The Academic Achievement of Immigrant Children in Japan: An Empirical Analysis of the Assimilation Hypothesis

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In this study, we test the assimilation thesis by comparing the academic achievement between native students and first and second generation immigrant pupils. It is the first empirical study that systematically analyzes the native-immigrant achievement gap in Japan. Although numerous studies have examined the achievement gap, most of them are based on small-scale case studies and have failed to test the effects of multiple factors simultaneously, using large-scale nationally representative data. Since the number of immigrant (foreign) students is relatively small in Japan, we constructed a pooled dataset of PISA by combining all five waves from 2000 through 2012. The dependent variable is the test score in reading literacy, and we tested the effects of three key independent variables: immigrant generation, parental socioeconomic status and language spoken at home. A multilevel analysis was performed to examine both individual and school-level variations, followed by a multiple imputation method to deal with missing values of parental socioeconomic status. The major findings are three-fold. First, first generation immigrant students perform more poorly in reading literacy, but there is no significant difference between second generation and native students. Second, parental socioeconomic status has a positive effect on academic achievement, but the effect is not robust enough to mediate the impact of immigrant generation. Third, Japanese spoken at home is an important determinant of the native-immigrant gap in academic achievement. The same results were obtained for mathematics and scientific literacy test scores. Although these findings echo previous studies, they underscore the importance of language use at home. Our empirical results suggest that it is important to expand opportunities for Japanese language learning for both immigrant students and parents.

Keywords: immigrants; assimilation; academic achievement; pisa; multilevel model

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1. Introduction

Japan has often been portrayed as a "non-immigrant" nation or a "negative case" of immigration (Bartram, 2000). The number of immigrants[1] currently stands at 1.7% of the total population. It is very small in comparison to other industrialized countries, but has nonetheless grown over the past several decades. Along with this trend, the second generation, or the children of immigrants born or raised in Japan, has come of age, and are attending (or have attended) school in Japan. According to the Japanese Population Census, the total foreign-national population, including youths aged 15–19, has more than doubled between 1965 and 2010 (Figure 1).

How do second generation immigrant children fare academically, compared to native children in Japan? The question is important because it allows us to examine how immigrants and their children can integrate and "make it" in a society largely regarded as homogeneous and closed to outsiders. Since education is a key to one's socioeconomic achievement, regardless of nativity, it also offers important insights into social mobility and inequality in Japan. Unlike their first generation parents, immigrant children who are born and raised in the host society can, in principle, compete on a more level playing field with native children (Levitt & Waters, 2006; Portes & Rumbaut, 2001). The educational attainment of the second generation, therefore, provides a crucial test to assess immigrants' opportunity structure in Japanese society.

According to the assimilation thesis, time spent in the host society is an important predictor of immigrants' educational success. Across countries, immigrant children tend to lag behind their native counterpart in educational achievement, as demonstrated by their lower average scores (than for natives) in standardized tests, such as PISA (Programme for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study) (Marks, 2005; OECD, 2006; Schnepf, 2006, 2007). This gap often narrows through generational succession, however, as immigrants gradually assimilate to the host society. Thus, the second generation
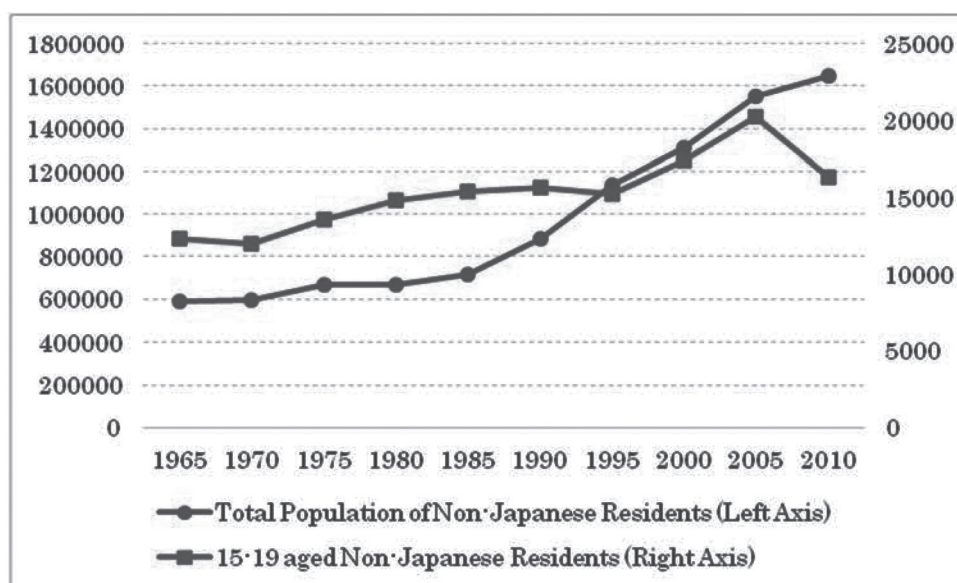
Source: Calculated by authors based on Population Census

