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# Ethical implications of TIMSS findings: an integrative model of student achievement

SCHOOL EFFECTIVENESS AND SCHOOL IMPROVEMENT

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## ABSTRACT

This study aimed to explore students' perceptions of school practices that have ethical significance using an integrative model based on the eighth-grade Trends in International Mathematics and Science Study (TIMSS) 2015. The sample comprised 280,130 students, 8,353 principals, and 8,353 teachers from 8,353 different schools across 45 countries. Based on Mplus V8.0 analyses, the results show that ethical school practices fall into three main categories: caring about students' learning, student bullying, and sense of belonging. These findings expand on the meaning of ethical school practices beyond the concept's original definition, and suggest that the original items of the TIMSS student questionnaire contain unmined potential. The findings encourage an integrative approach, including ethical school practices and intra- and extra-school factors, to exploring the factors that relate to student achievement. In addition, this study has produced a new multinational index that can help explain similarities and differences among countries.

## KEYWORDS

- Ethical school practices
- international assessment tests
- achievement
- students
- TIMSS

## Introduction

Previous studies (e.g., Hallinger & Chen, 2015; Marfan & Pascual, 2018) describe the importance of cross-national research in education. These studies give a wider perspective and present an integrative approach that imbues research with added significance. Therefore, in this study, I focused on principal, teacher, and student Trends in International Mathematics and Science Study (TIMSS) reports. TIMSS 2015 was conducted by the International Association for the Evaluation of Educational Achievement (IEA) across 45 countries (Foy, 2017). TIMSS international assessments provide information reflecting the practice in schools as reported by the responding principals, teachers, and students to a set of questionnaires (Mullis et al., 2016). Since ethics is an integral part of a student's learning (Finefter-Rosenbluh, 2016), I examined whether ethical practices can be elicited from the students' TIMSS questionnaires that describe school practices, and what could be the main characteristics of these practices. TIMSS questionnaires also include intra-school factors (e.g., class size, based on teachers' TIMSS reports, and science equipment, based on principals' TIMSS reports) and extra-school factors (e.g., students' family socioeconomic status [SES], based on students' and principals' TIMSS reports). These factors may be used as covariates in a study in which the potential effects of ethical practices in schools are of focal interest.

The main study goals are (a) to see whether shared ethical meanings emerge from school practices as seen in the multinational set of student responses to the TIMSS questionnaires. If such shared perceptions of ethical meaning are found, my subsequent

goals would be (b) to discover the meaning of these shared perceptions and (c) to investigate the relationships between these ethical perceptions and students' science achievement using an integrative approach in which some intra- and extra-school factors are taken into account.

In the following section, I present the theoretical background that supports this study. First, I describe the research approach and then ethical school practices in international studies. This is followed by a description of the relationships between intra- and extra-school factors available in the TIMSS database and student achievement. I conclude with the multinational study context.

## Theoretical framework

Various researchers have sought to identify factors affecting student achievement. For example, international TIMSS 2011 and 2015 results showed that eighth-grade girls' average science scores are higher than those of boys, although not in a way that is statistically significant (Martin et al., 2012, 2016). In addition, previous studies indicated that teachers' educational background and teaching experience related to educational outcomes (Boyd et al., 2009; Tatto et al., 2012); these, in turn, are significantly related to student achievement (Kersting et al., 2012). In a sample that included 205,515 students from 47 countries nested in 10,059 classrooms, results revealed that teachers' level of education and experience were significantly related to student achievement (Blömeke et al., 2016).

Moreover, previous studies focused on intra- and extra-school factors and their relationships to students' achievement (e.g., Han et al., 2015; Hopkins et al., 2014). The findings were mixed. Chiu and Chow (2015) found that extra-school factors such as the students' families' SES and educational resources at home were more strongly related to their achievement than were intra-school factors such as class and school size and resources such as technology in schools. Conversely, Teddlie and Reynolds (2000) argued that intra-school factors were more strongly related to student achievement than extra-school factors. Coleman et al. (1966) argued that both extra-school factors, such as socioeconomic background and parental involvement, and intra-school factors, such as the school's social fabric and its resources, equally related to a student's success. Dumay and Dupriez (2007) put forth the possibility that neither extra- nor intra-school factors can strongly relate to student achievement.

Due to the divergent opinions, I considered adding a factor: ethical school practices. I used this factor as part of an integrative model that includes intra- and extra-school factors to explain students' science achievement from a multinational perspective, based on student, teacher, and principal TIMSS reports.

## Ethical school practices in international studies

There are various ways of employing the concept of ethical school practices, depending on the study participants and their roles. For example, Norberg and Johansson (2007), in their study among educational leaders, defined this concept in the context of scenarios that serve to reveal ethical decision making. Lehr et al. (2007), in their study among school counselors, defined this concept in terms of ensuring students' confidentiality while sharing sensitive information with parents, teachers, principals, and other stakeholders. Mayworm and Sharkey (2014) focused on school psychologists and defined ethical school practices in terms of making ethical decisions in the midst of difficult situations.

According to Bergmark and Alerby (2008), ethics are embedded in practice; thus, students infer ethical school practices from the way they experience ethically challenging situations in the school. Although the definition of ethical school practices varies, the common meaning is the choice of ethical behaviors and actions (Heugens et al., 2006; Kaptein, 2011).

Additional studies (e.g., Booker, 2016; Higgins et al., 2012) discussed three main categories of ethical school practices. The first category is *caring about students' learning*. Ethical schools care for their students by maximizing their potential, promoting inquiry and creativity, and teaching up-to-date topics. Teachers should be well versed in the subject matter and should use a wide range of strategies and assessments in the classroom (Louws et al., 2018). Ethical schools ensure a high-quality learning environment, thus promoting scholastic excellence and high achievement.

The second category relates to *student bullying*. Ethical schools stress the importance of abiding by school rules, as these rules protect students' rights (Shapira-Lishchinsky, 2014). Ambiguous rules lead to insufficient school discipline, which can reduce classroom learning time, thereby reducing student achievement (Limbos & Casteel, 2008). More specifically, Higgins et al. (2012) found that students' fear of becoming victims of violence affected their learning motivation and their academic achievement. The authors concluded that schools should strive to create a safe environment, both physically and psychologically, for students.

The third category is a *sense of belonging*, which refers to a student's sense of being accepted, valued, included, and encouraged by others in the academic setting and feeling like an important part of the life and activity of the class and school (Booker, 2016). Ethical schools are characterized by a safe environment with fair and equitable treatment of each student, which increases the students' sense of belonging and personal safety. This environment leads to an increase in student achievement (O'Keeffe, 2013).

