Implicit Stereotypes in Teachers' Track Recommendations

By Michela Carlana, Eliana La Ferrara and Paolo Pinotti*

Research on discrimination in economics has traditionally adopted either the "taste-based discrimination" perspective (Becker et al., 1957) or the "statistical discrimination" perspective (Arrow et al., 1973; Phelps, 1972). Both perspectives presume that it is a conscious decision that leads individuals to discriminate, either because they are willingly prejudiced or because they are rational agents unable or unwilling to obtain additional information (Small and Pager, 2020). Yet, individuals may discriminate even without choosing to do so. Motivated by a psychological literature, economists have put forward implicit discrimination as an alternative form of discrimination that operates even without an explicit intention to harm a particular group, or not even the awareness of doing that (Bertrand et al., 2005).

In this paper, we focus on the role of teachers' implicit stereotypes toward immigrants in explaining their high-school track recommendation to students. We find that

teachers with negative stereotypes toward immigrants are more likely to recommend low-quality high schools to immigrant students and less likely to encourage them to attend top-tier tracks, compared to natives with similar ability and background characteristics.

Teachers' expectations and stereotypes affect long-term educational careers of students (Papageorge et al., 2020; Carlana, 2019), even without explicit "animus" or endorsement of negative stereotypical views. Implicit stereotypes, embedded in the over-generalized representations of differences between groups (Bordalo et al., 2016), may affect teachers' interaction with students and prevent teachers from unlocking students' potential. Stereotypes lead to discriminatory behavior when members of the stigmatized group are treated less favorably than members of the majority group with similar characteristics (Bertrand and Duflo, 2017). Such stereotypes may give rise to a self-fulfilling prophecy if they are internalized by the students, who start behaving in the direction predicted by the stereotype (Glover et al., 2017).

In schooling systems where high school choice requires selecting into different tracks, such as those of many OECD countries, teachers' stereotypes play an additional role in suggesting the track most suitable for different groups of students. For example, teachers' track recommendation may play a crucial role for high-ability students from disadvantaged families in enhancing equality of opportunities (Brunello and Checchi, 2007). Immigrants are particularly vulnerable to biased recommendation when choosing a high school track, as their family may have a more limited information set on the local schooling system and they may give a higher weight to the teachers' suggestions (Dustmann et al., 2017; Carlana et al., 2022).

We measure implicit stereotypes using an *Implicit Association Test* (IAT) (Greenwald and Banaji, 1995). IATs were developed almost three decades ago, but there is still limited evidence outside lab settings on whether they predict actual behavior of individuals (Rooth, 2010; Glover et al., 2017; Carlana, 2019), as apparent also from the heated debate among social psychologists (Blanton et al., 2009; Oswald et al., 2013). Our paper contributes to this debate by showing that teachers' implicit stereotypes towards immigrants do predict their track recommendations in a real world educational setting. This is an ideal context where we can observe a high-stake choice by teachers directly from administrative data, without issues related to social desirability bias in reporting.

The rest of the paper is organized as follows. First, we briefly describe the data, sample, and empirical strategy. Then, we present the results on immigrant-native gaps in teachers' recommendation and the association with teachers' stereotypes. We conclude with a discussion on how to address implicit discrimination.

I. Data and Empirical Strategy

A. Teachers' Recommendations and Track Choice

High school choice is an important early-career decision for children in all schooling systems characterized by tracking (Giustinelli, 2016; Card and Giuliano, 2016). In Italy, during grade 8 (age 13-14), students and their families have to choose a track that will affect the curriculum they study and the peers they interact with in the following five years of high school. The high-school system is organized into three main tracks -academic, technical, and vocational- and several sub-tracks. In practice, the scientific and classical academic tracks are considered the top-tier, while vocational is the bottom-tier track. Children with an immigrant background disproportionately enroll into the vocational track and shy away from top-tier tracks, even after one controls for student ability as measured by standardized test scores (columns 1 and 2, Table A1).