Figure 1   Population of non-Japanese residents

generally performs better (closer to natives) than the first generation, as do those who arrive at a younger age in the host society (OECD, 2006; Van de Werfhorst & Van Tubergen 2007; Levels et al., 2008; Duong et al., 2015). This is in part because immigrants (and their children) acquire the new language and culture due to more time spent in the host society, and additionally, their socioeconomic positions tend to improve over time (e.g. Chiswick, 1978).

In Japan, where the school-aged second generation has reached a critical mass only recently, there is no clear evidence as to how, or whether, the assimilation thesis or generational succession works. Past studies have repeatedly pointed out the difficulties immigrant children face in Japanese schools (Nagayoshi & Nakamuro, 2012; Miyajima, 2014). While virtually all Japanese children attend primary, junior, and senior high schools[2], only about 60% of immigrant pupils, of both generations, enroll in primary and junior high schools (Miyajima, 2014, p. 73), and about half of them are estimated to go on to senior high school (Kanai, 2004).

Those studies have identified several key factors explaining the challenges immigrant children face in Japan. One is parental socioeconomic status. Immigrant parents in Japan tend to engage in manual labor and work for long hours, often in precarious conditions. As a result, they lack resources, time, and knowledge to provide sufficient educational support for their children (Shimizu & Shimizu, 2006; Miyajima, 2014), including supervision of homework at home and extra-curricular schooling prevalent among Japanese native children.

Another factor often pointed out in the literature is Japanese language proficiency. Over the last decade, pupils without sufficient Japanese ability who are enrolled in public schools have increased in number from 19,000 in 2003 to 27,000 in 2012[3]. The majority are children of immigrants, from Brazil (32.8%), China (20.4%), the Philippines (16.6%), and Peru (12.9%)[4]. Language deficiency is problematic, not only as it hinders children's school performance (all public schools in Japan operate almost entirely in Japanese), but it also deprives them of motivation to attend and stay in school (Sakuma, 2006). Equally problematic is lack of Japanese proficiency among immigrant parents. Parents' language ability is important for accessing information on education, communicating with teachers, and monitoring children's school performance. It is also crucial for enhancing communication at home, especially if children are Japanese monolinguals (Miyajima & Ota, 2005).

Many prior studies have also stressed the importance of cultural difference in hindering immigrant children's educational achievement in Japan. In the "mono-cultural" and "conformist" Japanese school environment, immigrant children often become the target for bullying simply by virtue of their foreign roots (Shimizu & Shimizu, 2006; Shimizu, 2006; Miura, 2015). Teachers are often unaccustomed to dealing with foreign pupils, and there are inadequate resources and infrastructure in school (such as bilingual education) to accommodate the needs of students with diverse cultural backgrounds (Tsuneyoshi, 2001; Miyajima & Ota, 2005). Whether or not these problems are simply attributable to "cultural difference" needs to be tested, however. That is, we need to examine whether the "immigrants' disadvantage" commonly associated with their foreign culture can possibly be mediated by Japanese proficiency and socioeconomic status gained in the process of assimilation in Japan.

In this paper, we test the efficacy of assimilation to find out what explains the immigrant-native achievement gap in Japan. Are immigrant children disadvantaged simply because of their lack of time spent in Japan, and can these disadvantages be overcome with time? And if so, what else should be done to overcome the achievement gap, and to what extent can it be explained by improvement in Japanese language proficiency and socioeconomic status?