## The relationships between intra-school factors and student achievement

Researchers have looked for relationships between student achievement and each of three intra-school variables that are available in TIMSS data: class size, school size, and technology. Research regarding the relationship between class size and student achievement has yielded notably inconsistent results. According to Finn et al. (2003), a smaller class allows students to be more active both academically and socially, which in turn leads to improved student achievement. However, Wößmann and West (2006), in their analysis of schools in 11 countries, found a significant negative relationship between class size and achievement in only two countries. In addition, Shafrir et al. (2016) found no significant relationship between class size and achievement.

The findings regarding the relationship between school size and student achievement also are mixed. Vorthmann (2011) showed that higher levels of student achievement were generally found in larger schools. Conversely, Lee and Loeb (2000) found higher student achievement in small schools, while Gershenson and Langbein (2015) suggest that, on average, there is no causal relationship between school size and academic performance.

A study conducted by Saidin et al. (2015) suggests that technology offers students several advantages, allowing for deeper and more efficient learning. These advantages are due to the internet's inherent opportunities for communication, which facilitate the exchange of ideas and knowledge that motivates learning, thus improving achievement.

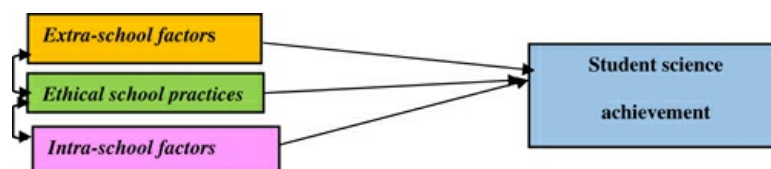
## The relationships between extra-school factors and student achievement

Researchers also have explored the relationships between student achievement and two extra-school variables that are available in TIMSS data: family SES and immigrant students. Families can use their financial, human, social, and cultural capital to enhance their children's learning opportunities. Thus, high-SES students can learn more than lower SES students, leading to higher academic achievement (e.g., Chiu & Chow, 2015).

Appel et al. (2015) have found that diversity – that is, the presence of both majority and minority group members – has a negative relationship with student achievement. However, previous studies found a positive relationship of this same type of diversity with student achievement both among the majority and minority group members (e.g., Aarepattamannil & Lee, 2014).

This study did not seek to determine whether, and under what conditions, ethical, intra-, and extra-school factors are the more dominant predictors of student achievement. Rather, it focuses on how these factors interact (Figure 1). The basic working hypothesis was that under various conditions, intra- and extra-school factors are intertwined. For example, the time students spend doing homework at home is related to the teacher's actions in schools. Another example is the way that school principals distribute school resources in cases of parental intervention. Many if not all of these factors entail ethical aspects that underscore links between intra-, extra-, and ethical school practices and students' science achievement.

**Figure 1.** A schematic representation of the study model.



I explored the factors determining student achievement using an integrative model that includes intra-, extra-, and ethical school factors. I began with the following question:

- (1) Can shared concepts of ethical school practices across TIMSS-participating countries be found based on student responses to TIMSS questionnaires?

When the answer was affirmative, these questions followed:

- (2) What categories do ethical school practices include?
- (3) Is there support for an integrative model that includes the relationship between intra-, extra-, and ethical school practices and students' science achievement?

## Method

### Variables

From the student questionnaires, I initially used three sets of questions with 52 items that indicate ethical practices, which were subsequently condensed to 27 items (shown in Table 1) based on educators' ranking (for further details, please see the Results section). These items focused mainly on the original scales: student views on engaging teaching in science lessons (e.g., "How much do you agree with these statements about your science lessons?: 'My teachers tell me how to do better when I make a

mistake"; a 4-point Likert-type scale ranging from 1 = *agree a lot* to 4 = *disagree a lot*); students' sense of school belonging (e.g., "Tell how much you agree with these statements: 'Teachers at my school are fair to me'"; a 4-point Likert-type scale ranging from 1 = *agree a lot* to 4 = *disagree a lot*); and student bullying (e.g., "How often have other students from your school done any of the following things to you?"; a 4-point Likert-type scale ranging from 1 = *at least once a week* to 4 = *never*).

**Table 1.** Student-level exploratory factor analysis.

Item code and label	F1	F2	F3
<b>Factor 1 – Caring about students' learning</b>			
BSBS22E <i>My teacher has clear answers to my questions</i>	.821	-.046	-.034
BSBS22C <i>I am interested in what my teacher says</i>	.807	.002	-.002
BSBS22B <i>My teacher is easy to understand</i>	.797	-.025	-.038
BSBS22D <i>My teacher gives me interesting things to do</i>	.795	.029	-.002
BSBS22H <i>My teacher does a variety of things to help us learn</i>	.789	-.021	-.030
BSBS22I <i>My teacher tells me how to do better when I make a mistake</i>	.789	-.021	-.020
BSBS22G <i>My teacher lets me show what I have learned</i>	.762	.001	-.006
BSBS22J <i>My teacher listens to what I have to say</i>	.756	-.055	.013
BSBS22A <i>I know what my teacher expects me to do</i>	.675	.039	.013
BSBS21G <i>Science teaches me how things in the world work</i>	.616	.029	.065
BSBS23F <i>My teacher tells me I am good at science</i>	.557	.027	-.004
BSBS24A <i>I think learning science will help me in my daily life</i>	.530	.092	.076
BSBS21H <i>I like to conduct science experiments</i>	.484	.008	.058
<b>Factor 2 – Student bullying</b>			
BSBG16G <i>Shared embarrassing information about me</i>	-.015	.710	.030
BSBG16F <i>Made me do things I didn't want to do</i>	-.021	.654	.033
BSBG16I <i>Threatened me</i>	.012	.651	-.007
BSBG16C <i>Spread lies about me</i>	.010	.646	-.048
BSBG16E <i>Hit or hurt me (e.g., shoving, hitting, kicking)</i>	.002	.645	-.004
BSBG16H <i>Posted embarrassing things about me online</i>	-.032	.577	.045
BSBG16A <i>Made fun of me or called me names</i>	.013	.571	-.042
BSBG16B <i>Left me out of their games or activities</i>	.028	.553	-.016
BSBG16D <i>Stole something from me</i>	.057	.537	-.021
<b>Factor 3 – Sense of belonging</b>			
BSBG15C <i>I feel like I belong at this school</i>	-.055	-.042	.740
BSBG15F <i>I am proud to go to this school</i>	.025	.047	.723
BSBG15B <i>I feel safe when I am at school</i>	-.009	-.057	.683

BSBG15A <i>I like being in school</i>	.053	.083	.658
BSBG15E <i>Teachers at my school are fair to me</i>	.104	-.073	.492
Percent variance explained	26.98	13.89	5.78
Mean score	1.79	3.50	1.78
Standard deviation	0.64	0.57	0.64
Reliability –Cronbach's alpha	.93	.84	.80

Note:  $N = 93,376$  students.

