Speaking the same language – The effect of foreign origin teachers on students' language skills

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Abstract

Population diversity arising from international migration does not only affect the labor market but also its training ground—the classroom. The economics literature studies the large and persistent achievement gap between native and foreign origin students, but surprisingly little is known about the effect of having a foreign origin teacher on students' academic achievements. In this study, I investigate whether having a foreign origin teacher causally affects the language skills of students in German secondary school, holding constant both observed and unobserved factors related to academic outcomes. Exploring within-student variation in assignment to teachers, due to student mobility and teacher turnover, I am the first to show that foreign origin teachers significantly increase the reading comprehension of students. Most notable is the positive effect of foreign origin teachers who report a mother tongue other than German. They increase reading comprehension scores universally. Ruling out alternative explanations, I argue that bilingual teachers are particularly well-equipped in teaching languages to both native and foreign origin students.

JEL-Classification: J13, J15, I24

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1 Introduction

International migration does not only affect the labor force, it also increases the diversity in classrooms around the world. In OECD countries, more than 25 percent of 15-34 year-olds report a foreign origin, and the share of foreign origin students continues to rise (OECD, 2018). In most OECD countries, the share of foreign origin teachers is comparably small but increasing. In Germany, for example, the share of foreign origin teachers rose from 7.8 percent of all primary and secondary school teachers, in 2012, to approximately 10.7 percent, in 2016 (Statistisches Bundesamt, 2018).

Political institutions such as, the German *Federal Office for Migration and Refugees*, promote the "fast and sustainable" recruitment of foreign origin teachers to facilitate the integration of foreign origin students in both, the educational system and the labor force (Bundesamt für Migration und Flüchtlinge, 2010). Yet, we know surprisingly little about the effect of foreign origin teachers on students' academic achievements. Are foreign origin teachers better equipped in helping children with migration background to overcome potential language barriers and socio-economic disadvantages? And how do they affect the achievement of native students? For the US, the literature has shown that minority students benefit from same-race teachers (e.g., Dee, 2004; Gershenson *et al.*, 2016), but it is unclear if these findings can be transferred to the European migration context.

This study provides empirical evidence on the effect of foreign origin teachers on students' language skills in Germany. In doing so, it contributes to a small but growing literature on foreign teacher effects. From the broader literature of education economics, I derive two reasons for why foreign origin teachers might affect students' academic achievement differently than native teachers. First, foreign origin teachers have different *language skills* than native teachers. On the one hand, foreign origin teachers could be less proficient in the language of instruction. On the other hand, they could communicate course content to foreign origin students in a language or manner these students are more familiar with (Seah, 2018a).

Second, *student-teacher matching* may affect academic achievement. Matching effects comprise two complementary channels that can make demographic matching of students and teachers particularly advantageous for matched students. A *role model effect* describes a positive reaction of foreign-born students to foreign-born teachers. Triggered by the teacher's presence, rather than an explicit behavior, the foreign origin students' beliefs about their educational possibilities may change and they become more enthusiastic, confident, and engaged. A *teacher bias effect* refers to the teacher's behavior. Foreign origin teachers may display origin-specific patterns of behavior, they may allocate more class time to interacting with students who share the same background, they may prepare class material more oriented towards same origin students, or they may favor them in their grading (Dee, 2007). Given the different channels, the effect of having a foreign origin teacher on students' language skills is theoretically inconclusive.

A small strand of the literature on education economics discusses language skills. Early studies analyze the effect of foreign teaching assistants on the academic achievements of undergraduate students (Borjas, 2000; Asano, 2008). The ambiguous effects found by these studies can be explained by the non-random assignment of teaching assistants across students. More recently, Seah (2018a) examines the effect of having a linguistically-similar teacher on the academic achievements of secondary school students in the United States. Using data from the National Education Longitudinal Study of 1988 (NELS), he exploits within-student variation in test scores and the native language of teachers across two subjects. He finds no effect of being assigned to a linguistically similar teacher once the teacher's ethnicity is controlled for. In related work, Chin *et al.* (2013) evaluate the effect of a bilingual education program on the achievement of limited English proficient (LEP) students and their classmates. Employing a regression-discontinuity design, they find no impact on the achievement of students for whom the program was designed (LEP students), but estimate a positive effect for their classmates.

Other studies discuss matching effects with respect to teacher-student characteristics, mostly gender and race (e.g., Dee, 2004; Bettinger and Long, 2005; Hoffmann and Oreopoulos, 2009; Fairlie *et al.*, 2014; Antecol *et al.*, 2015). Dee (2004) examines test score data from the Project STAR class-size experiment, which randomly matches students and teachers within participating schools. He shows that assignment to an own-race teacher significantly increases math and reading achievement of both black and white students. Egalite *et al.* (2015) confirm the positive effect of teacher-student race matching using administrative data from Florida. The study most closely related to this paper, Seah (2018b), uses data from the NELS and investigates the effect of immigrant teachers on 8th graders in the US. He compares student achievements within school and within student across subject and finds no adverse effect of immigrant teachers on the achievement of (native) students.

Empirically, role model and teacher bias effects are difficult to disentangle, but some studies on gender matching make important contributions to understand the drivers at work (e.g., Bettinger and Long, 2005; Paredes, 2014; Antecol *et al.*, 2015). Paredes (2014) employs Chilean data and studies gender matching effects on academic achievement. She finds that girls benefit from having female teachers and argues that her results are explained by a role model rather than teacher bias effect. More specifically, she shows that the effect is only significant for subjects with lower proportions of female teachers and for girls with less educated mothers.

Other studies directly test for teacher bias and discrimination effects. Dee (2005) exploits student-specific evaluations from teachers and shows that ethnic matching between student and teacher has large effects on teachers' perception of students' performances. Similarly, Gershenson *et al.* (2016) find that non-black teachers have significantly lower educational expectations for black students, and Hinnerich *et al.* (2015) show that native Swedes are graded significantly better by their teacher in comparison to a blind grading of an external evaluator. Evidence from Germany finds teacher discrimination for essay grades for students with a Turkish-sounding first name (Sprietsma, 2013) and grade penalties in primary school for second generation immigrants (Kiss, 2013). Foreign origin teachers might mitigate such discriminating effects.

Using data from the German National Educational Panel Study (NEPS) (Blossfeld, 2011), I investigate whether having a foreign origin teacher causally affects students' reading comprehension in lower secondary school, holding constant both observed and unobserved time-invariant factors related to academic outcomes. Exploiting within-student variation in assignment to teachers, resulting from student mobility and teacher turnover, I show that foreign origin teachers increase objective reading comprehension. The effect is strongest for foreign origin students and can partly be explained by a positive role model effect. More specifically, foreign origin students perceive their teacher more favorably and increase their reading frequency outside of school when they are taught by a foreign origin teacher. The positive effect on reading comprehension is strongest for foreign origin teachers who report a mother tongue other than German. They increase test scores meaningfully for both native and foreign origin students. Ruling out alternative explanations, I argue that bilingual teachers are particularly well-equipped in teaching languages.

This study contributes to the literature in three ways. First, this study identifies a causal relationship between teachers' foreign origin and students' achievement in an European country. To my knowledge, this is the first study providing such evidence. Given the large and persistent achievement disparity between native and foreign origin students in many European countries (e.g., Schnepf, 2007; Algan *et al.*, 2010; Dustmann *et al.*, 2010), this research question fills an important gap. Second, the data allow me to contribute to the discussion on teacher bias versus role model effects. The data do not only provide information on objective test scores but also on subjective teacher grading and survey questions on students' perception of their teacher. Third, I am the first to investigate the particular role of foreign origin teachers in the context of language acquisition. My results point to a special ability of bilingual teachers in teaching language skills to students.

The remainder of the study is organized as follows. Section 2 gives a short institutional overview of the German school system, and Section 3 introduces the empirical strategy. Section 4 discusses the data employed and Section 5 presents the findings. Section 6 concludes.

2 Institutional Background

A key feature of the German education system is that students are usually tracked after four years of elementary schooling.[1] Students are separated based on their academic ability and enter into one of the secondary school tracks, namely lower-secondary track (*Hauptschule*), middle-secondary track (*Realschule*) and upper-secondary track (*Gymnasium*).[2] *Hauptschule* is designed to provide practical education and prepare students for vocational education (until grade 9); *Realschule* has a broader range of emphasis for intermediate students (until grade 10); and *Gymnasium* qualifies students for higher education (until grade 12 or 13).[3] Depending on the federal state, the track is determined by parental choice or a binding teacher recommendation based on the students' academic achievement and ability to work independently. Schooling is compulsory for nine or ten years, depending on the federal state. Typically, students finish the track they have been assigned to, but switching tracks is possible and became more common in recent years.