This is the first empirical study that systematically analyzes the academic achievement gap by comparing native students with first and second generation immigrant pupils. Although numerous studies have looked at the achievement gap, most of them have been based on small-scale case studies and failed to test the effects of multiple factors simultaneously, using large-scale nationally representative data. As a result, we do not know whether and to what extent the achievement gap really exists in the first place[5], and if so, what explains the gap, once generation (or time spent in Japan), nativity (or foreign vs. immigrant status), and parental socioeconomic status are controlled for. Drawing on merged cumulative data of PISA conducted by the OECD at randomly selected high schools in Japan between 2000 and 2012, we test whether and how immigrant children lag behind Japanese native children in school achievement, and if so, what accounts for the achievement gap. By empirically testing these questions, we explore the extent to which the achievement gap may narrow or persist over generations, and how it can be explained by acquiring higher levels of language proficiency and/or socioeconomic status in the host society.

Although our analysis is limited to high school students, its scope can be significant. High school education has a special importance in Japanese society, as it directly affects students' employability and future life chances in Japan (Ojima, 2002; Kariya, 1991). It is critical, therefore, to identify the mechanism of who falls behind in high school and why, and how immigrant status matters in explaining it. This, in turn, allows us to assess not only what kinds of opportunities Japan provides, or fails to provide, for immigrants and their children, but also what the state should do to educate children whose backgrounds are becoming more and more diverse.

2. Assimilation Hypotheses

Our empirical analysis begins with an assessment of the educational achievement gap between immigrant and native-born children. To test the effects of generational succession, we compare the achievement level, measured as standardized test scores between native and first and second generation immigrant children. If the assimilation thesis is valid, the second generation should outperform the first generation, although not to the same extent as native children.

Subsequently, we analyze the mechanisms, or what explains the achievement gap, by testing two hypotheses. The first is the "socioeconomic status hypothesis," which predicts that parental socioeconomic status accounts for the achievement gap. Based on prior studies, we hypothesize that first generation immigrants perform more poorly in school than the second generation due to the lower economic positions their parents tend to occupy in Japan. If parental socioeconomic status is proven significant, it should mediate the nativity and generational differences in academic achievement. That is, once parental socioeconomic status is controlled for, the achievement gap between natives and first and second generation immigrants should disappear.

The second is the "linguistic integration hypothesis," which tests the effects of Japanese language use in explaining the native-immigrant achievement gap. This hypothesis predicts that the achievement gap is attributable to the use and level of language proficiency, measured as Japanese spoken at home (Entorf & Minoiu, 2005; Schnepf, 2006). Accordingly, once immigrant children acquire sufficient Japanese proficiency, their "academic disadvantage" should disappear.

Table 1   Definition of immigrant generation based on birthplace

	Father	Mother	Student	Language at Home: Non-Japanese (%)	Total N
Native (1)	Japan	Japan	Japan	0.1%	26303
Native (2)	Japan	Japan	Other Country	1.6%	64
Second Generation	At least, either father or mother is not born in Japan		Japan	6.0%	215
First Generation	At least, either father or mother is not born in Japan		Other Country	45.9%	74

Source: Calculated by authors based on PISA

3. Data and Method

3.1. Data

These hypotheses are tested, drawing on cross-sectional micro data of PISA (Programme for International Student Assessment). Administered by the Organization for Economic Co-operation and Development (OECD) every three years since 2000, PISA contains information on standardized test scores and socioeconomic status of approximately 5,000 high school students, aged 15, enrolled in randomly selected 160 high schools nationwide[6]. Since the number of immigrant (foreign) students included in each wave is small in Japan, we constructed a pooled dataset by combining all five waves from 2000 through 2012 (2000/2003/2006/2009/2012)[7]. This allowed us to run a multivariate analysis, *ceteris paribus*, to test the hypotheses more rigorously than in previous studies. The total number of immigrant students in our sample, as shown in Table 1, was 289 (1.09% of the total sample).

3.2. Variables

Table 2 summarizes the descriptive statistics of the variables included in the models. The dependent variable, or students' academic achievement, is measured as the standardized test score in reading literary, mathematics, and science. Although reading literacy is closely related to linguistic skills (one of our independent variables), it is used as a broader measure of reading comprehension and analytical skills, as defined by PISA (OECD, 2013). Each score was derived by calculating the average value of five "plausible values" available in the PISA dataset[8]. Across the OECD countries where the study was conducted, the average score for reading literacy, for instance, was 500 with a standard deviation of 100. Although test scores in three subjects were examined, we focus our analysis and discussions on reading literacy, partly because the results derived were almost identical, and partly because reading literacy skills have been identified as particularly crucial in the mostly mono-lingual Japanese school environment (e.g, Kalmijn, 1996; Portes & Rumbaut, 2001; Takenaka et al., 2015).

