



Can Schools and Education Policy Make Children Happier? A Comparative Study in 33 Countries

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Abstract

Our understanding of child subjective well-being and how to promote it has improved substantially over the last decade. In relation to the role of education policy in shaping subjective well-being, although valuable research has been conducted, many questions remain unanswered. This paper aims to fill this gap by studying the links between education policy and students' life satisfaction. We use linear and multilevel regression to analyse PISA 2015 data on 15-year-old students in 33 countries. Our interest is in within society differences and how these vary across societies. We find that (1) there is an association between multiple education policy-relevant factors and students' life satisfaction, which is particularly prominent –and observed in a larger number of countries- in the domains of family relationships, schoolwork-related anxiety and bullying. Our models explain between one-fifth and one-third of the variation in students' life satisfaction. Results also indicate that (2) schools may play an important role in shaping students' life satisfaction. This is supported by evidence that these associations tend to vary by school; by evidence on the existence of school effects in all countries but two; and by the finding that a proportion - substantial in some countries- of the variation in students' life satisfaction is explained by differences between schools. Finally, we find that (3) in relation to both questions, there are important differences across societies. Overall, these results provide evidence that an association between education policy and children's subjective well-being seems to exist but is of a complex nature.

Keywords Subjective well-being · Life satisfaction · Education policy · PISA · Child well-being · Happiness

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1 Background

An increasing interest in subjective well-being (SWB) has been observed in recent decades. One motivation for this growing interest is the finding that beyond a certain level, increases in GDP do not translate into greater happiness (Easterlin 1974; Layard 2005). Since the recommendation by the Stiglitz Commission (Stiglitz 2009) that social progress should be assessed using SWB indicators, efforts to promote this have proliferated worldwide. At the international level, some examples are the creation by the OECD of the How is Life Index (OECD 2011, 2013, 2015, 2017c) and the publication of multiple World Happiness reports (Helliwell et al. 2012, 2013, 2015, 2016, 2017, 2018, 2019). At the national level, in the UK, the Office for National Statistics has created a programme to measure national well-being including the use of SWB indicators (Hicks et al. 2013). In some countries, SWB has gained importance in governments' agendas and nations such as Buthan (OPHI 2020) and the United Arab Emirates (UAE) (UAE Government 2020) have appointed Ministers of Happiness and declared happiness among its citizens a national goal to be pursued through government intervention.

In relation to children, this is a more recent phenomenon and the consideration of subjective indicators of child well-being in policymaking remains far less common. This is so despite the fact that it has been three decades since almost all countries worldwide recognised the United Nations Convention on the Rights of the Child (United Nations 1989), including children's right to be listened to and to have their views taken into consideration in all decisions affecting their lives (Article 12). Casas (2011) argues that this is mainly the result of the lack of political importance attributed to children's own perspectives. In academia, however, important progress has been made in recent years in understanding children's SWB and its links with policy-relevant domains. This is, in part, thanks to an increasing number of international studies including the Health Behaviour in School-aged Children study (Currie 2012) and, more recently, Children's Worlds (Rees and Main 2015). More recently, PISA 2015 (OECD 2017a) has incorporated questions on SWB, which represents a substantial improvement in terms of data availability. This is particularly relevant regarding the association between public policy and child SWB in an educational context, which remains under-researched. In this regard, PISA 2015 includes very rich information not only on students' life satisfaction (LS) and broader well-being but also on education policies and practices.

Education is one of the policy areas which is likely to influence children's SWB. Children spend a large amount of time at school and performing school-related activities, and school is often a major source of social interactions. For these reasons, school and education are deemed to impact the well-being of children in a wide range of domains. Studies of school life have traditionally focused on academic outcomes and well-becoming considerations (Ben-Arieh 2005) –that is, children's future outcomes in adulthood, rather than well-being in the present. The increasing acknowledgement of the importance of considering children's views on the things which affect their lives (Ben-Arieh 2008) highlights the importance of considering children's well-being in the context of education. This research aims to contribute to this goal by using subjective measures of child well-being in order to shed some light on the issue of whether schools and education policy can make children happier.

1.1 Conceptualising SWB

SWB refers to ‘a person’s cognitive and affective evaluations of his or her life’ (Diener et al. 2002). The cognitive dimension involves assessing satisfaction with one’s life in general or with a particular aspect of life. The affective element refers to emotions, moods and feelings, which can be positive (e.g. joy, affection, confidence, etc.) and negative (anxiety, shame, anger, etc.). This highly influential conceptualisation by Diener (1984) informed the work by the Stiglitz Commission (Stiglitz 2009) and, for more than three decades, has remained as the main conceptual reference in research on SWB.

This paper focuses on the cognitive dimension of SWB, which is more stable over time than the affective dimension (Eid and Diener 2004). In particular, we focus on overall LS. LS is closely related to the notion of happiness, and multiple studies have used both terms interchangeably (e.g. Diener 1984; Diener et al. 1999). In research on children and adolescents, LS is also the most common indicator used by researchers to study SWB (Proctor et al. 2009).

1.2 Explaining Variation in Child Subjective Well-Being

One reason that child well-being has been more difficult to incorporate into policy considerations may be the common and widely challenged belief that children belong in the ‘private realm’ (Wyness 2014), with their parents being responsible for ensuring their well-being. Unquestionably, the factors shaping children’s well-being will be different in some ways from those informing levels of adult well-being, as a result of their different experiences of the world. Some of these differences emerge as a result of children’s dependence on families for the provision of care and resources; others result from their participation in different activities – e.g. school rather than work – compared to adults. For the purposes of this article, we draw on Bronfenbrenner’s ecological systems theory (1978) to explore the variation in child well-being. This allows for the consideration of a wide range of influences on child well-being. The importance of family and immediate surroundings (microsystems) is an important proximal factor in understanding well-being, and it is complemented with simultaneous consideration of more distant influences, such as education policy. Besides, to better understand the role played by schools, the analysis focuses on two key elements of the student’s most immediate environment (family and school) and how they interact to shape students’ SWB in the mesosystem.

Turning to the literature investigating variation in subjective well-being, three main conclusions can be drawn. The first one is that differences in mean levels of child SWB across countries are significant (Klocke et al. 2014; Dinisman and Ben-Arieh 2016). In the case of adults, Helliwell et al. (2015) find that six nation-level factors - GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity of giving and perceptions of corruption- explain up to 74% of the variation in SWB between countries. However, in the case of children, nation-level factors rarely explain country differences in the mean level of SWB (Lee and Yoo 2015; Bradshaw and Rees 2017). In contrast, family, school and community significantly affect the levels of children’s SWB (Lee and Yoo 2015). The second conclusion is, therefore, that most of the variation in child SWB seems to be explained by differences within countries rather

than between countries (Lee and Yoo 2015; Bradshaw and Rees 2017; Klocke et al. 2014; Moreno 2017; Looze et al. 2018; Bradshaw 2015; Newland et al. 2018). The third important conclusion is that the factors that explain this variation at the national level –that is, micro- (individual, home) and meso-level (school, community) factors– and their relative importance in the shaping of child SWB, vary considerably from country to country (Lee and Yoo 2015; Bradshaw and Rees 2017). However, home, school and community factors are still significant predictors of children’s SWB even after controlling for country-specific culture and context variables (Lee and Yoo 2015).

These and other studies show that many of the factors that explain variation in child SWB seem policy amenable. This observation begs the question of whether children’s SWB can be influenced by education policy, a question which remains under-researched.

1.3 Public Policy and Child Subjective Well-Being

There are several reasons why we might not expect to find an association between public policy and children’s SWB. Bradshaw (2015) provides a detailed discussion of potential reasons for this, noting that there is also increasing evidence that although an association may be hard to find, it is likely to exist. Most of this evidence refers to the links between children’s SWB and domains of children’s lives that seem policy amenable. Some of these public policy-relevant domains are discussed below. Since the focus of this paper is on education policy, we initially discuss education-specific factors which have been demonstrated to have (the potential to) relate to SWB. Following this, we provide brief details of other aspects of children’s lives which, while not directly related to the school setting, may be subject to school-level interventions with the potential to realise improvements in children’s SWB.

1.3.1 School Life

School is a domain of children’s lives in which policy can make a clear difference. Using Children’s Worlds data, Rees and Main (2015) show that there is a much higher degree of cross-country variability regarding children’s feelings about school issues than in other domains such as health or safety. Their study also reveals that although overall SWB seems to decrease from age 10 to 12, school is the area where this trend is most accentuated, with children from some countries experiencing a more substantial decrease in SWB than others.

Other research indicates that differences between schools – both obvious and more subtle - may be important. In a comparative study using data from England and the United States, Clair (2014) shows that the school a child attends may explain a considerable proportion of the variance in her SWB both in terms of affective well-being and LS.

Some factors within school life which have been identified as important in previous research include:

- The *quality of relationships between teachers and the student* has been found to decrease with age (Bokhorst et al. 2010; Demaray and Malecki 2003; Furman and Buhrmester 1992; García-Moya et al. 2014). Positive relationships with teachers are

related to higher child SWB (Cotterell and Cotterell 2007; García-Moya et al. 2014; OECD 2017a; Moore et al. 2018; Newland et al. 2018; Danielsen et al. 2011; Diseth and Samdal 2014), higher satisfaction with school (Samdal et al. 1998), lower risk of initiation of health-risk behaviours (McNeely and Falci 2004; Moore et al. 2018) and lower risk of mental health problems (Moore et al. 2018).

- *Relationships with school peers* are also important. Multiple aspects of these relationships are associated with children's SWB. These include number of friends, frequency of interactions, satisfaction with friendships, perceiving that friends care about oneself; friendship group shared attitudes such as hope and positivity; and, particularly, bullying (Chu et al. 2010; Corsano et al. 2006; Gilman and Huebner 2003; Goswami 2012; Marshall 2004; Oberle et al. 2011; Proctor et al. 2010; Rose et al. 2014; Tiliouine 2015; Newland et al. 2018).
- *The experience of bullying* profoundly shapes children's experiences at school and it is of paramount importance to children's SWB. Bullying is negatively associated with factors such as school climate, peer and teacher support, liking school and—in particular—SWB (Martinez et al. 2011; Bradshaw et al. 2017; Kutsar and Kasearu 2017); and negative effects may impact both bullied and bullying students (Flaspohler et al. 2009; Navarro et al. 2015). The effects of bullying vary by gender, age and socio-economic status (Alikasifoglu et al. 2007; Bradshaw et al. 2017), and although bullying is a better predictor of SWB in rich than in poor countries (Bradshaw et al. 2017; Savahl et al. 2019) it is an important factor in understanding variation in children's well-being at school globally.

1.3.2 Other Factors

Other factors demonstrated to be associated with SWB include that school change is negatively associated with child SWB (Rees et al. 2012) and that children living in countries with more generous preschool education policies are more satisfied with their lives (Moreno 2017). More broadly, other factors which have been established as associated with SWB and which, while not directly school-related, are amenable to policy intervention at the level of the school, include:

- *Local area:* Feeling safe, access to resources and social connectedness have been found to positively relate to subjective well-being (Eriksson et al. 2011; Oberle et al. 2011; Kaye-Tzadok et al. 2017; Lee and Yoo 2015; Newland et al. 2015; Lawler et al. 2017; Newland et al. 2018).
- *Health:* Several health-related factors including physical fitness (positive association) and illness or disease (negative association) have been found to relate to children's LS (Marques et al. 2017; Klocke et al. 2014; Kleszczewska et al. 2018; Haanpää et al. 2018; Lew et al. 2018).
- *Time use (including ICT use):* Time use, particularly in relation to ICT use, has been found to predict variation in LS, and also varies according to gender, thus potentially explaining gender differences in LS (Rees 2017; Larson and Verma 1999; Amin and Chandrasekhar 2012; Ersado 2005; Dornan and Woodhead 2015; Iannotti et al. 2009; Fergusson et al. 2015; Boniel-Nissim et al. 2015)

- *Rights*: Children's awareness of their rights as children and, especially, perceiving that these rights are respected by adults are positively associated with SWB (Casas et al. 2018).
- *Gender and sexuality*: Gender differences are common in studies of SWB (Rees and Main 2015). Furthermore, there is evidence from Iceland that adolescents from sexual minority groups report lower LS (Thorsteinsson et al. 2017). This would call for the development of programmes oriented to promote LGBTQI+ rights in schools and the wider society.
- *Body image*: Satisfaction with body images strongly relates to gender and has been found to impact SWB (Rees and Main 2015).
- *Home context and relationships within the family*: Home environment and family relationship quality are frequently found to be among the most important predictors of SWB (Lawler et al. 2017; Powdthavee and Vernoit 2013; Klocke et al. 2014; Oberle et al. 2011; Rose et al. 2014; Chu et al. 2010; Gilman and Huebner 2003; Goswami 2012; Govender et al. 2014; Proctor et al. 2010; Moore et al. 2018; Newland et al. 2018; González et al. 2015; Rees et al. 2012).

1.4 Approach and Research Questions

Based on the above literature and evidence review, we adopt the following approach to studying the links between education policy and students' LS. First, we focus on education policy-relevant factors and how these are associated with students' LS. We then go on to look at the effects of schools on LS. Finally, we examine differences between countries in terms of the association between education policy and student LS. This comparative approach is not concerned with explaining country differences based on nation-level characteristics. Instead, we focus on micro- (student, home) and meso-level (school) characteristics and cross-society differences in how these factors influence students' LS.