A second relevant feature of the German education system is that teaching is organized in classes rather than courses. More specifically, class refers to a group of up to 30 students who are allocated by their school's headmaster to the same classroom upon entry into secondary school. All students in one class share the same teacher for a given subject. In contrast to the US, students do not take different courses in the same subject based on their proficiency. Further, teachers do not specialize in teaching a particular grade but are assigned by the school's headmaster to certain classes on a yearly basis. Typically, the composition of students in a class changes rarely throughout the school years.

Most German teachers are graduates of a formal teaching education program (*Lehramtstudium*). Conditional on having earned a degree that qualifies for tertiary education, teacher training for secondary education comprises two components. First, teacher candidates complete four to six years of university courses covering the two subjects they later want to teach in combination with some pedagogical training. At the end of the first

[1] In the federal states of Berlin and Brandenburg students are tracked after six years of schooling.

[2] Additionally, there are comprehensive schools (*Gesamtsschulen*) that combine all education types and amount to 12 percent of all German secondary schools (Malecki *et al.*, 2014).

[3] See Figure A1 for an illustration of the German education system.

phase, the candidate takes exams on pedagogic and theoretical knowledge of the subjects studied. In addition to the grades earned at the university level, this comprises the first state examination grade. Second, candidates participate for 18-24 months in a practical program of teaching seminars (*Referendariat*) at a teaching training school. During this phase, the candidates have teaching positions, they complete a thesis, and deliver demonstration lessons rated by head teachers. The combination of exams, assessments of the demonstration lessons, and the thesis grade sum up to the second state examination.

The second state examination is compulsory to become a civil servant.[4] Candidates who have studied abroad can only become civil servants by exhibiting comparable educational attainment, or by obtaining the second state examination. Ultimately, the grade of the second state examination, in combination with the local demand for teachers, determines the school a teacher is assigned to. Teaching candidates without the second state examination can be hired on regular salaried positions without having the civil servant status. For subjects with teacher scarcity, even teachers without a formal teacher training are eligible (*Quereinsteiger*).

3 Empirical Strategy

An ideal empirical setting to study the effect of having a foreign origin teacher on students' academic achievement requires teachers to be randomly allocated across classes. Otherwise, simple OLS regressions might lead to biased estimates due to two main threats to identification: First, native and foreign origin teachers might self-select into schools with students who systematically differ with respect to their proficiency. In Germany, residential sorting by socio-economic status produces significant quality differences between schools even within small geographical areas (Noreisch, 2006). Additionally, in most federal states, teachers are allocated to schools partly based on their second state examination grade. If foreign origin teachers were better teachers and had better grades, they could, for example, be more likely to be allocated to schools with better performing students. This would lead

[4] In most federal states, teachers become civil servants. Nevertheless, approximately 1 in 4 teachers are hired as an employee rather than a civil servant.

to an overestimation of a positive effect of foreign origin teachers.

Second, within schools, the headmaster might allocate teachers to more or less proficient classes based on foreign origin or confounding factors correlated with foreign origin. For example, foreign origin teachers could be more often allocated to classes with a high share of foreign origin students, and, thus more heterogeneous classes. If the class heterogeneity is negatively correlated with student performance, a positive effect of foreign origin teachers would be underestimated.

In order to address these biases, I use longitudinal data with class fixed effects. In doing so, I estimate the effect of having a foreign origin teacher within classes using variation in teacher assignment over time.

For the class fixed effects specification, I estimate the model

$$y_{iclt} = \beta FT_{ct} + \phi' X_{it} + \gamma' C_l + \rho_c + \delta_t + \varepsilon_{iclt} \tag{1}$$

where y_{iclt} is the outcome of student i, in class c with teacher l in year t. FT_{ct} is a dummy variable for the teacher being of foreign origin and X_{it} is a vector of observed student characteristics. C_l denotes a vector of observed teacher characteristics and ρ_c is a class fixed effect. δ_t captures year dummies and ε_{iclt} is the error term.

In line with the education production function, Eq. (1) represents the return to both individual characteristics as well as teacher characteristics. The main variable of interest is FT_{ct} and the parameter β which captures the effect of having a foreign origin teacher. If β>0, foreign origin teachers positively affect student achievement. The opposite is true if β<0. The key assumption is that there is no unobserved factor that is correlated with both students' outcomes and the assignment of teachers to classes.

If teacher assignment within class is not random, the error term in Eq. (1) will correlate with FT_{ct}. Then, OLS is an inconsistent estimator of β. Empirically, I cannot test for non-random teacher assignment over time, but I can test for systematic sorting of teachers to classrooms. In doing so, I regress observed student characteristics on the probability of having a teacher of foreign origin. If foreign origin teachers are randomly allocated across classes, then the coefficient on teacher origin would be zero. Table A1 presents the results of this balancing test. For most cases, we cannot reject the hypothesis that the correlation between student characteristics and foreign origin teacher is equal to zero. The coefficients of most student observable characteristics are close to zero and precisely estimated. However, non-random teacher assignment regarding students' foreign origin cannot be ruled out.

Further sources of endogeneity could arise from changes in class compositions over time and unobserved student characteristics. Therefore, I extent Eq. (1) and include student fixed effects into the model. This within-student identification strategy employs variation in assignment to teacher due to student mobility and teacher turnover and accounts for time-invariant student heterogeneity (e.g., with respect to student ability or motivation). This strategy yields unbiased estimators if there are no unobserved, time-varying student-specific factors that are correlated with both students' outcomes and class assignment.

For the student fixed effects specification, I estimate the model

$$y_{iclt} = \beta FT_{ct} + \phi' X_{it} + \gamma' C_l + \omega_i + \rho_c + \delta_t + \varepsilon_{iclt} \tag{2}$$

where ω_i are student fixed effects.

4 Data and Descriptive Statistics

This chapter employs data from the German Educational National Panel Study (NEPS) (Blossfeld, 2011). The NEPS has a multi-cohort design and draws from a representative sampling of students from six starting cohorts. The survey follows students as they move through the education system and contains questionnaires answered by persons in the students' personal environment, such as parents, teachers and headmasters. Starting cohort 3 (SC3) of the NEPS provides unique information on teachers' origin.

The sampling population of SC3 contains all German fifth graders in schools offering lower secondary education in school year 2010/11. First, schools are randomly drawn from the population of public schools to be representative by school type.[5] Second, a class is randomly selected within each school (see Steinhauer and Zinn, 2016, for sampling design). Participation is voluntary and implies that students answer a questionnaire as well as complete the competency tests. In particular, students are interviewed about their socioeconomic background. The teacher questionnaire contains information on the teachers' demographics as well as aspects of their career choice and studies. I disregard interview data on parents and headmasters in order to minimize sample attrition.

For the empirical analysis, I use the SC3 data following students from grade 5 to 9. This age cohort is particular suitable for the research question as the first five years of secondary schooling are compulsory and crucial for lifelong education outcomes (Angrist and Krueger, 1991).

In order to determine the students' foreign origin, I employ three variables provided by the NEPS dataset. i. Students are asked which citizenship they hold. If they report any (additional) nationality other than German, I code them as foreign origin. ii. Interviewers further record the students' country of origin. Non-German groups of origin are coded as foreign origin. iii. Students are directly asked about having a Russian or Turkish migration background. If they state either of those migration backgrounds, I code them as foreign origin.[6]

To determine German language teachers' foreign origin, I use two variables. i. Teachers are asked about their migration background, namely if they are foreign born or if they have at least one foreign-born parent. ii. Teachers report their mother tongue, meaning the language they learned as a child in the family. If they mention a mother tongue additional to German, or other than German, I code them as foreign origin. If teachers do not report a migration background or a mother tongue, I code them as native Germans.

Besides containing unique information on teacher origin, the NEPS has the advantage of providing objective and unidimensional competence scores. For the empirical analysis,

[5]Students from schools with a predominant foreign teaching language and students who are not able to participate in the normal testing procedure are excluded.

[6]This question does not bias the sample towards students of Russian and Turkish background. It only identifies an additional 6 percent of foreign origin students.

I focus on reading comprehension score as the main outcome variable. It is designed to measure the ability to understand and use written texts, which is an important precondition to develop personal skills and participate in social life and in the labor force (Gehrer *et al.*, 2012). As promoting reading comprehension is also one of the key objectives of German language classes, we can attribute this skill to the domain of the German language teacher.