In the middle of grade 8, teachers jointly give a formal track recommendation to each student. This recommendation is shared with the student's family and is included among the administrative data available to the Ministry of Education. As shown in Table A1 of the Online Appendix, teachers' track recommendation is highly correlated with the actual track choice of students, even after controlling for students' background (notably for a cubic polynomial of the standardized test score in grade 8, parental background and student characteristics, and class fixed effects).

B. Implicit Association Test

The Implicit Association Test (IAT) is a tool developed by social psychologists and aimed at capturing the strength of the association between two concepts (Greenwald and Banaji, 1995). Roughly speaking, participants are asked to quickly sort words or pictures into categories that are in the top-left or top-right corner of the screen. The speed at which they perform this task conveys information on how closely the individuals associate these categories with the word or picture that they see. In our case, we focus on the implicit stereotypes associating native/immigrant names with positive/negative adjectives. We implemented this IAT with a large sample of teachers in Italian middle schools.[1] The results of the test are condensed into a d-score (Greenwald et al., 2003), which we label as *IAT* and which takes higher values the more a teacher associates immigrants with negative features, relative to natives.

C. Sample

From September 2016 to March 2017, we collected original survey data from math and literature teachers in 102 schools in the North of Italy. The survey included teachers' implicit stereotypes toward immigrants (IAT), as well as information on

---

[1] Details on the IAT we implemented are available in Appendix B of (Alesina et al., 2018).

teachers' background and explicit attitudes. The full sample includes 1384 teachers. We matched teacher surveys with administrative data on students, including their high-school track choice and teachers' track recommendation. Detailed information on the data, including descriptive statistics for students and teachers, are available in Alesina et al. (2018). In this paper, we focus on the sample of teachers and students for whom we have information on the IAT, teachers' track recommendation, and students' track choice.[2] We include in the analysis 23,061 students from 1,262 classes. The math and literature teachers are the main teachers in terms of hours taught, and they are typically the most influential in determining the (joint) track recommendation for each student. When we have survey data from both teachers for the same student (40% of the sample) we calculate the average of the two IAT scores, otherwise we use the IAT of the available teacher.

D. Empirical Strategy

We estimate the following equation:

$$(1) \quad \begin{aligned} Y_{ic} = {}& \beta_0 + \beta_1 Immigrant_{ic} * IAT_c + \\ & + \beta_2 Immigrant_{ic} + \mathbf{X}_{ic}\rho + \eta_c + \epsilon_{ic} \end{aligned}$$

where Y_{ic} is the track recommended to student i in class c; IAT_c is the d-score of the Implicit Association Test described in section I.B; $Immigrant_{ic}$ is an indicator for whether the student is a immigrant[3]; $\mathbf{X}_{ic}$ is a vector of controls including the cubic polynomial of the standardized test score in grade 8, gender, mother's education and occupation; and η_c denotes class fixed effects. We cluster standard errors at the class level.

[2]Given that our main specification includes class fixed effects, we drop around 5% of the sample for whom we have less than 10 observations in the same class with a complete set of information. Our results are not significantly affected by this choice.

[3]Both first and second generation immigrants are considered in $Immigrant_{ic}$.

II. Results

A. Gaps in Track Recommendation

Table 1 shows that immigrant children are 20 percentage points more likely to be recommended for the vocational track and 10 percentage points less likely to be recommended for a competitive top-tier track, compared to their classmates (column 1). The difference is in part explained by their ability, but even after controlling for the cubic polynomial of the standardized test score, we do find persistent native-immigrant gaps (column 2). This result has important consequences, as teachers' track recommendation is likely to provide a particularly relevant signal for children from an immigrant background, who often have more limited knowledge of the education system and of the opportunities offered by different tracks, with deep implications for their educational career (Dustmann et al., 2017).