In addition, these questionnaires included student reports on intra-school factors such as technology use in school (e.g., "How often do you use a computer or tablet at school for schoolwork?"; a 4-point Likert-type scale ranging from 1 = *every day* to 4 = *never*) and students' reports on extra-school factors such as home resources (e.g., "Do you have any of these things at your home? Computer/tablet/desk/own room/internet/own mobile phone"; yes/no).

Student achievement refers to students' eighth-grade science scores, which were aggregated into mean achievement for each school. TIMSS data provide student scores in a plausible-value format due to the incomplete test each student was given. In practice, students answered different questions, which they were randomly assigned; thus, the scores for unassigned items were imputed to generate the five plausible values. Plausible values are meant to substitute a single point estimate, such that they include variation. This methodology is commonly used in large-scale data and large-scale questionnaires to reduce the number of questions per respondent. This approach saves resources and improves test quality. In other words, tests overlapped to some extent but were not identical for all students; they were intentionally incomplete in a manner that was completely random. The five imputed values per student substituted for a single score (von Davier et al., 2009).

From the principal questionnaire, measurements were derived for intra-school factors such as the number of students in the school (e.g., "What is the total enrollment of students in your school?") and school resources (e.g., "Does your school have a science laboratory that can be used by eighth-grade students?"; yes/no; "How much is your school's capacity to provide instruction affected by a shortage or inadequacy of library resources relevant to science instruction?"; *not at all, a little, some, a lot*), in addition to their reports of extra-school factors such as family SES (e.g., "Approximately what percentage of students in your school come from economically affluent homes?"; 0–10%, 11–25%, 26–50%, more than 50%).

From the teacher questionnaire, survey items were derived for intra-school factors such as the number of students in a class (e.g., "How many students are in this class?") and extra-school factors such as the number of immigrant students (e.g., "How many eighth-grade students experience difficulties understanding the spoken language of the test?").

## Sample

Our sample comprised 280,130 eighth-grade students (gender distribution was equal), 8,353 principals (gender distribution is not available in TIMSS questionnaires), and 8,353 science teachers (of whom 67.7% were women). These represent 8,353 different schools in 45 countries that participated in the TIMSS 2015 survey, including one principal and one science teacher per school. The majority of the students (88.9%) were born in the country in which the survey took place, while the others (11.1%) migrated to the surveyed country. In this survey, 25.4% of students' mothers had completed primary and lower secondary education, 25.5% had completed upper secondary education, and 19.9% had completed post-secondary (non-tertiary or tertiary) education, while the rest had completed higher levels of education: 18.6% had bachelor's degrees or equivalent, and 10.6% had graduate degrees (master's or doctorate).

All of the teachers had at least a bachelor's degree or its equivalent, with 41.8% holding graduate degrees (mostly master's degrees, with 1.6% having a doctorate). The age distribution was as follows: 15% of the teachers were between 20 and 30 years old, 35% were between 31 and 40, 32.5% were between 41 and 50, and the rest were between 50 and 60, with an average of about 37.6 ( $SD = 8.2$ ). Their teaching experience varied from one to 48 years with an average of about 15 years ( $SD = 9.0$ ).

All but 3.7% of the principals held at least a bachelor's degree or its equivalent: 49.8% had a bachelor's degree or its equivalent, 42.5% had completed a master's degree, and 4% had a doctorate. The average management experience was 9.42 years ( $SD = 7.79$ ).

## Preliminary procedures

Ethics committee approval was obtained from the author's university. The school distribution for each country ranged from a

minimum of 48 schools (Malta) to 477 schools (United Arab Emirates). The analyses required a similar number of schools for each country across all 45 countries. I therefore used the country sampling weight to equalize the school number across countries (Foy, 2017). The weight was calculated around the mean number of schools per country ( $M = 186$ ). The weight inflates lower than mean numbers to the mean, and conversely for higher than mean numbers.

## Data analysis procedure

Study results are presented according to the following two main steps.

### Step 1: educators' ranking of ethical school practices

I utilized the multiculturalism special-interest group (SIG) of the Association for Moral Education, sending emails to a random sample of 12 educators (one educator from each of the following countries: Australia, Ireland, Canada, Hong Kong, United Kingdom, United States, Sweden, Israel, Italy, Chinese Taipei, Hungary, and New Zealand) who were actively employed as educators in TIMSS-participating countries (as subject teachers, general studies teachers, educational coordinators, vice principals, or principals). The educators were asked to independently rate 52 questionnaire items concerning the degree to which they reflected ethical aspects of schools. Specifically, the question was: "Below are items that relate to school practice. Please rate each item on a scale of 1 (*low ethical meaning*) to 5 (*high ethical meaning*) according to its relevance to ethics in school practice." Ten educators agreed to participate (83.3% response rate). The ratings were then used to choose items that were perceived as highly relevant to ethical school practice (those that received an average rating of 4 or above). The final set of items consisted of 27 out of 52 items in the TIMSS student questionnaire.