A relevant feature of the competence tests is that they are conducted by NEPS interviewers. They take place between November and January in every other school year and cannot be manipulated by the German language teacher. This is particular relevant in our setting, where teacher bias effects might be at work. Reading comprehension is assessed by multiple choice questionnaires, which test the understanding of five text functions and associated text types, namely informational, commenting, instructional, advertising and literary texts. The reading competence test takes 28 minutes per text function and is adjusted to the thematic orientation, lexical, semantic, and grammatical properties of the specific age cohort (Gehrer *et al.*, 2012). The answers to the multiple choice questions are aggregated by a weighted maximum likelihood estimation and constrained to having a mean of zero in the first wave. This ensures that scores are comparable across different survey waves.

Several restrictions are imposed on the data. From the initially 6,527 students, 6,485 were observed in the years where the test was conducted. Of those, 362 students were dropped because they did not participate in the competence test. 5,754 students can be linked to their German language teacher and context data is available for 719 German language teachers of 4,720 students.[7]

In order to illustrate the data at hand, Table 1 presents descriptive statistics for the students observed. The first variable describes the main outcome variable, i.e., the objective reading comprehension scores tested by the NEPS team. The average of 0.29 indicates that the reading comprehension in our sample has increased over time.[8] Out of

[7] To avoid further sample attrition, I keep teacher observations with missing information if the teacher answers at least two questions used for the control variables.

[8] Further, the sample is slightly skewed towards higher achieving students as the average reading comprehension in grade 5 is 0.07 rather than 0.

Table 1: Descriptive Statistics – Students

	Mean	Std. Dev.	Min	Max	Student Obs.	Panel Obs.
Main outcome variable						
Reading comprehension	0.285	1.30	−4	6	4,720	7,346
Student characteristics						
Female	0.494	0.50	0	1	4,720	7,346
Foreign origin	0.345	0.48	0	1	4,720	7,346
Birth month						
January	0.081	0.27	0	1	4,720	7,346
February	0.078	0.27	0	1	4,720	7,346
March	0.084	0.28	0	1	4,720	7,346
April	0.079	0.27	0	1	4,720	7,346
May	0.078	0.27	0	1	4,720	7,346
June	0.085	0.28	0	1	4,720	7,346
July	0.090	0.29	0	1	4,720	7,346
August	0.092	0.29	0	1	4,720	7,346
September	0.091	0.29	0	1	4,720	7,346
October	0.081	0.27	0	1	4,720	7,346
November	0.080	0.27	0	1	4,720	7,346
December	0.079	0.27	0	1	4,720	7,346
Birth year						
1995	0.000	0.01	0	1	4,720	7,346
1997	0.002	0.04	0	1	4,720	7,346
1998	0.045	0.21	0	1	4,720	7,346
1999	0.412	0.49	0	1	4,720	7,346
2000	0.530	0.50	0	1	4,720	7,346
2001	0.010	0.10	0	1	4,720	7,346
2002	0.000	0.01	0	1	4,720	7,346
Grade	6.649	1.57	5	9	4,720	7,346
Grade repeated	0.025	0.16	0	1	4,720	7,346
Household size	4.439	1.38	1	10	4,720	7,346
Other outcome variables						
Mathematical literacy	0.304	1.23	−5	5	4,720	7,346
German grade	4.377	0.82	1	6	3,921	4,692
German teacher has class under control	3.702	1.18	1	5	4,662	7,208
German teacher expects me to try my very best	4.028	0.89	1	5	4,660	7,198
Reading frequency on a school day	0.828	0.75	0	2	4,620	7,117

Notes: – The descriptive statistics are weighted to account for differences in the number of observations per student.

the 4,720 students in the sample, 35 percent are of foreign origin. This is in line with recent statistics of the German Microzensus, which estimate a share of foreign origin students of 38 percent in 2017 (Statistisches Bundesamt, 2017). The most common countries of origin in the data are Russia, Turkey, and Poland, which together account for 45 percent of foreign origin students. The sample is balanced with respect to gender, and almost 95 percent of the students are either born in 1999 or 2000. The sample contains observations from grade 5, 7, 9, because reading comprehension is only tested in those grades.[9] The grade average of 6.65 indicates that the sample is slightly skewed towards lower grades. This can be explained by sample attrition as well as by the 3 percent of repeated grades. The average household size is 4 and around 80 percent of students live in households of 3

[9]The missing years are not necessary a concern, as teachers typically change classes every 2 years implying that a teacher teaching a certain subject in grade 5 (7) is likely to teach the same class in grade 6 (8).

to 5 people.

Besides student characteristics, Table 1 provides information on further outcome variables. It shows an average mathematical literacy score of 0.30, indicating that the mathematical literacy also increases over time. The German grade corresponds to the subjective grade given by the German teacher at the end of the school year and ranges from one to six. Here, six corresponds to an outstanding achievement while one (and two) refers to an insufficient achievement. The most prevalent grade is satisfactory (4), which 44 percent of students receive. The NEPS data also contain survey questions on how students perceive their teachers. Students are asked to agree with certain statements about their German language teacher on a scale ranging from 1 to 5.[10] 31 percent of students completely agree that their teacher has the class under control. The students' self-reported frequency of reading on a school day is transformed into a variable ranging from zero to two (hours). On an average school day, most students read around 45 minutes outside of school.

The characteristics of native and foreign origin students differ significantly with respect to all variables except gender composition and birth month (see Table A2). In line with the existing literature, the data reveal a large native-foreign gap in achievement with a mean reading comprehension score for native students of 0.42 (0.47 for math) and 0.06 (0.04 for maths) for foreign origin students. In addition, foreign origin students are older and more likely to live in larger households.

Table 2 summarizes the main explanatory variable as well as the teacher characteristics controlled for in the empirical analysis. 9 percent of German language teachers in the sample are of foreign origin. This is in line with national estimates for 2012 of 7.8 percent (Statistisches Bundesamt, 2018). Of the teachers reporting a foreign origin, 76 percent are born in Germany. This means that the majority of foreign origin teachers are second and higher generation immigrants. Half of the foreign origin teachers report a mother tongue other (or additional to) German. In contrast to the students, teachers are evenly

[10]The categories are: Does not apply at all (1), does rather not apply (2), partly (3), does rather apply (4), applies completely (5).

Table 2: Descriptive Statistics – German Language Teachers

	Mean	Std. Dev.	Min	Max
Foreign origin	0.094	0.29	0	1
First generation immigrant	0.072	0.26	0	1
Second-and-higher generation immigrant	0.022	0.15	0	1
Bilingual	0.045	0.21	0	1
Slavic	0.014	0.12	0	1
Romance	0.014	0.12	0	1
Others	0.017	0.13	0	1
Grade at first state exam	−0.011	0.87	−2	3
Female	0.752	0.44	0	2
Age	44.156	11.89	24	66
Birth decade				
1940s	0.031	0.17	0	1
1950s	0.291	0.45	0	1
1960s	0.209	0.41	0	1
1970s	0.228	0.42	0	1
1980s	0.241	0.43	0	1
Age when job was chosen				
Between 0-14	0.145	0.35	0	1
Between 15-19	0.444	0.50	0	1
Between 20-24	0.210	0.41	0	1
After 25	0.106	0.31	0	1
Teacher-year observations	7,346			
Teacher observations	718			

Notes: – The descriptive statistics are weighted to account for differences in the number of observations per teacher.

distributed across origins and therewith mother tongues, with 31 percent having a Romance mother tongue (mainly Italian), 31 percent having a Slavic mother tongue (mainly Polish and Russian), and 38 percent having a *Other* mother tongue (mainly English). Less than one in four German language teachers is male, and the teachers' average grade at the first state examination is standardized to have a mean of zero and a standard deviation of one in the full sample. Besides age and birth decade, I further control for the age when the person decided to become a teacher. Most teachers report that they decided to become a teacher in their teens. While the question on age when profession was chosen might be prone to response bias, I include it to proxy for unobserved intrinsic motivation. Controls for the federal state where the German language teacher acquired her higher education entrance qualification are included but not reported due to data confidentiality.

Overall, the sample consists of 248 classes (1,889 students) that have a teacher transition. Thereof, 42 classes (287 students) experience a change in the foreign origin of the teacher. While the sample size is limited, the identifying variation is larger than in previous studies (c.f., Borjas, 2000; Fleisher *et al.*, 2002; Asano, 2008) and comparable to the US study by Seah (2018b).