Table 3 shows the mean scores in reading, mathematical and scientific literacy between native and immigrant children. These are referred to as "unconditional means," because they represent raw scores prior to controlling for any other variable. Native children score the highest, on average, followed by the second generation and then by the first generation. This difference

Table 2   Summary statistics of variables

	N	Mean	S.D.	Min	Max
Reading Test Score (Mean of 5 Plausible Values)	26656	520.96	93.17	95.55	849.36
Immigrant Generation (Ref.: Native)					
Second Generation	26656	0.0081	0.0894	0	1
First Generation	26656	0.0028	0.0526	0	1
Gender (Ref.: Male)					
Female	26656	0.490	0.500	0	1
Parents' Highest Socio-Economic Index	21941	50.612	16.351	11.56	88.70
Cultural Possession Index	26656	−0.393	0.941	−1.65	1.35
Language Spoken at Home (Ref.: Japanese)					
Other Language	26656	0.0027	0.0523	0	1
Parents' Highest Level of Education (Ref.: Tertiary Education)					
Lower Secondary or Below	21269	0.024	0.152	0	1
Upper Secondary and Post-secondary but Non-tertiary	21269	0.360	0.480	0	1
School Type (Ref.: Public)					
Private	26656	0.280	0.449	0	1
Courses Students Belong to (Ref.: General Course)					
Technical College at the First 3 years	21765	0.011	0.103	0	1
Specialized Course	21765	0.238	0.426	0	1
School's Location (Ref.: City)					
Small Town	26397	0.048	0.214	0	1
Town	26397	0.284	0.451	0	1
Large City	26397	0.199	0.400	0	1
Test Year (Ref.: 2000)					
2003	26656	0.162	0.368	0	1
2006	26656	0.211	0.408	0	1
2009	26656	0.218	0.413	0	1
2012	26656	0.226	0.418	0	1

Source: Authors' calculation

is statistically significant, plausibly supporting the assimilation hypothesis. Through generational succession and the process of assimilation (with more time spent) in Japan, second generation immigrants perform better than the first generation, although they do not quite reach parity with native children.

There are three key independent variables. The first and most important is immigrant generation. We define "immigrant students" as those who have at least one parent born outside Japan (See Table 1). Immigrant students are classified into two categories: (i) first generation students (N = 74) who were born abroad with parents also born abroad; and (ii) second generation students (N = 215) who were born in Japan to foreign-born parents. Table 4 shows that although the number of immigrant students is still small in Japan relative to other countries,

Table 3   Unconditional means of three literacy scores

	Reading Literacy	S.E.
Native (N = 26367)	521.19	0.57
Second Generation (N = 215)	508.65	6.90
First Generation (N = 74)	475.49	13.72
	Math	S.E.
Native (N = 21472)	535.23	0.61
Second Generation (N = 196)	515.65	6.73
First Generation (N = 67)	491.49	13.57
	Science	S.E.
Native (N = 21472)	545.74	0.64
Second Generation (N = 196)	526.54	6.84
First Generation (N = 67)	487.01	14.08

Sorce: Author's Calculation
Note: On math and science scores, we used the analytical sample for Model 5 and 6 in Table 7.

Table 4   Trend of immigrant generation composition

	2000	2003	2006	2009	2012	2000–2012
Native	99.47%	99.37%	98.81%	98.88%	98.27%	98.92%
Second Generation	0.39%	0.37%	0.85%	0.90%	1.33%	0.81%
First Generation	0.14%	0.25%	0.34%	0.22%	0.40%	0.28%
N	4,891	4,319	5,622	5,798	6,026	26,656

Source: Authors' calculation

both first and second generation students have gradually increased in number over the years; the share of first generation immigrants grew by 2.8 times between 2000 and 2012 and the second generation, by 3.4 times. To designate immigrant generation, two sets of dummy variables were created for each generation, coded as 1 for immigrants of either the first or second generation, and 0 for native-born Japanese[9].

