Top-Performing Math Students in 82 Countries: An Integrative Data Analysis of Gender Differences in Achievement, Achievement Profiles, and Achievement Motivation

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Abstract

The present integrative data analysis examined gender differences in achievement, achievement profiles, and achievement motivation in mathematics, reading, and science among 113,864 top-performing adolescent math students (top 5% in their respective countries). To do this, we applied the same analysis protocol to representative individual participant data from six cycles of the Programme for International Student Assessment (PISA 2000–2015, 82 countries) and integrated the results by using meta-analytical random coefficient models. We found that in the group of top-performing math students, male students were overrepresented (mean female-to-male ratio 1:1.50, 95% CI [1:1.58, 1:1:43]). Furthermore, female students possessed better reading skills (mean d = –0.23, 95% CI [–0.25, –0.21]) and more positive reading attitudes (–0.64, 95% CI [–0.69, –0.60] ≤ mean d ≤ –0.38, 95% CI [–0.46, –0.30]). Male students had stronger math self-efficacy (mean d = 0.32, 95% CI [0.28, 0.35]) and demonstrated mathematics-oriented achievement profiles, whereas female students' profiles were more balanced across domains. Moreover, female students were more interested in organic and medical fields (–0.44, 95% CI [–0.48, –0.40] ≤ mean d ≤ –0.30, 95% CI [–0.34, –0.25]), whereas male students showed greater interest in physics-related topics (0.39, 95% CI [0.36, 0.43] ≤ mean d ≤ 0.54, 95% CI [0.50, 0.58]). Gender equality indicators moderated the proportion of female students in the top 5% in mathematics and explained variability in achievement profiles across countries. Results are explained by social role theory and situated expectancy–value theory, and implications for women's underrepresentation in (specific) STEM fields are discussed.

Keywords: gender differences, achievement, achievement motivation, mathematics, integrative data analysis

Educational Impact and Implications Statement

Gender differences in top-performing math students merit researchers' attention, because this group of students can be viewed as the talent pool for professions in science, technology, engineering, and mathematics (STEM). The present study characterized gender disparities in the achievement-related and motivational properties of top-performing math students (i.e., the top 5% in mathematics scores). We found that across 82 countries, (a) two out of five students in this group are female, (b) female and male students differ in their achievement profiles and specific verbal and science interests, and (c) gender equality indicators explain some of the observed cross-national variation in gender differences. These gender differences may contribute to gender imbalances between academic fields (STEM vs. other) and in specific STEM fields (e.g., women prevail in health professions and men in engineering or computer science).

Top-Performing Math Students in 82 Countries: An Integrative Data Analysis of Gender Differences in Achievement, Achievement Profiles, and Achievement Motivation

Understanding the underrepresentation of women in math-intensive fields such as science, technology, engineering, and mathematics (STEM) remains a concern of scientists and society (e.g., European Institute for Gender Equality, 2017; Halpern et al., 2007; National Science Board, 2020). For example, in 2016, across all member states of the European Union (Eurostat, 2020), 74% of all tertiary students in the fields of engineering, manufacturing, and construction-related studies were male. By contrast, the percentage of female students was 71% among all tertiary students in fields related to health and welfare and 78% in the field of education. Similar results were reported in the U.S. (National Science Board, 2016). In particular, previous research showed that students who did exceptionally well in standardized math tests (i.e., top-performing math students) are those most likely to major in and enter STEM fields (Halpern et al., 2007; Lubinski & Benbow, 2006; Park et al., 2007). Thus, gender differences in top-performing math students merit attention.

In their influential review, Ceci et al. (2014) concluded that future research should focus on the "barriers to women's full participation in mathematically intensive academic science fields [that are] rooted in precollege factors and the subsequent likelihood of majoring in these fields" (p. 76). Several precollege factors contribute to women's underrepresentation in STEM (for reviews, see Ceci et al., 2009; Wang & Degol, 2013, 2017). Among them are (a) students' level of achievement, (b) their achievement profiles, and (c) their achievement motivation (e.g., Eccles, 1994; Halpern et al., 2007; Park et al., 2007; Wang et al., 2017). That is, students are most likely to enroll in courses and pick occupations for which they have specific academic strengths, that they think they can master, and for which they experience a high task value (Eccles, 1994). Thus,

gender differences in these precollege factors among top-performing math students are vital for explaining gender disparities in STEM (Ceci et al., 2009, 2014; Halpern et al., 2007).

The major goal of the present study was to substantially expand the body of knowledge on gender differences in top-performing math students. To this end, we analyzed (a) the proportions of top-performing male and female students in this group of students, as well as gender differences in (b) top-performing math students' achievement, (c) achievement profiles, and (d) their domain-specific achievement motivation in mathematics, reading, and science across 82 countries in an integrative data analysis. In addition, we examined several possible sociocultural moderator variables that may help explain why gender differences in top-performing math students are larger in some countries than in others. In particular, drawing on social role theory (Eagly, 1987; Wood & Eagly, 2012) and situated expectancy–value theory (Eccles (Parsons) et al., 1983; Eccles & Wigfield, 2020; Wigfield & Eccles, 2020), we examined the extent to which gender equality indicators are related to the cross-national heterogeneity of gender differences in top-performing math students.

Capitalizing on meta-analytical techniques to examine representative student data, this integrative data analysis substantially enlarges the empirical evidence on gender differences among top-performing math students. Specifically, we investigated gender differences in top-performing math students by drawing on international, representative, and unselective samples from well-defined populations—an approach considered the "gold standard" (Hedges & Nowell, 1995; Reilly et al., 2019; Shrout, 2009) when studying gender differences. To do this, we used data from six cycles of the Programme for International Student Assessment (PISA 2000–2015). In contrast, previous research on gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation has focused on U.S. samples and used data from special programs that solicit volunteers with unknown representativeness for the

full student population (e.g., Lubinski & Benbow, 2006), which consequently has a potential for bias. Other studies that examined gender differences in top-performing math students have focused on gender differences in students' achievement[1], but not on gender differences in their achievement motivation (Baye & Monseur, 2016; Guiso et al., 2008; Hedges & Nowell, 1995; Hyde, Fennema, & Lamon, 1990; Lindberg et al., 2010; Machin & Pekkarinen, 2008; Nowell & Hedges, 1998; Penner, 2008; Stoet & Geary, 2013; but see Hyde, Fennema, Ryan, et al., 1990 for gender differences in math anxiety among top-performing math students).

In sum, the present study provides reliable and comprehensive empirical knowledge on gender differences among top-performing math students and on sociocultural factors moderating these gender differences. This kind of knowledge is essential for any fact-based scientific, practical, and political discourse on gender differences related to STEM (e.g., What is the actual proportion of female students in the group of top-performing math students and how much does it vary across countries?). Furthermore, this knowledge has theoretical implications (i.e., Do the predictions of social role theory and situated expectancy–value theory hold at the right tail of the ability distribution?), and practical implications (e.g., What are potential starting points for interventions to reduce women's underrepresentation in STEM fields?).

The Development of Gender Differences

Various theoretical explanations for the emergence of gender differences have been offered while simultaneously acknowledging that biological, psychological, and environmental factors constantly interact in reciprocal feedback loops to shape individuals' development (Miller & Halpern, 2014). In the following, we focus on the role of sociocultural factors for the development of gender differences.

[1] Unless otherwise indicated, student achievement in the reported studies was measured using standardized achievement tests.

Social role theory (Eagly, 1987; Wood & Eagly, 2012) and situated expectancy–value theory (Eccles (Parsons) et al., 1983; Eccles & Wigfield, 2020; Wigfield & Eccles, 2020) provide prominent psychological models for explaining why sociocultural factors influence gender differences in the development of mathematical talent. Both theories propose that gender differences emerge because of differences in males' and females' roles in society. These differences in gender roles are based on gender stereotypes (Eccles, 1994; Wood & Eagly, 2012), that is, on beliefs about differences between females and males (Ashmore & Del Boca, 1979).

Social role theory argues that gender stereotypes emerge because people infer that there is a correspondence between people's external behavior and their internal characteristics (Wood & Eagly, 2012). For example, because women tend to do domestic work and communally demanding jobs, people infer that women are warm, caring, and socially skilled. Similarly, because men tend to take on strength-intensive roles and high-status roles, people infer that men are assertive, dominant, and forceful (Wood & Eagly, 2012). In addition to this descriptive aspect of gender roles, gender roles also have a prescriptive function. By considering these typical attributes as generally desirable and admirable for each sex, gender role beliefs promote norms and socialization practices (e.g., by parents, teachers, and peers) that encourage children to acquire the skills, characteristics, and preferences that support their society's division of labor. Over time, gender roles tend to be internalized as gender identities and thus facilitate stereotype-consistent behavior through self-regulatory processes (Eagly, 1987; Wood & Eagly, 2012). Empirical research supports that there is a direct link between gender stereotypes and the representation of men and women in social roles (Koenig & Eagly, 2014). In educational contexts, research has indicated that a higher female enrollment in tertiary science education and the representation of women in the science workforce are related to weaker national gender–science stereotypes (Miller et al., 2015). Further, if the gender roles that women are expected to

fulfill within a society do not include math- or science-related activities, female students may encounter social barriers (e.g., mathematics and science are stereotyped as male domains) and perhaps even structural barriers (e.g., girls are disadvantaged in terms of formal access to [math or science] education). In turn, this can impair girls' development of skills in mathematics or science. For example, a large-scale study by Nosek et al. (2009) demonstrated that gender differences in mathematics and science achievement are larger in countries where residents hold stronger stereotypes that associate men with science.

Taken together, social role theory explains the psychological mechanisms that lead to gender stereotypes and how gender-typed roles influence gender differences in educational contexts. Situated expectancy–value theory proposes more specifically that gender differences in achievement and motivational aspects, such as domain-specific expectations for success (e.g., self-efficacy beliefs, self-concepts) and values (e.g., interest, enjoyment, emotional costs such as anxiety), emerge through the processes by which children are socialized into gender roles (Eccles (Parsons) et al., 1983; Eccles & Wigfield, 2020; Wigfield & Eccles, 2020). For example, the meta-analysis by Lytton and Romney (1991) found differential parental encouragement of gender-typed activities. Hence, parents' socialization processes may differ for boys and girls with the consequence that parents provide different learning opportunities and experiences to boys and girls. For instance, mothers seem to provide more math-supportive environments for boys than for girls by buying more math-related toys for their sons than for their daughters (Jacobs et al., 2005). Ultimately, situated expectancy–value theory states that such socialization processes will result in gender differences in male and female students' domain-specific achievement and motivation, which in turn lead to gender differences in educational and occupational preferences and choices.

Social role theory, in combination with the related role congruity theory (Diekman & Eagly, 2008), and situated expectancy–value theory also provide an explanatory framework for women's underrepresentation in STEM fields. Social role theory predicts that to the extent that individuals internalize the roles related to their gender, they develop gender identities that lead women to perceive themselves as especially communal and men as especially agentic (Wood & Eagly, 2012). For example, Eagly et al. (2020) showed that, on average, 85% of the respondents of nationally representative U.S. public opinion polls between 1946 and 2018 ascribed communal traits more to women than men, and that this attribution has risen over time. According to the related role congruity theory (Diekman & Eagly, 2008), these gender identities and related personal goals regulate men's and women's engagement in tasks or occupations that offer opportunities to meet communal or agentic goals (Evans & Diekman, 2009; Sczesny et al., 2019; Wood & Eagly, 2012). Importantly, individuals perceive that STEM fields are less likely to meet individuals' communal goals than female-stereotyped occupations or than other (formerly) male-stereotyped occupations such as law, business, or medicine (Diekman et al., 2010, 2011). Consistent with situated expectancy–value theory, these beliefs may be particularly influential in the decisions of those individuals who place the highest value on communal goals (Diekman et al., 2017). As STEM careers are not expected to fulfill communal goals (i.e., working with or helping others; e.g., Committee on Public Understanding of Engineering Messages, 2008; Cunningham et al., 2005), and because women endorse communal goals more strongly than men (e.g., Diekman et al., 2011), women tend to show particular disinterest in STEM fields (Diekman et al., 2010, 2011; Diekman & Steinberg, 2013).

To conclude, both situated expectancy–value theory and social role theory emphasize that gender-typed socialization processes are sociocultural factors that influence the development of gender differences. According to both theories, gender differences in educational (and

occupational) contexts should be smaller in societies that have greater gender equality in social roles. More specifically, situated expectancy–value theory predicts that if a female student gender-types a domain such as mathematics as masculine and not in line with her gender role values, she is less likely to value mathematics and less likely to put effort into math-related fields, especially if she does not expect to do well. Consequently, she is more likely to perform poorly in mathematics and to avoid choosing math-related studies and careers (Eccles, 1994; Meece et al., 1982). Thus, socialization processes that are more gender-typed produce larger gender differences in achievement and motivation.

Several studies that have investigated the link between sociocultural factors and gender differences in educational contexts focused on gender equality as an important sociocultural factor. Prior cross-national studies have primarily analyzed the role of gender equality for gender differences in math achievement and math motivation at the level of the general student population (Baker & Jones, 1993; Else-Quest et al., 2010; Guiso et al., 2008; Reilly, 2012; Riegle-Crumb, 2005; Stoet & Geary, 2013; 2015). Only a few studies have investigated the role of gender equality for gender differences in mathematics achievement among top-performing math students. Using data from TIMSS 1995 (Penner, 2008) and PISA 2003 (Guiso et al., 2008), two studies found that the proportion of female students in the top 5% in mathematics increased as gender equality in a country increased. Similar to results on the population level, findings varied to some extent depending on the gender equality indicators used (Penner, 2008). Furthermore, Hyde and Mertz (2009) found that the percentage of female students on a country's International Mathematical Olympiad team was significantly correlated with its Global Gender Gap Index. Thus, there is evidence that sociocultural factors may affect the development of mathematical talent: In countries with higher levels of gender equality, more female students score at the highest levels of math achievement. Yet, it is unknown whether sociocultural factors

are also related to gender differences (e.g., in math, reading, or science achievement) *within* the group of top-performing math students.

