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How (do) school experiences contribute to students' sense of belonging?

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ABSTRACT

Scholars have long documented the positive influence of students' sense of belonging on their achievement and retention; however, the variation in students' sense of belonging has been underexplored. This paper extends previous research examining the effects of student-level characteristics (e.g., student achievement, learning attitude, experience of being bullied) and school-level characteristics (e.g., location, emphasis on academic success, disciplinary climates) on students' sense of belonging in five East Asian educational systems (Hong Kong, Japan, Korea, Singapore, and Taiwan). I analysed data from the 2015 Trends in International Mathematics and Science Study using two-level hierarchical linear models (42,201 students in 1,241 schools). The results show that variance in students' sense of belonging was mainly at the school level and that predictors were differently associated with sense of belonging according to system. Despite the differences, students' learning attitudes had the strongest association with students' sense of belonging in all educational systems included in the study, followed by their experiences with bullying. These results suggest that fostering academic belonging could be vital to increasing students' sense of belonging, in addition to addressing their socio-psychological formation.

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Introduction

The desire for belonging has been considered to be one of the most fundamental human needs (Maslow, 1943). In the educational context, scholars found that when students meet their need for belonging, they are more likely to have positive educational experiences, including greater academic achievement, satisfaction, motivation, and persistence than students whose need for belonging is not met (Anderman, 2003; Finn, 1989; Steele, 1997; Walton & Cohen, 2011; Wehlage, 1989). Furthermore, adolescents with a stronger sense of belonging are less likely to engage in problematic and risky behaviours (Burnett & Walz, 1994; Reep, 1996; Resnick et al., 1997).

Reflecting these educational benefits of sense of belonging, scholars' interest in understanding students' sense of belonging has increased in recent years. Nevertheless, most previous work is limited to predicting educational or psychological outcomes of developing a stronger sense of belonging. Ma's (2003) work is one of the few studies that focused on understanding how students' sense of belonging is cultivated, especially regarding the role of school in its development. Ma used hierarchical linear models (HLM) to examine sixth and

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eighth grade students' sense of belonging with reference to the students' and schools' characteristics, accounting for the nested nature of students within schools. The results suggest that students' belonging has a stronger association (a) with students' mental and physical conditions than their demographics and (b) with school climate (academic emphasis, disciplinary culture, and parental involvement) than school context (size and school socioeconomic status).

This study builds on Ma's (2003) work, which was discussed in the Canadian context by analysing the New Brunswick School Climate Study (NBSCS), and extends our understanding of how sense of belonging is developed in schools by looking at schools in East Asia. Previous work has shown that a country's cultural orientation towards individualism and collectivism or power distance is related to students' sense of belongingness in school (Chiu, Chow, McBride, & Mol, 2016; Cortina, Arel, & Smith-Darden, 2017; Elliott, Stankov, Lee, & Beckmann, 2019). For example, Cortina et al. (2017) noted that students in East Asian countries scored below average while most Western countries scored consistently above average. Furthermore, they found that students in more individualistic countries reported a greater sense of belonging than their peers in collectivist countries; however, the statistical relationship disappears once power distance – strength of social hierarchy – was taken into account. The results showed that students in countries with a greater level of social hierarchy experienced less sense of belonging to school. In this study, I focus on five East Asian education systems (Hong Kong, Japan, Korea, Singapore, and Taiwan) that are often identified as collectivist and hierarchical (Kitayama & Uskul, 2011; Stevenson et al., 1990) and examine what factors in each country are associated with students' sense of belonging.

Determinants of sense of belonging

Researchers have examined the statistical association of various student-level and school-level characteristics with students' sense of belonging. Among these, the strong association between student achievement and sense of belonging stands out the most. Nevertheless, most studies limit themselves to discussions of the significance of belonging as a predictor of student performance, not vice versa (Korpershoek, Canrinus, Fokkens-Bruinsma, & de Boer, 2020). Recently, a growing number of studies have begun to examine to what extent academic achievement predicts students' sense of belonging. Indeed, academic achievement has been found to be one of the main determinants of students' sense of belonging, although the nature of the relationship varies across studies (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018). For example, Anderman (2003) found that, of 618 middle school students in a southeastern US state, those with greater academic achievement had a significantly stronger sense of belonging. However, Ma (2003) found that, of 6,883 sixth-grade students in 148 schools in New Brunswick, Canada, those with lower levels of academic performance demonstrated a stronger sense of belonging.

Furthermore, student attitudes towards academic subjects have been found to predict middle school students' sense of belonging. Goodenow (1993), for example, showed that students' sense of belonging was significantly correlated with their academic motivation. However, as with academic achievement, the direction of the relationship defines sense of belonging as a predictor rather than an outcome. Furthermore, the measures of motivation included a rather broad assessment of the intrinsic value and importance attributed to academic work, and the level of interest in it. Thus, students' perception of liking an academic subject was used in this study as a predictor of sense of belonging to examine motivational variables in a specific way.

In addition to academic variables, social variables have been studied as influential, "almost by definition", in developing students' sense of belonging (Anderman, 2003, p. 8). In particular, students' experience of being bullied significantly contributes to differences in their sense of belonging. Bullying causes victims to experience heightened levels of distress and decreases their self-esteem, which leads them to feel that they do not belong (Glew, Fan, Katon, & Rivara, 2008). Pizmony-Levy and Kosciw (2016), in their comparative study of LGBT students in the U.S. and Israel, found that

bullying behaviours such as derogatory remarks significantly decreased victims' sense of belonging in both countries.