The second is parental socio-economic status. This is measured by two variables constructed: (i) parental socio-economic index (ISEI), originally developed by Ganzeboom et al. (1992); and (ii) cultural possession index. More specifically, ISEI is derived from ISCO (the International Standard Classification of Occupations), the internationally recognized classification system constructed on the basis of tasks and duties undertaken in the job; higher ISEI scores indicate higher socioeconomic status. The cultural possession index is comprised of "classic cultural products" owned at home, such as classic literature, books of world-class poetry, and works of classic art. The index is used to measure parental cultural capital or whether the home environment is conducive to children's education. As shown in Table 5, immigrants' parental socioeconomic status is lower, on average, as is cultural capital possessed at home, than that of their native-Japanese counterparts. However, this difference is not statistically significant. Moreover, immigrant students' parents are slightly more educated than natives, as shown by the higher percentage who have attended tertiary school education (See Table 6). These results are not consistent with the pattern predicted by the assimilation thesis.

Table 5   Immigrant generation and parental socio-economic statuses

	Parents' SEI	Cultural Possession Index
Native (N = 21,697)	50.62 (0.11)	–0.38 (0.01)
Second Generation (N = 189)	49.51 (1.34)	–0.45 (0.06)
First Generation (N = 55)	49.41 (2.49)	–0.43 (0.13)

Source: Authors' calculation
Note: Parentheses are standard errors of each mean.

Table 6   Immigrant generation and parent's education

	Lower Secondary or Below	Upper Secondary and Post-secondary but Non-tertiary	Tertiary Education	N
Native	2.3%	36.1%	61.7%	21,017
Second Generation	8.6%	28.9%	62.6%	187
First Generation	7.7%	21.5%	70.8%	65
Total	2.4%	36.0%	61.7%	21,269

Source: Authors' calculation

The third exploratory variable is language spoken at home. This variable is based on students' response to the PISA questionnaire regarding whether they usually speak Japanese at home. It is coded as 0, if Japanese is usually spoken at home and 1, if otherwise. As shown in Table 1, linguistic integration seems to proceed over generations. While 45.9% of first generation students responded that they usually spoke another language at home, almost all of the second generation students reported Japanese as their primary language used at home. The age at which immigrants arrived in Japan is an important determinant of the language used at home. In our sample, one-quarter of first generation students arrived after the age of seven, and these children were more likely to report another language as the primary language they speak at home.

In addition to the three key independent variables, various school-level variables were added to the models as controls: (i) the type of school (1 = private); (ii) the type of programs in which students were enrolled[10] (general/technical college during the first 3 years/specialized); and (iii) the location of school (small town/town/large city). These contextual variables are important, because there is significant variation in the kinds of resources and infrastructure provided by schools. This is because Japanese high schools, unlike primary and secondary schools, are highly differentiated by admission standards, curricula, and student and teacher orientations (Taki, 2011; Matsuoka, 2014). The type and location of school could play a role in shaping students' educational achievements, and therefore need to be controlled when analyzing the native-immigrant achievement gap.

3.3 Models

3.3.1. Multilevel Modeling

To determine the effects of the explanatory variables on students' educational achievement (in reading literacy, mathematics, and science), we used a multilevel model to estimate both individual and school-level variations. Multilevel analysis is an extension of the conventional regression analysis, such as Ordinary Least Squares (hereafter, OLS), but unlike OLS, it enables us to estimate coefficients that may vary by school. The model is appropriate for our analysis, because school-wide variations are rather large at the high-school level in Japan, as mentioned above, while students within the same school are quite homogenous in terms of their levels of academic achievement and socioeconomic status. Therefore, the assumption required by OLS that each observation is independent of each other may be violated and would bias the estimated coefficients (see Raudenbush & Bryk, 2002 for more details). In other words, the conventional linear regression model tends to underestimate standard errors, thereby leading to the so-called "Type I Error" that rejects the null hypothesis when it is in fact true. The multilevel model is more effective in accurately estimating the effect of school-level variations, as it correctly adjusts the potential problem of underestimated standard errors. Fortunately, the two-stage stratified sampling procedure designed for PISA, in which schools were randomly selected first and then students were selected within each school, is suitable for carrying out the multilevel model analysis. The hierarchical nature of the data (students are "nested" within schools) enables us to employ random intercept models and estimate the intercept varied by each school.

The model was run in four stages (Model 1 through 4) with different sets of control variables. It is expressed in the following mathematical equation where y of the individual student i attending school j is a function of IMG (immigrant generation), SES (parental socioeconomic status), LNG (language spoken at home), the vector of other control variables, X (individual level) and Z (school level), and ε is a random disturbance with mean zero and constant variance.

$$y_{ij} = \beta_0 + IMG_{ij}\beta_1 + SES_{ij}\beta_2 + \beta_3 LNG_{ij} + X_{ij}\beta_4 + Z_j\beta_5 + \varepsilon_i$$

The school-level intercept is defined as:

$$\beta_0 = \gamma + u_j,$$

where the "fixed effect" is constant for all schools, and the "random effect (u_j)" varies across schools.

