

Immigrant Students' Emotional and Cognitive Engagement at School: A Multilevel Analysis of Students in 41 countries

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Abstract Central to student learning and academic success, the school engagement of immigrant children also reflects their adaptation to a primary institution in their new country. Analysis of questionnaire responses of 276,165 fifteen-year-olds (50 % female) and their 10,789 school principals in 41 countries showed that school engagement has distinct, weakly-linked cognitive and emotional components. Native students had weaker attitudes toward school (cognitive engagement) but greater sense of belonging at school (emotional engagement) than immigrant students or students who spoke a foreign language at home. Students with better teacher–student relationships, teacher support or a classroom disciplinary climate often had a greater sense of belonging at school and had better attitudes toward school than other students. While immigrant students often have solid attitudes toward school, teachers can help them feel a greater sense of belonging at school.

Keywords Student engagement · Immigrants · Sense of belonging · Attitude toward school · International comparisons

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Introduction

Driven by globalization, unprecedented large-scale migration across national borders has moved many immigrant children into schools in new countries, whose degree of adaptation to their new country often is reflected in their school engagement (Suárez-Orozco 2001). The school as a proximal context plays a key role in the assimilation of immigrant adolescents because it is often the first social and cultural institution that immigrant children face outside of their homes. Immigrant students spend most of their day in school to learn and develop their cognitive and social skills for future participation in the adult world; therefore, we would expect a student's school to play a key role in their psychological well-being. The schools that students attend can foster social, political and cultural values and attitudes that influence their socio-psychological development. As positive feelings and thoughts toward school are crucial aspects of psychological well-being (Anderman and Freeman 2004), students with greater school engagement tend to be more academically motivated and have higher achievement (e.g., Anderman 2003; Roeser et al. 1996). All of these characteristics are linked to occupational success and life satisfaction (e.g., Suldo et al. 2008). Hence, immigrant students' school engagement both indicates their short-term adaptation to school and portends their long-term adaptation to society.

In this study, we test whether the cognitive and emotional components of school engagement differ substantially, whether the school engagement of native students differs from that of immigrant students, and whether culture, family, school or individual characteristics are linked to school engagement. This study considers both cognitive and emotional engagement in school, specifically attitude toward school and sense of belonging at school, as past

studies have found that cognitive and emotional aspects of a construct can differ and have different antecedents (e.g., Wong et al. in press). Also, native students and immigrant students differ in many ways, including their family, school and individual characteristics, which might be linked to each aspect of school engagement. To compare students across diverse economic and cultural contexts, we used data from 41 countries, which also enhances statistical power to the 0.75 threshold. In short, this study examines two types of school engagement of 276,165 fifteen-year-old immigrants and natives in 10,789 schools in 41 countries.

Immigrants, Schools and School Engagement

This section discusses school engagement, and how school engagement of immigrants and natives might differ. First, we define two types of school engagement, attitude toward school and sense of belonging at school. Next, we examine how family, school, and schoolmate characteristics are related to school engagement, and consider how the school engagements of immigrants and natives might differ.

School Engagement

Attitude toward school. Attitude toward school is a cognitive aspect of school engagement that represents students' thoughts on the values and purposes of their schools (Fredricks et al. 2004). Cognitive engagement involves students' degree of psychological investment in their learning, such as their use of learning strategies, self-regulation and valuing of school-related outcomes (Finn 1989; Fredricks et al. 2004; Voelkl 1997). Though cognitive engagement and motivation are similar constructs, cognitive engagement focuses more on self-regulation and strategy use (Fredricks et al. 2004). Attitude toward school is an important outcome in its own right, in addition to its links to other cognitive and psychosocial constructs.

Studies have shown that attitude toward school also is linked to cognitive and psychosocial constructs. Students with more positive attitudes toward school typically have higher intrinsic motivation towards academic achievement (Fredricks et al. 2004). Furthermore, students with better attitudes toward school often have higher academic test scores (Wang and Holcombe 2010). Hence, students with more positive attitudes toward school often are more intrinsically motivated and have higher academic achievement.

Sense of belonging at school. Students' sense of belonging is an emotional aspect of school engagement that represents students' feeling of being connected to the school. Specifically, sense of belonging at school is a psychological state in which students "view schooling as

essential to their long-term well-being, as reflected in their participation in academic and non-academic pursuits" (Willms 2003: 8). It is conceptualized as part of an individual's perception of his or her connection to a group (Hurtado and Carter 1997). Sense of belonging focuses on students' feelings (e.g., I feel like I belong), whereas attitude toward school emphasizes students' psychological investment (e.g., "school helped give me confidence to make decisions"). Hence, sense of belonging at school is an important outcome, possibly distinct from attitude toward school.

Like attitude toward school, sense of belonging at school is linked to cognitive and psychosocial functioning (Anderman and Freeman 2004). Adolescents with a greater sense of belonging at school often have higher intrinsic motivation and higher academic performance (e.g., Goodenow and Grady 1993; Roeser et al. 1996). Conversely, students who are successful in school are more likely to view schooling positively and feel a greater sense of belonging (e.g., Anderman 2003). Likewise, students with higher intrinsic academic motivation enjoy school activities more and typically feel a greater sense of belonging to their school (e.g., Goodenow and Grady 1993). Students with higher sense of belonging at school often have fewer psychological health and social problems, such as lower rates of delinquency, reduced social rejection, less depression, fewer incidences of dropping out of school, and less drug use (e.g., Anderman 2002; Finn 1989). Hence, students with a greater sense of belonging at school tend to show higher cognitive and psychosocial functioning.

Immigrant versus Native Students' School Engagement

School engagement, like other aspects of human development, is influenced by interactive environmental systems. According to Bronfenbrenner's (2005) conceptualization of ecological systems, the immediate contexts (*microsystems*), the relationships between microsystems (*mesosystem*) and the broader economy and culture (*macrosystem*) all play important roles in human development. This study focuses on the mesosystem consisting of the family and school microsystems (*family-school mesosystem*) and examines how mesosystem mechanisms can influence the school engagement of immigrant students, while accounting for their broader macrosystems. (A cultural macrosystem is the patterns of history, ideas, and societal relationships of the society in which a student lives; Bronfenbrenner 2005).

Family

Within the family-school mesosystem, family characteristics can affect a student's school engagement. Immigrant families (especially first generation immigrants or those

that only speak a foreign language at home) typically have lower socio-economic status (SES) and fewer educational resources than other families (Schnepf 2007). Compared to natives, immigrant students' fewer educational resources often result in less academic success and a lower level of school engagement (Chiu 2007; Chiu and McBride-Chang 2010; Chiu and Zeng 2008).

Immigrant students also typically face more cultural barriers (such as racial discrimination or language barriers, Hirschman 1996) and have fewer cultural resources in the form of knowledge, skills, and values (*cultural capital*, Bourdieu 1993). In the family-school mesosystem, the values and norms of native students' families are more likely than those of immigrant families to resemble those of their school (Portes and MacLeod 1996). As a result, native students tend to learn their schools' values and norms more quickly, behave more appropriately in school and build better relationships with their teachers and schoolmates, compared to immigrant students (Chiu and Chow 2010). As a result, immigrant students might have more difficulty adapting to school and have less school engagement. As immigrant students tend to have less cultural capital, they might have less school engagement, compared to native students.