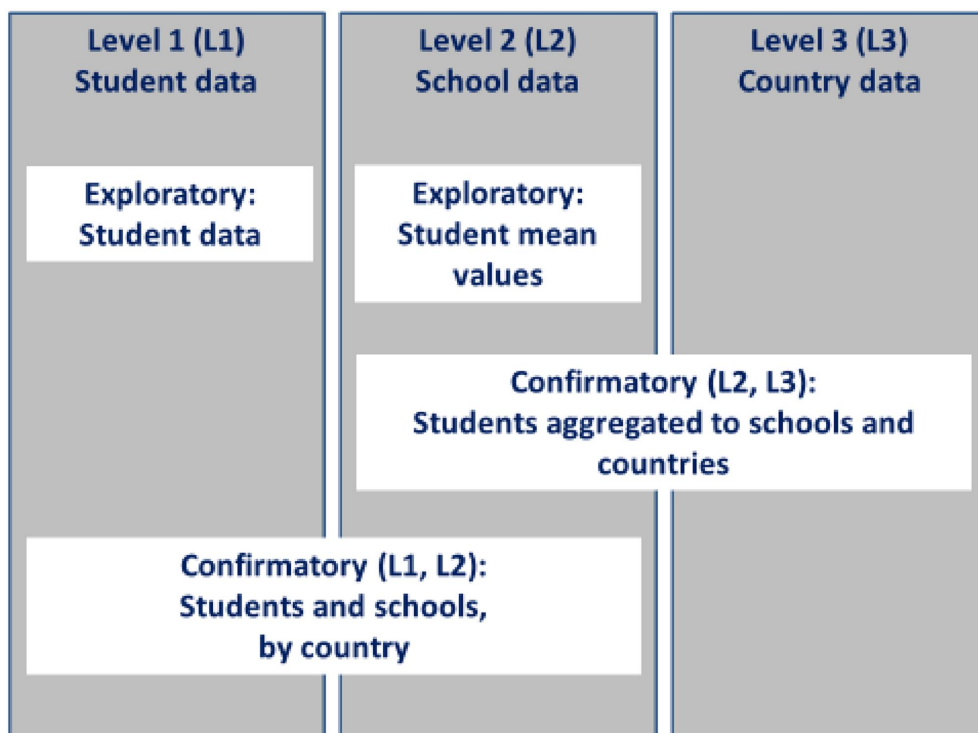
### Step 2: testing the model

In the analyses, I used Mplus V.8.0 (Muthén & Muthén, 1998–2017), which facilitates examinations of complex data related to this three-level structure in which students are nested within schools and the schools are nested in countries. More specifically, students are the first data level. Teachers and principals are the second data level, analyzed as school units (since there are one teacher and one principal per school). Both of these units are lower levels of data, while the countries are the highest data level.

In addition, our analysis opened up the possibility of constructing different latent factors, based on various items in the sample (Brown, 2015). The challenge was to test the latent factor, ethical school practices, across the levels, to find out whether there was global agreement regarding ethical school practices in an integrative approach considering extra- and intra-school factors across countries as well as across schools and across students, in a way that would explain student achievement.

Figure 2 shows the results of the exploratory and confirmatory procedures for testing ethical school practices across levels. White rectangles represent the levels within which the analyses were performed. The exploratory analysis is based on all student data, regardless of school and country levels. For the confirmatory phase, I developed a divided-modeling strategy in which I tested student responses at the school level and then at the country level. The modeling schedule is divided between a test of students and schools, and a test of schools (for which I aggregated the student answers) and countries.

**Figure 2.** Ethical school practices: exploratory and confirmatory procedures across levels of data.



## Results

### Exploratory factor analyses in search of ethical school practices

I ran an exploratory model across all students at Level 1 (about one third,  $N = 93,376$ , of the total sample), across the 45 countries in which students answered all items in the student questionnaire), as mentioned above.

The exploratory analysis on the student level (Table 1) revealed a new category of ethical school practices – caring about students’ learning – based on most items of the original scales of students’ views on engaging teaching in science lessons and a few items from the original scales of students like learning, students confident in science, and students value science. For the second category of ethical school practices, student bullying, items were the same as the original TIMSS item arrangement of the student bullying scale. The third category, students’ sense of belonging, included most of the items of the original measurement of students’ sense of school belonging with the exception of two items: “I like to see my classmates at school” and “I learn a lot in school.” The shaded cells represent the final set of items for each factor.

I ran a similar analysis at the *school level* (93,816 students nested in 2,784 schools) as conceptualized in Figure 2. I reduced the first set of analyses to two levels by aggregating students into schools. Thus, I ran the second exploratory round on the school mean value of students’ variables. Table 2 shows the loading coefficients for the different items in each factor. The total percentage of variance explained by the student level (Table 1) was 46.65 (26.98 + 13.89 + 5.78). This explained variance increased for the school-level data: 69.68 (39.83 + 21.41 + 8.44) by the three factors at the school level. I found similar categories when exploring the students’ answers at the school level, shown in Table 2.

**Table 2.** School-level exploratory factor analysis.

	F1	F2	F3
<b>Factor 1 – Caring about students’ learning</b>			
BSBS22E <i>My teacher has clear answers to my questions</i>	0.96	–0.10	–0.03
BSBS22C <i>I am interested in what my teacher says</i>	0.95	–0.01	–0.02
BSBS22B <i>My teacher is easy to understand</i>	0.93	–0.06	–0.04
BSBS22D <i>My teacher gives me interesting things to do</i>	0.88	0.08	0.00
BSBS22H <i>My teacher does a variety of things to help us learn</i>	0.93	–0.06	–0.01
BSBS22I <i>My teacher tells me how to do better when I make a mistake</i>	0.93	–0.05	0.00



BSBS22G <i>My teacher lets me show what I have learned</i>	0.91	0.04	0.00
BSBS22J <i>My teacher listens to what I have to say</i>	0.91	−0.13	0.02
BSBS22A <i>I know what my teacher expects me to do</i>	0.77	0.10	0.01
BSBS21G <i>Science teaches me how things in the world work</i>	0.78	0.04	0.11
BSBS23F <i>My teacher tells me I am good at science</i>	0.76	0.06	−0.13
BSBS24A <i>I think learning science will help me in my daily life</i>	0.67	0.27	0.10
BSBS21H <i>I like to conduct science experiments</i>	0.68	−0.12	0.06
<b>Factor 2 – Student bullying</b>	−0.05	0.84	0.04
BSBG16G <i>Shared embarrassing information about me</i>	−0.05	0.85	0.09
BSBG16F <i>Made me do things I didn't want to do</i>	0.00	0.85	−0.03
BSBG16I <i>Threatened me</i>	−0.01	0.75	−0.07
BSBG16C <i>Spread lies about me</i>	−0.02	0.83	−0.04
BSBG16E <i>Hit or hurt me (e.g., shoving, hitting, kicking)</i>	−0.05	0.76	0.05
BSBG16H <i>Posted embarrassing things about me online</i>	−0.02	0.70	−0.09
BSBG16A <i>Made fun of me or called me names</i>	0.09	0.72	−0.03
BSBG16B <i>Left me out of their games or activities</i>	0.08	0.73	0.03
BSBG16D <i>Stole something from me</i>	−0.05	0.84	0.04
<b>Factor 3 – Sense of belonging</b>			
BSBG15C <i>I feel like I belong at this school</i>	−0.09	−0.14	0.91
BSBG15F <i>I am proud to go to this school</i>	0.03	0.11	0.80
BSBG15B <i>I feel safe when I am at school</i>	−0.01	−0.07	0.87
BSBG15A <i>I like being in school</i>	0.06	0.22	0.77
BSBG15E <i>Teachers at my school are fair to me</i>	0.07	−0.14	0.72
Percent variance explained	39.83	21.41	8.44
Mean score	1.76	3.46	1.79
Standard deviation	0.34	0.26	0.32
Reliability – Cronbach's alpha	.97	.92	.90

Note:  $N = 2,784$  schools.

At the bottom of both [Table 1](#) and [Table 2](#), note the high internal consistency among the factor items (Cronbach's alpha > .80). The close similarity of the mean, standard deviation, and reliability values for the factors at both the student and the school levels means that students and schools are similar in the categories of ethical school practices.