We hypothesise that (1) there is an association between education policy-relevant dimensions and students' LS; that (2) schools play an important role in shaping students' LS; and that (3) differences across societies regarding the links between education policy and students' LS are significant. We examine these hypotheses in view of the following research questions:

1. Is there an association between education policy-relevant dimensions and students' LS?
2. Does this association vary by school? Are there school effects on students' LS? What proportion of the variation in students' LS is explained by differences between schools?
3. Does the association between education policy and students' LS vary across societies?

2 Methods and Data

2.1 Pisa 2015

In this paper, we use data from PISA 2015, which is the most recent PISA study available, released in 2017. PISA is a worldwide study by the OECD on member and

non-member countries and economies. This study is carried out every 3 years and focuses on 15-year-old students' performance in mathematics, science, and reading. It also includes information on students' socioeconomic status, and education policies and practices. Since 2015, it also collects information on a wider range of well-being domains, including students' LS. In addition to student-supplied data, PISA also gathers information from parents, teachers and school principals on a large number of issues affecting the lives of these children. Each student and school have their own identifier. This allows researchers to conduct multilevel analyses, an essential tool to study the association between education policy and students' SWB.

PISA 2015 LS questions were asked in 47 of the 72 participating countries. Countries included in this study were selected based on the inclusion of key questions, and on the levels of missing data in variables of interest. 33 countries were selected for inclusion on this basis: Austria, Bulgaria, Chile, China, Colombia, Croatia, Czech Republic, Estonia, Finland, France, Greece, Hong Kong, Hungary, Ireland, Iceland, Luxembourg, Latvia, Mexico, Peru, Poland, Portugal, Qatar, Russia, Slovakia, Slovenia, South Korea, Spain, Switzerland, Taiwan, Thailand, Turkey, the UAE, and the United States. For the sake of simplicity and to facilitate the reading, throughout this paper, we refer to all of them as countries regardless of the status of Hong Kong and Taiwan and the coverage of the data sample in the case of China, where only the regions and cities of Beijing, Shanghai, Jiangsu and Guangdong (B-S-J-G from now on) participated in PISA 2015.

2.2 Variables

Our dependent variable is overall LS as defined in PISA 2015 (see Appendix 1). As independent variables, we considered all those enumerated in Table 1. Some of these variables are derived from information collected from students (student-level variables) and others from information collected from school principals (school-level variables). Most of these variables were selected due to their relevance to education policy and practice. Nonetheless, there are important differences in the extent to which these factors can be considered to be amenable to policy interventions. For most of them, it is easy to see how policy could influence these factors (bullying, school anxiety, school resources, grade repetition, etc.). In other cases, the capacity of policy to influence these factors might appear more questionable. This is the case of valuing cooperation and teamwork, for example, which may be related to personality and, therefore, difficult to shape by policy. However, there is some evidence suggesting that schools may promote more positive attitudes towards cooperation (Glăveanu et al. 2016; Gillies 2004). Another important example is feeling emotionally supported by parents in relation to school. In this case, however, the items behind this variable (my parents are interested in my school activities; my parents support my educational efforts and achievements; my parents support me when I am facing difficulties at school; my parents encourage me to be confident) suggest that –although indirectly– students' feelings regarding their parents' support in relation to school could perfectly be influenced by education policy interventions intended to promote parents' involvement in the school and there is a large body of research studying possible strategies to facilitate this (Park and Holloway 2013; Bouakaz 2007).

In addition, a few independent variables are not policy-relevant but were included either because these are considered essential control variables (SES and gender) and/or because they can provide good insights into factors which may shape students' LS and which serve as an important reference to compare the relative importance of the effects of education policy-relevant factors in students' LS (certain time-use variables, the population size of the community where the school is located).

In some cases, we used the original PISA 2015 variable. In others, some transformations were performed. This information is detailed in Appendix 1. Appendix 1 also provides information on the specific PISA 2015 items used to derive these measures.

2.3 Analysis

We first conducted a descriptive analysis to report the mean level of students' LS and the degree of skewness of this variable for each country. The implications of working with skewed data are discussed later in this paper. Then we estimated three linear regression models –model 1 (sociodemographic variables only), model 2 (incorporating self-reported well-being variables) and model 3 (full model, which includes all the independent variables) to report the adjusted R-squared. This figure indicates the proportion of variation in students' LS that is explained by the variables considered in the model (note for the multilevel models we report the R-squared as proposed by Snijders and Bosker (1994: 350–354), also see Snijders and Bosker (1999: 99–105).

We then went on to perform multilevel modelling. First, we estimated a null model to provide a “benchmark” (Hox 2010, pg 56) deviance value and allow for the calculation of the intra-class correlation (ICC) / variance partition coefficient (VPC), which provide an estimate of the proportion of variation in students' LS that is explained at student and school level. Then we created two two-level multilevel regression models for each country. The first model (Model 1) only considers student-level predictors and the second one (Model 2) considers both student- and school-level predictors. In this process, we used a top-down strategy to define the fixed part of the model (see Hox 2010, pg. 55; West et al. 2007) where non-statistically-significant variables (except essential control variables: gender and SES) were not retained. With these models we studied: the direct effects of independent variables in students' LS; the existence of school effects in students' LS; the school random effects to determine whether the association between education policy-relevant factors and students' LS varies by school; and the VPCs which, as noted before, indicate the proportion of variation in students' LS that is explained by differences between schools. As mentioned above, the difference between student-level and school-level independent variables is that the former were collected at the student-level (i.e. information provided by the student) and the latter at the school-level (i.e. information provided by the School Principal). However, in terms of the analysis, the role of schools is not assessed in view of the direct effect of student- and school-level variables but in terms of the school effects, random effects and the VPV values as described above.

To estimate our multilevel models, we used maximum likelihood (ML) instead of restricted maximum likelihood (REML). Although REML methods

Table 1 List of variables

Group	Variable	Details		
		Type of variable	Categories	Number of countries with available data
Sociodemographic	Life satisfaction (0–10)	Continuous	–	33
	Gender (girl)	Dichotomous	Girl; boy	33
	Index of socioeconomic status	Continuous	–	33
Self-reported well-being	Index of –		schoolwork-related anxiety	Continuous
		33		
	Index of sense of belonging at school	Continuous	–	33
	Index of frequency of suffering bullying	Continuous	–	33
	Index of feeling unfairly treated by teachers	Continuous	–	33
Index of feeling emotionally supported by parents	Continuous	–	33	
Time use, habits, ICT use	Worked in the household or took care of other family members	Categorical	Did not do it in the previous day; did it before or after school; did it before and after school	33
	Worked for pay	Categorical		33
	Studied for school or homework	Categorical		33
	Read a book / newspaper / magazine	Categorical		33
	Played videogames	Categorical		33
	Watched			

TV/<DVD>/VideoCategorical

33Met friends or talked to friends on the phoneCategorical

33Internet / Chat / Social networks (e.g. Facebook)Categorical

33Talked to parentsCategorical

33Had breakfastDichotomousDid it in the previous day; did not do it

33Had dinnerDichotomous

33Days of vigorous exercise outside school last weekCategorical0; 1; 2; 3; 4; 5; 6; 7

33Learning time at school (minutes per week)Continuous–

33Out-of-school study time per week (hours)Continuous–

- 33Index of time spent using ICT at school in generalContinuous–
 29Index of time spent using ICT outside school for schoolworkContinuous–
 29Index of time spent using ICT at home for leisureContinuous–
 29Other student-level variablesIndex of valuing cooperationContinuous–
 33Index of academic competenceContinuous–
 33Index of truancyContinuous–
 33Education programme attendedCategoricalGeneral; pre-vocational; vocational; modular
 33Having repeated a grade at least onceDichotomousYes; no
 33Years attended pre-primary educationCategoricalLess than 1 year; 1 year or more but less than 2 years;
 2 years or more but less than 3 years; 3 years or more but less than 4 years; 4 years or more but less than
 5 years; 5 years or more
 33School-level variablesSize of the community where the school is locatedCategoricalFewer than 3000
 people; 3000 to about 15,000 people; 15,000 to about 100,000 people; 100,000 to about 1,000,000 people;
 More than 1,000,000 people
 33School typeCategoricalPublic school (publicly funded and run); semi-private school (publicly funded
 but privately run); private school (privately funded and run).
 33School size (total school enrolment)Continuous–
 32Average class size in the schoolContinuous–
 33Index of shortage of material and human school resourcesContinuous–
 33Student / teacher ratioContinuous–
 33Percentage of certified teacher in the schoolContinuous–
 32Index of teachers' behaviour hindering teachingContinuous–
 33School practices ability grouping within classesDichotomousYes; no
 33School practices ability grouping between classesDichotomousYes; no
 33

tend to produce better estimates, particularly when the number of groups is small (Hox 2010), REML is not compatible with applying sample weights in multilevel models in Stata, which is an unavoidable requirement in the analysis of PISA data. In PISA studies, certain schools/students often are over/under-sampled for different reasons. For instance, in Australia, indigenous children are over-sampled to allow tracking progress of students of this minority group. To account for sampling and non-response consideration, PISA's data sets include a series of weights that need to be applied to avoid getting biased estimates. Laukaityte and Wiberg (2018) argue that although all international large-scale assessment databases (including PISA studies) include ready-to-use scaled weights and their components, these weights have been designed to use in single-level analysis and are not adequate to use in multilevel analysis. In PISA 2015 –as in other OECD datasets- final student weights need to be scaled in multilevel analyses (for a detail discussion, see Laukaityte and Wiberg 2018). In this paper, we do this using the scale method presented by Rabe-Hesketh and Skrondal (2006).

All variables were checked for missing data, and as noted above we focused our analysis on those countries where levels of missing data in variables of interest are acceptable - this is well below 20% in most cases. Information on ICT use variables in Qatar, Turkey, the UAE and the USA, school size in Austria, and the proportion of certified teachers in Hungary is 100% missing. In the case of these countries, these variables were not considered in the models. For all variables, we use listwise deletion, which is common in multilevel analyses using PISA data (Schirripa et al. 2018; Tsai et al. 2018; van Hek et al. 2018; Da Silva and Matos 2017).

3 Results

3.1 Basic Descriptive Information and Model Specifications

Table 2 shows, for each country, the mean level of students' LS, the degree of skewness of this variable and the number of participating students and schools. Overall, there is great cross-country variation. Students' LS is the highest in Mexico, but there is not a clear cluster of countries where students' LS seems to be higher. By contrast, it seems clear that students from Eastern Asian societies -South Korea, Hong Kong, Taiwan, China (B-J-J-G)- tend to report relatively lower levels of LS. Students' LS is the lowest in Turkey. As it is commonly observed in the field, LS is negatively skewed and this is particularly accentuated in Mexico (see later discussion of this).

Table 3 shows some specifications of the regression models. In relation to our research questions, it seems that education-policy relevant factors may explain an important proportion of the variation in students' LS. In view of the results of the adjusted R-squared in the linear regression models and the R-squared –as defined by Snijders and Bosker (1994)- in the multilevel models, the variables that we examined would explain, approximately, between one-fifth and one-third of the variation in students' LS in the countries analysed. A closer look at the results of the adjusted R-squared in the 3 linear regression models shows that socio-demographic variables (gender and SES) explain a rather small proportion of this variation. Most of this variation is explained by self-reported well-being variables -all of which are policy-relevant- and, to a lesser extent, the remaining independent variables, most of which are also policy-relevant. Differences across countries are significant. For instance, these variables explain up to 36% of the variation in students' LS in Iceland but only 15% in Bulgaria and the relative importance of these groups of variables in relation to students' LS also varies by country.

For all countries, results indicate that schools may influence students' LS. This is supported first by the results of the LR tests, which provide evidence of school effects (on 1 d.f., $LR > 3.84$) in all countries but Finland and Greece, where a multilevel model would not necessarily be preferred to a single-level model. And second, the VPC estimates indicate the proportion of the variance in students' LS that can be attributed to differences between schools. In the full model (model 2), the proportion of the variance in students' LS that is found to be explained at school level is above 5% in 24 countries and is particularly high in 5 Eastern European countries: the Czech Republic (45.98%), Estonia (42.41%), Slovakia (40.49%), Latvia (35.58%) and Poland (24.43%). Again, as in the case of the adjusted R-squared estimates discussed before, cross-country differences in terms of both the LR tests and VPC estimates are also important, indicating that the links between schools and education policy and students' LS vary substantially across countries.

3.2 Direct Effects

Table 4 presents a summary of the different direct effects studied in model 2 in the 33 countries analysed. Results show that whereas for some predictors a statistically significant effect is found in almost all the countries, for others, a statistically significant effect is found in a much smaller number of societies. In addition, the effect size varies

Table 2 Life satisfaction descriptive information and number of students and school

	Life satisfaction		Number of students	Number of schools
	Mean	Skewness		
Austria	7.55	-1.13	7007	263
Bulgaria	7.42	-0.94	5928	180
Chile	7.45	-0.90	7053	226
China (B-S-J-G)	6.97	-0.59	9841	268
Colombia	7.77	-1.23	11,795	371
Croatia	7.90	-1.32	5809	160
Czech Republic	7.05	-0.79	6894	333
Estonia	7.49	-1.03	5587	206
Finland	7.88	-1.36	5882	162
France	7.63	-1.03	6108	251
Greece	6.92	-0.79	5532	210
Hong-Kong	6.49	-0.64	5359	138
Hungary	7.19	-0.95	5658	245
Iceland	7.79	-1.32	3371	124
Ireland	7.85	-0.98	5741	167
Latvia	7.36	-0.95	4869	250
Luxembourg	7.38	-1.04	5299	44
Mexico	8.26	-1.55	7568	275
Peru	7.49	-0.96	6971	281
Poland	7.19	-0.90	4478	169
Portugal	7.36	-0.88	7325	246
Qatar	7.42	-0.94	12,083	167
Russia	7.74	-1.08	6036	210
Slovakia	7.47	-0.99	6350	280
Slovenia	7.21	-0.91	6406	301
South Korea	6.36	-0.44	5581	168
Spain	7.44	-1.11	6736	201
Switzerland	7.65	-1.21	5860	227
Taiwan	6.61	-0.44	7708	214
Thailand	7.67	-0.87	8249	273
Turkey	6.11	-0.37	5895	187
UAE	7.30	-0.80	14,167	470
United States	7.36	-0.87	5712	176

for different countries. The direction of the effect also varies, with some effects being universally positive or negative, and others varying between different countries.