The mesosystem of the family and school micro-systems can include countervailing relationships: immigrant parents tend to be more optimistic than native parents about their respective children's mobility in the social hierarchy (Kao and Tienda 1995), which yields greater school engagement by immigrant children. When parents have optimistic expectations for their children, these children often embrace these optimistic expectations, respond with greater effort in their studies and show higher academic achievement (Kao and Tienda 1995). Hence, immigrant children's more optimistic expectations might yield greater school engagement compared to native born children.

Families of Schoolmates

The mesosystem of the family and school micro-systems also can operate through the families of schoolmates. In many countries, immigrants often live in poor immigrant enclaves and often attend schools with many immigrant schoolmates (Pong and Hao 2007). As immigrant schoolmates often have lower SES families (Schnepf 2007), students with more immigrant schoolmates typically have fewer educational resources and poorer academic performance (Chiu 2010), which reduces student engagement (Chiu and Chow 2010). As immigrant students often have more immigrant schoolmates with fewer educational resources, they often have poorer academic performance and feel less school engagement.

On the other hand, immigrant students with more immigrant schoolmates might have a homophily bias. As

people often prefer interacting with others who share similar traits or experiences (*homophily bias*; McPherson et al. 2001), immigrant students might prefer to make friends with immigrant schoolmates rather than native born schoolmates, according to status inequality theory. As a result, immigrant students with more immigrant schoolmates may make more friends, compared to immigrant students with fewer immigrant schoolmates. As students with more friends at school typically have greater school engagement (Faircloth and Hamm 2005), immigrant students with more immigrant schoolmates might have higher school engagement than those with fewer immigrant schoolmates.

School

The mesosystem of the family and school micro-systems also operates through family SES's links to school quality and teacher quality (Chiu and Khoo 2005). As the families of immigrant students often live in poorer neighborhoods or in ethnically segregated areas (Iceland 2009; Pong 2009), immigrant children tend to be concentrated in schools with fewer resources, less skilled staff, worse student discipline, more safety concerns and poorer school climate (Pong and Hao 2007). In turn, school climate can influence students' school engagement. School climate refers to the environment that a school provides, including factors such as safety, relationships and its mission (Cohen et al. 2009). Past studies have found that supportive school climates, whether measured as student self-reports or school-level means of them, have been linked to greater school engagement, specifically greater sense of belonging at school and reduced feelings of alienation from school (e.g., Anderman 2003; Ma 2003; Osterman 2000). As immigrant students often attend schools with poorer school climate, they might have less school engagement.

As many of students' school experiences occur during class, teachers can influence students' school engagement through their relationships with and support of students, or through creating an orderly classroom disciplinary climate. Teachers can serve as role models, shaping students' views and values toward school. Furthermore, teachers can build caring relationships with students and create a supportive classroom atmosphere of mutual respect to promote students' school engagement (e.g., McNeely et al. 2002; Roeser et al. 1996). Compared to native students, immigrant students often attend poorer schools and thus are often taught by less skilled teachers. Furthermore, teachers (who are often natives) might form closer relationships with native students and be more supportive of them, in comparison to immigrant students (cf. Roscigno and Ainsworth-Darnell 1999). Hence, immigrant students may have weaker relationships with their teachers, receive less

support from them, and attend classes with weaker disciplinary climates, all of which might reduce their school engagement compared to native students.

However, previous studies in the United States found that most immigrant children arrive in schools with positive attitudes toward school. One study found that over 70 % of their sample of foreign-born students described their schools favorably, and they rated their school principals as good, capable, very friendly, and “exciting” (Suárez-Orozco and Suárez-Orozco 2001). These foreign-born students often viewed their teachers as role models and, in many cases, like additional parents (Suárez-Orozco and Suárez-Orozco 2001). In contrast, their second-generation (native-born) co-ethnic peers often had negative attitudes towards their schools and teachers (Suárez-Orozco and Suárez-Orozco 2001). This pattern of generation decline in student attitudes is consistent with the “immigrant paradox” in academic achievement, in which first generation (foreign-born) immigrant students outperform the second, third, and higher order generation (native-born) students (Pong and Zeiser 2012).

In short, the research literature suggests that, in the family-school mesosystem, some mechanisms (educational resources, cultural capital) might yield greater school engagement for native students, but other mechanisms (parent optimism, homophily bias) might yield greater school engagement for immigrant students. The greater family SES of native students results in more educational resources at home, among one’s schoolmates and at school (school climate and teacher skills), all of which are linked to greater academic performance and greater school engagement, compared to immigrant students. Furthermore, native students often have more cultural capital that they can use to learn their schools’ norms more quickly, have stronger relationships with their teachers and schoolmates, and develop greater school engagement compared to immigrants. However, immigrant students often embrace their parents’ greater optimism about their economic and social advancement mobility and might have greater school engagement, compared to native students. Also, immigrant students with more immigrant schoolmates might share more traits or experiences with them, make more friends and have greater school engagement. Hence, an empirical study is needed to test these competing claims to determine whether natives or immigrants have greater school engagement, specifically sense of belonging at school and attitudes toward school.

The Present Study and Research Questions

The present study examines immigrant adolescents’ school engagement and the immigrant generational differences in

41 countries. We analyzed both cognitive and emotional measures of school engagement (attitude toward school and sense of belonging at school) to provide a more comprehensive picture of school engagement. We examined four research questions regarding each aspect of immigrant students’ school engagement, and its related environmental factors, including family, school, and schoolmates. First, we tested whether cognitive and emotional school engagements are distinct by testing whether attitude toward school and sense of belonging at school are highly correlated, weakly correlated or largely independent. Second, we tested whether the cognitive and emotional school engagements of adolescents differ across immigration status (native, first generation immigrant, second generation immigrant). Third, we tested whether adolescents who speak foreign languages at home have lower cognitive and emotional school engagements than native speakers. Lastly, we examined whether the association between immigrant status and school engagement is retained after controlling for family, school, schoolmate and country characteristics.

Methods

Data

The Organization for Economic Cooperation and Development’s Program for International Student Assessment (OECD-PISA) asked 276,165 fifteen-year-old students and their principals to fill out 30–40 minute questionnaires. International experts from OECD and non-OECD countries created the questionnaire items, forward- and backward-translated them, and pilot tested them to check their validity and reliability (for details and sample items, see OECD 2005, and www.pisa.oecd.org). We also used their mathematics test scores (for details, see OECD 2005), economic data (World Bank 2004), political data (Beck et al. 2001), cultural values data (House et al. 2004), and religion data (CIA 2010).

This sample of 41 countries had diverse economic and cultural contexts, ranging from poor, very unequal, hierarchical, collectivist nations (e.g., Albania) to rich, relatively equal, egalitarian, individualistic ones (e.g., Switzerland). These countries/regions were Australia, Austria, Belgium, Brazil, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong-China, Hungary, Iceland, Indonesia, Ireland, Italy, Japan, Korea, Latvia, Liechtenstein, Luxembourg, Macao-China, Mexico, The Netherlands, New Zealand, Norway, Poland, Portugal, Russian Federation, Serbia and Montenegro, Slovak Republic, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, United Kingdom, United States, and Uruguay.

Missing questionnaire response data (4 %) can reduce estimation efficiency, complicate data analyses, and bias results. By estimating the missing data, Markov Chain Monte Carlo multiple imputation addresses this issue more effectively than deletion, mean substitution, or simple imputation (Peugh and Enders 2004). The Little (1988) analysis result ($p = .87$) suggests that the data was missing completely at random (MCAR). (A true MCAR test requiring follow-up interviews of respondents was too costly.) Hence, Markov Chain Monte Carlo multiple imputation was likely sufficient to model the missing data.