The confirmatory model was run simultaneously on two levels (on two thirds of the school sample,  $N = 5,568$  schools): the school level (within level) and the country level (between level). [Table 3](#) provides the unstandardized loading coefficients (regression-estimated coefficients) and the intraclass correlations (ICC) for all items to show variability across countries. Variances at the country level accounted for more than 10% across all 27 items. In some items, this variance accounted for up to 62%. This means



that a significant variation exists across countries as well as across schools (Heck & Thomas, 2015).

**Table 3.** The multilevel *confirmatory* model at school and country levels.

Factor 1 – Caring about students' learning					
	Within Level		Between Level		ICC
	Coeff.	SE	Coeff.	SE	
BSBS22E	0.31***	0.01	0.19***	0.02	.26
BSBS22C	0.27***	0.01	0.26***	0.03	.44
BSBS22B	0.32***	0.01	0.19***	0.03	.24
BSBS22D	0.30***	0.01	0.23***	0.05	.37
BSBS22H	0.29***	0.01	0.19***	0.03	.29
BSBS22I	0.28***	0.01	0.20***	0.03	.32
BSBS22G	0.27***	0.01	0.26***	0.04	.44
BSBS22J	0.28***	0.01	0.19***	0.04	.29
BSBS22A	0.20***	0.01	0.22***	0.08	.54
BSBS21G	0.17***	0.01	0.21***	0.05	.46
BSBS23F	0.18***	0.01	0.30***	0.06	.62
BSBS24A	0.15***	0.01	0.23***	0.03	.56
BSBS21H	0.14***	0.01	0.12***	0.03	.28
CR	.97***	.002	.98***	.005	–
Unconstrained model: CFI = .976, TLI = .968, RMSEA = .037, chi square = 812.25, <i>df</i> = 117. ***Significant at the 0.1% level ( $p \leq 0.001$ ). Constrained model: CFI = .973, TLI = .967, RMSEA = .038, chi square = 916.30 <i>df</i> = 130. ***Significant at the 0.1% level ( $p \leq 0.001$ ).					
Factor 2 – Student bullying					
	Within Level		Between Level		ICC
	Coeff.	SE	Coeff.	SE	
BSBG16G	0.19***	0.01	0.14***	0.03	.35
BSBG16F	0.16***	0.01	0.16***	0.02	.39
BSBG16I	0.17***	0.01	0.13***	0.03	.32
BSBG16C	0.20***	0.01	0.16***	0.04	.37
BSBG16E	0.21***	0.01	0.18***	0.03	.34
BSBG16H	0.13***	0.01	0.08***	0.02	.21
BSBG16A	0.24***	0.01	0.23***	0.05	.44
BSBG16B	0.19***	0.02	0.17***	0.03	.40
BSBG16D	0.19***	0.01	0.29***	0.06	.55

CR	.91***	.008	.95***	.01	–
Unconstrained model: CFI = .959, TLI = .940, RMSEA = .042, chi square = 422.21, <i>df</i> = 49. ***Significant at the 0.1% level ( $p \leq 0.001$ ). Constrained model: CFI = .957, TLI = .946, RMSEA = .040, chi square = 449.46, <i>df</i> = 58,. ***Significant at the 0.1% level ( $p \leq 0.001$ ).					
<b>Factor 3 – Sense of belonging</b>					
	<i>Within Level</i>		<i>Between Level</i>		ICC
	Coeff.	SE	Coeff.	SE	
BSBG15C	0.27***	0.02	0.15***	0.03	.27
BSBG15F	0.30***	0.02	0.15***	0.04	.32
BSBG15B	0.26***	0.03	0.16***	0.03	.30
BSBG15A	0.24***	0.02	0.14***	0.03	.42
BSBG15E	0.22***	0.02	0.17***	0.03	.26
CR	.92***	.01	.85***	.06	–
Unconstrained model: CFI = .999, TLI = .997, RMSEA = .028, chi square = 44.37, <i>df</i> = 10. ***Significant at the 0.1% level ( $p \leq 0.001$ ). Constrained model: CFI = .998, TLI = .997, RMSEA = .028, chi square = 64.37, <i>df</i> = 15. ***Significant at the 0.1% level ( $p \leq 0.001$ ).					

Note: *N* = 5,568 schools. ICC = intraclass correlations; CR = composite reliability; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation.

\*\*\*Significant at the 0.1% level ( $p \leq 0.001$ ), Clusters = 45.

I added a measurement of internal consistency, the composite reliability (CR) metric. CR replaced the common Cronbach's alpha (Raykov, 1997), and it is a measure of the latent and observed variance, in which the loadings represent the latent variance. Our results show high levels of reliability ( $CR > .85$ ) for all three factors.

Next, I constrained the factor loading to be equal at the two levels. A reduction of less than .01 in comparative fit index (CFI) levels was observed in all ethical school practice categories. This supports my expectations of a similar factor structure at the two levels (school and country). The chi-square difference test indicates a significant difference, yet it is affected by the large sample size. The similar results for the three categories of ethical school practices provide support for the concept of shared ethical school practices across countries. In other words, these results show that students perceive ethical school practices similarly across countries.

Table 4 complements Table 3 by providing the standardized loadings (regression weights). Regression weights are standardized slopes. These CRs are similar to the CRs that appear in Table 3. I did not run this measurement model at the country level, as it is too complex for 45 countries.

**Table 4.** Confirmatory factor analysis – the measurement model.

Factor	Loadings	SE
<b>Factor 1 – Caring about students' learning</b>		
BSBS22E <i>My teacher has clear answers to my questions</i>	0.94***	0.003
BSBS22C <i>I am interested in what my teacher says</i>	0.92***	0.004
BSBS22B <i>My teacher is easy to understand</i>	0.92***	0.003
BSBS22D <i>My teacher gives me interesting things to do</i>	0.91***	0.004
BSBS22H <i>My teacher does a variety of things to help us learn</i>	0.92***	0.003