The following sections present a more detailed account of the results by country and group of variables.

Table 3 Models specifications

	Linear regression				Multilevel regression															
	Adjusted R-squared		Null model		Model 1. Student-level variables only					Model 2. Full model										
	Model 1	Model 2	Model 3	Obs.	LR test	VPC	Obs.	% miss.	Cases	VPC	R-squared	SB1	SB2	Obs.	% miss.	Cases	VPC	R-squared	SB1	SB2
Austria	0.05	0.21	0.26	7007	64.75	3.47%	5310	24.22%	12.69%	12.69%	0.24	0.36	4909	29.94%	14.33%	0.24	0.38			
Bulgaria	0.02	0.13	0.15	5928	5.03	0.90%	2948	50.27%	8.98%	8.98%	0.14	0.15	2898	51.11%	9.09%	0.15	0.15			
Chile	0.02	0.12	0.25	7053	49.04	2.47%	4798	31.97%	3.96%	3.96%	0.18	0.22	4272	39.43%	3.72%	0.18	0.24			
China (B-S-J-G)	0.01	0.12	0.20	9841	89.63	2.57%	8116	17.53%	12.28%	12.28%	0.20	0.31	5516	43.95%	8.98%	0.20	0.41			
Colombia	0.01	0.13	0.24	11,795	66.90	3.23%	5706	51.62%	12.33%	12.33%	0.19	0.31	4835	59.01%	12.88%	0.20	0.32			
Croatia	0.02	0.23	0.26	5809	22.65	2.47%	2826	51.35%	7.60%	7.60%	0.26	0.40	2741	52.81%	6.88%	0.26	0.46			
Czech Republic	0.03	0.17	0.23	6894	31.17	2.02%	5559	19.36%	48.07%	48.07%	0.19	0.21	5372	22.08%	45.98%	0.19	0.21			
Estonia	0.03	0.22	0.31	5587	9.94	1.09%	4696	15.95%	42.89%	42.89%	0.27	0.27	4661	16.57%	42.41%	0.27	0.28			
Finland	0.05	0.24	0.29	5882	1.86	0.83%	4010	31.83%	2.14%	2.14%	0.28	0.29	4010	31.83%	2.14%	0.28	0.29			
France	0.02	0.20	0.23	6108	8.48	2.88%	4463	26.93%	10.02%	10.02%	0.20	0.36	4154	31.99%	9.86%	0.20	0.37			
Greece	0.03	0.17	0.23	5532	2.14	0.34%	3968	28.27%	3.01%	3.01%	0.22	0.24	3154	42.99%	2.34%	0.21	0.24			
Hong-Kong	0.01	0.17	0.23	5359	35.86	2.11%	4583	14.48%	6.90%	6.90%	0.21	0.29	4583	14.48%	6.90%	0.21	0.29			
Hungary	0.04	0.18	0.24	5658	27.09	2.78%	3641	35.65%	7.56%	7.56%	0.19	0.23	3379	40.28%	7.20%	0.20	0.25			
Iceland	0.06	0.26	0.36	3371	10.56	1.48%	2179	35.36%	10.48%	10.48%	0.34	0.36	2094	37.88%	10.17%	0.35	0.37			
Ireland	0.02	0.22	0.29	5741	8.75	1.06%	3519	38.70%	11.79%	11.79%	0.31	0.39	3519	38.70%	11.79%	0.31	0.39			
Latvia	0.02	0.13	0.19	4869	22.00	3.35%	3576	26.56%	34.78%	34.78%	0.18	0.21	3520	27.71%	35.58%	0.18	0.23			
Luxembourg	0.04	0.22	0.30	5299	11.62	0.77%	3149	40.57%	0.72%	0.72%	0.27	0.32	3149	40.57%	0.72%	0.27	0.32			
Mexico	0.00	0.10	0.18	7568	31.54	2.62%	5839	22.85%	7.30%	7.30%	0.14	0.16	5489	27.47%	6.45%	0.14	0.16			
Peru	0.00	0.13	0.23	6971	39.70	3.10%	4557	34.63%	14.96%	14.96%	0.20	0.23	4153	40.42%	14.51%	0.20	0.27			
Poland	0.03	0.23	0.27	4478	16.14	2.37%	3975	11.23%	26.49%	26.49%	0.25	0.34	3890	13.13%	24.43%	0.26	0.39			

Table 3 (continued)

	Linear regression		Multilevel regression															
Portugal	0.02	0.16	0.23	7325	15.11	1.50%	5629	23.15%	5.22%	0.18	0.28	5516	24.70%	4.54%	0.17	0.30		
Qatar	0.01	0.13	0.22	12,083	151.71	3.00%	7316	39.45%	4.75%	0.19	0.22	6690	44.63%	3.60%	0.20	0.27		
Russia	0.01	0.16	0.25	6036	15.81	1.48%	4662	22.76%	3.22%			4658	22.83%	3.08%	0.21	0.33		
Slovakia	0.02	0.15	0.21	6350	38.61	2.72%	4885	23.07%	40.09%	0.19	0.23	4659	26.63%	40.40%	0.19	0.25		
Slovenia	0.04	0.20	0.21	6406	63.04	3.59%	4923	23.15%	8.06%	0.23	0.32	4471	30.21%	8.47%	0.24	0.30		
South Korea	0.02	0.19	0.25	5581	35.86	2.64%	4365	21.79%	16.99%	0.24	0.22	4282	23.28%	19.21%	0.25	0.39		
Spain	0.02	0.18	0.22	6736	57.33	2.81%	4824	28.38%	14.86%	0.22	0.31	4289	36.33%	13.04%	0.22	0.39		
Switzerland	0.03	0.21	0.29	5860	56.67	1.95%	3184	45.67%	9.14%	0.22	0.24	3194	45.49%	9.14%	0.22	0.24		
Taiwan	0.01	0.18	0.23	7708	16.12	1.06%	7245	6.01%	2.08%	0.20	0.25	7245	6.01%	1.89%	0.21	0.30		
Thailand	0.00	0.09	0.19	8249	110.72	5.28%	7214	12.55%	3.52%	0.10	0.23	6518	20.98%	2.36%	0.12	0.31		
Turkey	0.01	0.16	0.24	5895	42.72	3.38%	4771	19.07%	17.04%	0.18	0.16	4752	19.39%	16.09%	0.18	0.16		
UAE	0.01	0.14	0.22	14,167	121.96	2.94%	10,118	28.58%	12.42%	0.18	0.21	7593	46.40%	10.18%	0.18	0.25		
United States	0.03	0.21	0.30	5712	15.97	2.29%	4646	18.66%	10.10%	0.28	0.33	4646	18.66%	10.10%	0.28	0.33		

Notes: VPC is expressed as a % and indicates the percentage of unexplained variation in students' life satisfaction that is explained at the school level

Linear regression model 1 contains socio-demographic variables only (SES and gender); model 2 adds self-reported well-being variable; and model 3 (full model) incorporates all the independent variables.

For each multilevel model, a value of r-squared -as defined by Snijders and Bosker (1994)- is provided for level 1 (SB1) and level 2 (SB2). SB1 and SB2 could not be estimated for Russia in Model 1.

Table 4 Summary table of the effect of all predictor variables in the full ML model (model 2)

	Number of countries with available data	Number of countries where a statistically significant effect is found	Mean effect size*
Girl	33	28(-)	-0.43
Index of socioeconomic status (SES)	33	17(+ 1(-))	0.15 -0.09
Index of schoolwork-related anxiety	33	33(-)	-0.34
Index of sense of belonging at school	33	14(+)	0.13
Index of frequency of suffering bullying	33	32(-)	-0.28
Index of feeling unfairly treated by teachers	33	26(-)	-0.19
Index of feeling emotionally supported by parents in relation to school	33	33(+)	0.53
Worked in the household or took care of other family members	33	5(+ 1(-))	<i>[0.19] - [0.33]</i>
Worked for pay	33	5(+)	<i>[0.21] - [0.70]</i>
Studied for school or homework	33	14(+)	<i>[0.20] - [0.63]</i>
Read a book/newspaper/magazine	33	1(+ 1(-))	<i>[0.24] - [0.39]</i>
Played videogames	33	2(+ 1(-))	<i>[0.15] - [0.40]</i>
Watched TV/<DVD>/Video	33	3(+)	<i>[0.23] - [0.70]</i>
Met friends or talked to friends on the phone	33	7(+)	<i>[0.18] - [0.45]</i>
Internet/Chat/Social networks (e.g. <Facebook>)	33	2(-)	<i>[0.32] - [0.60]</i>
Talked to parents	33	24(+)	<i>[0.37] - [1.44]</i>
Had breakfast	33	25(+)	0.39
Had dinner	33	4(+)	0.59
Days of vigorous exercise outside school last week	33	22(+)	<i>[0.20] - [0.73]</i>
Learning time at school (minutes per week)	33	3(+)	0.12
Out-of-school study time per week (hours)	33	2(+)	0.15
Index of time spent using ICT at school in general	29	3(+)	0.15
Index of time spent using ICT outside school for schoolwork	29	7(+)	0.14
Index of time spent using ICT at home for leisure	29	1(+ 2(-))	0.12 -0.15
Index of academic competence	33	21(-)	-0.18
Index of truancy	33	16(-)	-0.14
Index of valuing cooperation	33	28(+)	0.18
Having repeated a grade at least once	33	2(-)	-0.40
Years attended pre-primary education	33	3(-)	<i>[0.43] - [1.14]</i>
Education programme attended	33	2(-)	<i>[0.21] - [0.30]</i>
School type	32	15	<i>[0.16] - [1.23]</i>
Size of the community where the school is located	33	9(-) 1(+)	<i>[0.29] - [0.76]</i>

Table 4 (continued)

	Number of countries with available data	Number of countries where a statistically significant effect is found	Mean effect size*
Girl	33	28(-)	-0.43
School size (total school enrolment in hundreds)	32	1(+)	0.04
Average class size in the school	33	2(+)	-0.02
Index of shortage of material and human school resources	33	1(-)	0.02
Student / teacher ratio	33	4(-)	-0.15
Percentage of certified teacher in the school	32	2(+)	0.54
Index of teachers' behaviour hindering teaching	33	3(-)	-0.12
School practices ability grouping within classes	33	1(+)	0.19
School practices ability grouping between classes	33	1(-)	-0.29
			-0.18

*For continuous and dichotomous predictors, the mean effect in those countries where this is significant is provided. For categorical variables (effect size in *italics*), a range of the effect size (expressed in absolute terms) across different categories and countries and economies is provided

3.2.1 Socio-Demographic Variables

Girls report statistically lower LS in almost all the countries analysed (see Tables 4 and 8 in Appendix 2). The effect is greater than 0.4 points in half of them and above 0.7 in Luxembourg, Slovenia and Austria.

SES is positively associated with students' LS in 17 countries. The size of the effect of an increase of 1 standard deviation in the index of SES is between 0.1 and 0.2 points in the majority of cases. Interestingly, in Slovenia, this association is negative (-0.09 points).

3.2.2 Self-Reported Well-Being Variables

Self-reported well-being strongly relates to students' LS. Tables 4 and 8 in Appendix 2 show that there are three predictors whose effect on students' LS is found in almost all countries: schoolwork-related anxiety, frequency of bullying (with the only exception of South Korea, where this effect is not statistically significant), and feeling emotionally supported by parents in relation to school. The greatest effect size relates to feeling emotionally supported by parents in relation to school -the effect of an increase of 1 standard deviation in this index ranges between 0.4 and 0.7 points. The effect size is smaller (between 0.2 and 0.4 in most cases) for indices of frequency of bullying and schoolwork-related anxiety -although, in the latter case, it seems somewhat greater overall and particularly great (around 0.6 points) in South Korea and Iceland.

The other self-reported well-being variables seem somewhat less important to students' LS. In 26 countries, feeling unfairly treated by teachers is negatively

associated with students' LS. However, compared to the self-reported well-being variables mentioned above, the size of the effect is smaller (between 0.15 and 0.25 points in most countries). For sense of belonging at school, the association is positive and found in a smaller number of countries (14) and the size of the effect is smaller on average (between 0.1 and 0.2 points in most).

3.2.3 Effect of Time Use, Health Habits and ICT Use Variables

Multiple variables that refer to students' time use and health habits are associated with their LS. For ICT use variables, evidence of an association is more scarce overall. This information is detailed in Tables 4 and 9 in Appendix 2. In particular, talking to parents is a very important predictor of students' LS. In 24 countries, those who report having talked to their parents in the day before report much higher life satisfaction than those who do not. Moreover, LS is higher among those who do it before and after school than among those who do it either before or after school only. The effect size is above 0.40 points in most countries and is of at least 1.00 points in the UAE, Chile, Spain, Iceland, Mexico, and the United States. Other predictors of LS observed in many countries are eating breakfast before going to school, doing vigorous exercise outside the school in the previous week and studying for school or homework.