Teachers with and without foreign origin differ significantly from each other with respect to all variables, except gender and the federal state where they acquired their higher education entrance qualification (see Table A3). Foreign origin teachers are younger and decided to become teachers earlier than native teachers. Further, their average grade at the first state examination is 0.17 standard deviations below the grade of the native teachers. This illustrates that foreign origin and native teachers differ with respect to important observable characteristics. Accordingly, it is crucial to control for these characteristics to ensure that they do not bias the estimation results.

5 Results

5.1 Foreign Teacher Effect

I start the empirical analysis by testing if foreign origin teachers affect students' reading comprehension. Panel A of Table 3 displays the aggregated foreign origin effect for the full sample. Panels B and C provide separate estimates for native and foreign origin students to investigate if there are differential effects by students' origin. The specification in column (1) controls for student characteristics, and column (2) adds class fixed effects to the model. Following Eq. (1), it captures peer effects as well as teacher allocation across schools and classes. In column (3), teacher characteristics are controlled for, and column (4) represents Eq. (2), including student fixed effects. Finally, column (5) controls for students math test scores. The math test score proxies student-year-specific performance and, accordingly, column (5) provides a lower bound estimate of the foreign origin teacher effect if there are positive spillover effects, i.e. if better reading comprehension increases math test scores.[11] In general, column (4) captures the overall effect best and therefore represent the preferred specification.[12]

For the overall sample, there is a positive but insignificant correlation between reading

[11]The mathematical competence score tests for the ability to use and apply mathematics in realistic situations. Therefore, text comprehension is as much required as mathematical skills and knowledge.

[12]For ease of exposition, the coefficients on the control variables are not presented but they are in the expected direction (see Table A6).

Table 3: Reading Comprehension

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Foreign origin teacher	0.127	0.158**	0.186***	0.218*	0.216*
	(0.104)	(0.063)	(0.065)	(0.126)	(0.124)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.145	0.377	0.378	0.660	0.667
Observations	7,346	7,346	7,346	7,346	7,346
Panel B: Native Students					
Foreign origin teacher	0.143	0.195*	0.214**	0.214	0.229
	(0.106)	(0.099)	(0.098)	(0.197)	(0.195)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.129	0.362	0.363	0.647	0.655
Observations	4,865	4,865	4,865	4,865	4,865
Panel C: Foreign Origin Students					
Foreign origin teacher	0.079	0.145	0.134	0.307*	0.293*
	(0.170)	(0.095)	(0.097)	(0.180)	(0.176)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.142	0.398	0.398	0.658	0.662
Observations	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

comprehension scores and having a foreign origin teacher in column (1). The effect increases to 0.16 and becomes statistically significant at the 5 percent level when class fixed effects are included. The foreign origin teacher estimate becomes even larger once its effect is disentangled from teacher characteristics in column (3). In column (4), the effect is identified by within student variation in teacher allocation. This implies that less variation is employed and, accordingly, β is less precisely estimated. Nevertheless, the magnitude rises to 0.22, with the effect being robust to the inclusion of math test scores (column (5)). The coefficient of 0.22 amounts to 0.17 standard deviations in the reading comprehension test score.[13]

For native students, in Panel B, the effect size of having a foreign origin teacher is

[13]Notably, reading comprehension is a cumulative skill and a teacher's positive effect should also pay off in the following school years. Therefore, Table A8 illustrates the effect of ever having had a foreign origin teacher and shows that the positive foreign origin teacher effect persists if one considers the subsequent reading comprehension scores.

similar in the specifications including class and student fixed effects (column (3) and (4)). For foreign origin students, in Panel C, student unobserved heterogeneity matters. With student fixed effects, the effect of having a foreign origin teacher doubles in size and becomes statistically significant. Overall, the effect is larger and more precisely estimated than for native students. Nevertheless, the foreign teacher effects are positive and comparable in size for both sub-samples.[14] This finding is in line with Seah (2018b), who shows no adverse effects of immigrant teachers on native students in the US. In contrast to the literature on race-matching, we can rule out that the positive effect of foreign origin teachers is caused by matching effects in the sense that there are positive effects on the matched group (here: foreign origin students) and adverse effects on the mis-matched group (here: native students). Instead, Table 3 indicates positive effects for both groups.

Therefore, the following sections do not only investigate teacher bias and role model effects but also alternative explanations such as language specific skills.

5.2 Language Specific Skills

To understand why there is an effect of teachers' origin, this section focuses on an obvious characteristic in which native and foreign origin teachers differ: Language skills. Native teachers—by definition—only have German as a mother tongue, while teachers of foreign origin often grew up learning more than one language. This difference in exposure to languages could have important implications for their language teaching skills. Around 75 percent of foreign origin teachers in the sample are born in Germany. Going through the German education system requires them to be fluent in German, but the experience of learning German as a second language, or the early exposure to more than one language, might affect the way they understand and teach languages. To elicit the effect of such a language specific skill, I test if foreign origin teachers who report a mother tongue other than German affect students' reading comprehension differently.

[14] Results obtained from a fully interacted model do not reveal significantly different effects of foreign origin teachers on students with and without foreign origin.

Table 4 displays the effect of having a bilingual teacher, i.e. a teacher with a mother tongue other than German, on reading comprehension scores. In comparison to the baseline regression in Table 3, Panel A, the effect of having a bilingual teacher is larger and more significant than the effect of having a teacher of foreign origin. Further, the table reveals that the effect is particularly large for native students. Their reading comprehension increases by 0.53, i.e. 0.41 standard deviations, when they have a bilingual teacher. Nevertheless, the positive effect holds for both native and foreign origin students.

Table 4: Reading Comprehension – Bilingual Teachers

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Bilingual teacher	0.089	0.277***	0.286***	0.396**	0.387**
	(0.183)	(0.073)	(0.094)	(0.159)	(0.158)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.145	0.378	0.378	0.661	0.667
Observations	7,346	7,346	7,346	7,346	7,346
Panel B: Native Students					
Bilingual teacher	0.140	0.357***	0.430***	0.527**	0.540**
	(0.184)	(0.109)	(0.121)	(0.243)	(0.235)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.129	0.362	0.364	0.649	0.656
Observations	4,865	4,865	4,865	4,865	4,865
Panel C: Foreign Origin Students					
Bilingual teacher	0.015	0.225*	0.163	0.419*	0.387*
	(0.276)	(0.122)	(0.136)	(0.216)	(0.212)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.142	0.398	0.398	0.658	0.662
Observations	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

As a falsification test, I investigate if having a bilingual Math teacher influences math literacy in a similar way. If bilingual teachers have a language specific skill, rather than being a particularly positive selection of teachers, the effect on language comprehension should be larger than on analytical math skills. Table 5 displays the results for the math literacy test and shows no effect of having a bilingual teacher once class fixed effects are included.[15] Other than on reading comprehension, the effect of bilingual teachers is small and indistinguishable from zero for both sub-samples. This finding supports the notion that the effect of bilingual teachers is language specific rather than driven by a particular positive selection of bilingual teachers.[16]

In summary, I find no universal positive effect of foreign origin teachers on students' academic achievement. Instead, the positive effect is specific to reading comprehension and particularly strong for bilingual teachers. While most studies discuss matching effects between students and teachers, these results suggest that foreign origin teachers who grew up bilingual are especially equipped to teach languages. Notably, this language specific skill is beneficial for both native and foreign origin students.

Table 5: Mathematical Literacy – Bilingual Teachers

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Bilingual teacher	−0.519***	−0.169	−0.075	0.018	0.012
	(0.114)	(0.116)	(0.123)	(0.162)	(0.160)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
German test score	No	No	No	No	Yes
Adjusted R^2	0.179	0.469	0.470	0.739	0.745
Observations	8,640	8,640	8,640	8,640	8,640
Panel B: Native Students					
Bilingual teacher	−0.532***	−0.307	−0.195	0.103	0.102
	(0.161)	(0.198)	(0.206)	(0.283)	(0.265)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
German test score	No	No	No	No	Yes
Adjusted R^2	0.148	0.439	0.440	0.727	0.734
Observations	5,798	5,798	5,798	5,798	5,798
Panel C: Foreign Origin Students					
Bilingual teacher	−0.497***	−0.176	−0.134	−0.024	−0.043
	(0.094)	(0.140)	(0.147)	(0.230)	(0.238)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
German test score	No	No	No	No	Yes
Adjusted R^2	0.188	0.502	0.502	0.744	0.748
Observations	2,842	2,842	2,842	2,842	2,842

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

[15]The samples on reading comprehension and mathematical literacy test scores do not match perfectly as the NEPS data contain more observations with information on Math teacher than German teacher. More information on Math teachers' characteristics are displayed in Tables A4 and A5.