BSBS22I <i>My teacher tells me how to do better when I make a mistake</i>	0.93***	0.003
BSBS22G <i>My teacher lets me show what I have learned</i>	0.91***	0.003
BSBS22J <i>My teacher listens to what I have to say</i>	0.92***	0.003
BSBS22A <i>I know what my teacher expects me to do</i>	0.80***	0.008
BSBS21G <i>Science teaches me how things in the world work</i>	0.81***	0.007
BSBS23F <i>My teacher tells me I am good at science</i>	0.68***	0.009
BSBS24A <i>I think learning science will help me in my daily life</i>	0.71***	0.010
BSBS21H <i>I like to conduct science experiments</i>	0.67***	0.011
CR	.97	.001
<b>Factor 2 – Student bullying</b>		
BSBG16G <i>Shared embarrassing information about me</i>	0.81***	0.008
BSBG16F <i>Made me do things I didn't want to do</i>	0.83***	0.007
BSBG16I <i>Threatened me</i>	0.84***	0.007
BSBG16C <i>Spread lies about me</i>	0.77***	0.008
BSBG16E <i>Hit or hurt me (e.g., shoving, hitting, kicking)</i>	0.84***	0.007
BSBG16H <i>Posted embarrassing things about me online</i>	0.70***	0.012
BSBG16A <i>Made fun of me or called me names</i>	0.70***	0.009
BSBG16B <i>Left me out of their games or activities</i>	0.73***	0.009
BSBG16D <i>Stole something from me</i>	0.72***	0.010
CR	.92	.002
<b>Factor 3 – Sense of belonging</b>		
BSBG15C <i>I feel like I belong at this school</i>	0.84***	0.007
BSBG15F <i>I am proud to go to this school</i>	0.80***	0.009
BSBG15B <i>I feel safe when I am at school</i>	0.86***	0.006
BSBG15A <i>I like being in school</i>	0.75***	0.008
BSBG15E <i>Teachers at my school are fair to me</i>	0.77***	0.009
CR	.90	.003

Note:  $N = 5,568$  schools, standardized coefficients. CR = composite reliability. Goodness of fit: comparative fit index = .954, Tucker–Lewis index = .958; root-mean-square error of approximation = .037.

\*\*\*Significant at the 0.1% level ( $p \leq 0.001$ ).

Both [Table 3](#) and [Table 4](#) present goodness-of-fit indexes that indicate how well the proposed theory fits the data in this study. More specifically, based on Hooper et al. (2008), all the study's goodness-of-fit indexes present excellent fits: comparative fit index (CFI) – a cut-off criterion of  $CFI \geq 0.95$  is presently recognized as indicative of a good fit; root-mean-square error of approximation (RMSEA) – cut-off values close to .03 represent an excellent fit; and the Tucker–Lewis index (TLI) –  $TLI \geq 0.95$  also represents an excellent fit.

In summary, regarding the first and the second questions, I found that it is possible to elicit a shared concept of ethical school practices across TIMSS-participating countries based on student responses to TIMSS questionnaires. This factor includes three categories elicited from TIMSS questionnaires: one, new, caring about students' learning, and two factors, similar to the original factors of TIMSS, student bullying and sense of belonging.

### Estimating the relationship between ethical school practices and students' science achievement

First, I considered the five plausible values using the TIMSS IEA IDB analyzer (Foy, 2017). In my analysis, the science achievement score was measured and imputed to generate five plausible values for each student (von Davier et al., 2009). I integrated these five scores by aggregating each plausible value at the school level.

I ran a three-level fixed effect model (Table 5), which included several explanatory variables beyond the three categories of ethical school practices (caring about students' learning, student bullying, and sense of belonging). Among the additional variables were parents' education, student and school resources, and students' background.

**Table 5.** The relationships between ethical school practices, intra- and extra-school factors, and student achievement.

		Unstandardized		Standardized	
		B	SE	$\beta$	SE
<b>Level 1: Student level (<math>N = 274,618</math>) – <math>R^2 = .06^{***}</math></b>					
	<b>Ethical school practices</b>				
	Caring about students' learning	20.64***	1.41	.19***	.01
	Student bullying	–14.84***	1.70	–.12***	.01
	Sense of belonging	.98	1.08	.01	.01
ITSEX	Gender (student)	–1.49	1.25	–.01	.01
BSBG13B	Technology use in school	–.06***	1.19	–.09***	.02
BSBG07	Mother's education	.58*	0.27	.02*	.01
BSBG10A	Born in the country (student)	–2.68	5.05	–.01	.02
RESOURCES	Student resources	3.84***	0.55	.07***	.01
<b>Level 2: School level (<math>N = 8,155</math>) – <math>R^2 = .39^{***}</math></b>					
	<b>Ethical school practices</b>				
	Caring about students' learning	–3.36	3.90	–.02	.02
	Student bullying	–59.44***	6.78	–.29***	.03
	Sense of belonging	24.96***	5.61	.15***	.04
BCBG21	Principals' education	5.09***	1.12	.06***	.01
BTBG04	Teachers' education	3.20*	1.44	.04**	.02
BTBG01	Teachers' experience	0.13	0.09	.02	.02
RESOURCES	School resources	5.58***	1.52	.08***	.02
BCBG01	Number of students in school	0.01***	0.002	.16***	.03
BTBG12	Number of students in a class	0.09	0.21	.02	.04
BCBG03B	Socioeconomic status (student)	11.63***	1.16	.26***	.02

BCBG04	Immigration status (student)	−2.81*	1.31	−.08*	.04
BTBG13	Language difficulties (student)	−1.56***	0.18	−.20***	.02
<b>Level 3: Country level (<math>N = 44</math>) – <math>R^2 = .41^{***}</math></b>					
<b>Ethical school practices</b>					
	Caring about students' learning	−121.06***	26.84	−.56***	.12
	Student bullying	8.76	30.00	.03	.11
	Sense of belonging	−39.93	32.54	−.16	.13

Note: Model fit: comparative fit index = 1.00, Tucker–Lewis index = .999, root-mean-square error of approximation = .001,  $\chi^2 = 6.50$ ,  $df = 6$ ,  $p = .37$ .

\*Significant at the 5% level ( $p \leq 0.05$ ). \*\*Significant at the 1% level ( $p \leq 0.01$ ). \*\*\*Significant at the 0.1% level ( $p \leq 0.001$ ).

For each level, I tested the three categories of ethical school practices. These categories are directly calculated from items at the student level and aggregated to the school and country levels. Similarly, the science achievement score is aggregated to the school level and the country level as the three-level dependent variable (the numbers of students and schools that are in Table 5 are similar but not equal to the original numbers appearing in the sample section due to the absence of answers on various items).

At the student level, I added one intra-school factor (the level of use at school of technology such as computers and tablets), and variables derived from extra-school factors (e.g., mother's education, having been born in the country, and students' resources). For the school-level model, intra-school factors are: average class size and teachers' experience and education (according to the teachers' reports) and principals' level of education, school resources, and school size as measured by the number of children in the school (according to the principals' reports). The variables derived from extra-school factors are: students' SES, students' immigration status (according to the principals' reports), and accompanying difficulties with the local language (according to the teachers' reports).

Regarding the third question, I developed an integrative model that presents the relationship between the independent variables (intra-, extra-, and ethical school practices) and students' science achievement based on the student, teacher, and principal TIMSS 2015 questionnaires. The integrative model yields the following: On the student level, there are relationships between the various categories of ethical school practices and student achievement. More specifically, while caring about students' learning positively related to students' science achievement, student bullying negatively related to students' science achievement.

The negative relationship between student bullying and students' science achievement appears on the school level as well. In addition, a positive relationship between students' sense of belonging and students' science achievement was found on the school level.