For the other time use, health habits and ICT use variables analysed, the picture is more complex. Overall, a statistically significant association is found in a smaller number of countries. There is heterogeneity in terms of both the size and sign of the effect. In some cases, although a statistically significant effect is found in just a few societies the effect size is great in some. This is the case, for instance, of watching TV/DVD/video in Turkey (between 0.59 and 0.70 points) and having dinner in Austria (0.56 points), Colombia (0.63 points), Czech Republic (0.51 points), and Ireland (0.66 points). Moreover, for a few of these other variables, a positive effect is found in some countries and a negative one in others.

3.2.4 Effect of Other Student-Level Variables

Some of the remaining variables measured at the student-level that we considered in this study seem related to students' LS in most countries (see Tables 4 and 10 in Appendix 2). First, students that have more positive attitudes towards cooperation and teamwork seem to report higher LS. The effect of an increase of 1 standard deviation in the index of valuing cooperation is associated with higher LS in 28 countries, and the effect size is around 0.2 points in most of them. Interestingly, the association between academic competence and students' LS is negative. This negative association is found in 20 countries and the effect size is also around 0.2 in the majority of them. By contrast, truancy seems to have a negative effect on students' LS. A negative association is found in 16 countries and the size of the effect ranges between 0.1 and 0.2 points.

For the other variables of this group, evidence of an association is much scarce. Having repeated a grade, the education programme the student attends, and pre-primary education attendance relate to students' LS in a few countries only.

3.2.5 Effect of School-Level Variables

We find that for most of the predictor variables measured at the school level that we study, an association with students' LS is found in a small number of countries (see Tables 4 and 11 in Appendix 2). The main exception is school type. In 14 out of the 31 countries where there is more than one type of school, LS is associated with school type (i.e. either public, semi-private or private), and the effect size tends to be great (i.e. near or above 0.4 points in most cases). The population size of the community where the school is located is also important in some countries. In 10 of them, students attending schools located in small communities (fewer than 3000 people) report higher LS than those living in bigger communities. The effect size varies across societies and population categories and ranges between 0.29 and 0.76 points.

For all the other predictor variables measured at the school level, the picture is, again, less clear. In all of them, a statistically significant effect is found in a small number of societies. Moreover, for a few variables, the effect is positive in some societies and negative in others. The effect size tends to be small, although there are some exceptions. For example, the percentage of certified teachers seems to be important to students' LS in Greece and South Korea, which are the only two countries where an association is found. The size of the effect in these two countries is great, 0.36 and 0.73 points, respectively.

3.3 Random Effects

In these multilevel regression models, in order to assess how schools may influence students' LS, we also examined the existence of school random effects regarding schoolwork-related anxiety, the frequency of suffering bullying, feeling emotionally supported by parents in relation to school and having repeated a grade at least once. Table 5 shows evidence of random effects in relation to these factors in 16, 29, 26 and 14 countries, respectively. The estimates not reported (in blank) indicate that the random effect was not considered because it did not improve the model fit. Among those considered, statistically significant random effects are highlighted in bold. The existence of random effects would mean that differences in how schools deal with students with different characteristics (i.e. reporting different levels of schoolwork-related anxiety, frequency of suffering bullying and feeling emotionally supported by parents in relation to school; and those who have and have not repeated a grade at least once) has a significant impact on their LS.

In 5 Eastern European countries -Czech Republic, Estonia, Latvia, Poland and Slovakia- the school random effect coefficient for grade repetition is above 1 point. This means that among those students who have repeated a grade in these countries -a total of 4.03%, 3.34%, 4.23%, 4.16% and 5.88%, respectively- attending to one school or another makes a big difference to their LS. These exact same countries happen to be the countries with very high VPC values - this is the countries where schools influence students' LS the most (see section 3.1 and Table 3 above). In the null-model, these Eastern European countries did not stand out in terms of the VPC. However, when adding predictor variables (including random effects) to the model (i.e., model 1 and model 2), VPCs in these nations increase dramatically. Indeed, when removing school random effects for grade repetition from model 2, VPCs in Czech Republic, Estonia,

Table 5 Random effects in Model 2 (full model)

	Index of schoolwork-related anxiety		Index of frequency of suffering bullying		Index of feeling emotionally supported by parents		Having repeated a grade at least once	
	Coef.	S.E. (95% conf. Interv.)	Coef.	S.E. (95% conf. Interv.)	Coef.	S.E. (95% conf. Interv.)	Coef.	S.E. (95% conf. Interv.)
Austria	0.18	(0.06) (0.0931–0.3649)	0.29	(0.06) (0.1979–0.4189)	0.29	(0.05) (0.2066–0.4188)	0.59	(0.15) (0.3561–0.9749)
Bulgaria	0.29	(0.09) (0.1634–0.5263)	0.48	(0.11) (0.3082–0.7494)	0.37	(0.08) (0.2370–0.5662)		
Chile	0.10	(0.15) (0.0055–1.8738)	0.24	(0.07) (0.1347–0.4327)	0.25	(0.07) (0.1472–0.4200)		
China (B-S-J-G)	0.22	(0.22) (0.1327–0.3752)	0.17	(0.07) (0.0785–0.3880)	0.32	(0.07) (0.2030–0.5021)	0.48	(0.20) (0.2098–1.1078)
Colombia	0.14	(0.15) (0.0172–1.1105)	0.48	(0.09) (0.3344–0.6831)	0.26	(0.07) (0.1545–0.4395)	0.46	(0.12) (0.2736–0.7678)
Croatia	0.30	(0.06) (0.2075–0.4481)	0.29	(0.04) (0.2181–0.3953)				
Czech Republic	0.17	(0.08) (0.0731–0.4057)	0.29	(0.06) (0.1924–0.4264)	0.29	(0.07) (0.1808–0.4558)	1.75	(0.30) (1.2473–2.4492)
Estonia	0.23	(0.03) (0.1775–0.3092)	0.21	(0.05) (0.1356–0.3375)	0.32	(0.04) (0.2508–0.4104)	1.40	(0.35) (0.8496–2.2983)
Finland			0.21	(0.04) (0.1468–0.2908)				
France	0.28	(0.15) (0.1030–0.7868)	0.26	(0.08) (0.1462–0.4661)	0.39	(0.18) (0.1577–0.9652)	0.17	(0.27) (0.0077–3.7971)
Greece	0.12	(0.11) (0.0182–0.7618)	0.25	(0.09) (0.1268–0.5100)				
Hong-Kong			0.11	(0.07) (0.0310–0.3676)			0.45	(0.18) (0.2044–0.9818)
Hungary	0.25	(0.06) (0.1566–0.4095)	0.31	(0.06) (0.2157–0.4477)	0.32	(0.08) (0.1929–0.5324)		
Iceland	0.32	(0.05) (0.2282–0.4441)	0.32	(0.06) (0.2300–0.4581)	0.32	(0.06) (0.2186–0.4597)		
Ireland	0.20	(0.06) (–0.1074–0.3698)	0.24	(0.05) (0.1520–0.3748)	0.25	(0.04) (0.1809–0.3590)	0.49	(0.38) (0.1075–2.2261)
Latvia	0.28	(0.06) (0.1867–0.4142)	0.31	(0.06) (0.2108–0.4568)	0.31	(0.05) (0.2261–0.4260)	1.10	(0.21) (0.7652–1.5936)
Luxembourg								
Mexico	0.20	(0.08) (0.0953–0.4207)	0.33	(0.09) (0.1921–0.5589)	0.21	(0.06) (0.1220–0.3771)		
Peru			0.36	(0.06) (0.2553–0.4945)	0.32	(0.05) (0.2354–0.4377)	0.69	(0.14) (0.4622–1.0406)
Poland	0.18	(0.07) (0.0834–0.3718)	0.25	(0.06) (0.1611–0.3916)	0.19	(0.06) (0.1013–0.3380)	1.01	(0.26) (0.6057–1.6741)
Portugal	0.19	(0.07) (0.0996–0.3788)	0.22	(0.05) (0.1396–0.3552)	0.16	(0.10) (0.0492–0.5441)	0.19	(0.13) (0.0542–0.6993)

Table 5 (continued)

	Index of schoolwork-related anxiety		Index of frequency of suffering bullying		Index of feeling emotionally supported by parents		Having repeated a grade at least once	
	Coef.	S.E. (95% conf. Interv.)	Coef.	S.E. (95% conf. Interv.)	Coef.	S.E. (95% conf. Interv.)	Coef.	S.E. (95% conf. Interv.)
Qatar			0.24	(0.05) (0.1572–0.3550)	0.21	(0.06) (0.1211–0.3761)		
Russia	0.20	(0.08) (0.0881–0.4469)	0.23	(0.09) (0.1074–0.4832)	0.18	(0.05) (0.0997–0.3208)		
Slovakia			0.41	(0.05) (0.3278–0.5104)	0.16	(0.07) (0.0650–0.3755)	1.52	(0.25) (1.1088–2.0918)
Slovenia	0.29	(0.06) (0.1951–0.4178)	0.37	(0.05) (0.2809–0.4975)	0.25	(0.05) (0.1668–0.3739)		
South Korea			0.19	(0.06) (0.1073–0.3471)	0.26	(0.05) (0.1721–0.3888)	0.88	(0.29) (0.4565–1.6797)
Spain	0.11	(0.07) (0.0280–0.4179)	0.26	(0.05) (0.1748–0.37256)	0.24	(0.04) (0.1698–0.3454)	0.52	(0.08) (0.3848–0.7066)
Switzerland	0.16	(0.09) (0.0545–0.4635)	0.31	(0.06) (0.2070–0.4533)	0.36	(0.05) (0.2663–0.4804)		
Taiwan			0.22	(0.05) (0.1400–0.3451)	0.13	(0.05) (0.0584–0.2885)		
Thailand	0.08	(0.15) (0.0014–4.0325)			0.00	(0.00) (0.0000–0.0000)		
Turkey	0.26	(0.08) (0.1346–0.4912)			0.28	(0.08) (0.1652–0.4743)	0.95	(0.25) (0.5720–1.5839)
UAE			0.26	(0.05) (0.1814–0.3626)	0.33	(0.06) (0.2353–0.4750)	0.50	(0.15) (0.2831–0.8900)
United States	0.12	(0.10) (0.0230–0.5883)	0.29	(0.06) (0.1891–0.4449)	0.27	(0.04) (0.2045–0.3620)	0.38	(0.44) (0.0371–3.8001)

Latvia, Poland and Slovakia go, respectively, from 45.98, 42.41%, 31.22%, 24.43% and 40.40% to 6.27%, 7.04%, 7.30%, 4.27% and 6.50%.

4 Discussion

4.1 Main Findings

We found evidence in support of the three hypotheses that we examined. This is that (1) there is an association between education policy-relevant dimensions of students' lives and their LS; that (2) schools play an important role in shaping students' LS; and that (3) differences across societies regarding the links between education policy and students' LS are significant.

4.1.1 The Association between Education Policy-Relevant Factors and Students' Life Satisfaction

In relation to the association between education policy-relevant factors and students' LS, multiple associations were found. In particular, schoolwork-related anxiety (−), the frequency of suffering bullying (−) and feeling emotionally supported by parents in relation to school (+) were revealed as almost universal predictors of students' LS. As to the frequency of suffering bullying, however, a statistically significant effect was not found in South Korea. This may have to do with the fact that among the 53 countries with available data in PISA2015, South Korean students report by far the lowest frequency of feeling bullied (OECD 2017a). Using data from Children's Worlds, Rees and Main (2015) also find that children aged 10 and 12 in South Korea feel bullied less frequently. Regarding schoolwork-related anxiety, despite some exceptions (especially Colombia, France and Chile), this seems to be more important to students' LS than the experience of bullying. This is especially the case of South Korea and Iceland, which are the two countries where the effect of schoolwork-related anxiety in students' LS is by far the greatest. However, by a considerable margin, the greatest effect tends to be observed in relation to feeling emotionally supported by parents in relation to school. Some notable exceptions are Mexico and Chile -where the effect of feeling emotionally supported by parents in relation to school and schoolwork-related anxiety are similar and smaller than the effect of bullying, especially in Chile- and Ireland and Iceland -where the effect of feeling emotionally supported by parents in relation to school is similar to the effect of the experience of bullying and, especially in the case of Iceland, smaller than the effect of schoolwork-related anxiety. Overall, these country differences in the relative importance that distinct factors have in the making of students' LS indicate that the association between education policy and students' LS is complex.

Furthermore, being a girl (−), feeling unfairly treated by teachers (−), valuing cooperation (+), having breakfast before going to school (+), doing vigorous exercise outside school (+), academic competence (−) and talking to parents before and/or after school (+) are associated with students' LS in most countries. Once again, by a considerable margin, the greatest effect size tends to be found in the domain of family relationships (talking to parents). The somewhat surprising negative association

between academic competence and students' LS contradicts findings from previous research exploring this association. In a meta-analysis exploring the association between academic achievement and SWB, Bückner et al. (2018) find a small to medium positive correlation but also acknowledge that high achieving students do not necessarily report high SWB and that low-achieving students do not automatically report lower SWB.