Demographic characteristics such as gender and socioeconomic background are also important determinants of sense of belonging. The academic research on whether adolescent girls or boys have a stronger sense of belonging is inconclusive; however, the difference is often explained by how female and male students socialise in the school contexts (Goodenow, 1993; Renick & Reich, 2021; Sánchez, Colón, & Esparza, 2005; Shochet et al., 2011). Also, students from higher socio-economic backgrounds are more likely to have a stronger sense of belonging (Hautala, Lehti, & Kallio, 2022).

In addition to the student-level factors, some studies have found that school-level contextual and structural factors are associated with students' sense of belonging. Previous works have found that small schools are more likely to foster a strong sense of school belonging than large schools (Anderman, 2002; Cawelti, 1995; Raywid, 1996), and students in urban schools experienced a weaker sense of belonging than students in suburban schools (Anderman, 2002). Furthermore, school environments where academic performance and grades are emphasised tend to increase students' feelings of alienation and detachment (Eccles et al., 1993), while schools with better disciplinary climates elicit a stronger sense of belonging (Ma, 2003). Students also cultivate sense of belonging differently in schools with high or low socioeconomic status (Arhar & Kromrey, 1995).

However, research exploring determinants of students' sense of belonging in educational institutions has primarily been conducted in Western contexts, and it is difficult to say whether the results can be applied to other contexts. This is problematic because the results of such work must be relied upon to assist students in different cultural and social settings. Schools transmit norms and values that are essential to socialisation into the wider society (Dreeben, 1968; Parsons, 1959). Because school is one of the first social organisations where children test their belongingness to society, it is important to understand what shapes sense of belonging at school and how it is developed. Therefore, in this study, I investigate the relationships among student-level and school-level variables in reference to middle school students' sense of belonging and compare the results across different educational systems. The research questions for this study are:

(1) To what extent are student-level and school-level factors associated with middle school students' sense of belonging to school?
(2) How are the student or school characteristics that explain variation in sense of belonging similar or different across various educational systems?

Based on the review of the literature discussed above, I hypothesised the followings:

(1) Academic achievement and experience of being bullied would be the most significant predictors in each educational system.
(2) Discrepancies in students' sense of belonging would be mainly found within schools, not between schools.
(3) The relationship between student-level and school-level factors would differ between the East Asian and the Western educational systems.

Data and methods

Data

To investigate these research questions, this study uses data from the 2015 Trends in International Mathematics and Science Study (TIMSS) conducted by the International Association for the Evaluation of Educational Achievement (IEA). In addition to assessing student achievement, this international large-scale assessment collects rich background data on contexts

for learning, using questionnaires for students, parents, teachers, and principals. The questionnaires include questions on student attitudes, demographics, home environment, school climate, and school background. The Sense of School Belonging Scale was included for the first time in TIMSS 2015.

TIMSS includes representative samples of students in the fourth and eighth grades in various educational systems. For TIMSS 2015, a total of 57 countries and more than 580,000 students participated; 39 countries and seven benchmarking entities administered the assessments at the eighth-grade level (Martin, Mullis, & Hooper, 2016). This study focuses on the eighth grade due to the importance of sense of belonging in early adolescence. Middle school is considered to be a time during which students experience significant changes in roles, responsibilities, and group memberships (Elias, Gara, & Ubriaco, 1985; Farber, Primavera, & Felner, 1983). Thus, understanding how various factors shape the sense of belonging is crucial for middle school students, who are beginning to obtain support and direction from relationships other than familial ones (Goodenow, 1993).

TIMSS employs a two-stage random-sampling design, in which a sample of schools is drawn in the first stage, and one or more intact classes within each school are selected in the second stage. Every student in each class was asked to participate. In this study, I focused on a nationally representative sample of eighth grade students in five East Asian educational systems (Hong Kong, Japan, Korea, Singapore, and Taiwan) that are the top five performers in mathematics in TIMSS 2015. Furthermore, for comparison, I included Canada, where Ma's original work was conducted, and the U.S., where most research on sense of belonging has been focused. In this paper, I use the term "educational systems" to refer to the units of analysis because the sample includes separate regional educational systems within countries (e.g., the Hong Kong Special Administrative Region of the People's Republic of China).

I used listwise deletion of missing data (all variables had fewer than 5% missing responses), and 2,813 students were removed from the original sample. The majority of the missing responses were from the school climate variables (academic emphasis and disciplinary climate), and in the case of handling missing data within a nested data structure, listwise deletion performs satisfactorily and can produce estimates that are not significantly different from the ones produced from the complete data (see Gibson & Olejnik, 2003 for further discussion). The final sample for this analysis was 42,201 students in 1,241 schools. It included 3,855 students in 124 schools in Hong Kong, 4,694 students in 146 schools in Japan, 5,299 students in 150 schools in Korea, 5,911 students in 162 schools in Singapore, 5,692 students in 190 schools in Taiwan, 9,033 students in 219 schools in the U.S., and 7,717 students in 250 schools in Canada.