Gender Differences in Achievement and Achievement Motivation

Research syntheses, such as integrative data analyses or meta-analyses, and large-scale studies provide the strongest empirical evidence for studying gender differences. As evident from Figures 1 and 2 (see also Tables S1 and S2 in the supplemental materials on OSF), there is a considerable body of knowledge on gender differences in students' achievement and achievement motivation in the general student population that helps to benchmark the results obtained for top-performing math students. However, there are only few meta-analyses and large-scale studies that have examined gender differences in top-performing math students' achievement and achievement motivation. Only two meta-analyses (Hyde, Fennema, & Lamon, 1990; Lindberg et al., 2010) and one large-scale study (Baye & Monseur, 2016) examined gender gaps in math performance in this group of students. The results indicated that gender differences in favor of male students are somewhat larger in highly selective samples (e.g., students from highly selective colleges or the top 5% in mathematics) than in the general population ($0.17 \leq d \leq 0.54$ as compared to $-0.05 \leq d \leq 0.31$ for the general population; see Table S1 in the supplemental materials on OSF). However, some of these findings are at least partially based on data from talent search studies[2] (Hyde, Fennema, & Lamon, 1990; Lindberg et al., 2010). A study that used representative data exclusively from unselected top-performing math students in secondary school reported a smaller gender gap in math achievement ($d = 0.17$; Baye & Monseur, 2016). Notably, there is evidence that gender differences in math achievement in top-performing adolescent math students vary cross-nationally (Stoet & Geary, 2013).

[2] Participants in talent search studies represent a selected student group, particularly in that they are aware of their ability because of their selection into the program. This awareness most likely influences their self-beliefs, motivation, and possibly also their performance.

In addition, studies have revealed a substantial overrepresentation of male students among top performers in mathematics. Two studies that analyzed representative data sets of secondary and college aged students from the U.S. reported a female-to-male ratio of 1:1.50 to 1:4.09 in the top 5% in mathematics (Hedges & Nowell, 1995; Nowell & Hedges, 1998). Studies that used more recent data sets from representative international large-scale assessments (Machin & Pekkarinen, 2008; Stoet & Geary, 2013) and state or national assessments from the U.S. (Hyde et al., 2008; Reilly et al., 2015) also found a preponderance of male students in secondary school in the top 5% in mathematics. However, the female-to-male ratios were somewhat more balanced and varied across countries (1:1.09 to 1:2.13). Research findings from talent search programs showed that the female-to-male ratio of U.S. students in Grade 7 in the top 0.5% of math ability rapidly increased from the early 1980s (1:2.61) to the early 2010s (1:1.37; SMPY; Makel et al., 2016). Within the top 0.01% of math ability, the increase was even sharper (Makel et al., 2016; Table S1 in the supplemental online materials). Using a different U.S. talent search database, Olszewski-Kubilius and Lee (2011) reported slightly higher female-to-male ratios (1:2.5 to 1:3.7) for secondary school students in the top 2% in mathematics between 2000 and 2008 (compared with the results from Makel et al., 2016).

Regarding top-performing math students' achievement motivation, there is only one (somewhat dated) meta-analysis that covered gender differences in math motivation. The findings suggested that gender differences in math anxiety were negligible in highly selective samples (i.e., students from highly selective colleges or talent search studies; Hyde, Fennema, Ryan et al., 1990).

Achievement and achievement motivation in mathematics are not the only precollege factors that contribute to women's underrepresentation in STEM. To better understand these gender disparities it is necessary to examine gender differences in achievement and achievement

motivation in other domains as well (for reviews, see Ceci et al., 2009; Wang & Degol, 2013, 2017). However, as the overview in Figures 1 and 2 illustrates, the empirical body of knowledge is particularly weak concerning gender differences among top-performing math students in reading or science achievement as well as in achievement motivation in science or verbal domains.

Gender Differences in Achievement Profiles

Achievement profiles are comprised of the pattern and structure of achievement in multiple domains within an individual. One way to create achievement profiles is to calculate achievement tilts by subtracting a student's test score in one domain from the same student's test score in another domain (e.g., Wai et al., 2018). Previous research has demonstrated that achievement tilts in math and verbal domains at the age of 16 measured by school grades (Dekhtyar et al., 2018) and on college entrance exams (Coyle et al., 2014, 2015; Wang et al., 2013, 2017) predicted career choices in adulthood in the general population. Math tilts were associated with STEM majors (e.g., science and math) and STEM careers, whereas verbal tilts were associated with humanities majors (e.g., English and history) and humanities careers (Coyle et al., 2014, 2015; Dekhtyar et al., 2018; Wang et al., 2013, 2017). Similar findings have been reported for high-ability students in secondary school from talent search samples (Lubinski et al., 2001; Park et al., 2007). However, ability tilts seem to be larger in the right tail of the ability distribution than in the general population (Lohman et al., 2008).

Female and male students in the general population have been found to differ in their achievement profiles such that male students were more likely to show STEM tilts (and STEM preferences), whereas female students were more likely to show non-STEM tilts (and humanities preferences; Breda & Napp, 2019; Coyle et al., 2014, 2015; Dekhtyar et al., 2018; Goulas et al., 2020; Stoet & Geary, 2018; Wang et al., 2013). Wai et al. (2018) examined gender differences in

math and verbal achievement tilts in academically talented secondary school students in the U.S. across 35 years and found that more male than female students showed positive math tilts and more female than male students showed positive verbal tilts. Furthermore, gender differences in achievement tilts increased with achievement level (i.e., from the top 5% to the top 1% to the top 0.01% of ability; Wai et al., 2018). However, there are no research syntheses or large-scale studies that have investigated gender differences in achievement profiles in top-performing math students.

The Present Study

The present integrative data analysis had two main research goals. The first goal was to provide reliable and widely generalizable empirical knowledge about gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation in three core academic domains: mathematics, reading, and science. Importantly, we focused on students in secondary school because educational and occupational choices leading to STEM careers are shaped by precollege factors during adolescence (Ceci et al., 2009, 2014; McDaniel, 2016). To this end, we capitalized on international, representative, and unselected individual participant data from well-defined populations of students at the end of compulsory education. In doing so, the present study is the first to synthesize important gender differences in top-performing math students' reading and science achievement, achievement profiles (i.e., math–reading, science–reading, and math–science profiles), and achievement motivation related to mathematics, reading, and science. Furthermore, we significantly extended the findings on the proportion of female students in the group of top-performing math students and on gender differences in math achievement in this group of students (e.g., Guiso et al., 2008; Penner, 2008) by using more recent data from a substantially larger number of countries.

The second goal of this study was to investigate the moderating roles of gender equality for gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation. Specifically, we used domain-specific gender equality indicators (e.g., the tertiary enrollment ratio and women's share of employment in senior and middle management) to examine the specific processes that might lead to the observed gender gaps (Else-Quest & Grabe, 2012). In line with social role theory and situated expectancy–value theory, we expected that gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation would decrease with increasing levels of gender equality. Furthermore, we predicted that the share of female students in the top 5% in mathematics would increase with increasing levels of gender equality.

Method

Integrative Data Analysis: Enhancing the Robustness and Generalizability of Research Results

Integrative data analysis is a methodological approach developed to enhance and inform the replicability and generalizability of research results. In this approach, also called coordinated analysis (Hofer & Piccinin, 2009), the same statistical models are applied in a coordinated way to multiple similar data sets to produce a set of replications. These separate results are then summarized by using meta-analytical techniques to answer a specific research question. Because a coordinated analysis preserves the separate results across samples, it also allows researchers to examine the heterogeneity in effect sizes that may be due to variations in the true effect sizes across samples or sample variations (e.g., measurement variations). This makes it possible to evaluate the generalizability of the results across samples (Graham et al., 2020; Hofer & Piccinin, 2009).

Similar to other tools that are used to synthesize research (e.g., meta-analysis), an integrative data analysis meets the need for a cumulative approach to scientific inquiry (Curran, 2009; Hunter & Schmidt, 1996; Meehl, 1978). However, compared with traditional meta-analysis that synthesizes data on an aggregate study level using statistics obtained from study publications or study authors (e.g., an effect size and a standard error or confidence interval), integrative data analysis has the advantage that the method heterogeneity between studies—a major biasing factor—is drastically reduced by applying the same inclusion and exclusion criteria across studies, harmonizing the applied measures to derive a commensurable metric across data sets, and analyzing the data with a standardized analysis protocol. In this way, integrative data analysis is highly similar to an individual participant data meta-analysis (Curran & Hussong, 2009), a specific form of meta-analysis that has been described as the gold-standard method of meta-analysis for quite some time in the biomedical sciences (Stewart & Tierney, 2002). Consequently, like other forms of systematic research syntheses, integrative data analysis is particularly valuable for the estimation of gender differences because it evaluates the magnitude, consistency, replicability, and variability of findings, and explores moderators that might contribute to the presence or absence of gender differences (e.g., Eagly, 2013; Hyde, 2014).

Individual Participant Data From International Large-Scale Assessments

To conduct an integrative data analysis on gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation, we sought individual participant data from international large-scale assessments rather than from different types of empirical studies (e.g., different national large-scale assessments or college entrance exams). Our reasons for doing so were twofold. First, a key feature of international large-scale assessments is the applied standardization protocol for all phases of the study (e.g., applying the same set of standardized measures in all participating countries). Thus, using individual participant data from

international large-scale assessments allowed us to control for several sources of unwanted heterogeneity in effect sizes (for details see S1 in the supplemental materials on OSF), which, in turn, substantively improved the reliability, precision, and statistical power of the meta-analytic syntheses (Valentine et al., 2010) and moderator analyses (Hempel et al., 2013). Second, international large-scale assessments examine representative student samples in many different countries. Thus, these data intrinsically protect against the potential threat of selection bias (which may affect studies that use data from talent search programs or national college tests) and naturally support the wide generalization of findings on gender differences in top-performing math students within and across countries.

To identify all potential international large-scale assessments, we conducted a systematic search, which is described in detail in Section S1 in the supplemental materials on OSF. Figure S1 in the supplemental materials on OSF provides an overview of the selection process and the number of publications and unique international large-scale assessments identified in each step. After evaluation, only PISA met all inclusion criteria. Thus, for the present integrative data analysis, all available individual student data from six PISA cycles were used (i.e., samples between 2000 and 2015). Protocols can be accessed via the Open Science Framework (OSF; Soderberg, 2018) at https://osf.io/ych6q/.

Description of the PISA Study and Study Participants

PISA is a triennial international survey conducted by the Organisation for Economic Co-operation and Development (OECD). It is aimed at evaluating education systems worldwide at the end of compulsory education by testing the skills and knowledge of 15-year-old students in the key domains of mathematics, reading, and science. PISA capitalizes on a two-stage stratified sampling design to achieve representative probability samples (a detailed description of the sampling procedures can be found in Section S2 in the supplemental materials on OSF).

Consequently, PISA results can be generalized to the larger population of 15-year-old students in all participating countries.[3] Across all PISA cycles, a total of 2,280,502 students from 83 countries participated.

A key question is how to operationalize the term "top-performing math students." There is wide agreement that students belonging to the right tail of the achievement distribution belong to this group. However, there is currently no single agreed upon cutpoint that is applied in all studies to define top performers (see further discussion of this issue in the Discussion section). Yet, many reviews (Ceci et al., 2009, 2014) and empirical studies (Guiso et al., 2008; Hedges & Nowell, 1995; Machin & Pekkarinen, 2008; Olszewski-Kubilius & Lee, 2011; Penner, 2008; Roznowski et al., 2000) consider the top 5 % of students to belong to this group. Therefore, using the top 5% as cutpoint ensures comparability of our findings with those of prior studies. Moreover, selecting samples of the top 5% in mathematics for our analyses also ensured that the samples sizes were large enough to provide reliable country-specific estimates of gender differences (see Table S3 in the supplemental materials on OSF). In the present study, we therefore defined those students as top performers in mathematics who belonged to the top 5% in mathematics in their country in a certain PISA cycle. Table S4 in the supplemental materials on OSF presents the country-specific cut-off values for the top 5% in mathematics for each PISA cycle.

To help interpret the substantive meaning of student scores, students' mathematics scores from PISA 2003 onward were divided into six proficiency levels, with Level 1 being the lowest and Level 6 being the highest. Whereas students scoring below Level 1 are unable to apply mathematical skills in the situations required by the easiest PISA tasks, students at Level 6 are

[3] Students from OECD and non-OECD countries or economic regions can participate in PISA. For ease of presentation, we refer to both "countries" and "economic regions" as "countries" in this article.

able to master the most advanced and complex PISA tasks (OECD, 2004, 2016). Table S5 shows the country-specific percentage of top-performing math students in each mathematics proficiency level per PISA cycle. The variation in top-performing math students' proficiency levels (as well as in the cut-off scores, Table S4) indicates considerable heterogeneity in mathematics achievement in the group of top-performing math students across participating countries.

Students from Liechtenstein were excluded from the present analyses due to the small number of students who scored among the top 5% in mathematics in all PISA cycles in Liechtenstein ($n < 30$). In the year 2000, nine students were excluded from the analyses because they were missing information on their gender. Of note, in PISA 2000, a mathematics achievement score was provided for only 56% of the students (for an even smaller proportion of students, science achievement scores were available). This resulted in a smaller number of mathematically top-performing students compared with the other PISA cycles where a mathematics achievement score was provided for all students. The final sample included data from 82 countries (Figure S2 in the supplemental materials on OSF) and 113,864 top-performing math students (see Tables 1 and S3 in the supplemental materials on OSF for the sample characteristics).