In addition, in around half of the countries studied, an association was found with regard to SES (positive in all of them but in Slovenia), sense of belonging at school (+), truancy (−) and school type—in this case, when compared with public schools, students' LS is higher in semi-private and/or private schools in some countries and lower in others.

For the remaining predictor variables, the picture is less clear. In a few cases, the effect is positive in some societies and negative in others. Overall, for these remaining predictor variables, an effect is usually found in a smaller number of societies and the effect size tends to be smaller. However, there are some predictor variables that are associated with students' LS in a small number of countries but which are particularly important in these societies. For instance, this is the case for the shortage of educational resources, where a small but statistically significant effect is found only in Spain (-0.15^{***}); and for the percentage of certified teachers in the school, where an effect—rather great in size—is only found in Greece and South Korea (0.36^* and 0.73^{***} , respectively).

The models that we examined explain, approximately, between one-fifth and one-third of the variation in students' LS. Most of this variation is explained by education policy-relevant factors, especially by self-reported well-being variables. However, both the total proportion of variation in LS explained by these variables and the different contribution to the making of LS of these groups of variables differs substantially by country.

Overall, all this evidence of cross-society differences in the association between education-policy relevant aspects and students' LS suggests that although there are some domains of children's lives that seem to be important to SWB almost universally, in many instances, what is observed in one particular society is not necessarily observed in others. This highlights the importance of comparative research on children's SWB and the necessity of identifying cross-society differences and commonalities in terms of what contributes to children's SWB.

4.1.2 How Schools May Influence Students' Life Satisfaction

We also found evidence that schools may play an important role in shaping students' LS. First, there is evidence of school effects in students' LS in all countries but two (Finland and Greece). Second, part of the variation in students' LS is explained by differences between schools. In view of the analysis of the VPC, in the full multilevel model (model 2), this proportion is above 5% in 24 countries, being particularly great in 5 Eastern European countries: Czech Republic (45.98%), Estonia (42.41%), Slovakia (40.49%), Latvia (35.58%) and Poland (24.43%). These results are in line with previous research (see Clair (2014) for the cases of England and the United States) which indicate that, in some societies, schools may explain a large proportion of variation in students' SWB. And third, the association between education policy-relevant factors and students' LS tends to vary by school. That is, there is evidence of school random effects in all societies but Luxembourg and Thailand, meaning that

school responses to student experiences and characteristics are important. This is particularly important in those Eastern European societies with very high levels of between-school variance in students' LS (Czech Republic, Estonia, Slovakia, Latvia and Poland) as this between-school variance is mostly explained by how schools in these countries treat students who have repeated a grade –which, in these countries, represent around 4–6%. This is an intriguing finding and an interesting point to explore in future studies.

Overall, these results indicate that although schools seem to influence students' LS in all countries, there are important cross-society differences. Not only do schools seem to play a much more important role in some societies than in others but there is also substantial cross-society variation in how they shape students' LS (i.e. through differences when it comes to dealing with bullying, grade repetition, etc.; and perhaps through the way in which students of different characteristics are concentrated in different types of schools, study programmes and/or classrooms). Again, this highlights the important role of comparative research and the need for identifying cross-society differences and commonalities in how schools may influence students' LS and what may explain this.

4.1.3 The Complex Association between Education Policy and Students' Life Satisfaction

Although this study did not provide evidence of causal mechanisms, the finding that multiple education policy-amenable factors are associated with students' LS suggests that there is room for education policy to influence children's SWB. Education policy-relevant factors - and, particularly, self-reported well-being - seem to explain a significant proportion of the variation in students' LS. Furthermore, these findings support the position that both schools and education policy interventions at the school level may promote SWB. However, an important conclusion is that the association between education policy and children's SWB is complex. Many associations vary by school and across societies. For those interested in if and how schools may promote children's SWB, a promising way forward could involve conducting comparative research on children's SWB adopting a more nuanced approach to study this complexity, with consideration of school-level characteristics and cross-society differences but also factors at other levels (child, home, community) of the child's environment, and the interconnections between them.

4.2 Implications for Education Policy and Practice

In terms of implications for education policy and practice, some lessons are particularly important in relation to specific policies and policy domains. First, tackling bullying and school anxiety is essential to increase children's SWB. Second, interactions with parents are also very important. Although these may not seem as amenable by policy as bullying and school anxiety, practitioners and policymakers can –and should- work towards facilitating parental engagement with school and supporting parents in their efforts to provide a supportive and nurturing environment. Third, the quality of the relationships between students and teachers is important and measures intended to improve this –and particularly, to reduce the feeling of being unfairly treated by teachers- could boost child SWB. Fourth, the promotion of healthy habits –having

breakfast before going to school and practising vigorous exercise several days a week—is another way in which children’s SWB could be increased in many countries. Fifth, schools and education systems that tackle truancy, promote values of cooperation and manage to increase the sense of belonging to school among students may help in achieving higher levels of SWB.

Furthermore, attention needs to be paid to country-specific issues—this is factors which, regardless of the number of countries where effects were found, may be of especial importance in a specific society. For example, in view of the results observed for Spain, increasing the availability of human and material resources in schools in this nation could result in higher SWB. The fact that some interventions are likely to be important in some countries but not in others highlights the importance of policymakers having access to nationally representative data—and, ideally, also that of regions/states and municipalities. This would enable a more effective identification of which policy and practice interventions are more likely to increase the SWB of their children.

It is also important to note that, although the focus of this research was on education policy, for some of these factors (e.g. interactions with parents, health habits, etc.) interventions would not be limited to schools and education policy but would also involve taking action in other policy domains (health, work-life balance, broader social policy, etc.).

In relation to the role of schools, evidence that individual schools—and not only education systems—may have the capacity to influence students’ SWB has policy implications. The fact that students’ LS differs from one school to another may lead to two hypotheses, which are non-mutually exclusive and policy-relevant. The first one is that schools are different enough in ways which are important to students’ LS. And the second one is that students of certain characteristics are more likely to attend some schools than others. In view of the first of these two hypotheses, policymakers should aim at identifying the characteristics that result in higher LS in some schools and how these conditions can be promoted in others through changes in policy and practice. In view of the results presented in this research, some of these conditions are to do with school anxiety, bullying, feeling emotionally supported by parents and grade repetition, whose impact on students’ LS varies across schools in many countries. Some schools do better than others when it comes to dealing with these issues, and we should aim to identify how schools which do worse can learn from those which do better. And in view of the second hypothesis, policymakers should consider the effects on child SWB—and not only academic outcomes—of policies which determine how students are distributed into schools (e.g. school admission policies).

4.3 Limitations

Some important limitations of this study should be noted. Firstly, the data used includes only one outcome variable: LS. Ideally, other domains of SWB—both cognitive and affective—and eudaimonic well-being would be considered. Moreover, LS data are often negatively skewed, which might affect the validity of the results. We do not make use of any technique to deal with this issue and, although there is disagreement among academics on how one has to account for the special character of SWB variables (see Ferrer-i-Carbonell and Frijters 2004), working with skewed data might affect the validity of the results. In addition, this research is limited to 15–16-year-old adolescents who are enrolled in mainstream education, mainly in high-income countries. This is a rather restrictive sample but represents the best

data currently available to explore this issue. Given the nature of the data and the research design used, this thesis did not provide evidence of causal mechanisms. This was beyond the scope of this research mainly due to data availability limitations (i.e. the lack of longitudinal data). Nonetheless, these multilevel models controlled for a large number of possible confounding influences and, overall, evidence on the existence of an association between education policy and students' LS is quite robust. However, caution is needed when interpreting results as the findings indicate only an association – not the direction which that association might take. Additionally, self-reported well-being is not independent of LS, which may be why it explains most of the variation in LS. Therefore, further investigations into the comparative roles of self-reported well-being variables compared to other factors is indicated. Moreover, some of the factors studied are not policy-relevant (see section 2.2 for a rationale for their inclusion in the models), which must be kept in mind when assessing the links between education policy and students' LS investigated in this paper. Finally, as explained in section 2.3, we adopted a rather conservative approach to dealing with missing data, excluding from the analysis multiple countries and variables of interest. However, for some independent variables in some countries levels of missing data are above 20%, which may pose another limitation to this research. The aim of this paper was to provide a broad overview of this topic across a range of countries – and it would be useful to follow this up with studies focusing in more depth on individual countries, in which missing data should be handled differently to ensure that sufficient cases are available for the analyses performed.

5 Conclusions

There is an association between multiple education policy-relevant dimensions and students' LS, and schools play an important role in shaping students' LS. These findings suggest that there is room for education policy to impact children's SWB in different ways. The association between education policy and students' LS varies substantially across schools and societies. This suggests that this association is complex and that adopting a more nuanced approach to study the links between different aspects of the child's ecology and their impact on children's SWB may further our understanding of whether and how societies can make children happier.

Appendix 1. Variables information

This appendix provides more detailed information about the variables used in this study. In particular, information is provided regarding the PISA 2015 items associated with each of the indices that we used (Table 6) and the transformations performed on the original PISA 2015 variables (Table 7).

Dependent variable: students' LS

Students' LS is the only outcome variable considered in this study. We used the original PISA 2015 variable. In PISA 2015, LS was assessed using Cantril's ladder (Cantril 1966), asking students to rate how satisfied they feel about their lives these days from 0 (not at all satisfied) to 10 (completely satisfied).

Independent variables

Sociodemographics: socioeconomic status and gender

Socioeconomic status was assessed using PISA's index of Economic, Social and Cultural Status (ESCS), which is derived based on information of parents' level of education and occupational status and the level of material well-being in the household (see page 339 of PISA's technical report for a more detailed description; OECD 2017b). The original ESCS index was standardised in PISA 2015 with reference to all participating countries and economies. In this paper, this index was re-standardised 33 times with reference to each country and economy considered in the analysis.

Gender was assessed using the same dichotomous variable (boy, girl) provided in PISA 2015.

Self-reported well-being

We considered the following five indices: **schoolwork-related anxiety, sense of belonging at school, frequency of suffering bullying, feeling unfairly treated by teachers and feeling emotionally supported by parents in relation to school**. The original PISA 2015 indices were derived using IRT scaling with information from all the participating countries and economies (see Table 7). In this paper, we focused on within-country differences in 33 of these societies only. For this reason, instead of using the original PISA variable, we created simple-derived indices using information from the corresponding items for each of these variables –i.e. summing up the values assigned to each response in the Likert-scale of each of the items (see Table 6) considered in the index. These simple derived indices were then standardised with reference to each of the 33 countries, with 0 representing the average and 1 the standard deviation (see Table 7).

Time use, health habits and ICT use

In this paper, we studied a series of measures of students' time use and health habits. These include, first, information on the total **learning time of students at school** (in minutes per week) and **out-of-school study time per week** (in hours). We re-standardised the original PISA 2015 indices (see Table 7) with reference to the 33 countries. In addition, we used the information contained in the PISA 2015 items ST076 and ST078. These ask, respectively, whether the student did the following tasks in the previous day before or after school: **study for school or homework, watch TV/DVD/Video, read a book/newspaper/magazine, use internet/chat/social networks, play videogames, meet friends or talk to friends on the phone, talk to your parents, work in the household or take care of other family members, work for pay, exercise or practice a sport, eat breakfast** (before school) and **eat dinner** (after school). All these items were considered time use aspects and/or health habits. For all of them, we created a variable with three categories: did not do it, did it before or after school, and did it before and after school. The only exceptions are having breakfast and having dinner, which remain as two separate dichotomous variables (see Table 7). Another measure of health habits we examined in this paper is the **number of days the student practised vigorous exercise outside the school in the past week**. In this case, we used the original PISA variable (see Table 7).

Table 6 Indices and corresponding PISA 2015 items

Index	Associated PISA index	PISA items used	Items		
Index of schoolwork-related anxiety	ANXTEST	ST118	To what extent do you disagree or agree with the following statements about yourself? (Strongly disagree; Disagree; Agree; Strongly agree)		
		ST118Q01NA	I often worry that it will be difficult for me taking a test.		
		ST118Q02NA	I worry that I will get poor <grades> at school.		
		ST118Q03NA	Even if I am well-prepared for a test I feel very anxious.		
		ST118Q04NA	I get very tense when I study for a test.		
		ST118Q05NA	I get nervous when I don't know how to solve a task at school.		
Index of sense of belonging at school	BELONG	ST034	Thinking about your school: to what extent do you agree with the following statement? (Strongly disagree; Disagree; Agree; Strongly agree)		
		ST034Q01TA	I feel like an outsider (or left out of things) at school.		
		ST034Q02TA	I make friends easily at school.		
		ST034Q03TA	I feel like I belong at school.		
		ST034Q04TA	I feel awkward and out of place in my school.		
		ST034Q05TA	Other students seem to like me.		
Index of frequency of suffering bullying	beingbullied	ST038	During the past 12 months, how often have you had the following experiences in school? (Never or almost never; A few times a year; A few times a month; Once a week or more)		
		ST038Q01NA*	I got called names by other students.		
		ST038Q02NA*	I got picked on by other students.		
		ST038Q03NA	Other students left me out of things on purpose.		
		ST038Q04NA	Other students made fun of me.		
		ST038Q05NA	I was threatened by other students.		
		ST038Q06NA	Other students took away or destroyed things that belonged to me.		
		ST038Q07NA	I got hit or pushed around by other students.		
		ST038Q08NA	Other students spread nasty rumours about me.		
		Index of feeling unfairly treated by teachers	unfairteacher	ST039	During the past 12 months, how often did you have the following experiences at school? (Never or almost never; A few times a year; A few times a month; Once a week or more)
				ST039Q01NA	Teachers called on me less often than they called on other students.
ST039Q02NA	Teachers graded me harder than they graded other students.				
ST039Q03NA	Teachers gave me the impression that they think I am less smart than I really am.				
ST039Q04NA	Teachers disciplined me more harshly than other students.				
ST039Q05NA	Teachers ridiculed me in front of others.				