3.3.2. Multiple Imputation

In addition to the multilevel model technique, we employed the multiple imputation (MI) method to deal with missing values. A significantly large number of missing values were found in some independent variables. For example, 17.7% of total observations in parental socioeconomic index were missing, and this could lead to invalid inferences, because missing data are not always missing completely at random (MCAR). If respondents who did not provide information on their parental socioeconomic status share some common characteristics, this non-random response pattern can bias the overall estimates. Deleting all missing cases was not feasible because it would result in a significant data loss and make the standard errors of immigrant generation variable (IMG) unacceptably large. Another common method of substituting a single common value for each missing case is also not ideal when there are many cases of missing values.

The multiple imputation (MI) method based on the Monte Carlo technique was more suitable for our analysis. Subsequently, we conducted multiple random imputation (Allison, 2002) to generate imputations for missing values in the incomplete multivariate data and replaced each missing value with a set of plausible values (Rubin, 1987). Because our empirical specifications are based on the multilevel model with a two-level hierarchical structure, we applied multilevel imputation in order to avoid the biased coefficients and standard errors in the MI procedure (Carpenter & Kenward, 2013). For estimating the parental socioeconomic status score, we used a linear function of reading literacy, immigrant generation, and the language spoken at home as predictors.

4. Results

Table 7 shows the results of the multilevel model analysis (Models 1-6). Model 1 examines the effects of immigrant generation (***IMG***) on reading literacy, after controlling for gender and years when each test was conducted. The results show that the academic achievement level (test score) is lowest among the first generation, as predicted by the assimilation thesis, but no difference is observed between the second generation and native students[11]. Specifically, the average reading score is 28.34 points lower for first generation immigrants than it is for native students, which is statistically significant at the 0.1% level. Yet, the difference between natives and the second generation, 4.37 points, is not statistically significant.

Models 2 to 6 present combined results from MI performed 15 times, once for each of 15 imputed datasets, to obtain a single set of results. Model 2 tests the "socioeconomic hypothesis" by adding two indices of parental socioeconomic status (***SES***). SES turns out to be a significant determinant of reading literacy. Both indices (socioeconomic index and cultural possession index) have positive and significant effects on reading scores. Another important finding here is that even though we control for parental socioeconomic status, the magnitude of the coefficient on immigrant status (***IMG***) does not change from Model 1. This implies that both parental socioeconomic status and immigrant generation independently have direct effects on academic achievement. Parental socioeconomic status does not mediate the effect of immigrant generation, and this does not support the "socioeconomic status hypothesis."

Finally, the effect of the language spoken at home is examined in Model 3. This variable was found to be an important determinant of reading literacy. If a student speaks Japanese at home, his/her reading score would increase by 53.57 points, representing approximately 50% of the standard deviation. More importantly, once we control for the language spoken at home, the effects of immigrant generation are dramatically reduced and become statistically insignificant[12]. The significance of this variable remains robust and consistent, even after school-level variables are added and controlled for (Model 4)[13]. Regardless of the type of school, therefore, speaking Japanese at home significantly improves immigrants' academic performance.

These findings are consistent when the effects on test scores in mathematics and science are examined (See Model 5 and Model 6). The results of Model 5 (mathematics), using the same independent variables as in Model 4 (reading literacy), are almost identical; the effect of immigrant generation disappears once controlling for the language spoken at home. In Model 6 (science), the coefficient of the first generation dummy variable is negatively significant at the 5% level, but the magnitude of this coefficient decreases substantially from Models 4 and 5.