Measures

Sense of belonging

As there is no consensus measure for sense of belonging, it remains a rather broad concept in educational research. Goodenow (1993), who developed the Psychological Sense of School Membership (PSSM) scale for adolescents, defined students' sense of belonging as their "sense of being accepted, valued, included, and encouraged by others (teachers and peers) in the academic classroom setting and of feeling [themselves] to be an important part of the life and activity of the class" (p. 25). This concept implies a notion of membership in a group but also multi-dimensionality, which minimally includes the school environment. Many studies have used measures that are similar to or adapted from the PSSM scale. This study uses a scale constructed by the TIMSS & PIRLS International Study Center using IRT partial credit scaling (Martin et al., 2016). The scale includes the constructs of connectedness, liking, safety, acceptance, and respect, which are identified in the PSSM scale. The scale consists of the following seven items: (1) I like being in school; (2) I feel safe when I am at school; (3) I feel like I belong at this school; (4) I like to see my classmates at school; (5) Teachers at my school are fair to me; (6) I am proud to go to this school; and (7) I learn a lot in school.

The Cronbach's alpha reliability coefficients of the scale exceed 0.8 in all countries included in the analysis.

Student-level variables

I identified the following student-level independent variables for analysis based on prior literature: *student achievement in mathematics*, *sex*, *home educational resources (HER)*, *being bullied*, and *liking learning mathematics*. The measure of student achievement used the standardised mathematics scores of eighth-grade students from the TIMSS 2015. Sex variable was recoded as 0 for male and 1 for female, and HER was assessed based on students' responses to questions regarding the number of books and other study supports in the home and highest educational level of either parent. In the present study, I used the HER scale to measure students' socioeconomic status. The experience of being bullied scale was scored according to students' assessment of how often they experienced the nine bullying behaviours (e.g., name-calling, physical violence, threats) identified by TIMSS. This scale was reverse-coded, meaning that students with higher scores experienced less bullying. The liking learning mathematics scale was based on the students' level of agreement with nine statements about learning mathematics included in the TIMSS survey (e.g., enjoying learning, looking forward to class), with higher scores indicating that students have a stronger liking for learning mathematics.

School-level variables

School-level variables include *location*, *emphasis on academic success*, *disciplined schools*, *mean class size*, *mean student achievement in mathematics*, and *mean HER*. The location variable was recoded as a binary variable (non-urban = 0; urban = 1). The emphasis on academic success variable was based on principals' responses to 13 questions on academic emphasis (e.g., teacher expectations for student achievement, parental pressure on school to maintain high academic standards). The disciplined school scale was measured by principals' responses to 11 potential school problems, such as profanity, vandalism, and theft. The means for class size, student achievement in mathematics, and HER were generated by aggregating the number of students per classroom, the maths scores, and the HER, respectively, by school.

Table 1 shows definitions and metrics for all variables used in the analysis. The variables were drawn from the TIMSS 2015 database, in which scales were tested for reliability and validity (Martin et al., 2016). All continuous independent variables included in the analysis were grand-mean centred to enable multilevel analysis (Heck, Thomas, & Tabata, 2013).

Descriptive statistics

Table 2 presents descriptive statistics for all variables used in the analysis by each setting. The Canadian students showed the highest level of sense of belonging on average, followed by Singapore and the U.S., while Korean students showed the lowest level of sense of belonging among the seven educational settings. For student-level characteristics, because the five East Asian systems were selected due to their high performance in mathematics, it is not surprising that the U.S. and Canada had the lowest two scores. The Korean students had the highest level of HER and the second-highest mathematics score; however, they showed the least liking of mathematics. By contrast, Singaporean students, who showed the highest maths achievement, had the strongest liking for the subject. Students in Taiwan experienced bullying most frequently followed by the Korean students, whereas students in Hong Kong experienced bullying the least.

All sampled schools in Singapore were located in an urban area, as can be expected from its being a city-state. Fewer than half the respondents in the other systems were from urban schools (e.g., less than one-fifth of the respondents from Japan studied at urban schools). Additionally, Singapore had the smallest class size (19 students per class), whereas Japan had the largest class with 33 students on average, followed by Korea with 32 students. Schools in Korea and Canada placed the most emphasis on academic success, and those in Hong Kong and Japan the least. Singapore and Hong Kong had the most positive disciplinary climates, and the U.S. and Japan the most negative.

Table 1. Variables included in the analysis.

Variables	Variable label	Definition and metrics
Dependent variable		
Students' Sense of School Belonging	BSBGSSB	Scale based on seven variables regarding students' feelings toward their school and connectedness with the school community
Student-level variables		
Female	ITSEX	Male=0, Female=1
Student Achievement in Mathematics	BSMMAT01	First plausible value of achievement in mathematics
Home Educational Resources	BSBGHER	Scale based on students' answers regarding number of books in the home, number of home study supports, and highest level of education of either parent
Being Bullied	BSBGSB	Scale based on students' response to how often they experienced nine bullying behaviours
Liking Learning Mathematics	BSBGSLM	Scale based on students' level of agreement with nine statements about learning mathematics
School-level variables		
Urban	BCBG05B	Non-urban=0, Urban=1
School Emphasis on Academic Success	BCBGEAS	Scale based on principals' responses on thirteen questions regarding school emphasis on academic success
Disciplined Schools	BCBGDAS	Scale based on principals' responses concerning eleven potential school problems
School Mean Class Size	Generated variable	The average number of students per classroom
School Mean Student Achievement in Mathematics	Generated variable	The average of math achievement in each school
School Mean Student Home Educational Resources	Generated variable	The average of students' home educational resources in each school

Table 2. Descriptive statistics.