Table 6 (continued)

Index	Associated PISA index	PISA items used	Items		
Index of feeling emotionally supported by parents in relation to school	EMOSUPS	ST039Q06NA	Teachers said something insulting to me in front of others.		
		ST123	Thinking about <the last academic year>, to what extent do you agree with the following statements? (Strongly disagree; Disagree; Agree; Strongly agree)		
		ST123Q01NA	My parents are interested in my school activities.		
		ST123Q02NA	My parents support my educational efforts and achievements.		
		ST123Q03NA	My parents support me when I am facing difficulties at school.		
Index of time spent using ICT at school in general	USESCH	ST123Q04NA	My parents encourage me to be confident.		
		IC011	Frequency of use at school: (Never or hardly ever; Once or twice a month; Once or twice a week; Almost every day; Every day)		
		IC011Q01TA	<Chatting on line> at school.		
		IC011Q02TA	Using email at school.		
		IC011Q03TA	Browsing the Internet for schoolwork.		
		IC011Q04TA	Download/upload/browse schools web (e.g. <intranet>).		
		IC011Q05TA	Posting my work on the schools website.		
		IC011Q06TA	Playing simulations at school.		
		IC011Q07TA	Practicing and drilling, foreign language learning or math.		
		IC011Q08TA	Doing homework on a school computer.		
		IC011Q09TA	Using school computers for group work and communication with other students.		
		Index of time spent using ICT outside school for schoolwork	HOMESCH	IC010	Frequency of use outside of school: (Never or hardly ever; Once or twice a month; Once or twice a week; Almost every day; Every day)
				IC010Q01TA	Browsing the Internet for schoolwork (e.g. for preparing an essay or presentation)
IC010Q02NA	Browsing the Internet to follow up lessons, e.g. for finding explanations.				
IC010Q03TA	Using email for communication with other students about schoolwork.				
IC010Q04TA	Using email for communication with teacher\ submit of homework or other schoolwork				
IC010Q05NA	Using Social Networks for communication with other students about schoolwork.				
IC010Q06NA	Using Social Networks for communication with teachers.				
IC010Q07TA	Download/upload/browsing from school website (e.g. time table or course materials)				
IC010Q08TA	Checking the schools website for announcements, e.g. absence of teachers.				
IC010Q09NA	Doing homework on a computer.				

Table 6 (continued)

Index	Associated PISA index	PISA items used	Items
		IC010Q10NA	Doing homework on a mobile device.
		IC010Q11NA	Downloading learning apps on a mobile device.
		IC010Q12NA	Downloading science learning apps on a mobile device.
Index of time spent using ICT at home for leisure	ENTUSE	IC008	Frequency of use of digital devices outside school for: (Never or hardly ever; Once or twice a month; Once or twice a week; Almost every day; Every day)
		IC008Q01TA	Playing one-player games.
		IC008Q02TA	Playing collaborative online games.
		IC008Q03TA	Using email.
		IC008Q04TA	<Chatting online> (e.g. <MSN@>).
		IC008Q05TA	Social networks (e.g. <Facebook>, <MySpace>).
		IC008Q07NA	Online games\Social Networks (e.g. <Farmville@>, <The Sims Social>).
		IC008Q08TA	Browsing the Internet for fun videos, e.g. <YouTube>).
		IC008Q09TA	Reading news on the Internet (e.g. current affairs).
		IC008Q10TA	Obtaining practical information from the Internet
		IC008Q11TA	Downloading music, films, games or software from the Internet.
		IC008Q12TA	Uploading your own created contents for sharing
		IC008Q13NA	Downloading new apps on a mobile device.
Index of valuing cooperation	CPSVALUE	ST082	To what extent do you disagree or agree with the following statements about yourself? (Strongly disagree; Disagree; Agree; Strongly agree)
		ST082Q02NA	To what extent do you disagree or agree about yourself? I am a good listener.
		ST082Q03NA	I enjoy seeing my classmates be successful.
		ST082Q08NA	I take into account what others are interested in.
		ST082Q12NA	I enjoy considering different perspectives.
Index of truancy	–	ST062	In the last two full weeks of school, how often: (None; One or two times; Three or four times; Five times or more)
		ST062Q01TA	I <skipped> a whole school day
		ST062Q02TA	I <skipped> some classes
		ST062Q03TA	I arrived late for school
Index of shortage of material and human school resources	EDUSHORT; STAFFSHORT	SC017	Is your school's capacity to provide instruction hindered by any of the following issues? (Not at all; Very little; To some extent; A lot)
		SC017Q05NA	Lack of educational material (e.g. textbooks, IT equipment, library or lab material).
		SC017Q06NA	Inadequate or poor quality educational material (e.g. textbooks, IT equipment).
		SC017Q07NA	Lack of physical infrastructure (building, grounds, heating/cooling, lighting).

Table 6 (continued)

Index	Associated PISA index	PISA items used	Items
SC017Q04NA	Inadequate or poorly qualified assisting staff.	SC017Q08NA	Inadequate/poor quality phys infrastructure (building, grounds, heating\cooling).
		SC017Q01NA	A lack of teaching staff.
		SC017Q02NA	Inadequate or poorly qualified teaching staff.
		SC017Q03NA	A lack of assisting staff.
Index of teachers' behaviour hindering teaching	TEACHBEHA	SC061	Is your school's capacity to provide instruction hindered by any of the following issues? (Not at all; Very little; To some extent; A lot)
		SC061Q06TA	Teachers not meeting individual students' needs
		SC061Q07TA	Teacher absenteeism
		SC061Q08TA	Staff resisting change
		SC061Q09TA	Teachers being too strict with students
		SC061Q10TA	Teachers not being well prepared for classes

Note: Items ST038Q01NA* and ST038Q02NA* were not considered in the PISA 2015 index being bullied because, in view of results from an exploratory analysis conducted by PISA analysts, they “*did not load well onto a unidimensional construct and were also not strongly correlated with the other six items*” (see PISA 2015 Technical Report for more details). For the same reasons, these items were not used in the index of frequency of suffering bullying used in this paper neither

We also used three indices of Information and Communication Technologies (ICT) use. This included a measure of **time spent using ICT at school in general**, a measure of **time spent using ICT outside the school for schoolwork**, and a measure of **time spent using ICT at home for leisure**. Using information from the corresponding PISA 2015 items, we derived three standardised measures of ICT in the exact same manner that we derived the self-reported well-being indices (see Table 7).

Other student-level variables

We used a standardised measure of **attitudes towards cooperation** which was derived from the same items used in the corresponding PISA index (see Table 6) in the exact same way as in the case of the self-reported well-being variables described above (see Table 7).

The **truancy** index that we use was derived using information from the three items contained in the corresponding PISA variable (see Table 6). First, we transformed the four-point Likert scale into a three-point Likert scale due to the extremely small proportion of responses in the last two categories. Then we derived a simple index and standardised it in the same way as with the self-reported well-being variables (see Table 7).

Based on the information contained in the corresponding PISA variable, we derived a dichotomous measure of whether the student has **repeated a grade** at least once or not (see Table 7).

Study programme (general, pre-vocational, vocational, modular) was assessed using the same categorical variable provided in PISA 2015 (see Table 7).

In relation to the **number of years a student spent in early childhood education and care**, we merged the last four answer categories of the original PISA 2015 variable into one (5 years or more) (see Table 6). This is due to the extremely small proportion of responses observed within these last categories.

The measure of **academic competence** was created by estimating the mean of the 10 plausible values in each domain (reading, maths and science) and then the mean of the three means (an alternative approach might involve using the mean of the first plausible value in each domain). Then we standardised this index with reference to each country (see Table 6). However, it is important to note that, although multiple studies oriented to predict academic competence with PISA data have used the ‘raw’ plausible values before as a measure of academic competence (e.g. Lavy 2015), this practice is not recommended by some researchers who argue that a version of ‘Rubin’s rules’ for handling multiple imputations should be used (see Jerrim et al. 2017, for a detailed discussion). Details on how to do this are provided in OECD (2009) and in online Appendix D. In this research, academic competence is not studied as an outcome variable but simply as a control variable. For this reason, estimating the means of the plausible values should not compromise the validity of the results obtained in the quantitative analysis to a significant extent.

School-level characteristics

We used PISA’s original variables (see Table 7) regarding the following aspects: **population size of the community where the school is located**; **school type** (i.e. private (privately funded, privately run), semi-private (publicly funded, privately run) or public (publicly funded, publically run)); **school size** in total number of enrolled students in the school; **average class size** for 15-year-olds in the school, **student-teacher ratio**; **percentage of qualified teachers in the school**.

PISA 2015 contains an index of shortage of material resources at school (EDUSHORT) and an index of short of educational staff (STAFFSHORT). We created a simple derived index of **shortage of school resources** with information from all the items considered in the indices of shortage of material resources at school and shortage of educational staff, which was then standardised as in the self-reported well-being variables (see Tables 6 and 7).

Teachers’ behaviour hindering learning was considered by using a standardised measure that was derived from the same items used in the corresponding PISA2015 index (see Table 6) in the same way as in the case of self-reported well-being variables described in this section.

Finally, we used two dichotomous measures of whether the **school practices ability grouping** in the modal grade for 15-year-old between classes and within classes, which were derived from PISA’s variable SC042 (see Table 7).

Appendix 2. Tables

This appendix includes the tables showing the results –by country - of the direct effects of independent variables at student- and school-level (Tables 8, 9, 10 and 11).

Table 7 Transformations performed on the original PISA 2015 variables

		In this study					
	PISA items / variables used	Type	Associated PISA index	IRT scaling in PISA	Transformation	Type	Number of societies with available data
Life satisfaction (0–10)	ST016Q01NA	CO	–	–	–	CO	33
Gender (girl)	ST004D01T	DI	–	–	Recoded (girl 2 = 1; boy 1 = 0)	DI	33
Index of socioeconomic status	ESCS	CO	ESCS	–	(re-)standardised	CO	33
Index of school/work-related anxiety	ST118Q01–05	CA	ANXTEST	YES	Created simple derived index; standardised	CO	33
Index of sense of belonging at school	ST034Q01–06	CA	BELONG	YES	–	CO	33
Index of frequency of suffering bullying	ST038Q01–06	CA	beingbullied	–	–	CO	33
Index of feeling unfairly treated by teachers	ST039Q01–06	CA	unfairteacher	–	–	CO	33
Index of feeling emotionally supported by parents	ST123Q01–04	CA	EMOSUPS	YES	–	CO	33
Worked in the household or took care of other family members	ST076 and ST078	DI	–	–	Turned 2 dichotomous variables into one categorical variable	CA	33
Worked for pay	ST076 and ST078	DI	–	–	–	CA	33
Studied for school or homework	ST076 and ST078	DI	–	–	–	CA	33
Read a book / newspaper / magazine	ST076 and ST078	DI	–	–	–	CA	33
Played videogames	ST076 and ST078	DI	–	–	–	CA	33
Watched TV/<DVD>/Video	ST076 and ST078	DI	–	–	–	CA	33
Met friends or talked to friends on the phone	ST076 and ST078	DI	–	–	–	CA	33
Internet / Chat / Social networks (e.g. Facebook)	ST076 and ST078	DI	–	–	–	CA	33
Talked to parents	ST076 and ST078	DI	–	–	–	CA	33

Table 7 (continued)

		In this study					
Had breakfast	ST076 and ST078	DI	–	–	DI	33	
Had dinner	ST076 and ST078	DI	–	–	DI	33	
Days of vigorous exercise outside school last week	ST082	CA	–	–	CA	33	
Learning time at school (minutes per week)	TMINS	CO	TMINS	NO	Standardised	CO	33
Out-of-school study time per week (hours)	OUTHOURS	CO	OUTHOURS	NO		CO	33
Index of time spent using ICT at school in general	IC011	CA	USESCH	YES	Created simple derived index; standardised	CO	29
Index of time spent using ICT outside school for schoolwork	IC010	CA	HOMESCH	YES		CO	29
Index of time spent using ICT at home for leisure	IC008	CA	ENTUSE	YES		CO	29
Index of valuing cooperation	ST082Q01–04	CA	CPSVALUE	YES	Created simple derived index; standardised	CO	33
Index of academic competence	PV1–10 READ, MATH, SCIE	CO	–	–	Estimated mean of plausible values; standardised	CO	33
Index of truancy	ST062	CA	–	–	Transformed Likert scale; created simple derived index; standardised	CO	33
Education programme attended	ISCEDO	CA	–	–		CA	33
Having repeated a grade at least once	ST127	CA	–	–	Transformed categorical variable into dichotomous one	DI	33
Years attended pre-primary education	DURECEC	CA	–	–	Transformed Likert scale	CA	33
Size of the community where the school is located	SC001	CA	–	–		CA	33
School type	SCHTYPE	CA	–	–		CA	33

Table 7 (continued)