Measures

Achievement

In PISA cycles 2003 to 2015, mathematical achievement was assessed in four categories: change and relationships, space and shape, quantity, and uncertainty and data. In PISA 2000, the assessment covered just two categories: (a) space and shape and (b) change and relationships. Reading literacy was assessed in three different categories: the abilities to access and retrieve information, integrate information and interpret texts, and reflect upon and evaluate texts. In 2006, reading literacy results were not reported for the US because of an error in the printing of

the test booklets. Science literacy was assessed in the categories physical systems, living systems, earth and space systems, and technology systems. Achievement scores in reading were scaled to have a mean of 500 and a standard deviation of 100 in the PISA 2000 OECD student population, whereas achievement scores in mathematics were rescaled to have a mean of 500 and a standard deviation of 100 in the PISA 2003 OECD student population. Achievement scores in science were rescaled to have a mean of 500 and a standard deviation of 100 in the PISA 2006 OECD student population (see OECD, 2002, 2005b, 2009). See Section S3 in the supplemental materials on OSF for further details on the achievement measures.

Achievement Motivation

To assess students' achievement motivation, students reported their motivation with respect to mathematics, reading, and science on 26 self-report scales measuring, for example, their self-concept, self-efficacy beliefs, and instrumental and future-directed motivation, anxiety, interest, and enjoyment. Students gave their answers in a forced-choice format (for math intentions) and on 4-point rating scales (for the remaining 25 measures). Tables S6 to S9 in the supplemental materials on OSF provide an overview of the scales, the corresponding items, the response options for the items, and the scale score reliabilities (i.e., internal consistencies).

Students' Gender

We used the measurement from PISA, in which students' gender was assessed by self-categorization into one of two categories: female or male.

Gender Equality Indicators as Moderators

We selected widely regarded specific measures of gender equality recommended by Else-Quest and Grabe (2012) in the areas of education (i.e., gender ratios in primary, secondary, and tertiary education enrollment) and higher positions (i.e., women's share of employment in senior and middle management and women's share of research positions in a country) that are

theoretically relevant as moderators of girls' and women's engagement in mathematics. Gender equality in education reflects the value of female students' education in a society, and gender equality in higher positions reflects the penetration of the glass ceiling (Else-Quest & Grabe, 2012). Table 2 lists and provides descriptions of the indicators used in the present study. In the moderator analyses, we only included data on the specific gender equality indicators that were assessed in the same assessment years as the PISA cycles (e.g., the primary enrollment ratio has been reported annually since 1970, but we only included the data from 2000, 2003, 2006, 2009, 2012, and 2015 in the present study). To maximize the number of countries with data on women's share of research positions, we combined data from the OECD and the United Nations Educational, Scientific, and Cultural Organization (UNESCO). When data were available from only one data set, we used that information. When data were available from two sources, we averaged them. Values for all moderators, their intercorrelations, and descriptive statistics are presented in Tables S10 and S11 in the supplemental materials on OSF. The intercorrelations among moderators showed that all moderators contained unique information.

Data Analysis

We conducted an integrative data analysis (see Curran & Hussong, 2009; Hofer & Piccinin, 2009) where we applied the same analysis protocol to examine gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation in mathematics, reading, and science. In accordance with the analysis strategy proposed by Cheung and Jak (2016) for big data, we proceeded in three steps. In the first step, we computed effect sizes using the individual student data for each country and each PISA cycle. To do this, we followed the detailed PISA guidelines for the statistical analyses to be used to deal with plausible values as achievement indicators, apply sample weights, and estimate the standard errors of statistical parameters (OECD, 2014). In the second step, using meta-analytical

techniques, we integrated the effect sizes to estimate (a) the average effect sizes for gender differences in achievement, achievement profiles, and achievement motivation; and (b) the heterogeneity of effect sizes within and between countries. In the third step, we examined the extent to which moderator variables may explain the observed heterogeneity in effect sizes.

Analyses were conducted using the statistical software R (Version 3.6.1; R Core Team, 2019). Further information and the R code for reproducing the results and figures from the present study can be found on the OSF. All figures were produced using the R package "ggplot2" (Version 3.2.1; Wickham, 2009).

Step 1: Effect Size Computation

We analyzed the country-specific magnitude of gender differences in achievement and achievement motivation by computing the effect size *d* (Cohen, 1988). Cohen's *d* is the effect size for the standardized mean difference between two groups on a continuous variable (e.g., the mean difference between male and female students on a continuous measure of mathematics achievement). Thus, country-specific *d* was computed, with $d = (M_m - M_f)/SD_{OECD}$, M_m = the mean for male students, M_f = the mean for female students, and SD_{OECD} = the standard deviation of the total student sample from the OECD countries. Hence, positive values indicated an advantage of male students and negative values an advantage of female students. In accordance with Hyde (2005), we defined five ranges of effect sizes: negligible ($0.00 < |d| \leq 0.10$), small ($0.10 < |d| \leq 0.35$), moderate ($0.35 < |d| \leq 0.65$), large ($0.65 < |d| \leq 1.00$), and very large ($|d| > 1.00$).

To examine achievement profiles, we subtracted an individual student's achievement score in one domain from this student's achievement score in another domain, resulting in three different profiles: math–reading, science–reading, and math–science. Overall, we computed three effect sizes to capture gender differences in achievement profiles: country-specific mean profile

scores for male and female students, the gender-specific percentage of tilts within each profile score, and the percentage of nonoverlap in gender-specific profile distributions. Nonoverlaps of 8%/24%/41%/55% can be considered to represent small/medium/large/very large effects, respectively.

Further information on the calculation of effect sizes can be found in Section S4 in the supplemental materials on OSF, country-specific effect sizes for each outcome can be found in Tables S3 and S12 to S21 in the supplemental materials on OSF, and standard errors for all unweighted effect sizes can be accessed via the OSF.

Step 2: Integration of the Results With Meta-Analytical Random Coefficient Models

To integrate the effect sizes across PISA cycles and countries, we used the R package "metaSEM" (Version 1.2.2; Cheung, 2015) that implements random-effects models with maximum likelihood estimation to allow the true effect to vary (Borenstein et al., 2009; Cheung, 2015). When effect sizes were available only for a single PISA cycle, we used two-level random effects models. In the two-level random effects models, variance estimates for the various effect sizes (as obtained in Step 1) defined Level 1; Level 2 captured variability in effect sizes between countries. When effect sizes were available for several PISA cycles, we used three-level random effects models to account for the dependencies between the effect sizes (i.e., effect sizes obtained for several PISA cycles within countries). In the three-level random effects models, variance estimates for the various effect sizes (as obtained in Step 1) defined Level 1. Level 2 captured variability in effect sizes between PISA cycles within countries, and Level 3 captured variability in effect sizes between countries. We computed three statistics to assess the heterogeneity of effect sizes: τ, I^2, and Q (Borenstein et al., 2009). τ is the standard deviation of the effect size parameters (Borenstein et al., 2009). I^2 represents the proportion of observed heterogeneity that is real and not due to random noise and has a range of 0% to 100% (Higgins & Thompson, 2002).

For the three-level models, we estimated τ and I^2 within countries (τ_{Level2}, I^2_{Level2}), between countries (τ_{Level3}, I^2_{Level3}), and in total ($\tau_{\text{total}} = \sqrt{\tau^2_{\text{Level2}} + \tau^2_{\text{Level3}}}$, $I^2_{\text{total}} = I^2_{\text{Level2}} + I^2_{\text{Level3}}$); for the two-level models, we estimated τ_{total} and I^2_{total} only. The Q test statistic (introduced by Cochran, 1954) is computed by summing the squared deviations of each individual effect size estimate from the corresponding average effect estimate where individual effect sizes are weighted by their sampling variance (Huedo-Medina et al., 2006). A statistically significant value of Q is typically taken to indicate effect size heterogeneity. We considered all three statistics to evaluate the variability of effect sizes and, consequently, to decide whether it would be appropriate to conduct further moderator analyses. Specifically, moderator analyses were performed if the Q statistic associated with a certain effect size was significant (Lipsey & Wilson, 2001) or if τ_{total} or the I^2_{total} indicated at least moderate heterogeneity. Whereas there are established guideline values for moderate I^2 values ($I^2 \geq 30\%$, Higgins & Green, 2011), these guideline values are lacking for τ. Hence, to assess which τ_{total} value can be considered moderate, we computed empirical benchmark values using data on standardized mean differences (i.e., Cohen's *d* and Hedges' *g*) provided by van Erp et al. (2017). Cut-off scores were based on the approach presented by Hemphill (2003) and Bosco et al. (2014). Thus, τ_{total} values in the middle third ($.12 \leq \tau_{\text{total}} < .28$) could be considered to indicate a moderate level of heterogeneity.

Step 3: Mixed-Effects Models and Moderator Analysis

Mixed-effects models explain the heterogeneity of the effect sizes within and between countries by moderator variables (Borenstein et al., 2009; Cheung, 2015). We ran multivariate metaregression models for each effect size (i.e., the outcome variable) using the following set of moderator variables (i.e., the predictor variables): women's share of research positions, women's

share of employment in senior and middle management (i.e., legislators, senior officials, managers), and enrollment ratios in primary, secondary, and tertiary education.

Because data on moderator variables were incomplete (i.e., gender equality indicators were not available for all countries), we followed the recommendations by Pigott (2019) and Tipton et al. (2019) and used multilevel multiple imputation (e.g., Grund et al., 2018) to estimate unreported values and to account for the clustered data structure (effect sizes nested in countries). To facilitate the interpretation of the results, moderator variables that represented ratios were log-transformed before multiple imputation and then used in the metaregression. Subsequently, the regression coefficients were divided by 100 such that a 1% increase in the moderator variable increased (or decreased) the dependent variable by coefficient/100 units. Further details on the data analysis are provided in Section S4 in the supplemental materials on OSF.

Results

Proportions of Male and Female Students in the Top 5% in Mathematics

The overall percentage of female students in the top 5% in mathematics, averaged across all studies, was 40% (see Table 3), corresponding to a female-to-male student ratio of 1:1.50. Figure 3 shows the distribution of the percentages of female students. Given the heterogeneity in the effect sizes (see Table 3), we conducted analyses for moderator variables to explain the heterogeneity in effect sizes. Tertiary enrollment ratios positively predicted the proportion of female students in the top 5% in mathematics ($b = 0.04$), indicating that a rise in the tertiary enrollment ratio by 1% was associated with an increase in the percentage of female students in the top 5% in mathematics by 0.04% (under control of the other gender equality indicators; Table 4). That is, the larger the percentage of female students enrolled in a university compared with the percentage of male students enrolled, the larger the proportion of female students in the group of top-performing math students.

Gender Differences in Achievement

The overall weighted mean effect size of the gender gap in mathematics achievement was $d = 0.05$ (see Table 3), representing a negligible gender difference in top-performing math students. Figure 4A shows that the range of effect sizes was narrow and that gender differences were negligible in almost all countries. Because effect sizes were homogenous (see Table 3), moderator analyses were not performed.

The overall weighted mean effect size of the gender difference in reading achievement was $d = –0.23$ (see Table 3), indicating that, on average, female students showed better reading performance than male students did. Figure 4A shows that the magnitude of effect sizes varied across studies with the vast majority of effect sizes indicating that female students outperformed their male counterparts in reading. The heterogeneity measures showed that gender differences in reading achievement were heterogeneous (see Table 3). We therefore conducted further moderator analyses, but the gender equality indicators did not significantly explain the variation in effect sizes (see Table 4).

The overall weighted mean effect size of the gender difference in science achievement was $d = 0.01$ (Table 3), showing that male and female students performed similarly in science. Figure 4A displays the distribution of gender differences in science and displays that almost all effect sizes were negligible or small. Because the heterogeneity measures indicated that the effect sizes were homogeneous (see Table 3), moderator analyses were not conducted.

Gender Differences in Achievement Profiles

In the math–reading profile, mathematically top-performing male students' math achievement clearly exceeded their reading achievement by, on average, 57.65 points (see Table 5). Although female students' math achievement also exceeded their reading achievement, on average, by 22.71 points, the difference between mathematics and reading achievement was less

pronounced for female students than it was for male students. This pattern is also displayed in Figure 5A, showing that male students gravitated toward a strongly mathematics-oriented profile, whereas female students' achievement profiles were somewhat more evenly distributed across the math–reading dimension. Female and male students' math–reading profile distributions had, on average, a nonoverlap of 44%, representing a large effect (Table 5; see Figure 5B for the distribution of effect sizes). Of all male students, 87% scored higher in mathematics than in reading (i.e., 87% demonstrated a math $\text{tilt}_{\text{M–R}}$), whereas 66% of all female students showed stronger achievement tilts in mathematics than in reading (i.e., 66% demonstrated a math $\text{tilt}_{\text{M–R}}$; Table 5).

In the science–reading profile, mathematically top-performing male students performed better in science than in reading, showing a profile score difference of, on average, 32.20 points in favor of science (see Table 5), whereas female students performed almost as well in reading as in science, demonstrating a profile score difference of, on average, 2.08 points in favor of science. Figure 5A shows that male students gravitated toward a strongly science-oriented profile, whereas female students' achievement profiles were more evenly distributed over the science–reading dimension. Female and male students' science–reading profile distributions showed a mean nonoverlap of 42%, representing a large effect (Table 5; see Figure 5B for the distribution of effect sizes). Of all mathematically top-performing male students, 76% showed better achievement in science than in reading (i.e., 76% demonstrated a science $\text{tilt}_{\text{S–R}}$), and 48% of all mathematically top-performing female students demonstrated higher achievement in science than in reading (i.e., 48% demonstrated a science $\text{tilt}_{\text{S–R}}$; Table 5).

In the math–science profile, both male and female students performed better in mathematics than in science, demonstrating profile score differences of, on average, 24.55 and 19.87 points, respectively (Table 5). Figure 5A shows that male and female students'

achievement profiles were somewhat tilted toward mathematics. Female and male students' math–science profile distributions had a nonoverlap of 18% (Table 5; see Figure 5B for the distribution of effect sizes), and thus, gender differences in the math–science profile were small. For 69% of all male students, mathematics was their strongest skill compared with science (i.e., 69% demonstrated a math $\text{tilt}_{\text{M–S}}$). Similarly, 65% of all female students scored higher in mathematics than in science (i.e., they demonstrated a math $\text{tilt}_{\text{M–S}}$; Table 5).