Variables

There were two outcome variables, *attitude toward school and sense of belonging at school*. Explanatory variables included control variables (including country variables), family variables, school variables and student variables (see Table 1). All variables and statistics are from OECD (2005) unless noted otherwise.

Unless indicated otherwise, all indices had the following characteristics. Students were asked to select one of these four Likert scale choices for each item: strongly disagree (1), disagree (2), agree (3), and strongly agree (4). All indices were constructed from Warm (1989) estimates of student responses to several questionnaire items (see OECD 2005, for details). All OECD indices were centered to a mean of 0 and standard deviation of 1, based on data from all participating OECD countries (OECD 2005). The later participation of non-OECD countries resulted in non-zero means.

Sense of belonging at school. This index captures an emotional aspect of school engagement, students' feeling of being connected to the school. The question items used for this index were: I feel like an outsider; I make friends easily; I feel like I belong; I feel awkward and out of place; other students seem to like me; I feel lonely. The reliability of sense of belonging at school was 0.74.

Attitude toward school. This index captures a cognitive aspect of school engagement, students' views on the values and purposes of their schooling. The items used for this index were: school has done little to prepare me for adult life when I leave school; school has been a waste of time; school helped give me confidence to make decisions; school has taught me things which could be useful in a job. The reliability of attitude toward school was only 0.58, so results involving this variable should be interpreted cautiously (OECD 2005).

Girl was coded 1 for female students and 0 for male students.

Relative grade is a proxy for past achievement. It is higher if a student skipped a grade and is lower if a student was retained one or more grades. *Relative grade* is computed as:

$$\text{Relative grade} = \text{Grade} - 16 - \text{Start school age} - \text{Late} + \text{Early} \quad (1)$$

Grade is a student's current grade level. *Start school age* is the standard age at which students start school in their country. *Late* has a value of 1 if a student's birthday is after the school year enrollment cutoff end date (0 otherwise). *Early* has a value of 1 if a student's birthday is before the school year enrollment cutoff start date (0 otherwise). For example, if a school year enrollment's start and end dates are Sept. 1, 2005–August 31, 2006, then students starting school who were born on August 31, 2005 or earlier should have attended school earlier, but they enrolled *late*. Likewise, students starting school who were born on Sept 1, 2006 or later should have started school later, but they enrolled *early*.

Proportion of immigrants indicates the proportion of immigrants in a country (CIA 2010).

1st generation immigrant has a value of 1 if the student and both parents were born outside the country of the test (0 otherwise).

2nd generation immigrant has a value of 1 if both parents were born outside the country of the test and the student was native born (0 otherwise).

Foreign language spoken at home has a value of 1 if the language spoken at home is not one of the nationally recognized languages in the country of the test (0 otherwise). Speaking a foreign language at home can indicate families with less cultural capital, as truly bicultural immigrant families that have deep understanding of multiple cultures are uncommon. (Note that the measures of *cultural communication* and *cultural possessions* in the PISA data do not specify the culture of the destination country. Thus, they may refer to culture in the country of origin, so these variables are not suitable proxies for cultural capital.)

Against a baseline family of two parents, family structure categorical variables were *single parent*, and *no parents*. Students who lived with *no parents* lived alone, with friends, or with other non-parents.

A socio-economic status (*SES*) index was created from mothers' years of schooling, fathers' years of schooling, and highest job status of parents. OECD (2005) used the Ganzeboom et al. (1992) index to measure the highest job status among a student's parents.

Home educational resources. This index reflects the availability of educational opportunities at home and was derived from student reports on the availability of the following items in their home: a quiet place to study, a desk for study, textbooks, calculators, and a dictionary. Its reliability was 0.54 so results involving it should be interpreted cautiously.

Number of books at home included the following choices: none; 1–10; 11–50; 51–100; 101–250; 251–500; and more than 500 books.

Table 1 Summary statistics of significant variables (before centering around the country mean)

| Variable | Mean | SD | Description |
|---|-------|------|---|
| Sense of belonging at school | -0.02 | 0.98 | Index of: I feel like an outsider; I make friends easily; I feel like I belong; I feel awkward and out of place; other students seem to like me; I feel lonely. Choices: strongly disagree, disagree, agree, and strongly agree. Reliability = 0.74. Min = - 3.38, Max = 2.22 |
| Attitude toward school | 0.11 | 1.02 | Index of: School has done little to prepare me for adult life when I leave school; School has been a waste of time; School helped give me confidence to make decisions; School has taught me things which could be useful in a job. Choices: strongly disagree, disagree, agree, and strongly agree. Reliability = 0.58. Min = - 3.14, Max = 2.53 |
| Gender and grade variables at the student level (Control) ^a | | | |
| Girl | 0.50 | | 1 = Girl; 0 = Boy |
| Relative grade | -0.04 | 0.68 | Relative grade. Min = - 3, Max = 3. Skipping a grade increases this value, and retention decreases it |
| Family variables at the student level (Family) ^a | | | |
| 1st gen immigrant | 0.06 | | 1 = First generation immigrant (Student, mother, and father born outside the country) |
| 2nd gen immigrant | 0.10 | | 1 = Second generation immigrant (Same as 1st gen immigrant, but native born student) |
| Foreign language spoken at home | 0.04 | | 1 = Foreign language spoken at home relative to the nationally recognized languages in the country of the test |
| Living with no parents | 0.03 | | 1 = Living with no parents (baseline = Two parents) |
| Single parent | 0.19 | | 1 = Single parent |
| Blended family | 0.05 | | 1 = Blended family |
| Family SES | -0.19 | 0.96 | Factor score of mother's years at school, father's years at school, mother's job status, and father's job status (Ganzeboom et al. 1992). Min = - 3.85, Max = 2.65 |
| Home education resources | -0.14 | 1.09 | Index of: desk for study; a quiet place to study; own calculator; books to help with your school work; a dictionary. Choices: yes or no. Reliability = 0.54. Min = - 4.30, Max = 1.34 |
| Number of books at home ^b | 3.23 | 1.44 | 0-10 (13 %); 11-25 (18 %); 26-100 (30 %); 101-200 (18 %); 201-500 (13 %); >500 (8 %) |
| Teacher variables at the student-level (School) ^a | | | |
| Teacher-student relationship | 0.11 | 1.01 | Index of: Students get along well with most teachers; Most teachers are interested in students' well-being; Most of my teachers listen to what I have to say; If I need extra help, I will receive it from my teachers; Most of my teachers treat me fairly. Choices: strongly disagree, disagree, agree, or strongly agree. Reliability = 0.76. Min = - 3.09, Max = 2.85 |
| Teacher support | 0.11 | 1.00 | Index of: The teacher shows an interest in every student's learning; The teacher gives extra help when students need it; The teacher helps students with their learning; The teacher continues teaching until the students understand; The teacher gives students opportunities to express opinions. Choices: never or hardly ever, some lessons, most lessons, or every lesson. Reliability = 0.83. Min = - 2.92, Max = 2.10 |
| Disciplinary climate | 0.02 | 0.98 | Inverted index of: Students don't listen to what the teacher says; There is noise and disorder; The teacher has to wait a long time for students quiet down; Students cannot work well; Students don't start working for a long time after the lesson begins. Choices: never or hardly ever, some lessons, most lessons, or every lesson. Reliability = 0.83. Min = - 2.74, Max = 2.35 |
| Student variable at the student-level (Student) ^a | | | |
| Mathematics self-concept | 0.03 | 0.95 | Index of: I am just not good at mathematics; I get good marks in mathematics; I learn mathematics quickly; I have always believed that mathematics is one of my best subjects; In my mathematics class, I understand even the most difficult work. Choices = strongly disagree, disagree, agree, and strongly agree. Reliability = 0.89. Min = - 2.28, Max = 2.42 |
| Mathematics test score | 482 | 106 | Min = 30, Max = 881. The student mathematics scores estimated by the Rasch models were calibrated to a mean of 500 and a standard deviation of 100 (based on data from OECD countries; OECD 2005). (Many non-OECD countries scored below the mean) |