		In this study					
School size (total school enrolment)	SC002	CO	–	–	Transformed to report it in hundreds	CO	32
Average class size in the school	CLSIZE	CO	–	–	–	CO	33
Index of shortage of material and human school resources	SC017	CA	EDUSHORT; STAFFSHORT	YES	Created simple derived index; standardised	CO	33
Student / teacher ratio	STRATIO	CO	STRATIO	–	–	CO	33
Percentage of certified teacher in the school	PROATCE	CO	PROATCE	–	–	CO	32
Index of teachers' behaviour hindering teaching	SC061Q06-Q10	CO	TEACHBEHA	YES	Created simple derived index; standardised	CO	33
School practices ability grouping within classes	SC042	CA	–	–	Transformed categorical variable into dichotomous one	DI	33
School practices ability grouping between classes	SC042	CA	–	–	–	DI	33

Note: type of variables are labelled as CO (continuous), CA (categorical) and DI (dichotomous)

Table 8 Effect of socio-demographic and self-reported well-being variables by country

	Girl		Index of socioeconomic status		Index of schoolwork-related anxiety		Index of sense of belonging at school		Index of frequency of suffering bullying		Index of feeling unfairly treated by teachers		Index of feeling emotionally supported by parents	
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Austria	-0.77 ***	(0.09)	0.08	(0.04)	-0.46 ***	(0.05)			-0.24 ***	(0.05)	-0.17 **	(0.05)	0.52 ***	(0.05)
Bulgaria	-0.26 *	(0.11)	0.05	(0.05)	-0.33 ***	(0.07)			-0.28 **	(0.09)	-0.14 *	(0.06)	0.50 ***	(0.08)
Chile	-0.31 **	(0.09)	0.13 *	(0.06)	-0.36 ***	(0.04)			-0.46 ***	(0.05)			0.32 ***	(0.05)
China (B-S-J-G)	-0.16	(0.08)	0.11 *	(0.04)	-0.38 ***	(0.04)	0.14 **	(0.04)	-0.26 ***	(0.04)	-0.12 *	(0.05)	0.55 ***	(0.06)
Colombia	-0.46 ***	(0.10)	0.15 **	(0.06)	-0.16 **	(0.06)			-0.33 ***	(0.08)			0.54 ***	(0.07)
Croatia	-0.54 ***	(0.07)	0.12 **	(0.04)	-0.24 ***	(0.05)	0.11 *	(0.05)	-0.21 ***	(0.06)	-0.16 **	(0.05)	0.67 ***	(0.04)
Czech Republic	-0.48 ***	(0.07)	0.20 ***	(0.04)	-0.39 ***	(0.04)	0.11 **	(0.04)	-0.25 ***	(0.04)	-0.18 ***	(0.05)	0.58 ***	(0.04)
Estonia	-0.35 ***	(0.06)	0.14 ***	(0.03)	-0.39 ***	(0.04)	0.14 ***	(0.04)	-0.19 ***	(0.04)	-0.23 ***	(0.04)	0.69 ***	(0.05)
Finland	-0.63 ***	(0.06)	0.02	(0.03)	-0.30 ***	(0.03)	0.06	(0.03)	-0.27 ***	(0.04)			0.48 ***	(0.03)
France	-0.21 *	(0.10)	0.05	(0.05)	-0.22 ***	(0.06)	0.18 ***	(0.05)	-0.36 ***	(0.05)			0.55 ***	(0.06)
Greece	-0.52 ***	(0.10)	0.01	(0.05)	-0.34 ***	(0.05)			-0.22 ***	(0.05)	-0.21 ***	(0.05)	0.63 ***	(0.05)
Hong Kong	-0.35 ***	(0.07)	0.07 *	(0.03)	-0.27 ***	(0.04)			-0.27 ***	(0.04)	-0.09 *	(0.04)	0.51 ***	(0.04)
Hungary	-0.44 **	(0.13)	0.09	(0.05)	-0.25 ***	(0.05)	0.15 **	(0.06)	-0.32 ***	(0.07)	-0.17 **	(0.06)	0.44 ***	(0.06)
Iceland	-0.50 ***	(0.09)	0.09 *	(0.04)	-0.63 ***	(0.06)	0.13 **	(0.04)	-0.35 ***	(0.06)	-0.08	(0.04)	0.37 ***	(0.06)
Ireland	-0.28 ***	(0.07)	0.10 *	(0.04)	-0.45 ***	(0.05)	0.15 ***	(0.04)	-0.38 ***	(0.05)	-0.29 ***	(0.04)	0.40 ***	(0.05)
Latvia	-0.13 *	(0.07)	0.12 **	(0.04)	-0.29 ***	(0.05)	0.11 **	(0.04)	-0.27 ***	(0.05)	-0.14 ***	(0.04)	0.40 ***	(0.05)
Luxembourg	-0.79 ***	(0.10)	0.04	(0.05)	-0.39 ***	(0.04)	0.09 *	(0.04)	-0.23 **	(0.08)	-0.18 **	(0.05)	0.66 ***	(0.05)
Mexico	-0.12	(0.08)	0.06	(0.04)	-0.22 ***	(0.05)			-0.28 ***	(0.06)	-0.15 **	(0.05)	0.24 ***	(0.05)
Peru	-0.21 *	(0.09)	-0.04	(0.05)	-0.27 ***	(0.05)			-0.23 ***	(0.06)	-0.17 **	(0.05)	0.61 ***	(0.06)
Poland	-0.59 ***	(0.08)	0.05	(0.04)	-0.40 ***	(0.04)			-0.29 ***	(0.05)	-0.21 ***	(0.04)	0.67 ***	(0.05)

Table 8 (continued)

	Girl		Index of socioeconomic status		Index of schoolwork-related anxiety		Index of sense of belonging at school		Index of frequency of suffering bullying		Index of feeling unfairly treated by teachers		Index of feeling emotionally supported by parents	
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Portugal	-0.37 ***	(0.08)	0.01	(0.04)	-0.20 ***	(0.04)	0.11 **	(0.04)	-0.22 ***	(0.05)	-0.26 ***	(0.05)	0.50 ***	(0.05)
Qatar	-0.21 **	(0.07)	0.17 ***	(0.04)	-0.44 ***	(0.04)	0.11 **	(0.04)	-0.33 ***	(0.04)	-0.19 ***	(0.04)	0.64 ***	(0.04)
Russia	-0.25 **	(0.08)	0.13 **	(0.04)	-0.28 ***	(0.05)			-0.35 ***	(0.06)	-0.22 ***	(0.05)	0.60 ***	(0.04)
Slovakia	-0.59 ***	(0.07)	0.14 ***	(0.04)	-0.34 ***	(0.04)			-0.33 ***	(0.05)	-0.21 ***	(0.04)	0.55 ***	(0.04)
Slovenia	-0.79 ***	(0.09)	-0.09 *	(0.04)	-0.41 ***	(0.05)	0.13 **	(0.04)	-0.33 ***	(0.06)	-0.23 ***	(0.04)	0.58 ***	(0.05)
South Korea	-0.16	(0.12)	0.04	(0.03)	-0.59 ***	(0.04)	0.14 *	(0.06)					0.61 ***	(0.06)
Spain	-0.38 ***	(0.06)	0.08 *	(0.04)	-0.27 ***	(0.03)			-0.21 ***	(0.04)	-0.17 ***	(0.04)	0.48 ***	(0.04)
Switzerland	-0.58 ***	(0.09)	0.04	(0.04)	-0.43 ***	(0.05)			-0.27 ***	(0.05)	-0.15 **	(0.06)	0.47 ***	(0.06)
Taiwan	-0.32 ***	(0.06)	0.18 ***	(0.04)	-0.31 ***	(0.03)			-0.18 ***	(0.05)	-0.13 **	(0.05)	0.53 ***	(0.04)
Thailand	-0.18	(0.10)	0.10	(0.07)	-0.17 **	(0.05)			-0.22 ***	(0.06)			0.38 ***	(0.04)
Turkey	-0.52 ***	(0.12)	0.13	(0.07)	-0.39 ***	(0.07)			-0.27 **	(0.09)	-0.32 ***	(0.06)	0.79 ***	(0.06)
UAE	-0.16	(0.09)	0.21 ***	(0.04)	-0.30 ***	(0.04)			-0.21 ***	(0.05)	-0.21 ***	(0.04)	0.57 ***	(0.05)
United States	-0.28 ***	(0.08)	0.12 *	(0.05)	-0.42 ***	(0.05)	0.16 **	(0.06)	-0.22 ***	(0.06)	-0.14 *	(0.05)	0.58 ***	(0.06)

Table 9 Effect of time use, health habits and ICT use variables by country

		Days of vigorous exercise outside school last week (ref.cat.: 0 days)																			
1 day		2 days		3 days		4 days		5 days		6 days		7 days									
b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE						
Austria																					
Bulgaria	0.01	(0.17)	0.24	(0.14)	0.31	(0.18)	0.31	(0.18)	0.48	**	(0.18)	0.11	(0.18)	0.48	**	(0.18)					
Chile	0.05	(0.14)	0.12	(0.13)	0.29	(0.15)	0.27	(0.17)	0.16		(0.18)	0.04	(0.27)	0.54	**	(0.17)					
China (B-S-I-G)	0.29	*	(0.13)	0.57	***	(0.14)	0.34	**	(0.11)	0.35	*	(0.16)	0.46	**	(0.14)	0.36	(0.21)	0.37	*	(0.17)	
Colombia																					
Croatia	0.33	*	(0.13)	0.31	*	(0.14)	0.48	***	(0.12)	0.45	**	(0.13)	0.25	(0.16)	0.29	(0.19)	0.40	**	(0.15)		
Czech Republic																					
Estonia	0.31	**	(0.12)	0.11	(0.12)	0.27	*	(0.13)	0.38	**	(0.13)	0.32	**	(0.12)	0.26	(0.17)	0.37	**	(0.14)		
Finland	0.11		(0.12)	0.18	(0.11)	0.35	**	(0.13)	0.32	**	(0.12)	0.27	*	(0.14)	0.47	***	(0.13)	0.59	***	(0.16)	
France																					
Greece	0.33	*	(0.15)	0.31	*	(0.14)	0.44	**	(0.15)	0.38	*	(0.18)	0.46	*	(0.21)	0.59	*	(0.28)	0.41	(0.21)	
Hong Kong																					
Hungary																					
Iceland	-0.15		(0.19)	-0.13	(0.19)	0.07	(0.18)	0.13	(0.17)	0.29	(0.16)	0.34	*	(0.16)	0.52	**	(0.17)				
Ireland	0.44	***	(0.12)	0.28	*	(0.12)	0.39	**	(0.13)	0.42	**	(0.13)	0.69	***	(0.14)	0.70	***	(0.14)	0.71	***	(0.14)
Latvia	0.04		(0.13)	0.14	(0.13)	0.20	(0.13)	0.31	*	(0.14)	0.35	*	(0.15)	0.35	(0.20)	0.38	*	(0.20)	0.38	*	(0.15)
Luxembourg	0.07		(0.12)	0.20	*	(0.09)	0.05	(0.12)	0.07	(0.12)	0.12	(0.15)	0.35	(0.22)	0.34	*	(0.16)				
Mexico																					
Peru	0.29		(0.15)	0.34	*	(0.16)	0.41	**	(0.16)	0.33	(0.20)	0.63	**	(0.20)	0.12	(0.22)	0.73	**	(0.21)		
Poland																					
Portugal	0.23		(0.12)	0.12	(0.10)	0.08	(0.11)	-0.01	(0.13)	0.23	(0.12)	0.02	(0.21)	0.25	(0.14)						

Table 9 (continued)

Finland	0.22	**	(0.07)	0.29	***	(0.06)	0.70	***	(0.15)	0.37	**	(0.14)	0.29	(0.16)	0.36	*	(0.14)	
France							0.21		(0.16)	0.55	**	(0.17)	0.32	*	(0.15)	0.38	*	(0.15)
Greece													0.63	***	(0.17)	0.47	**	(0.16)
Hong Kong	0.19	**	(0.07)	0.12		(0.08)							0.40	***	(0.10)	0.42	***	(0.12)
Hungary													0.45	***	(0.11)	0.50	***	(0.11)
Iceland							0.02		(0.13)	0.28	*	(0.11)	0.47	***	(0.11)	0.35	**	(0.11)
Ireland																		
Latvia	0.12		(0.11)	0.28	**	(0.09)												
Luxembourg																		
Mexico																		
Peru																		
Poland													0.25	*	(0.12)	0.41	**	(0.14)
Portugal																		
Qatar							0.26	**	(0.09)	0.21	**	(0.08)						
Russia																		
Slovakia																		
Slovenia							0.47	***	(0.12)	0.46	**	(0.15)						
South Korea																		
Spain	-0.19	*	(0.08)	-0.25	**	(0.07)							0.28	*	(0.12)	0.25	*	(0.12)
Switzerland	0.18		(0.11)	0.24	*	(0.10)												
Taiwan																		
Thailand																		
Turkey																		
UAE													0.25	*	(0.11)	0.24	*	(0.11)

Table 9 (continued)

	Read a book/newspaper/magazine (ref.cat: no)		Played video games (ref.cat: no)		Watched TV/<DVD>/Video (ref.cat: no)	
	Before or after	SE	Before or after	SE	Before or after	SE
United States					0.27 *	(0.14) 0.50 *** (0.13)
Austria						
Bulgaria						
Chile						
China (B-S-J-G)	0.35 **	(0.11) 0.39 *** (0.10)				
Colombia					0.27	(0.16) 0.40 ** (0.13)
Croatia						
Czech Republic						
Estonia						
Finland						
France						
Greece	-0.24 *	(0.10) -0.07				
Hong Kong					0.36 **	(0.11) 0.23 * (0.12)
Hungary			0.24	(0.15) 0.40 ** (0.14)		
Iceland						
Ireland						
Latvia						
Luxembourg			-0.28 **	(0.09) -0.21 (0.14)		
Mexico						
Peru						