Moderator analyses were performed to investigate whether the heterogeneity in female and male students' profile scores, the percentage of nonoverlap between their distributions of profile scores, and the percentage of female and male students demonstrating a certain tilt in their profile scores (see Table 5) could be predicted by gender equality indicators. The results in Table 6 show that enrollment ratios in tertiary education were associated with female and male students' math–reading profile scores ($b_{\text{female}} = –0.15$, $b_{\text{male}} = –0.12$) and female students' science–reading profile scores ($b_{\text{female}} = –0.10$). The findings indicate that when the percentage of female students enrolled in tertiary education compared with the percentage of male students enrolled in tertiary education is higher, (a) the difference between math and reading scores is smaller for female and male math top performers and (b) the difference between science and reading scores is smaller for female math top performers. Furthermore, women's share of employment in senior and middle management (i.e., legislators, senior officials, managers) predicted the variation in female students' math–science profile scores. That is, the higher the percentage of women in senior and middle management positions, the smaller the difference between students' math and science scores ($b_{\text{female}} = –0.99$).

Gender Differences in Achievement Motivation

With regard to top-performing math students' math motivation, male students reported higher math self-efficacy than female students did. That is, compared with female students, male

students reported feeling more confident about solving a specific math task (d = 0.32; Table 3). Similarly, male students reported higher intentions to focus on math than female students did (i.e., male students reported a higher intention to choose additional math courses in school and beyond compared with additional language or science courses; d = 0.27). Furthermore, male students reported, on average, higher instrumental math motivation (d = 0.16), higher math self-concept (d = 0.15), and greater interest in math (d = 0.10) than female students did. Female students reported higher self-responsibility for failure in mathematics (d = –0.13), higher math anxiety (d = –0.15), and a higher math work ethic (e.g., preparing thoroughly, paying attention in class, positive learning behavior; d = –0.16) than male students did. However, the magnitude of all gender differences in math motivation was small to negligible. The distribution of effect sizes is depicted in Figure 4B. A heterogeneity analysis revealed that for six out of nine math motivation domains effect sizes were significantly heterogeneous (see Table 3). However, gender equality indicators did not account for the variation in effect sizes (see Table 4).

Regarding the verbal motivation of top-performing math students, female students' reports of their reading enjoyment (d = –0.64), their interest in reading (d = –0.50), and their verbal self-concept (d = –0.38; Table 3) were higher than their male counterparts' reports (all moderate effects). Importantly, across all (or almost all) countries, female students reported a higher verbal motivation (Figure 4C). Because effect sizes were heterogeneous for the enjoyment of reading (see Table 3), we performed a moderator analysis for this outcome. As shown in Table 4, gender equality indicators did not account for significant variation in effect sizes.

Table 3 also shows the weighted average effect sizes of seven components of top-performing math students' science achievement motivation: self-concept, general value, enjoyment, self-efficacy, future-oriented motivation, personal value, and instrumental motivation. The distribution of effect sizes is depicted in Figure 4D. Overall, in five out of seven science

achievement motivation domains, gender differences were on average negligible, indicating that among top-performing math students, male and female students' science motivation is more similar than different. Male students reported a higher science self-concept (d = 0.19, small effect) and a higher general value of science (d = 0.12, small effect) than female students did.

In contrast to top-performing math students' general motivation in science, we found gender differences in students' interest in specific science topics. Specifically, female students were more interested in human biology (d = –0.44, moderate effect; Table 3) and in learning more about diseases (d = –0.30, small effect) and plant biology (d = –0.30, small effect) than their male counterparts were. Male students were more interested in the topics motion and forces (d = 0.54), physics (d = 0.40), and energy transformation (d = 0.39); these gender differences were all moderate in size. Figure 4E depicts the distribution of effect sizes. A heterogeneity analysis revealed that the effect sizes for science self-concept, general value of science, science self-efficacy, future-oriented science motivation, enjoyment of science, instrumental science motivation, and interest in physics were heterogeneous (see Table 3). However, the magnitude of the gender differences was not associated with the level of gender equality across countries (see Table 4).

Discussion

For the group of top-performing math students, the body of knowledge on gender differences in precollege factors related to STEM was limited in several ways. For example, data were used from unrepresentative student samples, the focus was exclusively on mathematics, and results were provided for a very small number of selected countries. To address these research gaps, we conducted an integrative data analysis that drew on representative individual participant data of 15-year-olds in 82 countries from six PISA cycles (2000–2015). The first goal of the present study was to examine gender differences in top-performing math students' achievement,

achievement profiles, and achievement motivation in three core academic domains—mathematics, reading, and science. The second goal was to investigate the moderating role of gender equality indicators for gender differences in this group of students. In pursuing these goals, we provide reliable and widely generalize empirical evidence that has been missing from the field of mathematical talent, gender, and STEM.

Gender Differences in Achievement, Achievement Profiles, and Achievement Motivation

An important finding of our study was that—in line with the gender similarities hypothesis (Hyde, 2005, 2014)—female and male students in the top 5% in mathematics were similar in their achievement in mathematics, reading, and science and in 23 out of 30 motivational characteristics. However, we also found strong empirical evidence that there are vital gender differences in top-performing math students' achievement profiles, verbal motivation, and specific science interests as well as in the proportion of female students in the top 5% in mathematics. In the following, we will discuss the observed gender differences.

Gender Differences in Achievement Profiles

The present study is the first to systematically examine gender differences in achievement profiles in top-performing math students. We found that among students in the top 5% in mathematics, male students showed more distinct achievement profiles than female students did: Male students' strongest skill was more often mathematics or science than reading, whereas female students' achievement profiles were more evenly distributed across all achievement domains, especially in the math–reading and science–reading profiles. Importantly, female and male students' math–reading and science–reading profiles did not overlap much. This large lack of overlap underscores the distinctiveness of male and female students' achievement profiles in the group of top-performing math students. A similar pattern of gender differences has been

found for math–verbal achievement profiles in the general population (Coyle et al., 2014, 2015; Dekhtyar et al., 2018).

Gender Differences in Verbal Motivation and Science Interests

The present study is also the first to systematically examine gender differences in verbal and science motivation using meta-analytical techniques for top-performing math students. Regarding gender differences in students' verbal motivation, we found that across (almost) all countries, mathematically top-performing female students reported higher reading enjoyment, interest, and verbal self-concept than male students. These gender gaps are similar to those found in the general population (Brunner et al., 2009; OECD, 2003, 2010; Wilgenbusch & Merell, 1999; see Figure 1 and Table S2).

Moreover, regarding top-performing math students' interest in specific science topics, female students reported greater interest in human biology, diseases, and plant biology, whereas male students were more interested in physics- and engineering-related topics, such as motion and forces, physics, and energy transformations. These results are consistent with gender differences in specific science domains found in the general population, such as in physics (d = 0.56), mechanics and electronics (d = 1.21), engineering (d = 0.83), and medical services (d = –0.40; Su & Rounds, 2015; Figure 2 and Table S2). Our results suggest that gender differences on the "things–people" dimension (i.e., that men prefer working with things or inorganic topics, and women prefer working with people or organic topics, d = 0.93, Su et al., 2009; see also Morris, 2016 and Su & Rounds, 2015) also apply for students scoring at the high end of math ability. Effect sizes were mostly homogenous across PISA cycles and countries. This suggests that gender differences in interest in specific science topics are a rather universal phenomenon.

One possible explanation for female students' tilt toward biological and health interests is provided by the role congruity theory (Diekman & Eagly, 2008; Diekman et al., 2011). Role

congruity theory suggests that women's communal goal orientation intersects with beliefs that STEM careers do not involve helping or working with other people. Consequently, even mathematically talented girls and women frequently choose other activities, courses, or careers that they believe will help them to fulfill their communal goals (Diekman et al., 2010, 2011). Accordingly, female students in the group of top-performing math students might show a stronger interest in biological and health sciences, because they perceive a better match between these fields and communal goals than they perceive for fields such as the physical sciences and engineering.

The Proportion of Female Students in the Group of Top-Performing Math Students

The present study significantly expanded the evidence base on the proportion of female students in the group of top-performing math students by using a more comprehensive and more recent set of data as well as a considerably larger number of countries compared with previous research. We found that, on average, female students were underrepresented in the top 5% in mathematics: Only two out of five students (female-to-male ratio of 1:1.50) in the group of top-performing math students were female. Thus, our results fall within the range of results from previous studies that used representative student data and reported female-to-male ratios between 1:1.09 and 1:4.09 (i.e., Guiso et al., 2008; Hedges & Nowell, 1995; Hyde et al., 2008; Machin & Pekkarinen, 2008; Nowell & Hedges, 1998; Penner, 2008; Reilly et al., 2015; Stoet & Geary, 2013).

The Role of Gender Equality for Gender Differences in Top-Performing Math Students

Based on social role theory and situated expectancy–value theory, gender differences in top-performing math students' achievement, achievement profiles, and achievement motivation should be smaller in societies that have greater gender equality in social roles. Furthermore, differences in students' achievement scores between different (gender-typed) achievement

domains should be smaller in countries that have greater gender equality in social roles. We were able to explain some of the heterogeneity in effect sizes with domain-specific gender equality indicators as moderators. Our results suggested that tertiary enrollment ratios predicted the proportion of female students in the top 5% in mathematics. That is, the proportion of female students was higher when the share of female students enrolled in tertiary education was higher. Relative to previous studies (Guiso et al., 2008; Hyde & Mertz, 2009; Penner, 2008) that used composite gender equality indicators (e.g., the Global Gender Gap Index) that aggregate multiple domains of gender equality into one value, our results point to specific domains of gender equality that may be directly or indirectly responsible for the development of mathematical talent in female students. Furthermore, tertiary enrollment ratios and women's share of employment in senior and middle management in a country predicted mathematically top-performing female and male students' profile scores. For female students, math–reading and science–reading profile scores became less pronounced (i.e., the achievement scores in two domains differed less) when the share of female students enrolled in tertiary education was higher. For male students, this relation was found for their math–reading profile scores. Moreover, female students' scores in mathematics and science differed less when the proportion of women in senior and middle management positions in a country was higher.

However, gender gaps in achievement and achievement motivation in math, reading, and science *within* the group of top-performing math students were not related to domain-specific gender equality indicators. The effect sizes for these gender differences did not vary much within or between countries, as indicated by standard deviations (i.e., τ) of zero or close to zero within countries and at the country level. This might imply that gender differences (and similarities) in achievement and achievement motivation in math, reading, and science within the group of top-performing math students are not context dependent and represent universal phenomena.

However, although our sample of countries is comparably large, data were not available for all countries worldwide (see also the Strengths, Limitations, and Future Research Directions section). This restriction of range may have hampered our ability to detect moderating influences on the relationship between gender equality indicators and gender differences in achievement and achievement motivation in top-performing math students.

Overall, our results suggest that in societies that value higher education for women, more female students score in the top 5% in mathematics. In addition, achievement differences in different domains are smaller for female students (and partially also for male students), the more women study at universities and the more women hold positions in senior and middle management. Thus, the (realistic) perspective of attending a university and entering positions in senior and middle management for female students might (a) motivate female students to develop mathematical talent and (b) motivate female and male students to develop skills in several areas at a more similar level. In sum, our results (at least partially) support the predictions of situated expectancy–value theory and social role theory.

Practical Implications

STEM professions are important to a country's competitiveness and economic well-being (European Institute for Gender Equality, 2017; Halpern et al., 2007). Thus, successfully recruiting talented future professionals in this field is one major concern of modern societies. However, women are still underrepresented in STEM careers, especially in the fields of engineering, physics, and computer science. In 2017, women made up only 29% of the science and engineering workforce but accounted for half of the total college-educated workforce in the U.S. (National Science Board, 2020). Hence, making fuller use of the female talent pool could play a vital role in addressing workforce shortages (e.g., Bureau of Labor Statistics, 2019). Furthermore, working in STEM fields also provides positive benefits for women and men,

because STEM fields usually offer better earning opportunities and better working conditions compared with non-STEM fields (National Science Board, 2016).

In consideration of situated expectancy–value theory's assumption that gender differences in students' values and expectancies for success are vital factors for later gender differences in their occupational choices (Eccles, 1994), gender differences in top-performing math students can have implications for women's underrepresentation in STEM fields. Based on the findings from the present study, we provide the following presumptions.

The still existing preponderance of male students in the talent pool for STEM careers (i.e., at the top of the math achievement distribution), also found in this integrative data analysis, may partly explain women's underrepresentation in STEM. Another potentially contributing factor may be male students' more mathematics-oriented achievement profiles. Having one dominant academic strength is likely to promote higher self-concept in that domain and a clear goal to invest time, effort, and energy into pursuing mathematics-related fields in one's future career. This lines up with our finding that male students reported on average slightly higher math self-concept, self-efficacy, and stronger intentions to choose additional math courses in school and beyond compared with female students. By contrast, having multiple academic strengths is likely to result in more diverse expectancies and self-concepts (Valla & Ceci, 2014) and, consequently, less specific career goals. This is more likely true for mathematically top-performing female students as they had more balanced achievement profiles and stronger verbal motivation than male students. In other words and with a grain of salt: "Those who can only do mathematics, do mathematics, but those with multiple extreme talents may choose to do something else" (Ceci et al., 2009, p. S3). Finally, even if mathematically top-performing female students enter STEM careers, given their specific interests in organic sciences, they would be more likely to work in medical fields or biological sciences than in inorganic sciences. By contrast, top-performing male

students would be more likely to enter inorganic STEM fields, such as physics or engineering, given their respective science interests.

Strengths, Limitations, and Future Research Directions

The findings of the present integrative data analysis represent especially strong scientific evidence because they are based on (a) individual student data (Stewart & Tierney, 2002) from (b) representative, unselective samples of top-performing math students from well-defined populations, namely 15-year-olds in PISA (Hedges & Nowell, 1995; Reilly et al., 2019). Furthermore, we applied state-of-the-art meta-analytical techniques (i.e., accounting for the dependencies between effect sizes in random-effects models, multiple imputation of moderating variables, multivariate metaregressions; Tipton et al., 2019) to synthesize the results obtained from up to 343 student samples. Despite these strengths, the present study has several limitations that should be addressed in future research.