[16]Regressions with foreign origin as explanatory variable reveal comparable results (see Table A9).

5.3 Teacher Bias Effect

For native students, the positive effect of having a foreign origin teacher can be attributed to bilingual teachers. For foreign origin students, the positive effect is already large in the foreign origin teacher specification. Therefore, I test if there are additional teacher bias effects that can explain the differential effect size between native and foreign origin students in Table 3.

More specifically, I analyze if teachers are more likely to increase the reading comprehension of students who share a similar origin. Such an effect could be an indication that teachers allocate more class time to students whose origin they match with. In Table 6, I employ a language match variable as the main variable of interest. Notably, there is no positive matching effect for foreign origin students. The point estimates of having a student-teacher language match are smaller than the effect of having a foreign origin teacher. Furthermore, the standard errors are larger.[17]

Table 6: Reading Comprehension – Teacher Bias Effects

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Language match	−0.140	−0.357***	−0.430***	−0.527**	−0.540**
	(0.184)	(0.109)	(0.121)	(0.243)	(0.235)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.129	0.362	0.364	0.649	0.656
Observations	4,865	4,865	4,865	4,865	4,865
Panel B: Foreign Origin Students					
Language match	0.007	−0.053	−0.072	0.269	0.273
	(0.161)	(0.252)	(0.320)	(0.466)	(0.496)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.142	0.397	0.397	0.656	0.660
Observations	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

As a second test for teacher bias, I analyze the students' German grades. In Germany, few centralized exams are conducted until grade 9, and the grading of students is mostly

[17] The negative language match displayed for native students does not contain new information as the language match for native students is the reverse of the positive effect of having a bilingual teacher.

left to the discretion of the teacher. A positive effect of language matches on subjective teacher grading could suggest a teacher bias. Table 8 uses the student's German grade as an outcome variable and shows a positive correlation between having a language match and the German grade in columns (4) and (5). The effect is large for native students but imprecisely estimated. For foreign origin students, Table 8 does not reveal any positive matching effects.[18] Therefore, the results fail to confirm the existence of a teacher bias effect. Instead, they illustrate that the foreign teacher effect is not driven by specific language matches but rather by a general positive effect of foreign origin teachers.

Table 7: German Grade – Teacher Bias Effects

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Language match	−0.000	0.215***	0.194**	0.270	0.368
	(0.073)	(0.060)	(0.096)	(0.350)	(0.356)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.090	0.227	0.224	0.653	0.691
Observations	3,128	3,128	3,128	3,128	3,128
Panel B: Foreign Origin Students					
Language match	−0.177	−0.158	−0.148	0.037	0.027
	(0.130)	(0.463)	(0.506)	(0.335)	(0.248)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.032	0.155	0.151	0.589	0.625
Observations	1,564	1,564	1,564	1,564	1,564

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

5.4 Role Model Effect

As previously mentioned, teacher bias and role model effects are difficult to disentangle. Studies in the university setting interpret exposure to female faculty members or female instructors in initial courses as female role models (e.g., Canes and Rosen, 1995; Bettinger and Long, 2005). However, these studies cannot rule out direct teacher influence via teacher bias effects. To solve this problem, Dee (2007) compares students' perception on

[18] Due to the small sample size, I also run the regression for all students observed rather than the harmonized sample of students taking the reading comprehension test. The results are displayed in Table A10 and reveal similar effects.

Table 8: German Grade – Teacher Bias Effects

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Language match	−0.000	0.215***	0.194**	0.270	0.368
	(0.073)	(0.060)	(0.096)	(0.350)	(0.356)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.090	0.227	0.224	0.653	0.691
Observations	3,128	3,128	3,128	3,128	3,128
Panel B: Foreign Origin Students					
Language match	−0.177	−0.158	−0.148	0.037	0.027
	(0.130)	(0.463)	(0.506)	(0.335)	(0.248)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.032	0.155	0.151	0.589	0.625
Observations	1,564	1,564	1,564	1,564	1,564

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

the subject taught by matched and unmatched teachers to elicit the role model effect more directly. Likewise, I approximate role mode effects by employing a survey question on how the students perceive their teachers.

Table 9 shows students' perception on whether their teacher is in control of the class. If the teacher's foreign origin can explain part of the variation in students' perception of their teacher, this effect can be attributed to a role model effect.[19] The results in Table 9 illustrate that foreign origin students indeed perceive their foreign origin teachers more favorably. In line with the findings in Table 3, Panel A does not display adverse effects for native students.[20]

Besides affecting students' perceptions of teachers, a role model effect can also influence the students' educational effort. In Table 10, I test if students increase their frequency of reading on a school day when they match their teacher's origin. The Table 10 confirms some matching effects.

[19]In this context, I define the role model effect as a positive teacher perception of the student irrespective of this being caused by an underlying teacher bias effect or not.

[20]A similar, but insignificant pattern is shown in Table A11 where the outcome variable is whether the students think that their German teacher expects them to try their best.

Table 9: Teacher Has Class Under Control

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Foreign origin teacher	−0.143	−0.013	−0.108	0.040	0.036
	(0.097)	(0.118)	(0.149)	(0.287)	(0.284)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.052	0.236	0.249	0.288	0.287
Observations	4,789	4,789	4,789	4,789	4,789
Panel B: Foreign Origin Students					
Foreign origin teacher	0.052	0.329**	0.414***	0.530*	0.508*
	(0.092)	(0.132)	(0.143)	(0.306)	(0.304)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.054	0.209	0.210	0.307	0.308
Observations	2,419	2,419	2,419	2,419	2,419

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table 10: Frequency of Reading on a School Day

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Foreign origin teacher	−0.003	−0.089*	−0.183***	−0.223**	−0.232**
	(0.038)	(0.048)	(0.055)	(0.091)	(0.093)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.028	0.057	0.056	0.335	0.337
Observations	4,727	4,727	4,727	4,727	4,727
Panel B: Foreign Origin Students					
Foreign origin teacher	−0.039	0.019	0.046	0.279*	0.253
	(0.060)	(0.075)	(0.083)	(0.166)	(0.165)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.011	0.076	0.074	0.363	0.367
Observations	2,390	2,390	2,390	2,390	2,390

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table 11: Reading Comprehension – First vs. Higher Generation Immigrants

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Immigrant background (Ref.: None)					
First generation	0.072	0.185*	0.345***	0.205	0.194
	(0.215)	(0.100)	(0.127)	(0.202)	(0.202)
Second-and-higher generation	0.146	0.147*	0.111	0.223	0.226
	(0.116)	(0.080)	(0.076)	(0.148)	(0.150)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.145	0.377	0.378	0.660	0.667
Observations	7,346	7,346	7,346	7,346	7,346
Panel B: Native Students					
Immigrant background (Ref.: None)					
First generation	0.195	0.295***	0.471***	0.316	0.339
	(0.137)	(0.113)	(0.139)	(0.228)	(0.222)
Second-and-higher generation	0.127	0.149	0.066	0.170	0.181
	(0.130)	(0.130)	(0.126)	(0.247)	(0.248)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.129	0.362	0.363	0.647	0.654
Observations	4,865	4,865	4,865	4,865	4,865
Panel C: Foreign Origin Students					
Immigrant background (Ref.: None)					
First generation	−0.131	0.103	0.211	0.279	0.248
	(0.395)	(0.187)	(0.212)	(0.360)	(0.348)
Second-and-higher generation	0.150	0.159	0.110	0.317	0.309
	(0.168)	(0.111)	(0.106)	(0.198)	(0.196)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.143	0.397	0.397	0.658	0.662
Observations	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Overall, the results discussed in this section support a role model effect. Foreign origin students have a more favorable perception and read more if they are taught by a foreign origin teacher. Native students do not exhibit a negative perception of foreign origin teachers, but they read significantly more if they are taught by a native teacher. I conclude that the strong positive effect of having a foreign origin teacher on foreign origin students can partly be attributed to a role model effect that motivates foreign origin students to read more.