	Hong Kong		Japan		Korea		Singapore		Taiwan		US		Canada	
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Sense of Belonging	9.36	1.94	9.34	1.89	9.33	1.70	9.79	1.93	9.40	1.66	9.57	1.97	10.06	1.90
Student-level														
Student Achievement in Math	589.90	77.68	585.40	88.24	603.30	84.99	614.90	83.04	601.30	96.32	517.60	81.51	534.50	68.21
Female	.47	.50	.51	.50	.49	.50	.49	.50	.49	.50	.51	.50	.51	.50
Home Educational Resources (HER)	10.09	1.63	10.97	1.49	11.58	1.60	10.29	1.59	10.37	1.65	10.80	1.68	11.21	1.43
Being Bullied	5.63	1.75	4.36	1.80	4.16	1.72	5.56	1.75	3.92	1.73	5.26	1.95	5.15	1.85
Liking Learning Math	9.49	1.94	9.21	1.66	9.13	1.69	10.13	1.88	9.25	1.85	9.54	2.06	9.85	1.89
School-level														
Urban	.49	.50	.17	.37	.37	.48	1.00	0.00	.28	.45	.22	.41	.37	.48
School Mean Class Size	30.12	5.48	32.91	4.35	31.95	4.17	18.30	.67	31.23	7.40	21.79	5.02	23.69	5.32
School Mean Math Score	589.90	57.16	585.40	39.41	603.30	28.90	614.90	60.78	601.30	48.79	517.60	49.52	534.50	35.37
School Mean HER	10.09	.84	10.97	.54	11.58	.62	10.29	.73	10.37	.80	10.80	.86	11.21	.61
Academic Emphasis	9.61	1.77	9.79	1.56	11.17	1.85	10.62	1.69	10.07	1.97	10.01	2.08	10.83	2.31
Disciplined Schools	11.35	1.45	10.47	1.78	10.97	2.04	11.57	1.55	11.18	1.67	10.11	1.46	10.72	1.60

Descriptive statistics demonstrate that although academic achievement of the five systems included in the study was overall high, their educational settings varied significantly. On one hand, Singapore, on average, had fewer bullied students and both a strong sense of belonging and a positive attitude towards mathematics, in urban schools with a small class size and orderly disciplinary climates. On the other hand, Korea, on average had a greater level of bullying, a lower sense of belonging, abundant HER, and a negative attitude towards mathematics, in schools with a large class size and a high emphasis on academic success.

Analytic models

Unlike traditional ordinary least squares regression, HLM explains variance in dependent variables at the student and school levels. Therefore, to address the hierarchical structure of the data, I established four HLM models to measure student- and school-level effects on the student-level outcome of sense of belonging (Hox, Moerbeek, & Van de Schoot, 2010). Model A is the null model which included only the dependent variable, students' sense of belonging, to test its variance within and between schools; Model B is the achievement model where I entered the student achievement variable, which has been studied as the major predictor of sense of belonging; Model C is the student-level model with all student-level variables; and Model D is the full model, containing all student-level and school-level variables to test to what extent those variables explain within and between school variances in students' sense of belonging.

Two equations were used for the final mode. At the student level, the sense of belonging of student i in school j is predicted as follows:

$$SB_{ij} = \beta_{0j} + \beta_{1j}StudentAchievementinMath_{ij} + \beta_{2j}\text{Female}_{ij} + \beta_{3j}HomeEducationalResources_{ij} + \beta_{4j}StudentBullying_{ij} + \beta_{5j}LikeLearningMath_{ij} + \varepsilon_{ij} \quad (1)$$

At the school level, all independent variables, except the intercept β_{0j}, were fixed. The intercept varied among schools, and the following equation defines the intercept as a function of school-level variables:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Location_j + \gamma_{02}School\ Mean\ Class\ Size_j + \gamma_{03}School\ Mean\ Average\ Achievement\ in\ Mathematics_j + \gamma_{04}School\ Mean\ Home\ Educational\ Resources_j + \gamma_{05}School\ Emphasis\ on\ Academic\ Success_j + \gamma_{06}Disciplined\ School_j + u_{0j} + \varepsilon_{ij} \quad (2)$$

Results

The purpose of this study was to estimate the statistical association of student-level and school-level variables with students' sense of belonging using a two-level HLM. The intraclass correlation coefficients (ICCs) of the unconditional HLM model indicate how much variance in students' sense of belonging is at the student and school levels (Table 3). For example, in Hong Kong, about 12.3% of the variance in students' sense of belonging was at the school level with 87.7% of the variance at the student level. The ICCs across the educational systems demonstrate that although schools

Table 3. Intraclass correlation coefficients for unconditional models.

	Hong Kong	Japan	Korea	Singapore	Taiwan	US	Canada
Unconditional Model ICC	.123	.075	.074	.106	.069	.099	.123

systematically vary, most variance in students' sense of belonging can be attributed to differences among the students.

Modelling students' sense of belonging

Student-level variables and sense of belonging

The achievement model (Model B) shows a statistically significant relationship between student achievement and sense of belonging for all seven educational systems (Table 4). However, in Model C, when all student-level variables were added, student achievement lost its statistical significance in most educational systems (Table 5). I also added each student-level variable separately to Model B and, interestingly, when the liking mathematics variable was added, student achievement became not statistically significant in all systems except for Singapore and the U.S.