Data are from PISA, unless otherwise noted. OECD (2005) created Warm (1989) indices and tested them for reliability. PISA indices were initially standardized ($m = 0$; $SD = 1$) for OECD nations. Negative means indicate lower values for non-OECD nations

^a Bold letters indicate vectors (e.g., **U**) in their order of entry into the regression

^b Analyses with dummy variables showed roughly linear results, so an ordered variable was used to aid interpretation

School variables included *proportion of first generation immigrants in school*, *proportion of second generation immigrant in school*, *school mean SES*, *teacher-student relationship*, *teacher support* and *disciplinary climate*. We computed the school means of the variables *first generation immigrants*, *second generation immigrant in school* and *SES* to obtain the *proportion of first generation immigrants in school*, *proportion of second generation immigrant in school* and *school mean SES*.

Teacher-student relationship. This index captures the student's perceived quality of his or her relationship with his or her teacher. This Rasch-based index (using the Warm 1989 procedure) was created from student responses to multiple questions, which reduce measurement errors. The items used to create this index were: students get along well with most teachers; most teachers are interested in students' well-being; most of my teachers listen to what I have to say; if I need extra help, I will receive it from my teachers; most of my teachers treat me fairly. Its reliability was 0.76.

Teacher support. This index reflects the perceived academic support that a teacher provides students. The question items used for the index were: the teacher shows an interest in every student's learning; the teacher gives extra help when students need it; the teacher helps students with their learning; the teacher continues teaching until the students understand; the teacher gives students opportunities to express opinions. The choices were: never or hardly ever, some lessons, most lessons, or every lesson. Its reliability was 0.83.

Disciplinary climate. This index reflects a student's perception of the disciplinary climate in the classroom. The question items used for this index were: students don't listen to what the teacher says; there is noise and disorder; the teacher has to wait a long time for students quiet down; students cannot work well; students don't start working for a long time after the lesson begins. The choices were: never or hardly ever, some lessons, most lessons, or every lesson. Its reliability was 0.83.

Mathematics test score. As mathematics curricula are more similar across countries than language or science curricula, mathematics self-concept and mathematics achievement were used (Schmidt et al. 2001). The mathematics test score was computed as follows. Using a balanced incomplete block (BIB) test design, OECD (2005) gave these students mathematics *subtests* (overlapping subsets of all multiple choice and open-ended questions) to reduce both student fatigue and test-learning effects (Baker and Kim 2004). OECD (2005) fitted the test data with a graded response Rasch model, which estimated each test item's difficulty and each student's test score (Baker and Kim 2004).

Mathematics self-concept. Self-concept is the self-perception about one's abilities and competences that

influence the likelihood of success in a specific domain, such as mathematics (Chiu and Klassen 2010). The question items used for the *mathematics self-concept* index were: I am just not good at mathematics; I get good marks in mathematics; I learn mathematics quickly; I have always believed that mathematics is one of my best subjects; in my mathematics class, I understand even the most difficult work. The reliability of *mathematics self-concept* was 0.89.

Six types of country-level variables were included as controls. They were log GDP per capita, the Gini coefficient, democracy, leftist government, indices of cultural values, and religion. None of them were significant in our regression analysis, so they are not described here and are not reported in the results.

Methodological Design

Investigating these research questions across many countries and schools requires representative sampling, precise measures, and suitable statistical models. In each country, OECD (2005) chose 150 representative schools based on neighborhood SES and student intake, and sampled 35 fifteen-year-olds from each school (stratified sampling). OECD excluded students who were mentally or functionally incapable (based on psychological tests or professional staff assessment), refused to answer the questionnaire, could not physically take it, or did not speak the test language (less than 2 % of the total sample was excluded). With suitable weights, OECD created representative samples of each country's schools and 15-year-olds.

To reduce measurement error, multiple questionnaire items were used for each theoretical construct (e.g., sense of belonging at school) to create an index via a Rasch model (Warm 1989). The multi-group Rasch models for each item in each country yielded similar parameters, indicating measurement equivalence across countries (May 2006). (Unlike factor analysis, a multi-group Rasch model has the advantages of requiring only one invariant anchor item across countries and modeling heterogeneous use of the ordinal rating scale; Rossi et al. 2001). Other studies also showed consistent questionnaire responses and participant understandings across countries (Brown et al. 2005; OECD 2005; Schulz 2003).

Analysis

To address our first research question, we compute the correlation between emotional school engagement (sense of belonging at school) and cognitive school engagement (attitude toward school) to test whether they are highly correlated, weakly correlated or largely independent. Then, we test our explanatory model with a multilevel analysis. Multilevel analysis yields standard errors that are more

precise than those from ordinary least squares (Goldstein 1995). A multilevel variance components model tested for significant differences at each level (country, family, school, and student).

$$\text{School_Engagement}_{ijk_y} = \beta_{000_y} + e_{ijk_y} + f_{0jk_y} + g_{00k_y} \quad (2)$$

The type of school engagement y (sense of belonging at school or attitude toward school) of student i in school j in country k of **School_Engagement** $_{ijk_y}$, has intercept β_{000} , with student-, school-, and country-level residuals (e_{ijk} , f_{0jk} , g_{00k}). Explanatory variables were entered in sequential sets to estimate the variance explained by each set (Kennedy 2004). Country variables might influence family variables. As families might choose their children's schools, family variables might affect school variables. All of these might affect students. Hence, we entered the variables as follows: control, country, family, school, and student (see variable descriptions in Table 1). All continuous variables were centered at their country mean.

$$\begin{aligned} \text{School_Engagement}_{ijk_y} = & \beta_{000_y} + e_{ijk_y} + f_{0jk_y} + g_{00k_y} \\ & + \beta_{tjky} \text{Control}_{ijk_y} + \beta_{uy} \text{Country_Region}_{ky} \\ & + \beta_{vjky} \text{Immigrant}_{ijk_y} + \beta_{wjky} \text{Family}_{ijk_y} \\ & + \beta_{xjky} \text{School}_{ijk_y} + \beta_{zjky} \text{Student}_{ijk_y} \end{aligned} \quad (3)$$

We entered a vector of t control variables: girl and grade (**Control**, see Table 1). We tested whether sets of predictors were significant with a nested hypothesis test (χ^2 log likelihood, Kennedy 2004). Then, we applied this procedure to u country/region variables to control for macrosystem influences (**Country_Region**). To address our second research question, we applied this procedure to v immigrant variables (**Immigrant**): first generation immigrant and second generation immigrant. To address our third and fourth research questions, we applied this procedure to w family variables (**Family**) that include foreign language spoken at home, the x school variables (**School**) and the z student variables (**Student**). Applying a random effects model (Goldstein 1995), we tested if the regression coefficients of the student-level explanatory variables (e.g., $\beta_{vjky} = \beta_{v00y} + f_{vjky} + g_{v0ky}$) differed at the country-level ($g_{v0ky} \neq 0?$) or school-level ($f_{vjky} \neq 0?$), and if so, whether they correlated with the above country or school characteristics.