Table 12: Reading Comprehension – Language

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Language family (Ref.: German)					
Slavic	−0.275	0.220**	0.404***	0.364**	0.358**
	(0.349)	(0.089)	(0.135)	(0.183)	(0.178)
Romanic	0.331	0.421***	0.268*	0.323	0.298
	(0.233)	(0.098)	(0.141)	(0.344)	(0.347)
Others	0.113	0.209	0.094	0.559**	0.567**
	(0.304)	(0.192)	(0.213)	(0.283)	(0.277)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.146	0.377	0.378	0.661	0.667
Observations	7,346	7,346	7,346	7,346	7,346
Panel B: Native Students					
Language family (Ref.: German)					
Slavic	−0.197	0.284***	0.489***	0.477**	0.499**
	(0.302)	(0.100)	(0.145)	(0.236)	(0.211)
Romanic	0.355	0.442*	0.301	0.285	0.288
	(0.273)	(0.230)	(0.258)	(0.559)	(0.545)
Others	0.155	0.374*	0.454*	0.887***	0.899***
	(0.327)	(0.215)	(0.266)	(0.322)	(0.326)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.129	0.362	0.363	0.649	0.656
Observations	4,865	4,865	4,865	4,865	4,865
Panel C: Foreign Origin Students					
Language family (Ref.: German)					
Slavic	−0.380	0.178	0.342*	0.503*	0.481*
	(0.547)	(0.155)	(0.196)	(0.300)	(0.291)
Romanic	0.288	0.403**	0.121	0.297	0.250
	(0.303)	(0.180)	(0.214)	(0.418)	(0.409)
Others	0.063	−0.074	−0.163	0.503	0.484
	(0.442)	(0.303)	(0.371)	(0.440)	(0.447)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.144	0.398	0.397	0.657	0.661
Observations	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

5.5 Alternative Explanations

In the following section, I discuss additional teacher characteristics to test for the robustness of the findings. More specifically, I investigate if a particular group of foreign origin teachers is driving the effect. I first test if first generation immigrant teachers and second and higher generation immigrant teachers affect reading performance differentially. A strong effect of foreign-born teachers could hint at a positive selection, e.g., because of better teacher training abroad. Table 11 shows that better educated foreign-born teachers cannot explain the previous findings. The effect of first generation immigrant teachers is larger for native students and the effect of second and higher generation immigrant teachers is larger for foreign origin students. However, for the student fixed effect specifications in Panel A, the effects for both teacher groups are comparable in size and insignificant.

An alternative explanation is that the effect is driven by a particular well equipped immigrant group. Therefore, I test for differential effects across language groups. Table 12 illustrates the results, which resemble the findings on bilingual teachers in Table 4. The effect is strongest for native students and teachers with a *Slavic* or *Other* mother tongue. Nevertheless, the positive and large point estimates of all language groups show that one particularly motivated or able immigrant group is not driving the results.

6 Conclusion

To my knowledge, this paper is the first to provide evidence on the effect of having a foreign origin teacher on students' academic achievement in an European country. Given the under-performance of an increasing share of foreign origin students, this research question fills an important gap. Using data from the German National Educational Panel Study and exploiting variation in teachers assignment within students, I analyze the effect of having a foreign origin teacher on reading comprehension in lower secondary school. In doing so, I show that objectively measured reading test scores are positively affected by having a foreign origin teacher.

Most notably, bilingual foreign origin teachers increase students' reading comprehension scores universally. Ruling out alternative explanations, I argue that bilingual teachers have language specific skills that make them particularly well-equipped to teach languages both to native and foreign origin students. For foreign origin students, I further find evidence for a role model effec, a concept, which has already been established by studies on race and gender matching (e.g., Dee, 2004; Bettinger and Long, 2005; Paredes, 2014). Foreign origin students perceive their teacher more favorably and increase their reading frequency outside of school when they are taught by a foreign origin teacher. Adding to the literature on matching effects, this study shows that role model effects can also exist for "imperfect" matches, meaning that the country of origin of student and teacher does not have to be identical for role model effects to emerge.

Overall, this study contributes to the literature by establishing a role for foreign origin teachers in the context of language acquisition. It should, therefore, encourage researchers to study the advantages of bilingualism in the education system more rigorously. The knowledge and experience of bilingual teachers can be used to develop language teaching styles that improve the reading comprehension of both foreign origin and native students. Nevertheless, this study does not necessarily argue for the hiring of more foreign origin teachers as a policy recommendation. The characteristics and effectiveness of future teachers can differ significantly from the teachers studied here due to changes in the composition of immigrant cohorts, teacher training, and political agendas.

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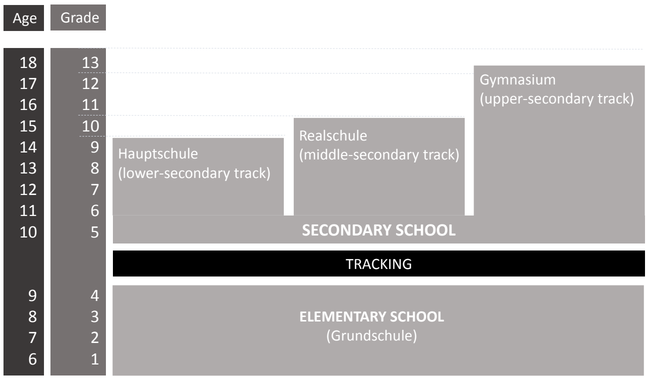
Appendix

Figure A1: German School System



Notes: – Own illustration.

Table A1: German Test – Random Assignment

	Foreign origin teacher
Student foreign origin	0.035*
	(0.021)
Female	0.020
	(0.022)
Birth month	0.067
	(0.149)
Birth year	0.025
	(0.026)
Grade	0.077
	(0.068)
Grade repeated	−0.005
	(0.006)
Household size	0.025
	(0.057)
Observations	7,346

*Notes: – Each estimate is from a regression of the corresponding student characteristic on a dummy indicating the teacher's origin. A separate regression is run for each student characteristic. Robust standard errors are in parentheses. – *** p<0.01, ** p<0.05 * p<0.10.*

Table A2: Student Characteristics, t-test

	Native	Foreign Origin	Difference	Std. Error
Main outcome variable				
Reading comprehension	0.418	0.062	0.356	(0.031)***
Student characteristics				
Female	0.493	0.505	−0.012	(0.012)
Grade	6.797	6.676	0.121	(0.039)***
Birth month	6.528	6.571	−0.043	(0.084)
Birth year	1999.536	1999.441	0.095	(0.015)***
Grade repeated	0.020	0.027	−0.007	(0.004)*
Household size	4.389	4.513	−0.123	(0.034)***
Other outcome variables				
Mathematical literacy	0.468	0.037	0.431	(0.030)***
German grade	4.454	4.260	0.194	(0.025)***
German teacher has class under control	3.673	3.715	−0.042	(0.030)
German teacher expects me to try my very best	4.041	3.990	0.051	(0.022)**
Reading frequency on a school day	0.820	0.842	−0.022	(0.019)
	4,865	2,481		

*Notes: – The table shows descriptive statistics for the two sub-samples of native and foreign origin students, as well as the difference in mean values between the two samples. Significance stars indicate the result of the respective t-test. – * p<0.10, ** p<0.05, *** p<0.01.*

Table A3: German Language Teacher Characteristics, t-test

	Native	Foreign Origin	Difference	Std. Error
Grade at first state exam	−0.003	−0.178	0.174	(0.039)***
Female	0.783	0.798	−0.014	(0.018)
Birth year	1967.848	1970.776	−2.929	(0.512)***
Age when job was chosen	1.588	1.114	0.474	(0.049)***
State of higher education entrance qualification	5.966	5.805	0.162	(0.143)
	6,778	568		

*Notes: – The table shows descriptive statistics for the two sub-samples of native and foreign origin German language teachers, as well as the difference in mean values between the two samples. Significance stars indicate the result of the respective t-test. – * p<0.10, ** p<0.05, *** p<0.01.*

Table A4: Descriptive Statistics – Math Teachers

	Mean	Std. Dev.	Min	Max
Foreign origin	0.079	0.27	0	1
No foreign origin	0.921	0.27	0	1
First generation immigrant	0.055	0.23	0	1
Second-and-higher generation immigrant	0.024	0.15	0	1
Bilingual	0.029	0.17	0	1
German	0.971	0.17	0	1
Slavic	0.011	0.11	0	1
Romance	0.005	0.07	0	1
Others	0.013	0.11	0	1
Grade at first state exam	−0.034	0.85	−2	3
Female	0.579	0.49	0	1
Age	44.694	12.05	22	70
Birth year				
1940s	0.031	0.17	0	1
1950s	0.322	0.47	0	1
1960s	0.201	0.40	0	1
1970s	0.195	0.40	0	1
1980s	0.250	0.43	0	1
Missing	0.000	0.00	0	0
Age when job was chosen				
Between 0-14	0.151	0.36	0	1
Between 15-19	0.456	0.50	0	1
Between 20-24	0.176	0.38	0	1
After 25	0.094	0.29	0	1
Missing	0.122	0.33	0	1
Teacher-year observations	8,640			
Teacher observations	795			

Notes: – The descriptive statistics are weighted to account for differences in the number of observations per teacher.