Table 6 presents the results of the final HLM model, concerning student-level and school-level predictors within different educational systems. The finding that needs special attention is that students' liking learning maths had the strongest associations with students' sense of belonging in all seven educational systems. The more positive the student's attitude towards mathematics, the greater their sense of belonging. Furthermore, the experience of being bullied had the second-strongest associations in six of the seven educational systems. As students experienced higher levels of bullying, their sense of belonging decreased.

Other variables demonstrated different statistically significant relationships with sense of belonging across the educational systems, particularly among the East Asian ones. For example, while students with more HER or students at a school with higher mean HER were more likely to have a stronger sense of belonging in the U.S. and Canada, the relationships between HER and sense of belonging varied among the East Asian educational systems. Individual HER had a significant positive relationship with students' sense of belonging in Korea, Taiwan, and Singapore, while the school average HER did not have a significant relationship with sense of belonging in Korea and Taiwan. In Singapore, the school average HER had a significant positive relationship with students' sense of belonging.

In the final model, the student achievement variable also demonstrated varying relationships across the systems and levels. Students with a higher level of academic achievement felt a weaker sense of belonging in Hong Kong and Singapore. By contrast, at the school level, student achievement had a positive relationship with students' sense of belonging in Hong Kong and Japan.

School-level variables and sense of belonging

While all individual-level variables had significant relationships with students' sense of belonging in most educational systems, few school-level variables had significant relationships with students' sense of school belonging. In Korea, students in urban schools reported a more positive sense of belonging than did students in rural schools. In Japan, students in schools with a smaller average class size reported a stronger sense of belonging than did students in schools with a larger average class size.

Interestingly, although school climate variables (academic emphasis and disciplinary climate) are often considered to have a stronger relationship with students' sense of belonging than school

Table 4. Relationship between students achievement in math and sense of belonging, by country (model B).

	Hong Kong		Japan		Korea		Singapore		Taiwan		US		Canada	
Variables	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student Achievement in Math	.150***	.000	.110***	.000	.134***	.000	.116***	.000	.142***	.000	.187***	.000	.147***	.000

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

Table 5. Effects of student-level variables on sense of belonging, by country (model C).

	Hong Kong		Japan		Korea		Singapore		Taiwan		US		Canada	
Variables	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student Achievement in Math	.035	−.001	.002	.000	.016	.000	−.039 *	.000	−.016	.000	.028*	.000	−.019	.000
Female	.081***	−.062	−.016	.052	−.049 **	.050	−.017	.048	.106***	.041	.010	.036	.046***	.037
Home Educational Resources (HER)	.042**	−.019	.022	.019	.046**	.015	.048***	.016	.072***	.014	.086***	.012	.046***	.014
Being Bullied	−.119***	−.017	−.231***	.015	−.176***	.013	−.219***	.013	−.158***	.012	−.246***	.009	−.275***	.010
Like Learning Math	.272***	−.016	.287***	.017	.262***	.014	.310***	.013	.280***	.012	.354***	.009	.350***	.011

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

Table 6. Comparison of hierarchical linear models estimating students' sense of school belonging (full model).

	Hong Kong		Japan		Korea		Singapore		Taiwan		US		Canada	
Variables	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student-level														
Student Achievement in Math	−.056*	.001	−.010	.000	.011	.000	−.085***	.000	−.022	.000	.007	.000	−.030*	.000
Female	.066***	.061	−.017	.052	−.050**	.050	−.021	.048	.107***	.041	.009	.035	.045***	.037
Home Educational Resources (HER)	.018	.020	.025	.019	.044**	.015	.034**	.016	.067***	.015	.073***	.013	.041***	.014
Being Bullied	−.122***	.017	−.228***	.015	−.176***	.013	−.217***	.013	−.158***	.012	−.246***	.009	−.273***	.010
Liking Learning Math	.292***	.016	.287***	.017	.263***	.014	.317***	.013	.282***	.012	.358***	.009	.353***	.011
School-level														
Urban	.044	.089	−.004	.113	.055*	.083	-	-	−.006	.083	.004	.083	−.004	.080
School Mean Class Size	−.011	.009	−.068**	.009	−.036	.010	−.042*	.062	.025	.007	.001	.007	.040*	.007
School Mean Math Score	.214***	.001	.116***	.002	.066	.002	.060	.001	.019	.001	.055*	.001	.033	.001
School Mean HER	.065	.080	−.055	.114	−.012	.096	.127**	.107	.033	.077	.061*	.062	.051*	.074
Academic Emphasis	−.031	.037	−.012	.032	−.017	.026	.036	.032	−.037	.021	.029	.021	−.034	.021
Disciplined Schools	.062*	.035	.035	.024	.055*	.021	.024	.033	−.003	.020	.044*	.027	.083***	.027
Unconditional Model ICC	.123		.075		.074		.106		.069		.099		.123	
Within	.101		.136		.111		.158		.122		.213		.220	
Between	.721		.482		.344		.526		.337		.550		.448	

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

context variables (location, average class size, school mean socioeconomic status and achievement), the results of this study do not necessarily support this conclusion. Academic emphasis at the school level did not have a significant relationship with students' sense of belonging in any system examined. The disciplinary culture did shape students' sense of belonging in the U.S. and Canada; however, it had little relationship with students' sense of belonging in most East Asian schools.