Table 7 Results of multilevel models

Fixed Effects	Model1		Model2		Model3		Model4		Model5 (Math)		Model6 (Science)	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Immigrant Generation (Ref.: Native)												
Second Generation	−4.37	4.44	−4.02	4.41	−0.82	4.43	−2.51	4.43	−0.21	4.76	1.52	4.88
First Generation	−28.34 ***	7.53	−27.26 ***	7.48	−2.83	8.43	−3.19	8.43	−0.52	8.90	−18.60 *	9.14
Gender (Ref.: Male)												
Female	23.52 ***	0.90	22.09 ***	0.89	22.04 ***	0.89	22.46 ***	0.89	−18.46 ***	1.00	−6.87 ***	1.03
Parents' Highest Socio-Economic Index			0.06 *	0.03	0.07 *	0.03	0.06 *	0.03	0.08 **	0.03	0.03	0.03
Cultural Possessions at Home			8.72 ***	0.45	8.76 ***	0.45	9.60 ***	0.45	5.18 ***	0.52	9.54 ***	0.53
Language Spoken at Home (Ref.: Japanese)												
Other Language					−53.57 ***	8.53	−55.05 ***	8.53	−61.78 ***	9.33	−53.21 ***	9.58
School Type (Ref.: Public)												
Private							−20.61 ***	5.59	−19.90 ***	5.59	−24.52 ***	5.61
Courses Students Belong to (Ref.: General Course)												
Technical College at the First 2 years							58.89 *	24.09	68.99 **	24.20	67.22 **	23.86
Specialized Course							−48.60 ***	5.63	−50.06 ***	5.65	−48.40 ***	5.58
School Location (Ref.: City)												
Small Town							−39.40	13.08	−36.28	13.13	−35.86	12.96
Town							−14.02 **	5.73	−18.55 **	5.75	−13.72 **	5.68
Large City							9.56 *	6.28	8.82 **	6.30	7.39 *	6.22
Test Year (Ref.: 2000)							Test Year (Ref.: 2003)		Test Year (Ref.: 2003)		Test Year (Ref.: 2003)	
2003	−30.02 ***	8.31	−28.39 ***	8.02	−28.39 ***	8.02						
2006	−30.18 ***	7.86	−28.14 ***	7.59	−28.14 ***	7.59	0.03	7.58	−10.47	7.09	−16.02	7.00
2009	−6.57	7.85	−5.76	7.58	−5.79	7.58	19.99 **	7.57	−7.79 *	7.08	−10.24 *	6.99
2012	12.11	7.81	14.09 †	7.54	14.09 †	7.54	40.10 ***	7.54	0.45	7.06	−1.73	6.97
Intercept	514.83 ***	6.05	514.58 ***	6.00	514.64 ***	6.00	508.40 ***	6.47	564.06 ***	6.46	575.63 ***	6.43
Random Effect (Intercept)	4548.70		4233.55		4229.62		3856.54		3919.84		3774.11	
ICC	0.53		0.51		0.51		0.48		0.54		0.46	
Obs. (Level1: Student)	26656		26656		26656		21735		21735		21735	
Obs. (Level2: School)	833		833		833		704		704		704	

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1

Source: Authors' Estimation

1) In Model2, 3, 4, 5 and 6, missing values of "Parents' Highest Socio-Economic Index" are substituted by multiple imputation (using reading score, immigrant generation, and language spoken at home).

2) Dependent variables of Model 5 and 6 are mathematical literacy score and scientific literacy score.

3) Parameters are estimated by REML (Restricted Maximum Likelihood).

In sum, the native-immigrant achievement gap seems to be more accounted for by the degree of linguistic integration, as measured by Japanese spoken at home, than by parental socioeconomic status. Although immigrant children do trail their native counterparts in academic achievement, the gap is not fully explained by their immigrant (or foreign) status itself. As previous studies frequently identified the barrier posed by the Japanese "mono-lin-gual" school environment, speaking Japanese at home significantly enhances the performance of immigrant children. It supports the assimilation thesis in that learning and speaking the host language contributes to socioeconomic integration in the host society. Yet, generational succession, or the mere amount of time spent in Japan, does not in itself narrow the achievement gap between immigrant and native Japanese children. A key to immigrant children's education in Japan, again, lies in language use, nourished particularly through child-parental communication at home[14]. As immigrants tend to speak more Japanese at home over generations, we would expect them to perform better and to catch up with their Japanese peers in school achievement.

5. Conclusion

In this paper, we have examined the academic achievement gap between native and immigrant children in Japan. The achievement gap indeed exists, and we have attempted to find whether the gap persists, or narrows, over generations and what explains the change over time by identifying the effects of parental socioeconomic status and the language spoken at home. The major findings are three-fold. First, first generation students generally perform more poorly in reading literacy, but there is no significant difference between second generation and native students. Second, parental socioeconomic status has a positive effect on academic achievement, but the effect is not robust enough to mediate the impact of immigrant generation. Finally, the language spoken at home is an important determinant of the native-immigrant gap in academic achievement.