Table A5: Math Teacher Characteristics, t-test

	Native	Foreign Origin	Difference	Std. Error
Grade at first state exam	−0.055	0.045	−0.100	(0.037)***
Female	0.562	0.412	0.150	(0.022)***
Birth year	1965.956	1972.488	−6.532	(0.506)***
Age when job was chosen	1.510	1.268	0.243	(0.050)***
State of higher education entrance qualification	6.086	5.827	0.259	(0.142)*
	8,072	568		

*Notes: – The table shows descriptive statistics for the two sub-samples of native and foreign origin Math teachers, as well as the difference in mean values between the two samples. Significance stars indicate the result of the respective t-test. – * p<0.10, ** p<0.05, *** p<0.01.*

Table A6: Reading Comprehension – All Students

	(1)	(2)	(3)	(4)	(5)
Foreign origin teacher	0.127	0.158**	0.186***	0.218*	0.216*
	(0.104)	(0.063)	(0.065)	(0.126)	(0.124)
Student characteristics					
Female	0.145***	0.114***	0.117***	–	–
	(0.030)	(0.029)	(0.029)		
Foreign origin	−0.295***	−0.189***	−0.189***	–	–
	(0.040)	(0.033)	(0.033)		
Birth month (Ref.: January)					
February	0.047	−0.058	−0.055	–	–
	(0.072)	(0.066)	(0.066)		
March	0.140*	0.014	0.015	–	–
	(0.072)	(0.064)	(0.064)		
April	−0.001	−0.045	−0.044	–	–
	(0.075)	(0.067)	(0.067)		
May	0.074	−0.023	−0.023	–	–
	(0.074)	(0.070)	(0.071)		
June	0.094	−0.024	−0.026	–	–
	(0.073)	(0.066)	(0.066)		
July	0.304***	0.113*	0.112*	–	–
	(0.070)	(0.065)	(0.065)		
August	0.426***	0.108	0.112*	–	–
	(0.073)	(0.067)	(0.067)		
September	0.464***	0.091	0.097	–	–
	(0.076)	(0.072)	(0.072)		
October	0.681***	0.278***	0.277***	–	–
	(0.080)	(0.075)	(0.075)		
November	0.524***	0.143*	0.140*	–	–
	(0.083)	(0.075)	(0.075)		
December	0.516***	0.154**	0.157**	–	–
	(0.081)	(0.074)	(0.074)		
Birth year (Ref.: 1999)					
1995	−1.113***	0.036	0.049	–	–
	(0.304)	(0.400)	(0.424)		
1997	−0.234	−0.122	−0.095	–	–
	(0.353)	(0.344)	(0.347)		
1998	−0.654***	−0.201***	−0.196***	–	–
	(0.063)	(0.054)	(0.054)		
2000	0.482***	0.142***	0.139***	–	–
	(0.041)	(0.037)	(0.037)		
2001	1.186***	0.317*	0.318*	–	–
	(0.159)	(0.168)	(0.169)		
2002	1.987***	1.626***	1.628***	–	–
	(0.081)	(0.061)	(0.061)		
Grade (Ref.: 5)					
7	0.679***	0.614***	0.580***	0.598***	0.484***
	(0.057)	(0.039)	(0.040)	(0.066)	(0.067)
9	−0.056	−0.074*	−0.088**	−0.147**	−0.136**
	(0.061)	(0.040)	(0.041)	(0.064)	(0.064)
Grade repeated	−0.131	−0.081	−0.085	−0.207	−0.215
	(0.101)	(0.092)	(0.092)	(0.171)	(0.168)
Household size	−0.060***	−0.029***	−0.028***	−0.067**	−0.059*
	(0.012)	(0.010)	(0.010)	(0.032)	(0.032)
Math literacy test score	–	–	–	–	0.166***
					(0.032)
Teacher characteristics					
Grade at first state exam	–	–	0.066***	0.068*	0.062*
			(0.023)	(0.038)	(0.037)
Female	–	–	0.005	−0.056	−0.062
			(0.043)	(0.059)	(0.058)
Age	–	–	0.006	−0.003	−0.005
			(0.009)	(0.013)	(0.013)
Birth decade (Ref.: 1940s)					
1950s	–	–	0.178*	0.184	0.196
			(0.096)	(0.171)	(0.162)
1960s	–	–	−0.078	0.030	0.084
			(0.149)	(0.250)	(0.240)
1970s	–	–	−0.104	0.067	0.117
			(0.219)	(0.337)	(0.325)
1980s	–	–	0.002	0.199	0.251
			(0.283)	(0.447)	(0.438)
Age job was chosen (Ref.: Before 10)					
Between 15-19	–	–	0.015	0.024	0.018
			(0.062)	(0.107)	(0.104)
Between 20-24	–	–	0.062	0.109	0.103
			(0.068)	(0.120)	(0.118)
After 25	–	–	−0.079	0.055	0.036
			(0.081)	(0.125)	(0.119)
Class FE	No	Yes	Yes	Yes	Yes
Adjusted R^2	0.145	0.377	0.378	0.660	0.667
Observations	7,346	7,346	7,346	7,346	7,346

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table A7: Reading Comprehension – By Student Origin