We used an alpha level of .05. To control for the false discovery rate, we used the two-stage linear step-up procedure, which outperformed 13 other methods in computer simulations (Benjamini et al. 2006). For robustness, we did two-level (school and student) multivariate regressions with both outcome variables for each country. Using

standardized scores within each country, we repeated the 3- and 2-level analyses. The small sample of countries ($N = 41$) limits identification of non-significant country-level results (for a 0.4 effect size at $p = .05$, statistical power = 0.75; Konstantopoulos 2008). Lastly, we analyzed residuals for influential outliers.

Results

See Table 1 for overall summary statistics. All results discussed below describe first entry into the regression, controlling for all previously included variables. Ancillary regressions and statistical tests are available upon request.

Cognitive versus Emotional School Engagement

These students' attitude toward school and sense of belonging at school are only weakly correlated ($r = 0.26$), which addresses our first research question. This weak correlation indicates that a positive attitude toward school does not necessarily imply a strong sense of belonging at school. Hence, this result suggests that cognitive school engagement and emotional school engagement are distinct constructs that are only weakly related to each other.

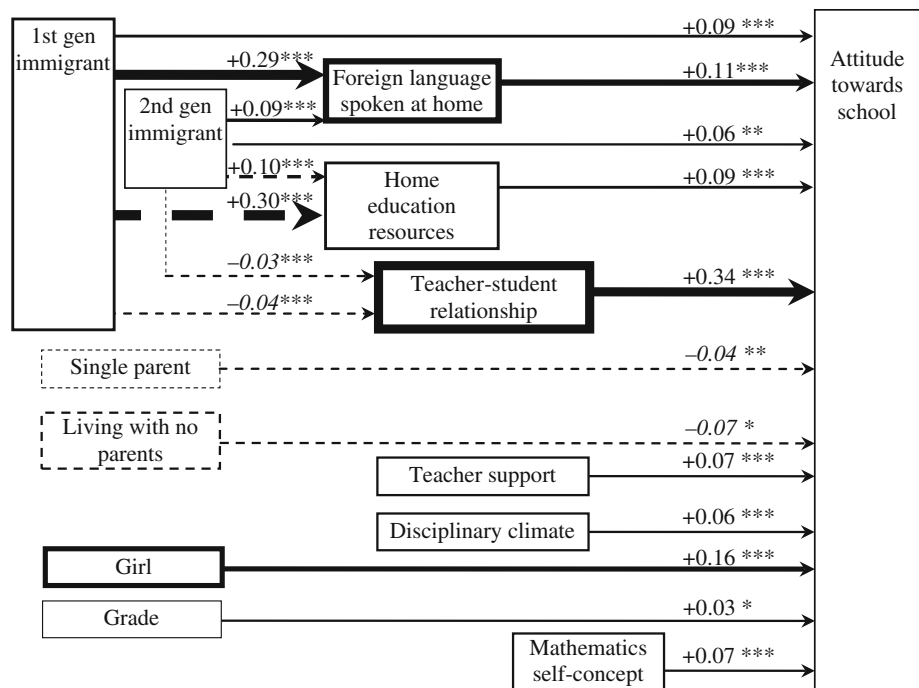
Attitude Toward School

Family (including immigrant), teacher, and student variables accounted for differences in students' attitude toward school (see Fig. 1 and Table 2). Most of the variance in attitude toward school was at the student-level (90 %), with only 4 % at the school-level and 7 % at the country level (percentages do not add up to 100 % due to rounding).

Family characteristics were linked to attitude toward school. The attitudes toward school of both first and second generation immigrant students were greater than those of native students ($\beta = .09$ and $\beta = .05$ respectively; see Fig. 1), which addresses our second research question. Students who spoke other languages at home had better attitudes toward school than those who spoke the test language at home ($\beta = .11$; see Fig. 1), which addresses our third research question. First and second generation immigrant students were more likely than native students to speak a foreign language at home ($\beta = .29$ and $\beta = .09$ respectively; multilevel mediation tests, $z = 5.00$ and $z = 4.99$; $p < .001$ and $p < .001$).

Students with more educational resources at home had better attitudes toward school than other students ($\beta = .09$; see Fig. 1). Compared to native students, first and second generation immigrant students had fewer educational resources at home ($\beta = -.30$ and $\beta = -.10$ respectively;

Fig. 1 Path diagram predicting attitude toward school with standardized regression coefficients. *Solid lines* indicate positive effects. *Dashed lines* indicate negative effects. *Thicker lines* indicate larger effect sizes



multilevel mediation tests, $z = -8.62$ and $z = -6.69$; $p < .001$ and $p < .001$).

Students perceiving better teacher–student relationships, teacher support or disciplinary climate had better attitudes toward school than other students ($\beta = .33$; $\beta = .07$ and $\beta = .06$; respectively, see Fig. 1). Compared to native students, first and second generation immigrant students had weaker teacher–student relationships ($\beta = -.03$ and $\beta = -.04$ respectively; multilevel mediation tests, $z = -2.99$ and $z = -3.97$; $p = .003$ and $p < .001$). Neither school climate nor schoolmate characteristics were not linked to attitude toward school. School variables accounted for about 17 % of the variance in students’ attitude toward school. After controlling for school and schoolmate variables, second generation immigrants have significantly more positive attitudes toward school, compared with those of native students.

Sense of Belonging at School

Family (including immigrant), school, and student variables accounted for differences in students’ sense of belonging at school (see Fig. 2 and Table 3). Most of the variance in sense of belonging at school was at the student-level (90 %), with only 3 % at the school-level and 8 % at the country level (percentages do not add up to 100 % due to rounding).

Family characteristics were linked to students’ sense of belonging at school. Sense of belonging at school was highest among native students, lower among second generation immigrants ($\beta = -.05$; see Fig. 2) and lowest

among first generation immigrant students ($\beta = -.09$; Wald test = 58.3, $p < .001$; Kennedy 2004), which addresses our second research question. Students who spoke the test language at home had greater senses of belonging at school than those who spoke other languages at home ($\beta = -.18$; see Fig. 2), which addresses our third research question. First and second generation immigrant students were more likely than native students to speak a foreign language at home ($\beta = .29$ and $\beta = .09$ respectively; multilevel mediation tests, $z = 5.33$ and $z = 5.32$; $p < .001$ and $p < .001$).

Compared to native students, first and second generation immigrant students had fewer educational resources at home ($\beta = -.30$ and $\beta = -.10$ respectively; multilevel mediation tests, $z = -10.33$ and $z = -7.40$; $p < .001$ and $p < .001$). Students in families with higher SES and more educational resources at home had greater senses of belonging at school ($\beta = .03$ and $\beta = .09$ respectively; see Fig. 2).