Although the importance of host language acquisition was frequently pointed out in prior studies, it may particularly be crucial in Japan, where schooling is almost completely dominated by one single language (Japanese). Unlike other findings, especially from studies conducted in many Western societies, duration of time in Japan does not translate linearly to better academic achievement. Nor does immigrants' socioeconomic status improve automatically with more time spent in Japan. This anomaly may resonate with the prevalence of "negative assimilation" (Chiswick & Miller, 2011) in Japan where there often is a negative (i.e. non-positive) relationship between immigrant socioeconomic success and duration of time in Japan. This may possibly be because immigrants with higher socioeconomic status (and higher wages) do not stay long in Japan (Takenaka et al., 2015). In a similar vein, immigrant children who stay long in Japan may characteristically be of lower socioeconomic status. The relationship between parental socioeconomic status and academic achievement needs to be investigated further with a larger sample, as well as the selectivity issue of who leaves and stays in Japan.

It is also necessary to clarify the causal relationship between student achievement and the language spoken at home in more detail. What it means and the function of speaking Japanese at home needs to be examined as well. Although we used this variable as a proxy for Japanese proficiency, it is not a direct measure of linguistic fluency or competency and may include other aspects, such as assimilation orientation or inclination. Future research also needs to empirically

examine the effects of social networks and peer groups on student academic achievement (Zhou & Kim, 2006; Park & Kyei, 2010).

In spite of certain limitations, our study has shed some light on our understanding of how immigrant children fare in school in Japan, identifying the language used at home as a crucial factor explaining the native-immigrant achievement gap. Based on this finding, we may conclude that in order to narrow the gap in academic achievement between immigrant and native children in Japan, it is essential to expand Japanese language learning opportunities for both immigrant children and their parents.

Acknowledgement

Notes

1. The term immigrant is used here to refer to foreign nationals residing in Japan.
2. Attendance in primary and junior high school is compulsory for Japanese nationals, but this does not apply to foreign students.
3. See MEXT website (http://www.mext.go.jp/b_menu/toukei/chousa01/nihongo/1266536.htm).
4. Children's nationalities are proxies for their mother tongues. The survey conducted by the MEXT only includes information on children's mother tongues. The vast majority of "Portuguese-speaking children," for instance, are estimated to hail from Brazil. Detailed information is available in MEXT website.
5. Taki (2010) found no difference in educational achievement between native and immigrant pupils, although the study did not focus on the achievement gap.
6. For more detailed information on PISA, see NIER (2002, 2004, 2007, 2010, and 2013).
7. The PISA sampling procedure used in Japan is the same in all waves and thus there is no compatibility problem in combining data from multiple years. We used dummy variables for each test year and controlled for any effects unique to each year in running empirical models.
8. Individual students responded to slightly different sets of questions concerning reading literacy. In order to make all scores comparable, we calculated the average value of five "plausible values," provided by PISA, by way of item response modeling.
9. In our data, as shown in Table 1, there are some students (N = 64) born abroad, but their parents were born Japan. They probably are returnee students, or "*kikokushijo*" in Japanese, because the majority speak Japanese at home. For our analysis, we included them in the native-Japanese category. The inclusion of this population did not change the overall results of our analysis.
10. Technical colleges (or "*Koto-senmon-gakko*" in Japanese) offer a five-year continuous program, and the first three years correspond to upper secondary education. Specialized programs mainly provide vocational or technical courses for those students who want to work in specific occupations.
11. This result is consistent with Nakamuro et al. (2015), which examined the difference in hours spent studying between the second generation and the native-born by using nationally representative panel data. They found that school orientation and second generation students' study habits at home are not significantly distinguishable from native-Japanese.
12. The effect of language spoken at home was equally significant in models run on test scores in other subjects, mathematics and science.
13. The sample size of Model 4 is smaller than that in other models, because data on the type of courses was not available in PISA 2000.
14. Previous studies reported problems associated with "dissonant acculturation" (e.g. Portes & Rumbaut, 2001, p. 52). This occurs when immigrant children learn the host language, while their parents do not, causing a communication gap between them. Although it is not possible to directly assess dissonant acculturation in our study due to lack of information on parental linguistic skills, it

is an unlikely scenario, given the positive and significant effects of Japanese spoken at home.

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