The bottom rows of Table 6 show the reduction in variance for each educational system. The reductions in variance *between* schools indicate to what extent between-school variance in sense of belonging could be explained by the level-1 and level-2 variables included in the final model, and the reductions in variation *within* schools indicate to what extent within-school variance in sense of belonging could be explained by level-1 variables included in this study. The table shows that the final model explains a greater proportion of between-school variance than within-school variance.

Discussion

This study measures the statistical relationships of various student- and school-level variables with students' sense of belonging, using a large, nationally representative sample of different educational systems. The results show that students' sense of belonging is not only shaped by their social interactions, which are the traditional focus of the literature, but also by their positive engagement and associations with academic subjects. Additionally, the results demonstrate how predictors are differently associated with sense of belonging in different systems, signifying the need to diversify research on sense of belonging.

Previous research and practice have emphasised the social aspect of sense of belonging when exploring its construct. The assessment of students' experience of being bullied is an attempt to measure and address the social dimension of sense of belonging. The results replicate previous findings of negative relationship between students' experience of being bullied and their sense of belonging: Students who were bullied more frequently had a weaker sense of belonging in all seven educational systems included in the study. The results can also be interpreted as a confirmation of the relationship between students' perceived safety and sense of belonging found in previous studies (e.g., Garcia-Reid, Reid, & Peterson, 2005; Hallinan, 2008).

Nevertheless, the results suggest that fostering academic belonging could be one of the most relevant and paramount ways to increase students' sense of belonging, perhaps even more than addressing their social needs. Students' attitude towards an academic subject (mathematics) had the strongest relationships among all student- and school-level variables in each of the seven systems. Indeed, previous studies have identified students' academic motivation as a covariate of students' sense of belonging (e.g., Anderman, 2003; Whitlock, 2007). Its large impact calls for greater attention to the promotion of positive learning experiences in schools. This finding could be interpreted in line with one of the major findings from Ma's study (Ma, 2003) that students' participation in school activities may be the key to their sense of belonging to their school. Ma (2003) found that greater self-esteem and health may allow students to participate in school activities more actively, which consequently helps students feel more valued and belong to school. Similarly, students' positive attitudes towards an academic subject would lead them to actively participate in academic activities. Low academic interest may lead students to feel disconnected from school.

Additionally, it is important to highlight that academic belonging must be cultivated with positive academic engagement and motivation rather than through the pressure to attain high scores. There have been numerous studies that have found an association between students' sense of belonging and their achievement (e.g., Anderman, 2003; Ma, 2003; Wilkinson-Lee, Zhang, Nuno, & Wilhelm, 2011), so it might not be surprising that the results from Model B confirm that students with higher academic achievement have a stronger sense of belonging. However, what is interesting is that, in most educational systems, students' achievement levels were no longer significantly related to belonging when attitude towards maths was added to the model. In other words, students' level of academic achievement may not be as critical for their sense of belonging as previous literature discussed; what matters more is the presence of academic interest.

Although the results of this study reject the first hypothesis that academic achievement and experience of being bullied would be the most significant predictors in each educational system, they confirm the second hypothesis that discrepancies in students' sense of belonging in the five East Asian educational systems are mainly found within schools, not between schools. The weaker relationships of school-level variables with students' sense of belonging may be because of the high degree of homogeneity in the forms of relationships between schools in modern educational systems. This finding suggests that it would be more effective for policymakers and administrators to focus on mediating student-level factors, particularly student attitudes towards academic subjects, in order to promote sense of belonging in school. In addition to helping students cultivate interest in academic subjects and building safe and healthy social interactions with peers, if school administrators and teachers desire to facilitate students' sense of belonging at the school level, decreasing disciplinary school problems such as absenteeism, cheating, profanity, vandalism, and verbal/physical abuse would be most relevant.

In this study, I investigated the statistical association of several factors with students' sense of belonging in East Asian educational systems, with a question whether there would be notable differences compared to the Western educational systems as well as similarities among the East Asian systems. The East Asian systems are often grouped together as collectivist and hierarchical, and such characteristics have been proposed to shape students' sense of belonging to school. This study shows that the patterns observed across the five East Asian educational systems were neither necessarily highly similar to each other nor different from the Western systems, rejecting the third hypothesis. However, differences in the relationship of one particular variable stood out: disciplinary climate. In the U.S. and Canada, disciplinary climate had a statistically significant positive relationship with students' sense of belonging, meaning that students in schools with better disciplinary climates were more like to report a strong sense of belonging than students in less disciplined schools. By contrast, in Japan, Singapore, and Taiwan, disciplinary climate did not have a statistically significant relationship. It is a finding that calls for further investigation, especially given that previous research has found that disciplinary climate has a stronger relationship with students' sense of belonging in collectivist countries (Chiu et al., 2016) because students from a collectivist culture are more likely than those from an individualistic culture to be sensitive to their classmates' behaviour (Chiu & Chow, 2015).

This study has a few limitations which could be addressed in future research. First, it is limited to the measurement of sense of belonging as defined in the TIMSS dataset. The investigation of other dimensions of sense of belonging that were not covered in this study might result in different patterns. Second, no causal inferences could be made from the results because the study is not experimental. Third, this study used listwise deletion to handle missing data. While listwise deletion has been discussed as a viable option in a nested design (Gibson & Olejnik, 2003), the findings of this study should be interpreted with caution considering the potential bias caused by data missing not at random. Fourth, although this study is designed to investigate what student- and school-level factors explain variance in students' sense of belonging, a significant portion of student variance and school-level variance remains unexplained. Therefore, the addition of other student-level variables, such as learning engagement, and school-level variables, such as teacher-student relationship could improve prediction of students' sense of belonging (Blum, McNeely, & Rinehart, 2002; Murdock, Anderman, & Hodge, 2000). Finally, because sense of belonging is a social construct that is understood and developed within a particular cultural context, future projects that include rigorous qualitative exploration of local contexts may explain the differences across the systems observed in this study. For example, in Korea, female students' sense of belonging was significantly weaker than male students', while females had a stronger sense of belonging than males in other educational systems. In Hong Kong, the schools' average achievement level had a particularly strong association which was even greater than the association of experience with bullying.