Teacher variables were linked to students’ sense of belonging. Students perceiving better teacher–student relationships, teacher support or classroom discipline climate had greater senses of belonging at school than other students ($\beta = .19$; $\beta = .04$ and $\beta = .03$). Compared to native students, first and second generation immigrant students had weaker teacher–student relationships ($\beta = -.03$ and $\beta = -.04$ respectively; multilevel mediation tests, $z = -2.96$ and $z = -3.91$; $p = .003$ and $p < .001$). Neither school climate nor schoolmate characteristics were linked to sense of belonging at school. School variables accounted for about 5 % of the variance in students’ sense of belonging at school. Controlling for family, school, and schoolmate characteristics did not affect the negative

Table 2 Summaries of 4 multilevel regressions predicting students' attitude toward school, with standardized coefficients (and SE)

| Explanatory variable | Regressions predicting attitude toward school | | | |
|---|---|--------------------|-------------------|-------------------|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Country variables | NS | NS | NS | NS |
| 1st gen immigrant | 0.02* (0.01) | 0.08** (0.02) | 0.09*** (0.02) | 0.09*** (0.02) |
| 2nd gen immigrant | 0.03 (0.02) | 0.03 (0.02) | 0.06** (0.02) | 0.06** (0.02) |
| Foreign language spoken at home | | 0.15*** (0.03) | 0.12*** (0.03) | 0.11*** (0.03) |
| Living with no parents | | -0.13** (0.04) | -0.08* (0.04) | -0.07* (0.04) |
| Single parent | | -0.08*** (0.02) | -0.05** (0.02) | -0.04** (0.02) |
| SES | | -0.01 (0.01) | 0.00 (0.01) | -0.01 (0.01) |
| Home education resources | | 0.13*** (0.01) | 0.09*** (0.01) | 0.09*** (0.01) |
| Girl | | 0.17*** (0.01) | 0.13*** (0.01) | 0.16*** (0.01) |
| Relative grade | | 0.01 (0.01) | 0.03** (0.01) | 0.03* (0.01) |
| Teacher-student relationship | | | 0.34*** (0.01) | 0.34*** (0.01) |
| Teacher support | | | 0.08*** (0.01) | 0.07*** (0.01) |
| Disciplinary climate | | | 0.07*** (0.01) | 0.06*** (0.01) |
| Mathematics test score | | | | 0.00 (0.01) |
| Mathematics self-concept | | | | 0.07*** (0.01) |
| χ^2 significance test ^a | 83*** | 3,579*** | 34,471*** | 806*** |
| Variance at each level | | | | |
| Country (7 %) | 0.00 | 0.00 | 0.27 | 0.32 |
| School (4 %) | 0.00 | 0.04 | 0.42 | 0.42 |
| Student (90 %) | 0.01 | 0.02 | 0.16 | 0.16 |
| Total variance explained | 0.01 | 0.01 | 0.18 | 0.18 |

Each regression included a constant term

* $p < .05$, ** $p < .01$, *** $p < .001$

^a Nested hypothesis test whether each set of extra predictors beyond that of the previous model is significant. (The first model is compared to the null model of no predictors)

relationships between immigrant status and the sense of belonging at school.

Country variables and interaction variables were not significant. None of the other variables mediated or moderated the relationships between immigrant status and either type of school engagement. Two-level analyses within each country showed similar results.

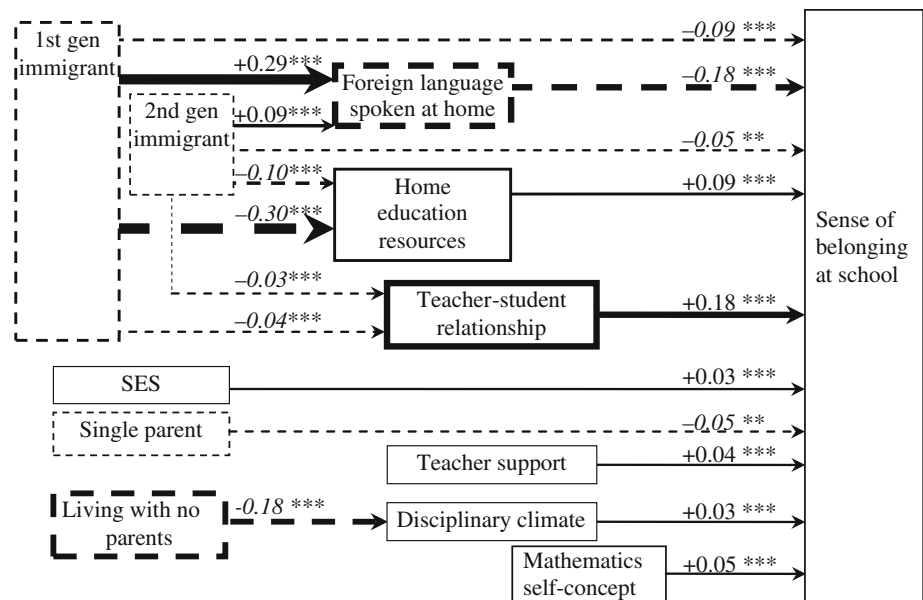
Differences Across Countries

Notably, none of the country-level variables were significantly linked to sense of belonging at school or attitude

toward school, and little of the variance of any of these variables occurred at the country level. Although most variables showed similar, significant results in most countries, some showed non-significant results in over half of the countries, and some showed opposite results in a few countries, indicating differences across countries (see summary of 2-level analyses [school and student] within each country in Table 4).

Sense of belonging at school. Variables that significantly predicted sense of belonging at school in less than half of the countries included first generation immigrant (41 %), second generation immigrant (10 %), and foreign language

Fig. 2 Path diagram predicting sense of belonging at school with standardized regression coefficients. *Solid lines* indicate positive effects. *Dashed lines* indicate negative effects. *Thicker lines* indicate larger effect sizes



spoken at home (37 %). In only 1 case, the regression coefficient of second generation immigrant was significant and in the opposite direction (Portugal).

Attitude toward school. Some variables were significantly linked to attitude toward school in less than half of the countries: first generation immigrant (22 %), second generation immigrant (10 %), and foreign language spoken at home (15 %). In some cases, the regression coefficients were significant in the opposite direction. These included first generation immigrant (Brazil), second generation immigrant (Brazil, Turkey), and foreign language spoken at home (Iceland, Latvia, Mexico, Spain).

Within each country, the regression coefficients did not vary significantly across schools. No school showed a significant regression coefficient in the opposite direction of the country’s regression coefficient. Analyses using standardized scores within each country yielded similar results. Analyses of residuals showed no substantial outliers.

Discussion

As globalization drives an increasing number of immigrant students into schools, their school engagement reflects both their short-term adaptation and their potential long-term assimilation to society. Hence, this study investigated immigrant and native adolescents’ school engagement in 41 countries. The results showed that attitude toward school and sense of belonging at school are distinct, weakly related constructs. Furthermore, immigrant status showed opposite relationships with each type of school engagement while teacher variables were linked positively to both types

of school engagement. We discuss each of these findings below.

Attitude Toward School versus Sense of Belonging at School

The results showing two weakly related, distinct constructs of student engagements help us understand the competing claims about the relationship between immigrant status and school engagement. Attitude toward school and sense of belonging at school are related weakly to each other, so students with better attitudes toward school are only somewhat more likely to have greater sense of belonging at school. As the cognitive and emotional components of school engagement (attitude toward school vs. sense of belonging at school) are distinct components, not all claims are necessarily applicable to both components. Some claims apply to only one aspect of school engagement, and other claims apply to both aspects.

