evaluation and policy analysis*, 39 (1), 146-170.
- Chetty, R., Friedman, J. N., Rockoff, J. E. (2014). Measuring the impacts of teachers ii: Teacher value-added and student outcomes in adulthood. *American economic review*, 104 (9), 2633-79.
- Dee, T. S. (2004). Teachers, race, and student achievement in a randomized experiment. *Review of economics and statistics*, 86 (1), 195-210.
- Dee, T. S. (2005). A teacher like me: Does race, ethnicity, or gender matter? *American Economic Review*, 95 (2), 158-165.
- Egalite, A. J., Kisida, B. (2018). The effects of teacher match on students' academic perceptions and attitudes. *Educational Evaluation and Policy Analysis*, 40 (1), 59-81.
- Egalite, A. J., Kisida, B., Winters, M. A. (2015). Representation in the classroom: The effect of own-race teachers on student achievement. *Economics of Education Review*, 45 , 44-52.
- Gershenson, S., Hart, C. M., Hyman, J., Lindsay, C., Papageorge, N. W. (2018). The long-run impacts of same-race teachers (Tech. Rep.). National Bureau of Economic Research.
- Gershenson, S., Holt, S. B., Papageorge, N. W. (2016). Who believes in me? the effect of student-teacher demographic match on teacher expectations. *Economics of education review*, 52 , 209-224.
- Graham, B. S., Ridder, G., Thiemann, P. M., Zamarro, G. (2020). Teacher-to-classroom assignment and student achievement (Tech. Rep.). National Bureau of Economic Research.

## References

- Holt, S. B., Gershenson, S. (2019). The impact of demographic representation on absences and suspensions. *Policy Studies Journal*, 47 (4), 1069-1099.
- Irvine, J. J. (1989). Beyond role models: An examination of cultural influences on the pedagogical perspectives of black teachers. *Peabody Journal of Education*, 66 (4), 51-63.
- Jackson, C. K. (2013). Match quality, worker productivity, and worker mobility: Direct evidence from teachers. *Review of Economics and Statistics*, 95 (4), 1096-1116.
- Jackson, C. K. (2018). What do test scores miss? the importance of teacher effects on non-test score outcomes. *Journal of Political Economy*, 126 (5), 2072-2107.
- Joshi, E., Doan, S., Springer, M. G. (2018). Student-teacher race congruence: New evidence and insight from tennessee. *AERA Open*, 4 (4), 2332858418817528.
- Kane, T. J., McCaffrey, D. F., Miller, T., Staiger, D. O. (2013). Have we identified effective teachers? validating measures of effective teaching using random assignment. In Research paper. met project. Bill Melinda Gates foundation.
- Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American educational research journal*, 32 (3), 465-491.
- Penney, J. (2017a). Racial interaction effects and student achievement. *Education Finance and Policy*, 12 (4), 447-467.
- Penney, J. (2017b). An instructor like me: Uncovering the channels of racial interactions.
- Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American economic review*, 94 (2), 247-252.
- Todd, P. E., Wolpin, K. I. (2007). The production of cognitive achievement in children: Home, school, and racial test score gaps. *Journal of Human capital*, 1 (1), 91-136.
- Wedenoja, L., Papay, J. P., Kraft, M. A. (2020). Second time™s the charm? How repeat student teacher matches build academic and behavioral skills. Working Paper. Retrieved from <https://scholar.harvard.edu/files/mkraft/files/repeatteachers20200721.pdf>.