Table 9 (continued)

	Met friends or talked to friends on the phone (ref.cat: no)		Internet/Chat/Social networks (e.g. <Facebook>) (ref.cat: no)		Talked to their parents (ref.cat: no)		
	Before or after	Before and after	Before or after	Before and after	Before or after	Before and after	
	b	SE	b	SE	b	SE	
Poland							
Portugal							
Qatar			0.12	(0.08)	0.15	*	(0.07)
Russia							
Slovakia							
Slovenia							
South Korea							
Spain							
Switzerland							
Taiwan							
Thailand							
Turkey							
UAE					0.70	***	(0.18)
United States					0.59	***	(0.15)
Austria	0.18	*	(0.09)	0.31	**	(0.10)	
Bulgaria			-0.60	*	(0.27)	-0.34	(0.23)
Chile			-0.07	(0.11)	-0.32	**	(0.10)
China (B-S-J-G)					0.05	0.41	(0.13)
Colombia					0.41	0.89	(0.22)
Croatia	0.12	(0.13)	0.31	**	(0.10)		

Table 9 (continued)

Czech Republic													
Estonia													
Finland	0.19	(0.10)	0.22	*	(0.09)			0.54	*	(0.22)	0.46	*	(0.23)
France								0.33		(0.25)	0.47	*	(0.23)
Greece													
Hong Kong								0.37	**	(0.13)	0.59	***	(0.11)
Hungary								0.61		(0.34)	0.64	*	(0.29)
Iceland								0.69		(0.45)	1.01	*	(0.47)
Ireland								0.28		(0.42)	0.99	*	(0.40)
Latvia								0.69	*	(0.28)	0.88	***	(0.24)
Luxembourg								0.49	**	(0.18)	0.68	**	(0.20)
Mexico								0.76	***	(0.18)	1.02	***	(0.16)
Peru								0.31		(0.18)	0.73	***	(0.16)
Poland								0.39		(0.23)	0.51	*	(0.22)
Portugal	0.12	(0.14)	0.28	*	(0.12)								
Qatar								0.41	*	(0.17)	0.63	***	(0.15)
Russia	0.28	(0.15)	0.45	**	(0.14)			0.77	*	(0.33)	0.82	**	(0.31)
Slovakia								0.44	*	(0.19)	0.68	***	(0.17)
Slovenia													
South Korea	0.11	(0.11)	0.26	*	(0.12)								
Spain	0.13	(0.08)	0.18	*	(0.07)								
Switzerland								0.84	***	(0.19)	1.16	***	(0.18)
Taiwan								0.52	***	(0.13)	0.73	***	(0.13)
Thailand								0.48		(0.45)	0.93	*	(0.43)

Table 9 (continued)

	Had breakfast		Had dinner		Learning time at school (minutes per week)		Out-of-school study time per week (hours)		Index of time spent using ICT at school in general		Index of time spent using ICT outside school for schoolwork		Index of time spent using ICT at home for leisure	
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Turkey														
UAE									0.89 **	(0.32)	1.29 ***	(0.31)		
United States									1.16 **	(0.41)	1.44 ***	(0.40)		
Austria	0.26	** (0.10)	0.56	* (0.22)										
Bulgaria									0.14 *	(0.07)	0.12 *	(0.06)		
Chile									0.17 ***	(0.05)	0.17 ***	(0.05)	0.12 *	(0.05)
China (B-S-J-G)									0.12 *	(0.05)	0.11 **	(0.04)	-0.17 **	(0.06)
Colombia														
Croatia	0.26	** (0.10)	0.63	** (0.23)	0.14 **	(0.05)								
Czech Republic	0.21	** (0.07)	0.51	** (0.18)										
Estonia	0.22	* (0.09)												
Finland	0.33	** (0.10)												
France	0.25	** (0.10)												
Greece					0.15	*** (0.04)								
Hong Kong														
Hungary	0.30	** (0.10)												
Iceland	0.45	*** (0.11)	0.66	* (0.26)									0.19	*** (0.05)
Ireland	0.56	*** (0.11)			0.09	* (0.04)								-0.13 *
Latvia														
Luxembourg	0.18	* (0.08)							0.17	*** (0.04)			0.08	* (0.04)

Table 9 (continued)

Mexico	0.47	***	(0.11)		
Peru	0.74	***	(0.18)		
Poland	0.50	***	(0.10)		
Portugal	0.40	***	(0.11)	0.09	(0.05)
Qatar	0.46	***	(0.07)		
Russia	0.41	***	(0.11)		
Slovakia	0.20	**	(0.07)		
Slovenia	0.29	***	(0.08)		
South Korea	0.30	**	(0.11)	0.18	*** (0.05)
Spain	0.49	***	(0.10)	0.13	*** (0.03)
Switzerland				0.12	** (0.04)
Taiwan	0.30	***	(0.08)		
Thailand	0.62	***	(0.17)		
Turkey	0.77	***	(0.13)		
UAE	0.33	***	(0.09)		
United States	0.43	***	(0.10)		

Table 10 Effect of other student-level variables by country

	Index of academic competence			Having repeated a grade at least once			Index of valuing cooperation			Index of truancy			Education programme attended (reference category: general)			
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Austria	-0.16 **	(0.05)	-0.21	(0.14)	0.12 **	(0.04)	-0.16 ***	(0.04)								
Bulgaria					0.17 **	(0.05)										
Chile	-0.13 *	(0.07)														
China (B-S-J-G)	-0.22 ***	(0.04)	-0.25 *	(0.12)	0.25 ***	(0.05)	-0.17 ***	(0.04)								
Colombia	-0.26 ***	(0.06)	-0.10	(0.11)	0.22 ***	(0.06)	-0.11 *	(0.04)								
Croatia	-0.17 ***	(0.05)			0.11 **	(0.04)										
Czech Republic	-0.16 **	(0.05)	-0.06	(0.28)	0.21 ***	(0.04)										
Estonia	-0.16 ***	(0.04)	-0.27	(0.25)	0.19 ***	(0.04)										
Finland					0.17 ***	(0.03)	-0.08 *	(0.03)								
France			-0.15	(0.10)												
Greece							-0.16 **	(0.06)								
Hong Kong			-0.08	(0.10)	0.30 ***	(0.04)	-0.10 **	(0.04)								
Hungary					0.13 **	(0.05)										
Iceland	-0.11 *	(0.05)			0.20 ***	(0.04)	-0.16 **	(0.05)								
Ireland	-0.14 ***	(0.04)	-0.15	(0.15)	0.24 ***	(0.04)										
Latvia			0.40	(0.23)	0.16 ***	(0.04)	-0.10 **	(0.04)								
Luxembourg	-0.13 *	(0.05)			0.19 ***	(0.04)	-0.16 **	(0.05)								
Mexico					0.20 ***	(0.05)										

Table 10 (continued)

	Index of academic competence	Having repeated a grade at least once	Index of valuing cooperation	Index of truancy	Education programme attended (reference category: general)					
					P r e - vocational	Vocational	Modular			
Bulgaria										
Chile										
China (B-S-J-G)										
Colombia										
Croatia	-0.97 **	(0.33)	-1.10 **	(0.32)	-1.14 ***	(0.32)	-1.05 **	(0.31)	-1.13 ***	(0.32)
Czech Republic										
Estonia										
Finland	-0.61 **	(0.22)	-0.67 **	(0.22)	-0.56 *	(0.22)	-0.73 **	(0.22)	-0.56 **	(0.22)
France										
Greece										
Hong Kong										
Hungary										
Iceland										
Ireland	-0.38	(0.21)	-0.43 *	(0.22)	-0.39	(0.23)	-0.25	(0.28)	-0.54	(0.57)
Latvia										
Luxembourg										
Mexico										
Peru										
Poland										

Table 10 (continued)

	Index of academic competence	Having repeated a grade at least once	Index of valuing cooperation	Index of truancy	Education programme attended (reference category: general)
Portugal					P r e - Vocational
Qatar					vocational
Russia					Modular
Slovakia					
Slovenia					
South Korea					
Spain					
Switzerland					
Taiwan					
Thailand					
Turkey					
UAE					
United States					

Table 11 Effect school-level variables by country

	Size of the community where the school is located (ref.cat.: fewer than 3000 people)						School type (ref. cat.: public)			School size (total school enrolment)		
	3 000–15 000 people		15 000–100 000 people		100 000–1 000 000 people		Semi-private		Private		b	SE
	b	SE	b	SE	b	SE	b	SE	b	SE		
Austria							-0.16 *	(0.07)	0.02	(0.08)		
Bulgaria									0.58 *	(0.27)		
Chile							-0.40 **	(0.12)	-0.13	(0.15)		
China (B-S-J-G)							-1.23 ***	(0.07)	-0.10	(0.13)	0.00 *	(0.00)
Colombia							0.18	(0.14)	-0.42 ***	(0.12)		
Croatia	-0.37 **	(0.12)	-0.29 *	(0.13)	-0.29 *	(0.12)	-0.76 **	(0.22)				
Czech Republic							0.25	(0.14)	0.50 *	(0.22)		
Estonia							-0.22	(0.17)	0.85 ***	(0.23)		
Finland												
France	-0.32 *	(0.15)	-0.32 *	(0.15)	-0.45 **	(0.16)	-0.56 ***	(0.16)				
Greece												
Hong Kong												
Hungary							-0.17	(0.14)	0.45 *	(0.23)		
Iceland												
Ireland												
Latvia							0.31 **	(0.09)	-1.01 *	(0.39)		
Luxembourg												
Mexico											-0.01 **	(0.01)
Peru	0.15	(0.13)	-0.05	(0.13)	-0.25	(0.16)	0.41 **	(0.15)	-0.32	(0.23)	-0.26 **	(0.09)

Table 11 (continued)

	Size of the community where the school is located (ref.cat.: fewer than 3000 people)					School type (ref. cat.: public)		School size (total school enrollment)
	3,000–15,000 people	15,000–100,000 people	100,000–1,000,000 people	More than 1,000,000 people	Private	Semi-private		
Poland	0.00 (0.11)	0.04 (0.10)	-0.48 *** (0.13)	-0.23 (0.16)	0.32 ** (0.10)	0.33 (0.21)		
Portugal	-0.34 (0.22)	-0.30 (0.22)	-0.51 * (0.21)	-0.54 * (0.22)	-0.42 * (0.20)	0.50 *** (0.12)		
Qatar	-0.27 (0.14)	-0.41 ** (0.13)	-0.32 * (0.13)	-0.43 ** (0.14)	-0.05 (0.11)	-0.35 ** (0.12)	-0.01 * (0.00)	
Russia	0.01 (0.13)	-0.11 (0.12)	-0.43 ** (0.16)					
Slovakia	-0.56 * (0.27)	-0.65 * (0.26)	-0.58 * (0.27)					
South Korea							-0.05 *** (0.01)	
Spain								
Switzerland								
Taiwan	-0.37 * (0.16)	-0.41 ** (0.13)	-0.41 ** (0.13)	-0.56 (0.12)				
Thailand	-0.15 (0.18)	-0.31 * (0.15)	-0.52 ** (0.16)	-0.39 (0.26)	-0.42 * (0.19)	-0.21 (0.15)	-0.01 * (0.01)	
Turkey							0.04 * (0.02)	
UAE							-0.01 *** (0.00)	
United States								
	Average class size in the school	Index of shortage of material and human school resources	Student / teacher ratio	Percentage of certified teacher in the school	Index of teachers' behaviour hindering teaching	School practices ability grouping within classes	School practices ability grouping between classes	
	b	b	b	b	b	b	b	
	SE	SE	SE	SE	SE	SE	SE	
Austria								
Bulgaria								
Chile								

Table 11 (continued)

	Size of the community where the school is located (ref.cat.: fewer than 3000 people)				School type (ref. cat.: public)		School size (total school enrollment)
	3,000 – 15,000 people	15,000 – 100,000 people	100,000 – 1,000,000 people	More than 1,000,000 people	Semi-private	Private	
China (B-S-J-G)							
Colombia	-0.01 ** (0.01)						
Croatia	0.03 * (0.01)				-0.12 ** (0.04)	0.19 * (0.08)	
Czech Republic							
Estonia							
Finland							
France							
Greece			-0.04 * (0.02)	0.36 * (0.14)		-0.29 * (0.12)	
Hong Kong							
Hungary							
Iceland							-0.18 * (0.08)
Ireland							
Latvia							
Luxembourg					-0.11 ** (0.04)		
Mexico							
Peru							
Poland							
Portugal							
Qatar							
Russia							

Table 11 (continued)

	Size of the community where the school is located (ref.cat.: fewer than 3000 people)					School type (ref. cat.: public)		School size (total school enrolment)
	3,000–15,000 people	15,000–100,000 people	100,000–1,000,000 people	More than 1,000,000 people	Semi-private	Private		
Slovakia								
Slovenia	-0.02 *	(0.01)						
South Korea				0.73 ***	(0.17)			
Spain	0.01 *	(0.00)	-0.15 ***	(0.04)	-0.02 **	(0.01)		
Switzerland								
Taiwan				-0.01 **	(0.00)			
Thailand	0.02	(0.01)						
Turkey							-0.12 *	(0.05)
UAE				-0.04 *	(0.02)			
United States								

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