Immigrant Status

Students’ immigrant status was linked significantly to school engagement, but had opposite relationships to its cognitive versus emotional components. First generation immigrants had the best attitudes toward school on average, followed by second generation immigrants, and then by native students, consistent with past studies (Suárez-Orozco and Suárez-Orozco 2001). In contrast, native students had the highest sense of belonging at school on average, followed by second generation immigrants, and then by first generation immigrants. This relationship

Table 3 Summaries of 4 multilevel regressions predicting students' sense of belonging at school, with standardized coefficients (and SE)

| Explanatory variable | Regressions predicting sense of belonging at school | | | |
|---|---|--------------------|--------------------|--------------------|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Country variables | NS | NS | NS | NS |
| 1st gen immigrant | −0.07*** (0.02) | −0.09*** (0.02) | −0.08*** (0.02) | −0.09*** (0.02) |
| 2nd gen immigrant | −0.06*** (0.02) | −0.07*** (0.02) | −0.05** (0.02) | −0.05** (0.02) |
| Foreign language spoken at home | −0.16*** | −0.17*** (0.03) | −0.18*** (0.03) | −0.18*** (0.03) |
| Living with no parents | | −0.09* (0.04) | −0.07 (0.04) | −0.07 (0.04) |
| Single parent | | −0.07*** (0.02) | −0.05** (0.02) | −0.05** (0.02) |
| SES | | 0.02** (0.01) | 0.03*** (0.01) | 0.03*** (0.01) |
| Home education resources | | 0.11*** (0.01) | 0.09*** (0.01) | 0.09*** (0.01) |
| Girl | | 0.01 (0.02) | 0.01 (0.02) | 0.01 (0.02) |
| Relative Grade | | 0.03 (0.04) | 0.03 (0.04) | 0.00 (0.04) |
| Teacher–student relationship | | | 0.19*** (0.01) | 0.18*** (0.01) |
| Teacher support | | | 0.04*** (0.01) | 0.04*** (0.01) |
| Disciplinary climate | | | 0.03*** (0.01) | 0.03*** (0.01) |
| Mathematics test score | | | | 0.00 (0.01) |
| Mathematics self-concept | | | | 0.05*** (0.01) |
| χ^2 significance test ^a | 201*** | 2,911*** | 12,237*** | 371*** |
| Variance at each level | Variance explained | | | |
| Country (8 %) | 0.00 | 0.06 | 0.00 | 0.02 |
| School (3 %) | 0.00 | 0.12 | 0.28 | 0.26 |
| Student (90 %) | 0.01 | 0.01 | 0.07 | 0.07 |
| Total variance explained | 0.01 | 0.02 | 0.07 | 0.07 |

Each regression included a constant term

* $p < .05$; ** $p < .01$; *** $p < .001$; NS not significant

^a Nested hypothesis test whether each set of extra predictors beyond that of the previous model is significant. (The first model is compared to the null model of no predictors)

between immigration status and sense of belonging at school is paralleled in academic achievement as natives outperform immigrants on mathematics, reading and science standardized tests, and second generation immigrants outperform first generation immigrants on these tests (e.g.,

Chiu 2007; Chiu and McBride-Chang 2010; Chiu and Zeng 2008). Taking these results together, recent immigrants' better attitudes toward school are not sufficient to yield greater academic achievement or greater sense of belonging at school compared to native students.

Table 4 Summary of two-level multivariate regression parameter estimates predicting students’ sense of belong at school and attitude toward school for each country/region (final model)

| Explanatory variable | Predictor effect on sense of belonging at school + Attitude toward school | | | | | % of countries | |
|-------------------------------------|---|------|-------|--------|-------|----------------|-------------|
| | Mean | SD | Min | Median | Max | Signif- (%) | Signif+ (%) |
| <i>Sense of belonging at school</i> | | | | | | | |
| Girl | 0.00 | 0.08 | -0.21 | 0.03 | 0.08 | 10 | 17 |
| Relative Grade | 0.09 | 0.13 | -0.09 | 0.08 | 0.38 | 5 | 20 |
| 1st gen immigrant | -0.12 | 0.14 | -0.28 | -0.14 | 0.42 | 41 | 0 |
| 2nd gen immigrant | -0.08 | 0.11 | -0.16 | -0.12 | 0.13 | 10 | 2 |
| Foreign language spoken at home | -0.33 | 0.17 | -0.74 | -0.29 | -0.10 | 37 | 0 |
| Living with no parents | -0.03 | 0.10 | -0.20 | -0.06 | 0.18 | 7 | 0 |
| Single parent | -0.04 | 0.05 | -0.11 | -0.04 | 0.20 | 17 | 0 |
| Blended parents | -0.03 | 0.17 | -0.30 | -0.03 | 0.73 | 12 | 5 |
| SES | 0.03 | 0.02 | -0.02 | 0.03 | 0.07 | 0 | 37 |
| Home education resources | 0.07 | 0.03 | 0.01 | 0.07 | 0.17 | 0 | 100 |
| Number of books at home | -0.01 | 0.03 | -0.03 | -0.02 | 0.04 | 17 | 10 |
| % 1st gen immigrant in school | -0.23 | 0.40 | -0.73 | -0.27 | 0.31 | 5 | 2 |
| % 2nd gen immigrant in school | 0.64 | 1.05 | -0.40 | 0.40 | 2.50 | 2 | 10 |
| School mean SES | 0.09 | 0.12 | -0.12 | 0.12 | 0.26 | 2 | 17 |
| Teacher–student relationship | 0.21 | 0.05 | 0.12 | 0.19 | 0.30 | 0 | 98 |
| Teacher support | 0.06 | 0.03 | 0.02 | 0.05 | 0.15 | 0 | 80 |
| Disciplinary climate | 0.05 | 0.03 | 0.02 | 0.05 | 0.14 | 0 | 68 |
| Mathematics self-concept | 0.06 | 0.03 | -0.01 | 0.06 | 0.11 | 0 | 66 |
| Mathematics test score | 0.00 | 0.06 | -0.09 | 0.02 | 0.13 | 34 | 27 |
| <i>Attitude toward school</i> | | | | | | | |
| Girl | 0.14 | 0.05 | 0.04 | 0.14 | 0.27 | 0 | 90 |
| Relative Grade | 0.02 | 0.08 | -0.09 | -0.01 | 0.18 | 17 | 17 |
| 1st gen immigrant | 0.06 | 0.23 | -0.71 | 0.11 | 0.22 | 2 | 22 |
| 2nd gen immigrant | -0.07 | 0.17 | -0.30 | 0.00 | 0.13 | 5 | 10 |
| Foreign language spoken at home | 0.05 | 0.23 | -0.42 | 0.05 | 0.19 | 10 | 15 |
| Living with no parents | -0.07 | 0.10 | -0.24 | -0.07 | 0.12 | 22 | 0 |
| Single parent | -0.04 | 0.03 | -0.11 | -0.04 | 0.05 | 17 | 0 |
| Blended parents | 0.00 | 0.06 | -0.12 | 0.00 | 0.12 | 0 | 2 |
| SES | 0.01 | 0.02 | -0.03 | 0.01 | 0.04 | 2 | 5 |
| Home education resources | 0.07 | 0.04 | 0.01 | 0.07 | 0.16 | 0 | 93 |
| Number of books at home | -0.01 | 0.02 | -0.03 | -0.01 | 0.02 | 5 | 2 |
| % 1st gen immigrant in school | 0.22 | 0.27 | -0.14 | 0.24 | 0.49 | 0 | 10 |
| % 2nd gen immigrant in school | -0.29 | 1.19 | -2.48 | -0.06 | 1.66 | 7 | 7 |
| School mean SES | -0.06 | 0.10 | -0.26 | -0.06 | 0.16 | 22 | 5 |
| Teacher–student relationship | 0.31 | 0.06 | 0.17 | 0.32 | 0.45 | 0 | 100 |
| Teacher support | 0.09 | 0.03 | 0.03 | 0.08 | 0.16 | 0 | 95 |
| Disciplinary climate | 0.07 | 0.03 | 0.03 | 0.06 | 0.14 | 0 | 98 |
| Mathematics self-concept | 0.07 | 0.03 | 0.03 | 0.06 | 0.14 | 0 | 83 |
| Mathematics test score | 0.00 | 0.04 | -0.08 | 0.00 | 0.11 | 22 | 17 |

Family-School Mesosystem Mechanisms

Several family-school mesosystem mechanisms were explored to account for the relationships between immigrant status and student engagement. Educational resources

mediated the link between immigrant status and both types of student engagement, but a proxy for cultural capital yielded mixed results. Teacher–student relationships mediated the link between immigrant status and both types of student engagement. Lastly, school climate and schoolmate

characteristics were not significant mediators and none of these were significant moderators. Hence, educational resources, cultural capital and teacher–student relationships can help explain the relationships between immigrant status and school engagements.