First, an important question in any analysis of "top-performing math students" is how to define this group of students. In line with many previous studies (Guiso et al., 2008; Hedges & Nowell, 1995; Machin & Pekkarinen, 2008; Olszewski-Kubilius & Lee, 2011; Penner, 2008; Roznowski et al., 2000), we chose to define top-performing math students in relative rather than in absolute terms. That is, we chose those students who scored in the top 5% in mathematics in each country rather than selecting those students who achieve, for example, PISA Proficiency Level 4, 5, or 6. Our decision has both (methodological) advantages and disadvantages. One disadvantage in defining top-performing math students in relative terms is that this definition increases the heterogeneity in mathematics achievement in the group of top-performing math students across countries. As a result, at least some of the students in the top 5% in mathematics in the lowest-achieving countries are not top-performing math students in an absolute sense (e.g., some scored at PISA Proficiency Level 2, see Table S5 in the supplemental materials on OSF).

However, choosing an absolute cut-off criterion, such as a specific PISA Proficiency Level, would have negatively affected the results of the present study in two ways. First, the reach of our study would have been limited. In particular, PISA 2000 could not have been used, because Proficiency Levels were not defined for that cycle in mathematics (OECD, 2004). In addition, sample sizes would have varied considerably between high-achieving and low-achieving countries in PISA if we applied absolute cut-off criteria. For high-achieving countries and economic regions such as Singapore or Chinese Taipei, for example, a cut-off at Proficiency Level 5 would result in a large proportion of the population of 15-year-olds belonging to the group of top-performing math students. For lower-achieving countries such as Algeria or Kyrgyzstan, a cut-off at Proficiency Level 4, 5, or 6 would result in sample sizes that were (greatly) reduced compared with those of other countries. Due to these lower sample sizes, the estimation of gender differences would be associated with higher uncertainty in lower-achieving countries than in higher-achieving countries. Higher-achieving countries in this scenario would receive (considerably) more weight in meta-analytic summaries and the meta-regression models. In contrast, using the top 5% of the national distribution of mathematics achievement from each country has the advantage of more comparable sample sizes across countries because of PISA's sampling requirement of at least 4,500 students (or the whole student population) per country (e.g., OECD, 2017b). We therefore achieve a better balance in how country-specific results are weighted in the meta-analytic and metaregression models.

Second, according to the situated expectancy–value theory, educational and occupational choices are assumed to be influenced by intraindividual hierarchies of achievement and motivation in different domains (Eccles, 1994). Within each PISA cycle, achievement measures in several domains are available, whereas the assessment of achievement motivation was focused on a single domain. Consequently, we were able to analyze gender differences in top-performing

math students' achievement profiles but not in their motivational profiles. Gender differences in top-performing math students' motivational profiles should be investigated in future studies. In addition, longitudinal research could investigate whether the interplay between cognitive and motivational profiles predicts top-performing math students' career choices (i.e., STEM vs. non-STEM fields; specific STEM fields).

Third, PISA employs a cross-sectional design. By using these data, we could not explore the impact of the gender differences found in the present study for top-performing math students' future educational and occupational STEM-related choices. Rather, any predictions we made in the present study were based on theoretical assumptions (Eccles, 1994; Wood & Eagly, 2012) and empirical evidence provided by previous longitudinal research.

Fourth, PISA data are obtained from standardized testing. Thus, we cannot completely rule out that our results are affected by stereotype threat effects. Stereotype threat theory predicts that members of a negatively stereotyped group will underperform on standardized tests when (a) that stereotype is made salient or relevant for the task at hand, and (b) they are concerned about being judged or treated negatively on the basis of this stereotype (Spencer et al., 2016). To trigger stereotype threat, "simply sitting down to write a test in a negatively stereotyped domain is enough […]" (Spencer et al., 2016, p. 418). Because math and science are stereotypically male domains and reading is stereotypically a female domain, we could not preclude the possibility that stereotype threat impaired female students' performance in math and science or male students' performance in reading (e.g., Hartley & Sutton, 2013; Pansu et al., 2016; Picho et al., 2013). However, if these effects were present in the PISA assessments, they were probably very small because the typical threat scenarios were not activated (e.g., no verbal or written statement that male students are superior to female students on the test, no priming of female identity; e.g., OECD, 1999, 2005a). Instead, PISA is designed in such a way that student achievement is

assessed first and then students are asked to indicate their gender on a subsequent student questionnaire (OECD, 2002, 2005b, 2009, 2012, 2013, 2017b). Moreover, it should be noted that recent research on stereotype threat in secondary education has shown divergent findings and that the literature seems to be distorted by publication bias (Flore et al., 2018; Flore & Wicherts, 2015; Shewach et al., 2019; Wei, 2012).

Finally, although the present integrative data analysis covered a large number of countries representing about 90% of the world economy (Schleicher, 2007), data were not available for all countries around the world. Participation rates in PISA are especially low in low- and lower-middle-income countries, mainly because participation in PISA is associated with high costs and high demands on the assessment infrastructure of a country (Lockheed et al., 2015). Nevertheless, a more diverse sample of countries would be desirable to draw even more generalizable conclusions. For example, we show in Table S22 in the supplemental online materials on OSF that female students have on average less access to formal schooling at the primary, secondary, and tertiary levels of education in countries that did not participate in PISA than in countries that participated. Thus, it is likely that gender differences would be larger in a more diverse sample.

Conclusions

Knowledge of gender differences in achievement, achievement profiles, and achievement motivation is a critical starting point for educational and psychological research, practice, and policy to target women's underrepresentation in STEM. By capitalizing on representative individual participant data, the present integrative data analysis provides unbiased, precise, and widely generalizable empirical knowledge about the size of gender differences in precollege factors in top-performing math students from 82 countries. First, we showed that, on average, two out of five students in the top 5% in mathematics were female. Second, we found that mathematically top-performing female and male students were similar with regard to their

achievement in mathematics, reading, and science as well as in most characteristics related to achievement motivation in mathematics and science. Third, we provided strong empirical evidence that male students tended to have mathematics-oriented achievement profiles, whereas female students' achievement profile scores were more balanced. Additionally, female students had stronger motivation levels in reading than male students. Fourth, we found important gender differences in top-performing math students' specific science interests: Whereas male students were more interested in learning about physics- and engineering-related topics, female students expressed greater interest in health- and biology-related domains. Fifth, tertiary enrollment ratios and women's share of employment in senior and middle management in students' respective countries were related to the proportion of female students in the top 5% in mathematics and students' achievement profiles. Thus, the extent to which female students' education in a society is valued (i.e., the proportion of women attending university) and women's possibility of breaking the glass ceiling (i.e., the proportion of women occupying higher positions in the labor force) are positively related to the development of mathematical talent in female students as well as to a more similar development of skills in different areas for male and female students. To conclude, our results demonstrate that there are many gender similarities in top-performing math students' achievement and math achievement motivation, but also important gender differences in their achievement profiles as well as their verbal and science motivation at the end of compulsory education. In sum, our findings at (least partially) support the predictions of situated expectancy–value theory and social role theory.

References

Ashmore, R. D., & Del Boca, F. K. (1979). Sex stereotypes and implicit personality theory: Towards a cognitive–social psychological conceptualization. *Sex Roles, 5*(2), 219–248. https://doi.org/10.1007/BF00287932

Baker, D. P., & Jones, D. P. (1993). Creating gender equality: Cross-national gender stratification and mathematical performance. *Sociology of Education, 66*(2), 91–103. https://doi.org/10.2307/2112795

Baye, A., & Monseur, C. (2016). Gender differences in variability and extreme scores in an international context. *Large-scale Assessments in Education, 4*, 1. https://doi.org/10.1186/s40536-015-0015-x

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Wiley. https://doi.org/10.1002/9780470743386

Bosco, F. A., Aguinis, H., Singh, K., Field, J. G., & Pierce, C. A. (2015). Correlational effect size benchmarks. *Journal of Applied Psychology, 100*(2), 431–449. https://dx.doi.org/10.1037/a0038047

Breda, T., & Napp, C. (2019). Girls' comparative advantage in reading can largely explain the gender gap in math-related fields. *Proceedings of the National Academy of Sciences of the United States of America, 116*(31), 15435–15440. https://doi.org/10.1073/pnas.1905779116

Brunner, M., Keller, U., Hornung, C., Reichert, M., & Martin, R. (2009). The cross-cultural generalizability of a new structural model of academic self-concepts. *Learning and Individual Differences, 19*(4), 387–403. https://doi.org/10.1016/j.lindif.2008.11.008

Bureau of Labor Statistics. (2019). *Computer and information research scientist.* Retrieved from https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm

Ceci, S. J., Ginther, D. K., Kahn, S., & Williams, W. M. (2014). Women in academic science: A changing landscape. *Psychological Science in the Public Interest, 15*(3), 75–141. https://doi.org/10.1177/1529100614541236

Ceci, S. J., Williams, W. M., & Barnett, S. M. (2009). Women's underrepresentation in science: Sociocultural and biological considerations. *Psychological Bulletin, 135*(2), 218–261. https://doi.org/10.1037/a0014412

Cheung, M. W.-L. (2015). metaSEM: An R package for meta-analysis using structural equation modeling. *Frontiers in Psychology, 5*, 1521. https://doi.org/10.3389/fpsyg.2014.01521

Cheung, M. W.-L., & Jak, S. (2016). Analyzing big data in psychology: A split/analyze/meta-analyze approach. *Frontiers in Psychology, 7*, 738. https://doi.org/10.3389/fpsyg.2016.00738

Cochran, W. G. (1954). The combination of estimates from different experiments. *Biometrics, 10*(1), 101–129. https://doi.org/10.2307/3001666

Cohen, J. (1988). *Statistical power analysis for the behavioral science*. Erlbaum.

Committee on Public Understanding of Engineering Messages. (2008). *Changing the conversation: Messages for improving public understanding of engineering.* The National Academies Press. https://doi.org/10.17226/12187

Coyle, T. R., Purcell, J. M., Snyder, A. C., & Richmond, M. C. (2014). Ability tilt on the SAT and ACT predicts specific abilities and college majors. *Intelligence, 46,* 18–24. https://doi.org/10.1016/j.intell.2014.04.008

Coyle, T. R., Snyder, A. C., & Richmond, M. C. (2015). Sex differences in ability tilt: Support for investment theory. *Intelligence, 50,* 209–220. https://doi.org/10.1016/j.intell.2015.04.012

Cunningham, C., & Lachapelle, C. P., & Lindgren-Streicher, A. (2005, June). *Assessing elementary school students' conceptions of engineering and technology* [Paper presentation]. Paper presented at the Annual Conference of the American Society of Engineering Education, Portland, Oregon, USA. https://doi.org/10.18260/1-2--14836

Curran, P. J. (2009). The seemingly quixotic pursuit of a cumulative psychological science: Introduction to the special issue. *Psychological Methods, 14*(2), 77–80. https://doi.org/10.1037/a0015972

Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods, 14*(2), 81–100. https://doi.org/10.1037/a0015914

Dekhtyar, S., Weber, D., Helgertz, J., & Herlitz, A. (2018). Sex differences in academic strengths contribute to gender segregation in education and occupation: A longitudinal examination of 167,776 individuals. *Intelligence, 67,* 84–92. https://doi.org/10.1016/j.intell.2017.11.007

Diekman, A. B., Brown, E., Johnston, A., & Clark, E. (2010). Seeking congruity between goals and roles: A new look at why women opt out of STEM careers. *Psychological Science, 21*(8), 1051–1057. https://doi.org/10.1177/0956797610377342

Diekman, A. B., Clark, E. K., Johnston, A. M., Brown, E. R., & Steinberg, M. (2011). Malleability in communal goals and beliefs influences attraction to stem careers: Evidence for a goal congruity perspective. *Journal of Personality and Social Psychology, 101*(5), 902–918. https://doi.org/10.1037/a0025199

Diekman, A. B., & Eagly, A. H. (2008). Of men, women, and motivation: A role congruity account. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 434–447). Guilford Press.

Diekman, A. B., & Steinberg, M. (2013). Navigating social roles in pursuit of important goals: A communal goal congruity account of STEM pursuits. *Social and Personality Psychology Compass, 7*(7), 487–501. https://doi.org/10.1111/spc3.12042

Diekman, A. B., Steinberg, M., Brown, E. R., Belanger, A. L., & Clark, E. K. (2017). A goal congruity model of role entry, engagement, and exit: Understanding communal goal processes in STEM gender gaps. *Personality and Social Psychology Review, 21*(2), 142–175. https://doi.org/10.1177/1088868316642141

Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation.* Erlbaum.

Eagly, A. H. (2013). The science and politics of comparing women and men: A reconsideration. In M. K. Ryan & N. R. Branscombe, *The SAGE handbook of gender and psychology* (pp. 11–28). SAGE Publications Inc. https://doi.org/10.4135/9781446269930.n2

Eagly, A. H., Nater, C., Miller, D. I., Kaufmann, M., & Sczesny, S. (2020). Gender stereotypes have changed: A cross-temporal meta-analysis of U.S. public opinion polls from 1946 to 2018. *American Psychologist 75*(3), 301–315. https://doi.org/10.1037/amp0000494

Eccles, J. S. (1994). Understanding women's educational and occupational choices. *Psychology of Women Quarterly, 18*(4), 585–609. https://doi.org/10.1111/j.1471-6402.1994.tb01049.x

Eccles (Parsons), J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meeee, J. L., & Midgley, C. (1983). Expectations, values and academic behaviors. In J. T. Spence (Ed.), *Perspective on achievement and achievement motivation* (pp. 75–146). Freeman.