On the country level, a significant negative relationship emerged between caring about students' learning and students' science achievement. Note that in a multilevel analysis, consistent relationships along the different levels are not required unless enveloped within the same hypothesis (Hamaker & Grasman, 2015).

I also found that most of the intra- and extra-school factors relate to students' science achievement on all study levels.

Due to limited degrees of freedom at the country level, I tested only the three main categories of ethical school practices on this level. Therefore, Table 6 presents a single analysis for the three main categories of ethical school practices by country. That is, I show how the regression coefficients vary across different countries. This table is important mainly because it shows that the expected effects are not always consistent across the countries in the model regarding the three main categories of ethical school practices. However, the general tendency of the relationships between the ethical school practice categories and students' science achievement is similar to that which is shown in Table 5.

**Table 6.** The relationship between the ethical school practice categories and science achievement (by country).

Country	Students	Schools	Caring about students' learning		Student bullying		Sense of belonging	
			L1	L2	L1	L2	L1	L2
Australia	9,990	284	.25***	.30***	−.13***	−.42***	.21***	.52***

Bahrain	4,822	105	.17***	.20	-.13***	-.66***	.09***	.38**
Botswana	5,904	159	.24***	-.15*	-.25***	-.55***	.14***	.16***
Canada	8,467	276	.17***	.06*	-.08***	-.39***	.15***	.34***
Chile	4,782	171	.09***	.06	-.04*	-.28**	.06***	.26**
Chinese Taipei	5,705	190	.30***	.28**	-.04*	-.13*	.14***	.18***
Georgia	3,887	153	.13***	.08	-.20***	-.12**	.04*	.06
Hong Kong (SAR)	4,140	133	.23***	.24*	.02	.08	.03	.60***
Hungary	4,854	144	.12***	-.06	-.03*	-.54***	.06***	.22*
Iran	6,087	250	.11***	-.04	-.13***	-.27***	.01	.02
Ireland	4,523	149	.25***	.33**	-.07***	-.30***	.13***	.45**
Israel	5,402	200	.25***	.04***	—	—	.07***	.08***
Italy	4,462	161	.16***	.06***	-.07***	-.15***	.09***	.02***
Japan	4,740	147	.30***	.27***	.01	-.08	.07***	.22*
Kazakhstan	4,794	172	.10***	.18*	-.09***	-.04***	.02	.11
Jordan	7,789	252	.20***	.17*	-.28***	-.63***	.02	.04
Korea	5,307	150	.36***	.40***	.02	.08	.11***	.16
Kuwait	4,121	168	.12***	.25**	-.08***	-.37***	.07***	.15
Lebanon	3,578	138	.16***	.11***	-.13***	-.61***	.08***	-.01
Lithuania	4,303	208	.10***	.02***	-.05**	-.21**	.04*	.04
Malaysia	9,629	207	.22***	.47***	-.21***	-.18*	.08***	.31***
Malta	3,604	48	.30***	.70**	-.12***	-.26	.18***	.59***
Morocco	11,879	345	.10***	-.00	-.09***	-.25***	.04***	.12
Oman	8,733	301	.12***	.31***	-.14***	-.49***	.04***	.19*
New Zealand	7,956	145	.23***	.13***	-.11***	-.37***	.18***	.31**
Norway	4,659	143	.23***	-.02	-.10***	-.15***	.15***	.30***
Qatar	5,312	131	.22***	.27***	-.18***	-.49***	.11***	.44***
Russian Federation	4,762	204	.03*	.09*	-.04*	-.21*	.03	.14
Saudi Arabia	3,695	143	.15***	.29***	-.18***	-.53***	.06**	.18*
Singapore	6,090	167	.17***	.18*	-.06***	-.47***	.07***	.50***
Slovenia	4,193	148	.19***	.04***	-.05**	-.15	.15***	.06
South Africa	12,415	292	.14***	-.15*	-.21***	-.76***	.06***	-.20***
Sweden	3,953	150	.20***	.15	-.09***	-.40*	.12***	.31*
Thailand	6,473	204	.11***	.02	-.05***	-.21**	.02	.03

United Arab Emirates	17,741	475	.18***	.27***	-.16***	-.48***	.03**	.51***
Turkey	6,047	218	.23***	.11*	-.15***	-.42***	.03	.10
Egypt	7,695	211	.20***	.22*	-.30***	-.52***	.04**	.09
United States	10,040	246	.16***	.19**	-.08***	-.16*	.13***	.51***
England	4,722	142	.18***	.17*	-.01	-.30*	.12***	.57***
Norway	4,747	142	.17***	.02	-.13***	-.21	.13***	.23*
United Arab Emirates (Dubai)	6,092	135	.16***	.27**	-.13***	-.34***	.07*	.64***
United Arab Emirates (Abu Dhabi)	4,699	154	.20***	.19*	-.18***	-.55***	-.03*	.41***
Canada (Ontario)	4,379	138	.16***	-.00	-.09***	-.27*	.16***	.28**
Canada (Quebec)	3,801	122	.18***	.16***	-.07**	-.36*	.13***	.48***
Argentina (Buenos Aires)	2,931	124	.12***	-.12*	-.03	-.30*	.05*	.24*

Note: L1 = student level; L2 = school level.

\*Significant at the 5% level ( $p \leq 0.05$ ). \*\*Significant at the 1% level ( $p \leq 0.01$ ). \*\*\*Significant at the 0.1% level ( $p \leq 0.001$ ).

## Discussion

One of the main goals of this study was to explore an integrative model regarding students' perceptions of ethical school practices alongside intra- and extra-school factors based on multiple sources of information in the form of principal, teacher, and student TIMSS questionnaires. Overall, this study finds evidence of the contribution of ethical school practice factors alongside extra- and intra-school factors. This new model bridges elements both inside and outside the school that can help explain student achievement worldwide.

An additional goal was to explore whether shared ethical meanings emerge from school practices as perceived by students' responses to TIMSS questionnaires across participating countries. Previous studies had mixed and contradictory results regarding the impact of both intra- and extra-school factors on student achievement.

Confirming the shared new factor, ethical school practices, and adding it to an integrative model for explaining student achievement across countries, makes it possible to balance the tensions seen in the previous mixed results and move toward developing a wider integrative perspective. Concerning the goal of finding characteristics of the new factor, ethical school practices, across countries, I showed that this factor includes items that already appear in TIMSS questionnaires but that were not discussed in previous studies as reflecting ethics in school practice, such as student bullying and sense of belonging.