B. Teachers' Implicit Stereotypes

Figure 1 provides an intuitive graphical representation of the main result of this paper. The horizontal axis measures teachers' IAT score: a higher value of this score implies a stronger association between Native-Positive and Immigrant-Negative. On the vertical axis, we plot the residual of the teachers' track recommendation controlling for the student's standardized test score and class fixed effects. The light solid line refers to immigrants and the dark solid line to natives; dashed lines represent 95% confidence intervals. In the top panel of the figure, we show the track recommendation to vocational high school, while in the bottom panel we show the top-tier recommendation. The slope of the light line provides evidence that teachers with stronger implicit stereotypes are more likely to recommend immigrants for a vocational track (top panel) and less likely to recommend them for a top-tier track (bottom panel). By contrast, teachers' stereotypes toward immigrant students do not affect the recommendation that native students get, as

shown by the dark lines. Therefore, the upgrading of recommendations to immigrant students does not come at the expense of native students.

Columns 3 and 4 of Table 1 quantify the visual evidence in Figure 1 and show that the results are robust to the inclusion of the cubic polynomial of the standardized test score and student-level controls described in equation 1. One standard deviation increase in the IAT score (0.24) is associated with a 2.5 percentage point higher probability of being recommended to the vocational track and a 1.2 percentage point lower probability of being recommended to a top-tier track for immigrants. These estimates imply that, *ceteris paribus*, the probability that an immigrant gets recommended for the vocational track increases by 16.2% and the probability of being recommended for a top-tier track decreases by 21.2% if they are assigned to a teacher with "strong" stereotypes compared to a teacher with no stereotypes.[4] If all teachers had no stereotypes, the immigrant-native gap in teachers' top-tier track recommendation conditional on measured ability would be closed, and the gap for vocational track recommendations would be reduced by more than 50%.

III. Conclusions

Teachers' expectations play an important role in shaping students' educational careers and may lead to a self-fulfilling prophecy if children internalize low beliefs on their educational success (Rosenthal and Jacobson, 1968; Papageorge et al., 2020). Implicit stereotypes affect teachers' interaction with students even when teachers are not aware or do not intend to harm the stigmatized group. In this paper, we show that teachers with stronger negative implicit stereotypes toward immigrants are less likely to encourage them to attend a top-tier high school and more likely to push

them toward vocational track. Teacher stereotypes, on the other hand, are not associated with the track recommendation for native students.

General debiasing messages and awareness campaigns provide an interesting and scalable avenue to mitigate the negative impact of stereotypes (Boring and Philippe, 2021), but revealing own implicit stereotypes may be more effective to target the most biased teachers (Alesina et al., 2018). More research is necessary to provide robust evidence across different contexts on how to effectively address implicit discrimination and prejudice (Paluck et al., 2021).

REFERENCES

Alesina, A., Carlana, M., La Ferrara, E., and Pinotti, P. (2018). Revealing stereotypes: Teacher bias and immigrants performance. *NBER Working Paper 25333*.

Arrow, K. J. et al. (1973). *The theory of discrimination*. Princeton University Press.

Becker, G. S. et al. (1957). *Economics of Discrimination*. University of Chicago Press.

Bertrand, M., Chugh, D., and Mullainathan, S. (2005). Implicit discrimination. *American Economic Review*, pages 94–98.

Bertrand, M. and Duflo, E. (2017). Field experiments on discrimination. *Handbook of Economic Field Experiments*, pages 309–393.

Blanton, H., Jaccard, J., Klick, J., Mellers, B., Mitchell, G., and Tetlock, P. E. (2009). Strong claims and weak evidence: Reassessing the predictive validity of the IAT. *Journal of Applied Psychology*, 94(3):567.

Bordalo, P., Coffman, K., Gennaioli, N., and Shleifer, A. (2016). Stereotypes. *The Quarterly Journal of Economics*, 131(4):1753–1794.