Eccles, J. S., & Wigfield, A. (2020). From expectancy–value theory to situated expectancy–value theory: A developmental, social cognitive, and sociocultural perspective on motivation.

Contemporary Educational Psychology, 61, 101859. https://doi.org/10.1016/j.cedpsych.2020.101859

Else-Quest, N. M., & Grabe, S. (2012). The political is personal: Measurement and application of nation-level indicators of gender equity in psychological research. *Psychology of Women Quarterly, 36*(2), 131–144. https://doi.org/10.1177/0361684312441592

Else-Quest, N. M., Hyde, J. S., & Linn, M. C. (2010). Cross-national patterns of gender differences in mathematics: A meta-analysis. *Psychological Bulletin, 136*(1), 103–127. https://doi.org/10.1037/a0018053

European Institute for Gender Equality. (2017). *Economic benefits of gender equality in the EU: How gender equality in STEM education leads to economic growth.* EU Publications Office. https://doi.org/10.2839/652355

Eurostat. (2020). *Graduates by education level, programme orientation, sex and field of education.* https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

Evans, C. D., & Diekman, A. B. (2009). On motivated role selection: Gender beliefs, distant goals, and career preferences. *Psychology of Women Quarterly, 33*, 235–249. https://doi.org/10.1111/j.1471-6402.2009.01493.x

Flore, P. C., Mulder, J., & Wicherts, J. M. (2018). The influence of gender stereotype threat on mathematics test scores of Dutch high school students: A Registered Report. *Comprehensive Results in Social Psychology, 3*(2), 140–174. https://doi.org/10.1080/23743603.2018.1559647

Flore, P. C., & Wicherts, J. M. (2015). Does stereotype threat influence performance of girls in stereotyped domains? A meta-analysis. *Journal of School Psychology, 53*(1), 25–44. https://doi.org/10.1016/j.jsp.2014.10.002

Goulas, S., Griselda, S., & Megalokonomou, R. (2020). Comparative advantage and gender gap in STEM. *IZA* (Discussion Paper, No. 13313).

Graham, E. K., Weston, S. J., Gerstorf, D., Yoneda, T. B., Booth, T., Beam, C. R., Petkus, A. J., Drewelies, J., Hall, A. N., Bastarache, E. D., Estabrook, R., Katz, M. J., Turiano, N. A., Lindenberger, U., Smith, J., Wagner, G. G., Pedersen, N. L., Allemand, M., Spiro III, A., … Mroczek, D. K. (2020). Trajectories of big five personality traits: A coordinated analysis of 16 longitudinal samples. *European Journal of Personality, 34*(3), 301–321. https://doi.org/10.1002/per.2259

Grund, S., Lüdtke, O., & Robitzsch, A. (2018). Multiple imputation of missing data for multilevel models: Simulations and recommendations. *Organizational Research Methods, 21*(1), 111–149. https://doi.org/10.1177/1094428117703686

Guiso, L., Monte, F., Sapienza, P., & Zingales, L. (2008). Diversity. Culture, gender, and math. *Science, 320*(5880), 1164–1165. https://doi.org/10.1126/science.1154094

Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S., & Gernsbacher, M. A. (2007). The science of sex differences in science and mathematics. *Psychological Science in the Public Interest, 8*(1), 1–51. https://doi.org/10.1111/j.1529-1006.2007.00032.x

Hartley, B. L., & Sutton, R. M. (2013). A stereotype threat account of boys' academic underachievement. *Child Development, 84*(5), 1716–1733. https://doi.org/10.1111/cdev.12079

Hedges, L. V., & Nowell, A. (1995). Sex differences in mental test scores, variability, and numbers of high-scoring individuals. *Science, 269*(5220), 41–45. https://doi.org/10.1126/science.7604277

Hempel, S., Miles, J. N., Booth, M. J., Wang, Z., Morton, S. C., & Shekelle, P. G. (2013). Risk of bias: A simulation study of power to detect study-level moderator effects in meta-analysis. *Systematic Reviews, 2*(1), 107. https://doi.org/10.1186/2046-4053-2-107

Hemphill, J. F. (2003). Interpreting the magnitudes of correlation coefficients. *American Psychologist, 58*(1), 78–80. https://doi.org/10.1037/0003-066X.58.1.78

Higgins, J. P. T., & Green, S. (Eds.) (2011). *Cochrane handbook for systematic reviews of interventions* (Version 5.1.0, updated March 2011). The Cochrane Collaboration. www.handbook.cochrane.org.

Higgins, J. P. T., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21,* 1539–1558. https://doi:10.1002/sim.1186

Hofer, S. M., & Piccinin, A. M. (2009). Integrative data analysis through coordination of measurement and analysis protocol across independent longitudinal studies. *Psychological Methods, 14*(2), 150–164. https://doi.org/10.1037/a0015566

Huedo-Medina, T. B., Sánchez-Meca, J., Marín-Martínez, F., & Botella, J. (2006). Assessing heterogeneity in meta-analysis: Q statistic or I^2 index? *Psychological Methods*, *11*(2), 193–206. https://doi.org/10.1037/1082-989X.11.2.193

Hunter, J. E., & Schmidt, F. L. (1996). Cumulative research knowledge and social policy formulation: The critical role of meta-analysis. *Psychology, Public Policy, and Law, 2*(2), 324–347. https://doi.org/10.1037/1076-8971.2.2.324

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60*(6), 581–592. https://dx.doi.org/10.1037/0003-066X.60.6.581

Hyde, J. S. (2014). Gender similarities and differences. *Annual Review of Psychology, 65*(1), 373–398. https://doi.org/10.1146/annurev-psych-010213-115057

Hyde, J. S., Fennema, E., & Lamon, S. J. (1990). Gender differences in mathematics performance: A meta-analysis. *Psychological Bulletin, 107*(2), 139–155. https://dx.doi.org/10.1037/0033-2909.107.2.139

Hyde, J. S., Fennema, E., Ryan, M., Frost, L. A., & Hopp, C. (1990). Gender comparisons of mathematics attitudes and affect. *Psychology of Women Quarterly, 14*(3), 299–324. https://doi.org/10.1111/j.1471-6402.1990.tb00022.x

Hyde, J. S., Lindberg, S. M., Linn, M. C., Ellis, A. B., & Williams, C. C. (2008). Diversity. Gender similarities characterize math performance. *Science, 321*(5888), 494–495. https://doi.org/10.1126/science.1160364

Hyde, J. S., & Mertz, J. E. (2009). Gender, culture, and mathematics performance. *Proceedings of the National Academy of Sciences, 106*(22), 8801–8807. https://doi.org/10.1073/pnas.0901265106

Jacobs, J., Davis-Kean, P., Bleeker, M., Eccles, J., & Malanchuk, O. (2005). "I can, but I don't want to": The impact of parents, interests, and activities on gender differences in math. In A. Gallagher & J. Kaufman (Eds.), *Gender differences in mathematics: An integrative psychological approach* (pp. 73–98). Cambridge University Press.

Koenig, A. M., & Eagly, A. H. (2014). Evidence for the social role theory of stereotype content: Observations of groups' roles shape stereotypes. *Journal of Personality and Social Psychology, 107*(3), 371–392. https://doi.org/10.1037/a0037215

Lindberg, S. M., Hyde, J. S., Petersen, J. L., & Linn, M. C. (2010). New trends in gender and mathematics performance: A meta-analysis. *Psychological Bulletin, 136*(6), 1123–1135. https://doi.org/10.1037/a0021276

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis.* Sage.

Lockheed, M., Prokic-Bruer, T., & Shadrova, A. (2015). *The experience of middle-income countries participating in PISA 2000-2015.* OECD Publishing/World Bank. https://doi.org/10.1787/9789264246195-en

Lohman, D. F., Gambrell, J., & Lakin, J. (2008). The commonality of extreme discrepancies in the ability profiles of academically gifted students. *Psychology Science, 50*(2), 269–282.

Lubinski, D., & Benbow, C. P. (2006). Study of mathematically precocious youth after 35 years: Uncovering antecedents for the development of math-science expertise. *Perspectives on Psychological Science, 1*(4), 316–345. https://doi.org/10.1111/j.1745-6916.2006.00019.x

Lubinski, D., Webb, R. M., Morelock, M. J., & Benbow, C. P. (2001). Top 1 in 10,000: A 10-year follow-up of the profoundly gifted. *Journal of Applied Psychology, 86*(4), 718–729. https://doi.org/1037//0021-9010.86.4.718

Lytton, H., & Romney, D. M. (1991). Parents' differential socialization of boys and girls: A meta-analysis. *Psychological Bulletin, 109*(2), 267–296. https://doi.org/10.1037/0033-2909.109.2.267

Machin, S., & Pekkarinen, T. (2008). Assessment. Global sex differences in test score variability. *Science, 322*(5906), 1331–1332. https://doi.org/10.1126/science.1162573

Makel, M. C., Wai, J., Peairs, K., & Putallaz, M. (2016). Sex differences in the right tail of cognitive abilities: An update and cross cultural extension. *Intelligence, 59,* 8–15. https://doi.org/10.1016/j.intell.2016.09.003

McDaniel, A. (2016). The role of cultural contexts in explaining cross-national gender gaps in STEM expectations. *European Sociological Review, 32*(1), 122–133. https://doi.org/10.1093/esr/jcv078

Meece, J. L., Eccles-Parsons, J., Kaczala, C. M., Goff, S. B., & Futterman, R. (1982). Sex differences in math achievement: Toward a model of academic choice. *Psychological Bulletin, 91*(2), 324–348. https://dx.doi.org/10.1037/0033-2909.91.2.324

Meehl, P. E. (1978). Theoretical risks and tabular asterisks: Sir Karl, Sir Ronald, and the slow progress of soft psychology. *Journal of Consulting and Clinical Psychology, 46*(4), 806–834. https://doi.org/10.1037/0022-006X.46.4.806

Miller, D. I., Eagly, A. H., & Linn, M. C. (2015). Women's representation in science predicts national gender-science stereotypes: Evidence from 66 nations. *Journal of Educational Psychology, 107*(3), 631–644. https://doi.org/10.1037/edu0000005

Miller, D. I., & Halpern, D. F. (2014). The new science of cognitive sex differences. *Trends in Cognitive Sciences, 18*(1), 37–45. https://doi.org/10.1016/j.tics.2013.10.011

Morris, M. L. (2016). Vocational interests in the United States: Sex, age, ethnicity, and year effects. *Journal of Counseling Psychology, 63*(5), 604–615. https://doi.org/10.1037/cou0000164

National Science Board. (2016). *Science and engineering indicators 2016*. National Science Foundation. https://www.nsf.gov/nsb/publications/2016/nsb20161.pdf

National Science Board (2020). *Science and engineering indicators 2020: The state of U.S. science and engineering.* National Science Foundation. https://ncses.nsf.gov/pubs/nsb20201/

Nosek, B. A., Smyth, F. L., Sriram, N., Lindner, N. M., Devos, T., Ayala, A., Yoav Bar-Anana, Y., Berghd, R., Caie, H., Gonsalkoralef, K., Kesebira, S., Maliszewskig, N., Netoh, F., Ollii, E., Parkj, J., Schnabelk, K., Shiomural, K., Tulburem, B. T., Wiersn, R. W., … Greenwald, A. G. (2009). National differences in gender–science stereotypes predict national sex differences in science and math achievement. *Proceedings of the National*

Academy of Sciences of the United States of America, *106*(26), 10593–10597. https://doi.org/10.1073/pnas.0809921106

Nowell, A., & Hedges, L. V. (1998). Trends in gender differences in academic achievement from 1960 to 1994: An analysis of differences in mean, variance, and extreme scores. *Sex Roles, 39*(1–2), 21–43. https://doi.org/10.1023/A:1018873615316

OECD. (1999). *Test administrator's manual.* https://www.acer.org/files/pisa2000_test_administrator_manual.pdf

OECD. (2002). *PISA 2000 technical report.* OECD Publishing.

OECD. (2003). *Learners for life: Student approaches to learning–Results from PISA 2000.* OECD Publishing. https://doi.org/10.1787/19963777

OECD. (2004). *Learning for tomorrow's world: First results from PISA 2003.* OECD Publishing. https://doi.org/10.1787/9789264006416-en

OECD. (2005a). *PISA 2003 technical report*. OECD Publishing.

OECD. (2005b). *Test administrator's manual.* https://www.acer.org/files/pisa2006_test_administrator_manual.pdf

OECD. (2009). *PISA 2006 technical report.* OECD Publishing.

OECD. (2010). *PISA 2009 results: Learning to learn–Student engagement, strategies and practices* (Vol. III). OECD Publishing. https://dx.doi.org/10.1787/9789264083943-en

OECD. (2012). *PISA 2009 technical report.* OECD Publishing.

OECD. (2013). *PISA 2012 assessment and analytical framework: Mathematics, reading, science, problem solving and financial literacy.* OECD Publishing. https://dx.doi.org/10.1787/9789264190511-en

OECD. (2014). *PISA 2012 technical report.* OECD Publishing.

OECD. (2016). *PISA 2015 results (Vol. I): Excellence and equity in education*. OECD Publishing. http://dx.doi.org/10.1787/9789264266490-en

OECD. (2017a). *PISA 2015 assessment and analytical framework: Science, reading, mathematic, financial literacy and collaborative problem solving* (revised ed.). OECD Publishing. http://dx.doi.org/10.1787/9789264281820-en

OECD. (2017b). *PISA 2015 technical report.* OECD Publishing.