Previous studies on school effectiveness based on TIMSS assessment referred to the relationship between students' sense of school belonging or student bullying and student science achievement, but not in an integrative approach as the present study suggests. Moreover, my study has uncovered a new category, caring about students' learning, based mostly on items related to students' views on engaging teaching in science lessons but also on items related to students like learning, student self-confidence, and students value science. All together, these findings, which are based on the TIMSS questionnaires, give additional meaning to ethics in school practices.

More specifically, I found that on the student and school levels, as bullying increases, student achievement decreases. While investigating each country separately (on the student and school levels), I found this negative relationship in almost all participating countries. This finding should encourage educational leaders to create a safe environment, not only for the students' wellbeing but also to increase student achievement. The few insignificant relationships found between this category and student achievement on the student and school levels (e.g., Hong Kong, Japan, and Korea) may be explained by additional factors such as context, culture, and norms in each country, which should be addressed in future studies.

I also found that caring about students' learning positively relates to student achievement on the student level. However, while investigating each country separately (regarding the student and school levels), I found insignificant relationships between this factor and student achievement at the school level in several countries (e.g., Bahrain, Chile, Georgia, Hungary, Iran, Italy, Morocco, Norway, Sweden, and Thailand) and, in a very few countries, a negative relationship (e.g., Botswana, South Africa, and Argentina).



These findings may be explained by different norms and attitudes among the participating schools across countries regarding the items this factor includes (e.g., "My teacher tells me I am good in science" and "I know what my teacher expects me to do," which reflects openness that is not normative in some countries).

In addition, I found that sense of belonging positively related to student achievement at the school level. This relationship was not significant in several countries at either the student or the school levels (e.g., Iran, Kazakhstan, Jordan, Russian Federation, Thailand, and Turkey), and in a few countries, only at the school level (e.g., Georgia, Morocco, and Slovenia). This can be explained by various items that make up the concept called "belonging," which may be interpreted differently across the participant countries (e.g., "Teachers at my school are fair to me" and "I like being in school"). In any case, the significant positive relationship found in most of the participant countries between sense of belonging and student achievement may reflect the potential importance of the sense of belonging, a factor that is sometimes neglected when considering how to increase student achievement.

In summary, the present study points to students' shared ethical perceptions across countries based on their TIMSS questionnaires. Thus, the findings support a multinational approach by suggesting a shared integrative model across countries. Nonetheless, it may be understood that countries differ from each other socially, normatively, and politically. Therefore, a shared integrative model across countries also must consider the unique context of each country. Each country can adopt the suggested cross-country characteristics of ethical practices while using a sensitive prism that preserves its specific culture and norms.

## Conclusions

The findings of this study indicate that student responses to TIMSS questionnaires manifest ethical meanings that are shared across all of the surveyed countries. This leads to the understanding that the TIMSS student questionnaire has added meanings that go beyond its intended areas of investigation. The study results also broaden the meaning of shared perceptions of ethical school practices among students by identifying three ethical categories: caring about students' learning, student bullying, and sense of belonging.

This is a new multinational analysis that has never before been investigated in TIMSS student questionnaires, and its initial outcomes may warrant an exploration of the similarities and differences among countries. These shared ethical practices were reaffirmed by their ability to help explain student achievement across countries, through an examination of students' ethical perceptions in an integrative model including sociodemographic factors and intra- and extra-school factors.

## Strengths, limitations, and future studies

The greatest strength of this study is in its findings, which expand upon the meaning of ethical school practices in the framework of an integrative model. I mainly used an advanced statistical approach that expanded the concept of ethics in school practices, considering educators' ranking. My approach included a multilevel analysis, and it demonstrated high internal reliability for the various ethical categories within students' perceptions of school practices.

Future studies should continue investigating other years' TIMSS data to see whether this study's findings assist in measuring ethical school practices in an integrative approach. More specifically, given the shared perspectives around ethical school practices highlighted in this study, it would be interesting to know whether students across different countries share similar interpretations of what it is to feel a sense of belonging.

An additional strength of this study is that it was designed to incorporate student, teacher, and principal reports. This method reduces self-bias and inaccuracies.

The present study analyzed 45 countries together. Future studies should consider analyzing the relationship between the proposed categories and students' science achievement by investigating the following comparisons: high and low science-achieving countries, countries with high and low education expenditures, developed and developing countries, and other comparisons that can affect the relationship between ethics in school practices and science achievement within each country's unique context.

One of the study's limitations is that questionnaires were administered in different languages for the participating countries. It is therefore difficult to ensure that the phrasing and the content's cultural appropriateness are identical across languages. However, I believe that the TIMSS administration is aware of this and acted to reduce this complication.

An additional limitation is that this study focused on the relationships between ethical school practices, intra- and extra-school factors, and student achievement in science. A cross-sectional study design allows for bivariate correlations or multivariate associations, not cause-and-effect relationships. Future studies should focus on causal relationships based on an intervention process, for example, whether educator training for ethical practices in the various TIMSS countries leads to improved student achievement.

## Contributions and implications

Considering the breadth of the cross-section of these data, the study findings may contribute to an understanding of student achievement in secondary schools by focusing on various categories of ethical school practices such as caring about students' learning, sense of belonging, and student bullying. Moreover, using the index of ethical school practices may help to evaluate the ethical environment on different levels (the class, the school, and the educational system) in different countries, which may contribute to an increase in effectiveness and improvement in schools around the world.

The study's multinational approach, as demonstrated in the student, teacher, and principal reports, strengthens the potential transferability of the investigated integrative model. The findings should encourage the use of the integrative model in different countries, while enabling changes and development tailored to each country's unique context.

This study is also academically important. Based on the last international TIMSS assessment (2015), we can uncover deeper meanings of ethics in school practices, including its components and complexities. This research also has educational significance. It can sensitize both principals and teachers to the students' expectations regarding ethical school practices, and to the outcomes of meeting or failing to meet those expectations.

The present study also has social significance, since this assessment sheds light on the ethical challenges faced by educational systems throughout the world. By understanding these challenges, we can apply this knowledge and reduce inequities in education, currently reflected by gaps in the TIMSS student scores.

In all, this study sheds light on ethical school practices as a whole, the components that make up such practices, and the relationship of such practices to students' science achievement. Future investigations based on these new insights could impact educational systems worldwide.

## Disclosure statement

No potential conflict of interest was reported by the author.

## Notes on contributor

**Orly Shapira-Lishchinsky** is an associate professor in the Department of Educational Administration, Leadership and Policy, School of Education, at Bar-Ilan University, Israel. Her research areas include: organizational ethics; teachers' withdrawal behaviors (lateness, absenteeism, and intent to leave); and mentoring through team-based-simulation. She was awarded the Emerald/EFMD Award and the European grant: MARIE SKŁODOWSKA-CURIE. She has published extensive research in a wide range of highly ranked scholarly journals, and a new book *Organizational Ethics in Educational Systems*.

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