Boring, A. and Philippe, A. (2021). Reducing discrimination in the field: Evidence from an awareness raising intervention targeting gender biases in student

---

[4]We consider a teacher with no implicit stereotypes as someone with $IAT score = 0$, and a teacher with strong stereotypes as someone with $IAT score = 0.75$, where 0.75 is the average value for 28% of teachers in our sample that have "severe" stereotypes according to the threshold defined by Greenwald et al. (2003), that is, $IAT score > 0.6$.

Recommendation: Vocational Track

Recommendation: Top Tier Track

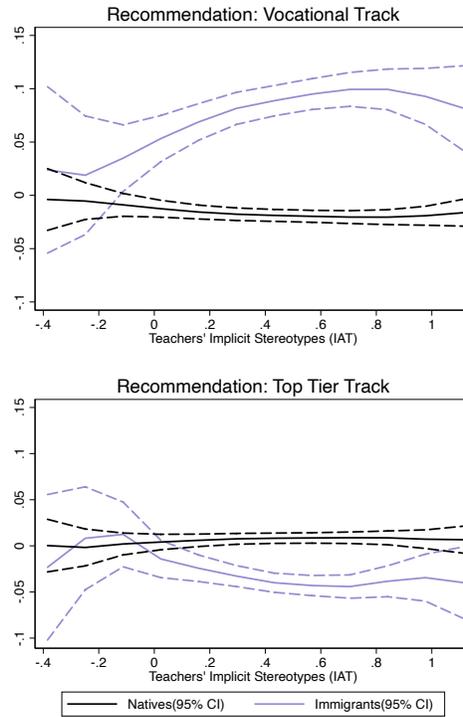Natives(95% CI)   Immigrants(95% CI)

FIGURE 1. TEACHERS: TRACK RECOMMENDATION AND IAT SCORE

Note: We calculate the residuals of teachers' track recommendation to a vocational and top-tier track controlling for the standardized test score (INVALSI) and class fixed effects. This graph shows the residuals of teachers' track recommendation on the vertical axis and the average of the IAT score of teachers on the horizontal axis. Students in this sample completed grade 8 between school years 2013-2014 and 2015-2016.

evaluations of teaching. *Journal of Public Economics*, 193:104323.

Brunello, G. and Checchi, D. (2007). Does school tracking affect equality of opportunity? New international evidence. *Economic policy*, 22(52):782–861.

Card, D. and Giuliano, L. (2016). Can tracking raise the test scores of high-ability minority students? *American Economic Review*, 106(10):2783–2816.

Carlana, M. (2019). Implicit stereotypes: Evidence from teachers' gender bias. *The Quarterly Journal of Economics*, 134(3):1163–1224.

Carlana, M., La Ferrara, E., and Pinotti, P. (2022). Goals and gaps: Educational careers of immigrant children. *Econometrica*.

Dustmann, C., Puhani, P. A., and Schönberg, U. (2017). The long-term effects of early track choice. *The Economic Journal*, 127(603):1348–1380.

Giustinelli, P. (2016). Group decision making with uncertain outcomes: Unpacking child–parent choice of the high school track. *International Economic Review*, 57(2):573–602.

Glover, D., Pallais, A., and Pariente, W. (2017). Discrimination as a self-fulfilling prophecy: Evidence from French grocery stores. *The Quarterly Journal of Economics*, 132(3):1219–1260.

Greenwald, A. G. and Banaji, M. R. (1995). Implicit social cognition: attitudes, self-esteem, and stereotypes. *Psychological review*, 102(1):4.