Olszewski-Kubilius, P., & Lee, S. Y. (2011). Gender and other group differences in performance on off-level tests: Changes in the 21st century. *Gifted Child Quarterly, 55*(1), 54–73. https://doi.org/10.1177/0016986210382574

Pansu, P., Régner, I., Max, S., Colé, P., Nezlek, J. B., & Huguet, P. (2016). A burden for the boys: Evidence of stereotype threat in boys' reading performance. *Journal of Experimental Social Psychology, 65*, 26–30. https://doi.org/10.1016/j.jesp.2016.02.008

Park, G., Lubinski, D., & Benbow, C. P. (2007). Contrasting intellectual patterns predict creativity in the arts and sciences: Tracking intellectually precocious youth over 25 years. *Psychological Science, 18*(11), 948–952. https://doi.org/10.1111/j.1467-9280.2007.02007.x

Penner, A. M. (2008). Gender differences in extreme mathematical achievement: An international perspective on biological and social factors. *American Journal of Sociology, 114*(S1), S138–S170. https://doi.org/10.1016/j.ssresearch.2007.06.012

Picho, K., Rodriguez, A., & Finnie, L. (2013). Exploring the moderating role of context on the mathematics performance of females under stereotype threat: A meta-analysis. *The Journal of Social Psychology, 153*(3), 299–333. https://doi.org/10.1080/00224545.2012.737380

Pigott, T. D. (2019). Missing data in meta-analysis (pp. 367–382). In H. Cooper, L. V. Hedges, & J. C. Valentine, *The handbook of research synthesis and meta-analysis* (3rd ed., pp. 367–382). Russell Sage Foundation.

R Core Team. (2019). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Reilly, D. (2012). Gender, culture, and sex-typed cognitive abilities. *PLoS One, 7*(7), e39904. https://doi.org/10.1371/journal.pone.0039904

Reilly, D., Neumann, D. L., & Andrews, G. (2015). Sex differences in mathematics and science achievement: A meta-analysis of National Assessment of Educational Progress assessments. *Journal of Educational Psychology, 107*(3), 645–662. https://doi.org/10.1037/edu0000012

Reilly, D., Neumann, D. L., & Andrews, G. (2019). Gender differences in reading and writing achievement: Evidence from the National Assessment of Educational Progress (NAEP). *American Psychologist, 74*(4), 445–458. https://doi.org/10.1037/amp0000356

Riegle-Crumb, C. (2005). The cross-national context of the gender gap in math and science. In L. Hedges & B. Schneider (Eds.), *The social organization of schooling* (pp. 227–243). Russell Sage Foundation.

Roznowski, M., Reith, J., & Hong, S. (2000). A further look at youth intellectual giftedness and its correlates: Values, interests, performance, and behavior. *Intelligence, 28*(2), 87–113. https://doi.org/10.1016/S0160-2896(99)00032-X

Schleicher, A. (2007). Can competencies assessed by PISA be considered the fundamental school knowledge 15-year-olds should possess? *Journal of Educational Change, 8*(4), 349–357. https://doi.org/10.1007/s10833-007-9042-x

Sczesny, S., Nater, C., & Eagly, A. H. (2019). Agency and communion: Their implications for gender stereotypes and gender identities. In A. E. Abele & B. Wojciszke (Eds.), *Agency and communion in social psychology. Current issues in social psychology* (pp. 103–116). Routledge.

Shewach, O. R., Sackett, P. R., & Quint, S. (2019). Stereotype threat effects in settings with features likely versus unlikely in operational test settings: A meta-analysis. *Journal of Applied Psychology, 104*(12), 1514–1534. https://doi.org/10.1037/apl0000420

Shrout, P. E. (2009). Short and long views of integrative data analysis: Comments on contributions to the special issue. *Psychological Methods, 14*(2), 177–181. https://doi.org/10.1037/a0015953

Soderberg, C. K. (2018). Using OSF to share data: A step-by-step guide. *Advances in Methods and Practices in Psychological Science, 1,* 115–120. https://doi.org/10.1177/2515245918757689

Spencer, S. J., Logel, C., & Davies, P. G. (2016). Stereotype threat. *Annual Review of Psychology, 67,* 415–437. https://doi.org/10.1146/annurev-psych-073115-103235

Stewart, L. A., & Tierney, J. F. (2002). To IPD or not to IPD? Advantages and disadvantages of systematic reviews using individual patient data. *Evaluation & the Health Professions, 25*(1), 76–97. https://doi.org/10.1177/0163278702025001006

Stoet, G., & Geary, D. C. (2013). Sex differences in mathematics and reading achievement are inversely related: Within-and across-nation assessment of 10 years of PISA data. *PLoS One, 8*(3), e57988. https://doi.org/10.1371/journal.pone.0057988

Stoet, G., & Geary, D. C. (2015). Sex differences in academic achievement are not related to political, economic, or social equality. *Intelligence, 48,* 137–151. https://doi.org/10.1016/j.intell.2014.11.006

Stoet, G., & Geary, D. C. (2018). The gender-equality paradox in science, technology, engineering, and mathematics education. *Psychological Science, 29*(4), 581–593. https://doi.org/10.1177/0956797617741719

Su, R., & Rounds, J. (2015). All STEM fields are not created equal: People and things interests explain gender disparities across STEM fields. *Frontiers in Psychology, 6*, 189. https://doi.org/10.3389/fpsyg.2015.00189

Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin, 135*(6), 859–884. https://doi.org/10.1037/a0017364

Tipton, E., Pustejovsky, J. E., & Ahmadi, H. (2019). Current practices in meta-regression in psychology, education, and medicine. *Research Synthesis Methods, 10*(2), 180–194. https://doi.org/10.1002/jrsm.1339

Valentine, J. C., Pigott, T. D., & Rothstein, H. R. (2010). How many studies do you need? A primer on statistical power for meta-analysis. *Journal of Educational and Behavioral Statistics, 35*(2), 215–247. https://doi.org/10.3102/1076998609346961

Valla, J. M., & Ceci, S. J. (2014). Breadth-based models of women's underrepresentation in STEM fields: An integrative commentary on Schmidt (2011) and Nye et al. (2012). *Perspectives on Psychological Science, 9*(2), 219–224. https://doi.org/10.1177/1745691614522067

van Erp, S., Verhagen, J., Grasman, R. P. P. P., & Wagenmakers, E.-J. (2017). Estimates of between-study heterogeneity for 705 meta-analyses reported in Psychological Bulletin from 1990–2013. *Journal of Open Psychology Data, 5*(1), 4. https://doi.org/10.5334/jopd.33

Wai, J., Hodges, J., & Makel, M. C. (2018). Sex differences in ability tilt in the right tail of cognitive abilities: A 35-year examination. *Intelligence, 67,* 76–83. https://doi.org/10.1016/j.intell.2018.02.003

Wang, M. T., & Degol, J. (2013). Motivational pathways to STEM career choices: Using expectancy–value perspective to understand individual and gender differences in STEM fields. *Developmental Review, 33*(4), 304–340. https://doi.org/10.1016/j.dr.2013.08.001

Wang, M. T., & Degol, J. L. (2017). Gender gap in science, technology, engineering, and mathematics (STEM): Current knowledge, implications for practice, policy, and future directions. *Educational Psychology Review, 29*(1), 119–140. https://doi.org/10.1007/s10648-015-9355-x

Wang, M. T., Eccles, J. S., Kenny, S. (2013). Not lack of ability but more choice: Individual and gender differences in choice of careers in science, technology, engineering, and mathematics. *Psychological Science, 24*(5), 770–775. https://doi.org/10.1177/0956797612458937

Wang, M. T., Ye, F., & Degol, J. L. (2017). Who chooses STEM careers? Using a relative cognitive strength and interest model to predict careers in science, technology, engineering, and mathematics. *Journal of Youth and Adolescence, 46*(8), 1805–1820. https://doi.org/10.1007/s10964-016-0618-8

Wei, T. E. (2012). Sticks, stones, words, and broken bones: New field and lab evidence on stereotype threat. *Educational Evaluation and Policy Analysis, 34*(4), 465–488. https://doi.org/10.3102/0162373712452629

Wickham, H. (2009). *Elegant graphics for data analysis (ggplot2).* Springer.

Wigfield, A., & Eccles, J. S. (2020). 35 years of research on students' subjective task values and motivation: A look back and a look forward. In A. J. Elliot (Ed.), *Advances in motivation science* (Vol. 7, pp. 161–198). Elsevier. https://doi.org/10.1016/bs.adms.2019.05.002

Wilgenbusch, T., & Merrell, K. W. (1999). Gender differences in self-concept among children and adolescents: A meta-analysis of multidimensional studies. *School Psychology Quarterly, 14*(2), 101–120. https://doi.org/10.1037/h0089000

Wood, W., & Eagly, A. H. (2012). Biosocial construction of sex differences and similarities in behavior. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 46, pp. 55–123). Academic Press. https://doi.org/10.1016/B978-0-12-394281-4.00002-7

Table 1

Number of Participating Countries, Sample Sizes, and Mean Percentages of Female Students ($\%_F$) in the Full PISA Sample and in the Sample Used in the Present Study (Top-Performing Math Students) per Cycle and in Total

	Full PISA sample			Top 5% in mathematics		
PISA	Countries	*N*	$\%_F$	Countries	*N*	$\%_F$
2000	43	127,388	50	42	6,314	39
2003	41	276,165	50	40	13,752	37
2006	57	398,750	51	56	19,920	39
2009	73	515,958	51	72	25,781	40
2012	65	480,174	50	64	23,994	39
2015	69	482,067	50	69	24,103	41
Total	83	2,280,502	50	82	113,864	40

Note. PISA = Programme for International Student Assessment. In PISA 2015, data from Argentina, Malaysia, and Kazakhstan were not included because either their population or construct were inadequately covered (OECD, 2017b). Spain additionally assessed its 17 adjudicated regions in PISA 2015. These data were not included in the present study or in this table. Furthermore, the US additionally assessed a subsample of federal states (in PISA 2012 and 2015) and Puerto Rico (PISA 2015), which were not analyzed due to data policies designed to protect the confidentiality of individually identifiable information.

Table 2

Indicators of Gender Equality Used in the Present Study

Indicator	Description	Cycles
Women's share of employment in senior and middle management[a,b]	Percentage of senior and middle management positions held by women (i.e., in decision-making and management roles in government, large enterprises, and institutions)	ILO: 2006, 2009, 2012, 2015 UN: 2000, 2012, 2015
Women's share of research positions[c,d]	Percentage of research positions held by women	OECD: 2000, 2003, 2006, 2009, 2012, 2015 UNESCO: 2000, 2003, 2006, 2009, 2012, 2015
Primary enrollment ratio[c]	Ratio of the percentages of female (numerator) and male students (denominator) in the population of official school-age students enrolled in primary education	2000, 2003, 2006, 2009, 2012, 2015
Secondary enrollment ratio[c]	Ratio of the percentages of female (numerator) and male students (denominator) in the population of official school-age students enrolled in secondary education	2000, 2003, 2006, 2009, 2012, 2015
Tertiary enrollment ratio[c]	Ratio of the percentages of female (numerator) and male students (denominator) in the population of official school-age students enrolled in tertiary education	2000, 2003, 2006, 2009, 2012, 2015

Note. For all indicators, higher values indicate greater gender equality; ILO = International Labour Organization; UN = United Nations; OECD = Organisation for Economic Co-operation and Development. UNESCO = United Nations Educational, Scientific, and Cultural Organization.
[a]Available from https://hdr.undp.org/. [b]Available from https://ilostat.ilo.org/data/. [c]Available from https://data.uis.unesco.org. [d]Available from https://stats.oecd.org.

Table 3

Meta-Analytic Results on Gender Differences in Achievement and Achievement Motivation in the Group of Top-Performing Math Students (Top 5%)

Outcome	ES	M_w	95% CI	$N_{countries}$	k	Q	τ_{total}	τ_{Level2}	τ_{Level3}	I^2_{total}	I^2_{Level2}	I^2_{Level3}	MA
Percentage of female students in the top 5% in mathematics	%	40.02	[38.83, 41.21]	82	343	4879.87***	5.86	2.95	5.06	94†	24	70	✓
Gender differences in achievement													
Math	*d*	0.05	[0.03, 0.06]	82	343	29.41	0.00	0.00	0.00	0	0	0	
Reading	*d*	–0.23	[–0.25, –0.21]	82	342	610.64***	0.12†	0.12	0.00	46†	46	0	✓
Science	*d*	0.01	[–0.01, 0.02]	82	343	104.65	0.00	0.00	0.00	0	0	0	
Gender differences in math motivation													
Self-efficacy	*d*	0.32	[0.28, 0.35]	65	104	159.18***	0.10	0.00	0.10	39†	0	39	✓
Intention	*d*	0.27	[0.23, 0.31]	64	64	96.11**	0.09	–	–	35†	–	–	✓
Instrumental motivation	*d*	0.16	[0.13, 0.19]	66	137	164.40*	0.08	0.00	0.08	22	0	22	✓
Self-concept	*d*	0.15	[0.12, 0.18]	66	137	175.72*	0.08	0.00	0.08	28	0	28	✓
Interest	*d*	0.10	[0.07, 0.13]	66	137	163.21	0.08	0.00	0.08	24	0	24	
Subjective norms	*d*	0.01	[–0.03, 0.04]	64	64	89.00*	0.08	–	–	29	–	–	✓
Attribution of failure	*d*	–0.13	[–0.16, –0.09]	64	64	66.33	0.05	–	–	17	–	–	
Anxiety	*d*	–0.15	[–0.18, –0.12]	65	104	141.87**	0.09	0.03	0.08	34†	4	31	✓
Work ethic	*d*	–0.16	[–0.20, –0.12]	64	64	80.00	0.08	–	–	26	–	–	
Gender differences in reading motivation													
Verbal self-concept	*d*	–0.38	[–0.46, –0.30]	33	33	35.49	0.09	–	–	14	–	–	
Interest	*d*	–0.50	[–0.57, –0.44]	33	33	29.93	0.02	–	–	1	–	–	
Enjoyment	*d*	–0.64	[–0.69, –0.60]	73	114	248.75***	0.15†	0.00	0.15	58†	0	58	✓
Gender differences in science motivation													
Self-concept	*d*	0.19	[0.14, 0.23]	56	56	110.00***	0.11	–	–	50†	–	–	✓
General value	*d*	0.12	[0.08, 0.16]	56	56	75.13*	0.08	–	–	29	15	15	✓
Self-efficacy	*d*	0.07	[0.04, 0.11]	72	124	232.95***	0.12†	0.00	0.12	51†	0	51	✓
Future-oriented motivation	*d*	0.05	[0.00, 0.11]	56	56	111.08***	0.13†	–	–	50†	–	–	✓
Enjoyment	*d*	0.07	[0.03, 0.10]	72	124	193.50***	0.10	0.00	0.10	43†	0	43	✓