By illustrating the relationships of student-level and school-level variables with students' sense of belonging in different educational systems, this study serves as an important starting point for scholars and practitioners to investigate the construct of sense of belonging. Furthermore, it adds to the ongoing discussion of education for all at a broader level. What makes students feel that they do

not belong at a school? How can policymakers, teachers, administrators, and scholars help shape a learning environment where all students feel that they belong? Although this study does not provide direct answers to these questions, it does offer the important suggestion that students' sense of belonging should be understood beyond the social domain and in relation to local contexts.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

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References

Allen, K., Kern, M.L., Vella-Brodrick, D., Hattie, J., & Waters, L. (2018). What schools need to know about fostering school belonging: A meta-analysis. *Educational Psychology Review*, *30*(1), 1–34. doi:10.1007/s10648-016-9389-8

Anderman, E.M. (2002). School effects on psychological outcomes during adolescence. *Journal of Educational Psychology*, *94*(4), 795–809. doi:10.1037/0022-0663.94.4.795

Anderman, L.H. (2003). Academic and social perceptions as predictors of change in middle school students' sense of school belonging. *Journal of Experimental Education*, *72*(1), 5–22. doi:10.1080/00220970309600877

Arhar, J.M., & Kromrey, J.D. (1995). Interdisciplinary teaming and the demographics of membership: A comparison of student belonging in high SES and low SES middle-level schools. *Research in Middle Level Education*, *18*(2), 71–88. doi:10.1080/10825541.1995.11670047

Blum, R.W., McNeely, C., & Rinehart, P.M. (2002). *Improving the odds: the untapped power of schools to improve the health of teens*. Minneapolis, MN: University of Minnesota, Center for Adolescent Health and Development.

Burnett, G., & Walz, G. (1994). *Gangs in schools*. (Report No. EDO-CG-94-28). Greensboro, NC: ERIC Clearinghouse on Counseling and Student Services.

Cawelti, G. (1995). High school restructuring: what are the critical elements? *NASSP Bulletin*, *79*(569), 1–15. doi:10.1177/019263659507956902

Chiu, M.M., & Chow, B.W.Y. (2015). Classmate characteristics and student achievement in 33 countries: classmates' past achievement, family socioeconomic status, educational resources, and attitudes toward reading. *Journal of Educational Psychology*, *107*(1), 152–169. doi:10.1037/a0036897

Chiu, M.M., Chow, B.W.Y., McBride, C., & Mol, S.T. (2016). Students' sense of belonging at school in 41 countries: cross-cultural variability. *Journal of Cross-Cultural Psychology*, *47*(2), 175–196. doi:10.1177/0022022115617031

Cortina, K.S., Arel, S., & Smith-Darden, J.P. (2017). School belonging in different cultures: the effects of individualism and power distance. *Frontiers in Educations*, *2*, 1–11. doi:10.3389/feduc.2017.00056

Dreeben, R. (1968). *On what is learned in school*. Reading, MA: Addison-Wesley.

Eccles, J.S., Midgley, C., Wigeld, A., Buchanan, C.M., Reuman, D., & Flanagan, C. (1993). The impact of stage-environment t on young adolescents experiences in schools and in families. *The American Psychologist*, *48*(2), 90–101. doi:10.1037/0003-066X.48.2.90

Elias, M.J., Gara, M., & Ubriaco, M. (1985). Sources of stress and support in children's transition to middle school: an empirical analysis. *Journal of Clinical Child Psychology*, *14*(2), 112–118. doi:10.1207/s15374424jccp1402_3

Elliott, J., Stankov, L., Lee, J., & Beckmann, J.F. (2019). What did PISA and TIMSS ever do for us?: The potential of large scale datasets for understanding and improving educational practice. *Comparative Education*, *55*(1), 133–155. doi:10.1080/03050068.2018.1545386

Farber, S.S., Primavera, J., & Felner, R.D. (1983). Older adolescents and parental divorce: adjustment problems and mediators of coping. *Journal of Divorce*, *7*(2), 59–75.