Family Resources

Students with more educational resources at home had greater school engagement, both in terms of attitude toward school and sense of belonging at school. This study found that native students often had more educational resources at home than did immigrants (especially compared to first generation immigrants). Students with more educational resources at home often have better academic performance, and academic successes can improve students' attitudes toward school and their sense of belonging at school. Hence, these results are consistent with the view that native students use their greater educational resources at home to learn more and succeed academically, which enhances both their attitude toward school and their sense of belonging.

Students who spoke a foreign language at home had a weaker sense of belonging at school but better attitudes toward school. While the former result supports a cultural capital view, the latter result does not. Students speaking a foreign language at home likely have less cultural capital (except for rare bicultural families), learn their schools' norms slowly, have weaker relationships with their teachers and schoolmates, and develop weaker school engagement. However, speaking a foreign language at home also was linked to better attitudes toward school, which suggests that cultural capital might affect sense of belonging at school but a different mechanism is operating with regard to attitudes toward school. One possibility is that speaking a foreign language at home is linked to lower family SES and greater optimism about economic and social advancement mobility (Kao and Tienda 1995; Pong and Zeiser forthcoming). Further research using a suitable measure of cultural capital can help disentangle these relationships.

Teachers

Teachers' behaviors were linked to both types of students' school engagement, but family characteristics of schoolmates were not linked to either one. Students with better teacher–student relationships, greater teacher support or higher disciplinary climate typically had higher school engagement with respect to both attitude toward school and sense of belonging at school. Indeed, perceived teacher–student relationship quality had the strongest links to both attitude toward school and sense of belonging at school. These findings are in line with previous research showing that teachers who supported students enhanced their

academic achievement (e.g., Skinner et al. 1990). Furthermore, effective classroom discipline promoted students' sense of responsibility, academic achievement, and positive behavioral outcomes (e.g., Ma and Willms 2004). Hence, teachers who effectively build warm relationships with their students, support them and create an orderly disciplinary climate likely help them develop greater cognitive and emotional school engagement. However, perceived teacher–student relationships differed across immigration status. Compared to native students, immigrant students perceived weaker teacher–student relationships. This result suggests that teacher training might be improved to sensitize teachers about immigrant students' educational needs and to build better relationships with them.

Other variables did not show significant effects. Notably, school climate, the tested schoolmate characteristics, and the tested country characteristics were not significant. Perceived teacher support and classroom discipline did not differ across students with different immigrant status. Also, the teacher variables did not show any moderation effects, suggesting that given a specific level of teacher support or teacher–student relationship, immigrant students did not benefit less than native students did. Indeed none of these variables showed significant moderation. While the above results held across many of the countries, some results were not significant in some countries, which suggest that future studies of individual countries might identify country-specific relationships.

Theoretical, Methodological and Practical Implications

This study suggests several theoretical, methodological and practical implications. The distinct cognitive and emotional components of school engagement help explain apparently conflicting theoretical relationships. Attitude toward school and sense of belonging at school are weakly related to each other, so students with better attitudes toward school are only somewhat more likely to have greater sense of belonging at school. Among immigrant and native students, immigrant students often had better attitudes toward school but native students felt greater sense of belonging at school. Overall, recent immigrants' better attitudes toward school are not sufficient to overcome native students' advantage in educational resources, cultural capital, and teacher–student relationship quality, which in turn yield greater academic achievement and greater sense of belonging at school.

Furthermore, this study points to the potentially powerful impact that teachers can have on students' school engagement. Perceived teacher–student relationship showed the strongest link to both cognitive and emotional components of school engagement. Teacher support and the classroom disciplinary climate maintained by a teacher also were linked to both attitude toward school and sense of

belonging at school. Hence, any theory of students' school engagement must include central roles for teachers.

The results of this study also have methodological implications. The results showed that school engagement's cognitive and emotional components were distinct, weakly-linked components. After identifying distinct components of a construct, different explanatory models can be constructed for each component, allowing multiple mechanisms to yield different effects on each component.

If the results of this study are replicated, there are several implications for practitioners. First, educators and counselors should not treat the cognitive and emotional components of school engagement as identical. Second, while some antecedents may show similar effects on both cognitive and emotional components of school engagement, not all antecedents will affect each component in the same way. Third, effective interventions that improve the school engagement of immigrant students might differ substantially from those for native students.

Limitations and Future Research

There were four main limitations of the present study: few low income countries, only fifteen-year-olds, two dimensions of school engagement and low reliabilities of some variables. These data include most of the wealthier countries that receive many of the world's immigrants, but not poorer countries that would tend to have non-economic immigrants (like war refugees that might differ substantially from economic immigrants and have more difficulty adapting to their destination countries). Also, this study only examined 15-year-olds who attended school, and so the results might not fully generalize to all 15 year olds or to students of different ages. Still, this study informs our understanding of immigrant and native students' school engagement in diverse contexts. Ideally, future international research will examine the actual process of school engagement formation in immigrant and native students with a longitudinal design. Another limitation is that the present study examined only two dimensions of school engagement. Future studies can test other outcome variables, such as attention in class and participation in school-related activities, to provide a more comprehensive picture of school engagement. Likewise, future studies can test other explanatory variables such as history or science achievement rather than only mathematics achievement. Lastly, the reliabilities of home education resources and attitude toward school were low, so results involving these variables should be interpreted cautiously. Future studies can test whether these results hold in low income countries, for students at other ages, for other dimensions of school engagement and for parallel variables with higher reliability.

Conclusion

This study of students in 41 countries showed that cognitive and emotional components of school engagement are distinct, which helps explain competing claims. Attitude toward school and sense of belonging at school are related weakly to each other, so students with better attitudes toward school are only somewhat more likely to have a greater sense of belonging at school. Among immigrant and native students, immigrant students often had better attitudes toward school but native students felt greater sense of belonging at school. Overall, recent immigrants' better attitudes toward school are not sufficient to overcome native students' advantage in family resources and teacher–student relationship quality, which in turn yield greater sense of belonging at school among native students.

Teacher behaviors were linked strongly to both cognitive and emotional components of school engagement. A student's perceived relationship with a teacher showed the strongest link to both attitude toward school and sense of belonging at school. Teacher support and the classroom disciplinary climate maintained by a teacher were also linked to both attitude toward school and sense of belonging at school. However, immigrant students were found to have weaker teacher–student relationship. Hence, this study suggests that teachers are essential to improving immigrant students' emotional engagement at school.

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