	Native Students					Foreign Origin Students				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Foreign origin teacher	0.143	0.195*	0.214**	0.214	0.229	0.079	0.145	0.134	0.307*	0.293*
	(0.106)	(0.099)	(0.098)	(0.197)	(0.195)	(0.170)	(0.095)	(0.097)	(0.180)	(0.176)
Student characteristics										
Female	0.199***	0.134***	0.134***	–	–	0.048	0.073	0.078	–	–
	(0.036)	(0.037)	(0.037)			(0.051)	(0.056)	(0.056)		
Birth month (Ref.: January)										
February	−0.011	−0.118	−0.111	–	–	0.156	0.144	0.140	–	–
	(0.087)	(0.084)	(0.085)			(0.128)	(0.126)	(0.127)		
March	0.080	−0.052	−0.051	–	–	0.241**	0.224*	0.234*	–	–
	(0.089)	(0.084)	(0.085)			(0.117)	(0.125)	(0.126)		
April	−0.095	−0.149*	−0.144*	–	–	0.188	0.180	0.189	–	–
	(0.094)	(0.086)	(0.087)			(0.142)	(0.161)	(0.163)		
May	0.062	−0.053	−0.049	–	–	0.072	0.051	0.039	–	–
	(0.092)	(0.088)	(0.089)			(0.130)	(0.148)	(0.148)		
June	0.097	−0.043	−0.038	–	–	0.127	0.056	0.055	–	–
	(0.091)	(0.087)	(0.087)			(0.125)	(0.125)	(0.126)		
July	0.286***	0.136	0.139	–	–	0.362***	0.211*	0.207*	–	–
	(0.093)	(0.091)	(0.091)			(0.118)	(0.119)	(0.120)		
August	0.320***	0.045	0.051	–	–	0.636***	0.389***	0.404***	–	–
	(0.087)	(0.086)	(0.087)			(0.133)	(0.138)	(0.139)		
September	0.340***	0.041	0.050	–	–	0.709***	0.356**	0.368**	–	–
	(0.089)	(0.091)	(0.091)			(0.132)	(0.149)	(0.149)		
October	0.636***	0.276***	0.284***	–	–	0.776***	0.371***	0.362**	–	–
	(0.099)	(0.097)	(0.098)			(0.136)	(0.141)	(0.142)		
November	0.486***	0.104	0.106	–	–	0.606***	0.254*	0.262*	–	–
	(0.100)	(0.098)	(0.098)			(0.136)	(0.148)	(0.149)		
December	0.497***	0.157	0.162*	–	–	0.563***	0.270*	0.280*	–	–
	(0.098)	(0.096)	(0.097)			(0.140)	(0.154)	(0.155)		
Birth year (Ref.: 1999)										
1995	−1.158***	0.243	0.345	–	–	–	–	–	–	–
	(0.321)	(0.254)	(0.280)							
1997	0.568***	0.923***	0.926***	–	–	−0.298	−0.339	−0.339	–	–
	(0.095)	(0.082)	(0.082)			(0.409)	(0.356)	(0.351)		
1998	−0.643***	−0.218***	−0.213***	–	–	−0.666***	−0.211**	−0.206**	–	–
	(0.084)	(0.077)	(0.077)			(0.093)	(0.092)	(0.093)		
2000	0.480***	0.167***	0.165***	–	–	0.479***	0.178**	0.180**	–	–
	(0.052)	(0.051)	(0.051)			(0.066)	(0.071)	(0.072)		
2001	1.163***	0.347*	0.350*	–	–	1.162***	0.434	0.487	–	–
	(0.183)	(0.207)	(0.208)			(0.251)	(0.352)	(0.351)		
2002	1.899***	1.395***	1.390***	–	–	–	–	–	–	–
	(0.095)	(0.091)	(0.091)							
Grade (Ref.: 5)										
7	0.625***	0.584***	0.554***	0.591***	0.469***	0.775***	0.636***	0.595***	0.612***	0.510***
	(0.062)	(0.047)	(0.047)	(0.072)	(0.076)	(0.077)	(0.068)	(0.071)	(0.130)	(0.139)
9	−0.181***	−0.143***	−0.131***	−0.170**	−0.150*	0.187**	0.041	0.018	−0.103	−0.106
	(0.068)	(0.049)	(0.049)	(0.079)	(0.079)	(0.079)	(0.068)	(0.074)	(0.122)	(0.121)
Grade repeated	−0.157	−0.049	−0.063	−0.298	−0.307	−0.113	−0.141	−0.121	−0.004	0.008
	(0.139)	(0.132)	(0.132)	(0.269)	(0.262)	(0.140)	(0.160)	(0.163)	(0.289)	(0.293)
Household size	−0.044***	−0.025*	−0.026*	−0.032	−0.023	−0.080***	−0.056***	−0.055***	−0.110**	−0.103*
	(0.015)	(0.014)	(0.014)	(0.041)	(0.041)	(0.018)	(0.018)	(0.018)	(0.055)	(0.054)
Math literacy test score	–	–	–	–	0.180***	–	–	–	–	0.137*
					(0.039)					(0.074)
Teacher characteristics										
Grade at first state exam	–	–	0.058**	0.083*	0.075*	–	–	0.052	0.061	0.058
			(0.026)	(0.047)	(0.045)			(0.035)	(0.050)	(0.048)
Female	–	–	−0.022	−0.078	−0.074	–	–	0.149*	0.053	0.029
			(0.048)	(0.071)	(0.070)			(0.084)	(0.123)	(0.122)
Age	–	–	0.008	0.004	−0.000	–	–	0.004	−0.004	−0.002
			(0.011)	(0.017)	(0.017)			(0.013)	(0.022)	(0.021)
Birth decade (Ref.: 1940s)										
1950s	–	–	0.239**	0.103	0.105	–	–	0.064	0.235	0.251
			(0.120)	(0.210)	(0.212)			(0.167)	(0.302)	(0.286)
1960s	–	–	−0.007	−0.090	−0.018	–	–	−0.393*	0.013	0.031
			(0.191)	(0.326)	(0.324)			(0.236)	(0.393)	(0.377)
1970s	–	–	−0.134	−0.175	−0.092	–	–	−0.142	0.157	0.138
			(0.271)	(0.425)	(0.423)			(0.339)	(0.571)	(0.546)
1980s	–	–	−0.005	−0.074	0.026	–	–	−0.152	0.303	0.260
			(0.349)	(0.564)	(0.561)			(0.446)	(0.749)	(0.723)
Age job was chosen (Ref.: Before 10)										
Between 15-19	–	–	0.014	0.020	0.027	–	–	0.097	0.070	0.043
			(0.074)	(0.128)	(0.125)			(0.093)	(0.158)	(0.159)
Between 20-24	–	–	0.111	0.125	0.128	–	–	0.080	0.116	0.099
			(0.082)	(0.143)	(0.142)			(0.102)	(0.175)	(0.173)
After 25	–	–	−0.146	0.006	−0.023	–	–	0.155	0.184	0.171
			(0.101)	(0.153)	(0.147)			(0.117)	(0.193)	(0.187)
Class FE	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Adjusted R^2	0.129	0.362	0.363	0.647	0.655	0.142	0.398	0.398	0.658	0.662
Observations	4,865	4,865	4,865	4,865	4,865	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table A8: Reading Comprehension – Ever Had a Foreign Origin Teacher

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Ever had a foreign origin teacher	0.114	0.101*	0.117**	0.233*	0.236*
	(0.087)	(0.057)	(0.056)	(0.133)	(0.133)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.145	0.377	0.378	0.660	0.666
Observations	7,346	7,346	7,346	7,346	7,346
Panel B: Native Students					
Ever had a foreign origin teacher	0.144	0.091	0.086	0.231	0.257
	(0.090)	(0.077)	(0.084)	(0.217)	(0.219)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.129	0.362	0.363	0.647	0.655
Observations	4,865	4,865	4,865	4,865	4,865
Panel C: Foreign Origin Students					
Ever had a foreign origin teacher	0.035	0.129	0.139	0.375*	0.358*
	(0.140)	(0.104)	(0.100)	(0.196)	(0.193)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.142	0.398	0.398	0.658	0.662
Observations	2,481	2,481	2,481	2,481	2,481

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table A9: Mathematical Literacy

Panel A: All Students	(1)	(2)	(3)	(4)	(5)
Foreign origin teacher	−0.012	−0.015	0.002	−0.060	−0.069
	(0.104)	(0.063)	(0.058)	(0.073)	(0.072)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
German test score	No	No	No	No	Yes
Adjusted R^2	0.176	0.469	0.470	0.739	0.745
Observations	8,640	8,640	8,640	8,640	8,640
Panel B: Native Students					
Foreign origin teacher	0.018	0.003	0.019	−0.068	−0.076
	(0.107)	(0.080)	(0.078)	(0.094)	(0.094)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
German test score	No	No	No	No	Yes
Adjusted R^2	0.145	0.438	0.440	0.727	0.734
Observations	5,798	5,798	5,798	5,798	5,798
Panel C: Foreign Origin Students					
Foreign origin teacher	−0.059	−0.018	−0.032	−0.130	−0.149
	(0.139)	(0.099)	(0.099)	(0.144)	(0.143)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
German test score	No	No	No	No	Yes
Adjusted R^2	0.185	0.502	0.502	0.744	0.748
Observations	2,842	2,842	2,842	2,842	2,842

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table A10: German Grade – Teacher Bias Effect (Full Sample)

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Language match	0.054	0.100	0.122**	0.098	0.110
	(0.058)	(0.066)	(0.052)	(0.070)	(0.070)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.083	0.224	0.223	0.644	0.662
Observations	5,811	5,811	5,811	5,811	5,811
Panel B: Foreign Origin Students					
Language match	−0.303**	−0.312	−0.319	−0.093	−0.132
	(0.137)	(0.364)	(0.365)	(0.198)	(0.178)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.029	0.171	0.173	0.618	0.641
Observations	2,734	2,734	2,734	2,734	2,734

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*

Table A11: Teacher Expects Me To Try My Very Best

Panel A: Native Students	(1)	(2)	(3)	(4)	(5)
Foreign origin teacher	−0.102**	0.007	0.007	0.074	0.070
	(0.050)	(0.081)	(0.087)	(0.190)	(0.191)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.019	0.072	0.070	0.168	0.168
Observations	4,779	4,779	4,779	4,779	4,779
Panel B: Foreign Origin Students					
Foreign origin teacher	0.046	0.070	0.092	0.186	0.174
	(0.080)	(0.087)	(0.112)	(0.266)	(0.266)
Student controls	Yes	Yes	Yes	Yes	Yes
Class FE	No	Yes	Yes	Yes	Yes
Teacher controls	No	No	Yes	Yes	Yes
Student FE	No	No	No	Yes	Yes
Math test score	No	No	No	No	Yes
Adjusted R^2	0.008	0.073	0.069	0.190	0.189
Observations	2,419	2,419	2,419	2,419	2,419

*Notes: – Results are obtained from OLS regressions. All reported standard errors are clustered at the teacher level. – *** p<0.01, ** p<0.05 * p<0.10.*