Finn, J.D. (1989). Withdrawing from school. *Review of Educational Research*, *59*(2), 117–142. doi:10.3102/00346543059002117

Garcia-Reid, P., Reid, R.J., & Peterson, N.A. (2005). School engagement among Latino youth in an urban middle school context: valuing the role of social support. *Education and Urban Society*, *37*(3), 257–275. doi:10.1177/0013124505275534

Gibson, N.M., & Olejnik, N.M. (2003). Treatment of missing data at the second level of hierarchical linear models. *Educational and Psychological Measurement*, *63*(2), 204–238. doi:10.1177/0013164402250987

Glew, G.M., Fan, M.Y., Katon, W., & Rivara, F.P. (2008). Bullying and school safety. *The Journal of Pediatrics*, *152*(1), 123–128. doi:10.1016/j.jpeds.2007.05.045

Goodenow, C. (1993). The psychological sense of school membership among adolescents: scale development and educational correlates. *Psychology in the Schools*, *30*(1), 79–90. doi:10.1002/1520-6807(199301)30:1<79:AID-PITS2310300113>3.0.CO;2-X

Hallinan, M.T. (2008). Teacher influences on students' attachment to school. *Sociology of Education*, *81*(3), 271–283. doi:10.1177/003804070808100303

Hautala, H., Lehti, H., & Kallio, J. (2022). Family background and classroom belonging among adolescent students in Finland. *Child Indicators Research*, *15*(3), 863–883. doi:10.1007/s12187-021-09894-1

Heck, R.H., Thomas, S.L., & Tabata, L.N. (2013). *Multilevel and longitudinal modeling with IBM SPSS*. London, UK: Routledge.

Hox, J.J., Moerbeek, M., & Van de Schoot, R. (2010). *Multilevel analysis: techniques and applications*. Abingdon, UK: Routledge.

Kitayama, S., & Uskul, A.K. (2011). Culture, mind, and the brain: current evidence and future directions. *Annual Review of Psychology*, *62*(1), 419–449. doi:10.1146/annurev-psych-120709-145357

Korpershoek, H., Canrinus, E.T., Fokkens-Bruinsma, M., & de Boer, H. (2020). The relationships between school belonging and students' motivational, social-emotional, behavioural, and academic outcomes in secondary education: A meta-analytic review. *Research Papers in Education*, *35*(6), 641–680. doi:10.1080/02671522.2019.1615116

Ma, X. (2003). Sense of belonging to school: can schools make a difference? *The Journal of Educational Research*, *96*(6), 340–349. doi:10.1080/00220670309596617

Martin, M.O., Mullis, I.V., & Hooper, M. (2016). *Methods and procedures in TIMSS 2015*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center.

Maslow, A.H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370–396. doi:10.1037/h0054346

Murdock, T.B., Anderman, L.H., & Hodge, S.A. (2000). Middle-grade predictors of students' motivation and behavior in high school. *Journal of Adolescent Research*, *15*(3), 327–351. doi:10.1177/0743558400153002

Parsons, T. (1959). The school as a social class system and some of its functions in American society. *Harvard Educational Review*, *29*(4), 297–318.

Pizmony-Levy, O., & Kosciw, J.G. (2016). School climate and the experience of LGBT students: A comparison of the United States and Israel. *Journal of LGBT Youth*, *13*(1–2), 46–66. doi:10.1080/19361653.2015.1108258

Raywid, M.A. (1996). *Taking stock: the movement to create mini-schools, schools-within-schools, and separate small schools* (Vol. 108). New York, NY: ERIC Clearinghouse on Urban Education, Institute for Urban and Minority Education.

Reep, B.B. (1996). Lessons from the gang. *The School Administrator*, *53*(2), 26–29.

Renick, J., & Reich, S.M. (2021). Best friends, bad food, and bullying: how students' school perceptions relate to sense of school belonging. *Journal of Community Psychology*, *49*(2), 447–467. doi:10.1002/jcop.22471

Resnick, M.D., Bearman, P.S., Blum, R.W., Bauman, K.E., Harris, K.M., Jones, J. . . . Udry, J.R. (1997). Protecting adolescents from harm: Findings from the national longitudinal study on adolescent health. *JAMA: The Journal of the American Medical Association*, *278*(10), 823–832. doi:10.1001/jama.1997.03550100049038

Sánchez, B., Colón, Y., & Esparza, P. (2005). The role of sense of school belonging and gender in the academic adjustment of Latino adolescents. *Journal of Youth and Adolescence*, *34*(6), 619–628. doi:10.1007/s10964-005-8950-4

Shochet, I.M., Smith, C.L., Furlong, M.J., & Homel, R. (2011). A prospective study investigating the impact of school belonging factors on negative affect in adolescents. *Journal of Clinical Child & Adolescent Psychology*, *40*(4), 586–595.

Steele, C.M. (1997). A threat in the air: how stereotypes shape intellectual identity and performance. *The American Psychologist*, *52*(6), 613–629. doi:10.1037/0003-066X.52.6.613

Stevenson, H., Lee, S., Chen, C., Stigler, J., Hsu, C., Kitamura, S., & Hatano, G. (1990). Contexts of achievement: a study of American, Chinese, and Japanese Children. *Monographs of the Society for Research in Child Development*, *55*(1/2), 1–119. doi:10.2307/1166090

Walton, G.M., & Cohen, G.L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science*, *331*(6023), 1447–1451. doi:10.1126/science.1198364

Wehlage, G.G. (1989). Dropping out: can school be expected to prevent it? In L. Weis, E. Farrar, & H.G. Petrie (Eds.), *Dropouts from school: issues, dilemmas, and solutions* (pp. 1–19). New York, NY: State University of New York Press.

Whitlock, J. (2007). The role of adults, public space, and power in adolescent community connectedness. *Journal of Community Psychology*, *35*(4), 499–518. doi:10.1002/jcop.20161

Wilkinson-Lee, A.M., Zhang, Q., Nuno, V.L., & Wilhelm, M.S. (2011). Adolescent emotional distress: the role of family obligations and school connectedness. *Journal of Youth and Adolescence*, *40*(2), 221–230. doi:10.1007/s10964-009-9494-9