Greenwald, A. G., Nosek, B. A., and Ba-

Table 1—Teachers' IAT and Track Recommendation

	(1)	(2)	(3)	(4)
Dep. Var.: = 1 if student recommended for vocational track				
Immigrant	0.202	0.094	0.043	0.024
	(0.010)	(0.009)	(0.020)	(0.020)
IAT*Immigrant			0.108	0.103
			(0.039)	(0.039)
Mean Y Natives	0.271	0.271	0.271	0.271
Mean Y Immigrants	0.501	0.501	0.501	0.501
Obs.	23061	23061	23061	23061
R^2	0.141	0.348	0.351	0.362
Dep. Var.: = 1 if student recommended for top-tier track				
Immigrant	-0.104	-0.030	-0.007	0.002
	(0.007)	(0.006)	(0.014)	(0.014)
IAT*Immigrant			-0.049	-0.045
			(0.026)	(0.025)
Mean Y Natives	0.234	0.234	0.234	0.234
Mean Y Immigrants	0.173	0.173	0.173	0.173
Obs.	23061	23061	23061	23061
R^2	0.172	0.322	0.323	0.332
Class FE	Yes	Yes	Yes	Yes
Test Score	No	Yes	Yes	Yes
Controls	No	No	No	Yes

Note: This table reports OLS estimates, where the dependent variable is a dummy which assumes value 1 if the teachers recommended vocational track to the student in grade 8, and the unit of observation is student i in class c. "IAT" is the raw score of IAT. "Test Score" indicates the cubic polynomial of INVALSI test score in grade 8 and a dummy variable which assumes value 1 if the value is missing. Controls include gender of the student and mother's education and occupation.

naji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of personality and social psychology*, 85(2):197.

Oswald, F. L., Mitchell, G., Blanton, H., Jaccard, J., and Tetlock, P. E. (2013). Predicting ethnic and racial discrimination: A meta-analysis of IAT criterion studies. *Journal of Personality and Social Psychology*, 105(2):171.

Paluck, E. L., Porat, R., Clark, C. S., and Green, D. P. (2021). Prejudice reduction: Progress and challenges. *Annual review of psychology*, 72(1):533–560.

Papageorge, N. W., Gershenson, S., and Kang, K. (2020). Teacher expectations matter. *The Review of Economics and Statistics*, 102(2):234–251.

Phelps, E. (1972). The statistical theory of

racism and sexism. *The American Economic Review*, 62(4):659–61.

Rooth, D.-O. (2010). Automatic associations and discrimination in hiring: Real world evidence. *Labour Economics*, 17(3):523–534.

Rosenthal, R. and Jacobson, L. (1968). Pygmalion in the Classroom. *The Urban Review*, 3(1):16–20.

Small, M. L. and Pager, D. (2020). Sociological perspectives on racial discrimination. *Journal of Economic Perspectives*, 34(2):49–67.

ONLINE APPENDIX

TABLE A1—TRACK CHOICE AND TEACHERS' TRACK RECOMMENDATION

	(1)	(2)	(3)	(4)
Panel A: Dep. Var.:= 1 if student attends vocational track				
Recommendation Vocational	0.390	0.351	0.350	0.338
	(0.007)	(0.008)	(0.008)	(0.008)
Immigrant	0.035	0.023	0.014	0.003
	(0.007)	(0.007)	(0.007)	(0.007)
Mean Y Natives	0.137	0.137	0.137	0.137
Mean Y Immigrants	0.262	0.262	0.262	0.262
Obs.	23061	23061	23061	23061
R^2	0.251	0.264	0.267	0.337
Panel B: Dep. Var.: $= 1$ if student attends top-tier track				
Recommendation Top-Tier	0.676	0.588	0.561	0.558
	(0.007)	(0.009)	(0.010)	(0.010)
Immigrant	-0.061	-0.024	-0.010	0.003
	(0.007)	(0.006)	(0.007)	(0.007)
Mean Y Natives	0.319	0.319	0.319	0.319
Mean Y Immigrants	0.173	0.173	0.173	0.173
Obs.	23061	23061	23061	23061
R^2	0.378	0.411	0.432	0.491
Test Score	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Class FE	No	No	No	Yes

Note: This table reports OLS estimates, where the dependent variable is a dummy which assumes value 1 if the student chooses to attend vocational (Panel A) or a top-tier track (Panel B), and the unit of observation is student i in class c. The recommendation is a dummy for the teachers' track recommendation. Controls include gender of the student and mother's education and occupation.