(table continues)

Table 3 *(Continued)*

Outcome	ES	M_w	95% CI	$N_{countries}$	k	Q	τ_{total}	τ_{Level2}	τ_{Level3}	I^2_{total}	I^2_{Level2}	I^2_{Level3}	MA
Gender differences in science motivation													
Personal value	*d*	0.05	[0.01, 0.08]	56	56	62.45	0.05	–	–	14	–	–	
Instrumental motivation	*d*	0.00	[–0.02, 0.03]	72	124	155.36*	0.07	0.04	0.06	26	7	20	✓
Gender differences in science interest													
Motion and forces	*d*	0.54	[0.50, 0.58]	55	55	69.06	0.07	–	–	22	–	–	
Physics	*d*	0.40	[0.35, 0.44]	56	56	88.81**	0.11	–	–	37†	–	–	✓
Energy transformation	*d*	0.39	[0.36, 0.43]	55	55	65.66	0.05	–	–	15	–	–	
History of the universe	*d*	0.14	[0.10, 0.17]	55	55	47.36	0.00	–	–	0	–	–	
Chemistry	*d*	0.06	[0.02, 0.10]	56	56	67.02	0.06	–	–	17	–	–	
Geology	*d*	0.04	[0.01, 0.08]	56	56	32.44	0.00	–	–	0	–	–	
Astronomy	*d*	–0.04	[–0.08, –0.01]	56	56	40.81	0.00	–	–	0	–	–	
Biosphere	*d*	–0.11	[–0.15, –0.08]	55	55	38.03	0.00	–	–	0	–	–	
Plant biology	*d*	–0.30	[–0.34, –0.25]	56	56	55.45	0.06	–	–	13	–	–	
Disease	*d*	–0.30	[–0.34, –0.27]	55	55	54.19	0.01	–	–	1	–	–	
Human biology	*d*	–0.44	[–0.48, –0.40]	56	56	69.15	0.08	–	–	26	–	–	

Note. ES = type of effect size (percentage or Cohen's *d*); M_w = weighted mean effect size; 95% CI = 95% confidence interval; $N_{countries}$ = number of countries; k = number of effect sizes, Q = total homogeneity statistic; τ_{Level2} = within-countries standard deviation of effect sizes, τ_{Level3} = between-countries standard deviation of effect sizes; I^2_{Level2} = percentage of the variability in effect sizes that is due to heterogeneity within countries rather than sampling error; I^2_{Level3} = percentage of the variability in effect sizes that is due to heterogeneity between countries rather than sampling error. A dash in the columns τ_{Level2}/ τ_{Level3} and I^2_{Level2} /I^2_{Level3} indicates that a two-level random effects model was used to analyze a single PISA cycle. MA = was a moderator analysis conducted (based on heterogeneity measures)? ✓ = Yes.

†At least moderate heterogeneity (i.e., $\tau \geq 0.12$ for standardized mean differences or $I^2 \geq 30\%$). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Metaregression Models for Explaining Heterogeneity in Gender Differences in the Group of Top-Performing Math Students (Top 5%)

Outcome	Moderator	*b*	95% CI	*p*	N_{CNT}	*k*	*Q*	R^2	R^2_{L2}	R^2_{L3}
Percent female students in the top 5% in mathematics	wr	0.112	[–0.307, 0.531]	.599	82	343	4,879.87	–	3	12
	smm	–0.057	[–0.492, 0.378]	.797						
	per	0.035	[–0.078, 0.148]	.541						
	ser	0.010	[–0.064, 0.085]	.783						
	ter	**0.036**	[0.004, 0.068]	.028						
Reading achievement	wr	0.001	[–0.059, 0.062]	.964	82	342	610.64	–	2	0
	smm	–0.001	[–0.075, 0.072]	.970						
	per	0.000	[–0.011, 0.011]	.995						
	ser	0.000	[–0.007, 0.007]	.951						
	ter	0.000	[–0.004, 0.004]	.989						
Math self-efficacy	wr	–0.004	[–0.082, 0.073]	.915	65	104	159.18	–	0	25
	smm	0.003	[–0.093, 0.099]	.952						
	per	0.001	[–0.014, 0.015]	.931						
	ser	–0.001	[–0.010, 0.009]	.910						
	ter	0.000	[–0.005, 0.004]	.921						
Math intention	wr	0.000	[–0.087, 0.086]	.992	64	64	96.11	34	–	–
	smm	0.005	[–0.102, 0.112]	.925						
	per	–0.002	[–0.024, 0.021]	.871						
	ser	–0.002	[–0.013, 0.010]	.792						
	ter	0.000	[–0.005, 0.005]	.996						
Instrumental math motivation	wr	–0.001	[–0.077, 0.075]	.973	66	137	164.40	–	0	14
	smm	0.001	[–0.091, 0.093]	.982						
	per	0.001	[–0.014, 0.016]	.867						
	ser	0.001	[–0.008, 0.009]	.898						
	ter	0.000	[–0.005, 0.004]	.867						
Math self-concept	wr	–0.004	[–0.077, 0.069]	.918	66	137	175.72	–	0	44
	smm	0.001	[–0.086, 0.089]	.978						
	per	0.002	[–0.013, 0.017]	.821						
	ser	0.001	[–0.008, 0.009]	.909						
	ter	0.000	[–0.005, 0.004]	.897						
Subjective math norms	wr	–0.003	[–0.085, 0.080]	.952	64	64	89.00	17	–	–
	smm	0.001	[–0.104, 0.107]	.980						
	per	–0.006	[–0.028, 0.017]	.631						
	ser	–0.001	[–0.012, 0.010]	.879						
	ter	0.000	[–0.005, 0.005]	.966						
Math anxiety	wr	0.003	[–0.074, 0.079]	.945	65	104	141.87	–	99	25
	smm	–0.004	[–0.098, 0.089]	.926						
	per	–0.002	[–0.016, 0.012]	.790						
	ser	–0.002	[–0.011, 0.007]	.717						
	ter	0.001	[–0.004, 0.006]	.792						

(table continues)

Table 4 *(Continued)*

Outcome	Moderator	*b*	95% CI	*p*	N_{CNT}	*k*	*Q*	R^2	R^2_{L2}	R^2_{L3}
Enjoyment of reading	wr	0.001	[–0.080, 0.082]	.981	73	114	248.75	–	0	43
	smm	–0.008	[–0.106, 0.091]	.881						
	per	0.002	[–0.016, 0.019]	.864						
	ser	0.002	[–0.009, 0.013]	.724						
	ter	–0.002	[–0.007, 0.003]	.458						
Science self-concept	wr	–0.008	[–0.105, 0.089]	.873	56	56	110.00	54	–	–
	smm	0.006	[–0.099, 0.111]	.908						
	per	0.001	[–0.022, 0.024]	.918						
	ser	–0.002	[–0.013, 0.010]	.757						
	ter	–0.001	[–0.007, 0.005]	.711						
General value of science	wr	–0.004	[–0.104, 0.096]	.937	56	56	75.13	31	–	–
	smm	0.004	[–0.102, 0.110]	.944						
	per	0.000	[–0.021, 0.020]	.986						
	ser	–0.003	[–0.015, 0.008]	.578						
	ter	0.000	[–0.006, 0.007]	.908						
Science self-efficacy	wr	–0.004	[–0.090, 0.082]	.928	72	124	232.95	–	0	21
	smm	0.004	[–0.093, 0.100]	.941						
	per	0.001	[–0.013, 0.015]	.896						
	ser	–0.001	[–0.010, 0.009]	.881						
	ter	0.001	[–0.005, 0.006]	.833						
Future-oriented science motivation	wr	–0.007	[–0.112, 0.097]	.892	56	56	111.08	46	–	–
	smm	0.004	[–0.111, 0.119]	.946						
	per	0.007	[–0.017, 0.031]	.555						
	ser	–0.005	[–0.018, 0.008]	.436						
	ter	0.000	[–0.007, 0.007]	.978						
Enjoyment of science	wr	–0.007	[–0.084, 0.071]	.869	72	124	193.50	–	0	50
	smm	0.002	[–0.085, 0.090]	.959						
	per	0.003	[–0.010, 0.017]	.624						
	ser	–0.001	[–0.010, 0.008]	.833						
	ter	0.000	[–0.005, 0.004]	.880						
Instrumental science motivation	wr	–0.005	[–0.078, 0.068]	.896	72	124	155.36	–	71	90
	smm	0.003	[–0.081, 0.086]	.952						
	per	0.001	[–0.012, 0.015]	.861						
	ser	–0.002	[–0.010, 0.007]	.676						
	ter	0.000	[–0.004, 0.004]	.956						
Interest in physics	wr	–0.006	[–0.107, 0.094]	.900	56	56	88.81	94	–	–
	smm	0.011	[–0.100, 0.121]	.851						
	per	0.004	[–0.021, 0.030]	.753						
	ser	–0.005	[–0.017, 0.008]	.474						
	ter	0.000	[–0.006, 0.007]	.939						

Note. N_{CNT} = number of countries; R^2 = variance explained in %; R^2_{L2} = variance explained within countries in %; R^2_{L3} = variance explained between countries in %; wr = women's share of research positions in percent; smm = women's share of employment in senior and middle management (i.e., legislators, senior officials, managers) in percent; per = log-transformed ratio of female to male students enrolled in primary education; ser = log-transformed ratio of female to

male students enrolled in secondary education; ter = log-transformed ratio of female to male students enrolled in tertiary education. Bold values indicate significant results ($p < .05$).

Table 5

Meta-Analytic Results on Achievement Profiles in the Group of Top-Performing Math Students (Top 5%)

Domain	ES	95% CI	$N_{countries}$	k	Q	τ_{total}	τ_{Level2}	τ_{Level3}	I^2_{total}	I^2_{Level2}	I^2_{Level3}	MA
Mean differences in individual profile scores among male and female students												
Male students												
Math–reading tilt	57.65	[52.09, 63.22]	82	342	7,040.22***	28.29	15.74	23.51	96†	30	66	✓
Science–reading tilt	32.20	[29.05, 35.36]	82	342	4,353.32***	19.31	15.68	11.26	93†	61	32	✓
Math–science tilt	24.55	[20.32, 28.78]	82	343	4,853.94***	21.19	11.62	17.72	93†	28	65	✓
Female students												
Math–reading tilt	22.71	[16.61, 28.81]	82	342	5,092.31***	30.24	15.35	26.06	95†	24	70	✓
Science–reading tilt	2.08	[–1.02, 5.18]	82	342	2,783.15***	18.12	14.12	11.35	89†	54	35	✓
Math–science tilt	19.87	[15.10, 24.65]	82	343	4,268.07***	22.91	10.27	20.48	92†	18	73	✓
Nonoverlap between male and female students' distributions of individual profile scores												
Math–reading profile	44	[42, 45]	82	342	654.69***	7.04	5.53	4.35	50†	31	19	✓
Science–reading profile	42	[40, 44]	82	342	505.73***	6.41	2.49	5.91	43†	6	36	✓
Math–science profile	18	[17, 19]	82	343	204.46	2.19	0.00	2.19	8	0	8	
Percentages of male and female students demonstrating a certain tilt in their individual profile scores												
Male students												
Math–reading profile: math $tilt_{M–R}$	87	[85, 89]	82	342	5,722.47***	1.01	0.63	0.78	96†	38	58	✓
Science–reading profile: science $tilt_{S–R}$	76	[74, 79]	82	342	5,395.50***	0.78	0.58	0.52	95†	53	43	✓
Math–science profile: math $tilt_{M–S}$	69	[66, 72]	82	343	5,616.37***	0.75	0.48	0.58	96†	38	58	✓
Female students												
Math–reading profile: math $tilt_{M–R}$	66	[62, 70]	82	342	4,785.42***	0.96	0.54	0.80	96†	30	66	✓
Science–reading profile: science $tilt_{S–R}$	52	[49, 55]	82	342	3,631.24***	0.66	0.50	0.43	92†	53	39	✓
Math–science profile: math $tilt_{M–S}$	65	[62, 68]	82	343	3,987.47***	0.75	0.43	0.62	94†	30	63	✓

Note. ES = effect size; Q = total homogeneity statistic; τ_{Level2} = within-countries SD of effect sizes; τ_{Level3} = between-countries SD of effect sizes; I^2_{Level2} = percentage of the variability in effect sizes that is due to heterogeneity within countries rather than sampling error; I^2_{Level3} = percentage of the variability in effect sizes that is due to heterogeneity between countries rather than sampling error. MA = was a moderator analysis conducted? ✓ = Yes.

†At least moderate heterogeneity (i.e., $I^2 \geq 30\%$) *** $p < .001$.

Table 6

Metaregression Models for Explaining Heterogeneity in Gender Differences in Achievement Profiles in the Group of Top-Performing Math Students (Top 5%)

Outcome	Moderator	*b*	95% CI	*p*	N_{CNT}	*k*	*Q*	R^2_{L2}	R^2_{L3}
			Achievement profile scores						
Math–reading	wr	–0.537	[–1.493, 0.420]	.271	82	342	5092.31	7	22
profile score	smm	–0.626	[–1.718, 0.465]	.261					
female students	per	–0.375	[–1.167, 0.417]	.356					
	ser	–0.033	[–0.386, 0.320]	.855					
	ter	**–0.152**	[–0.270, –0.034]	.012					
Math–reading	wr	–0.640	[–1.569, 0.290]	.177	82	342	7040.22	7	18
profile score	smm	–0.438	[–1.484, 0.607]	.411					
male students	per	–0.338	[–1.148, 0.472]	.415					
	ser	–0.018	[–0.337, 0.301]	.913					
	ter	**–0.123**	[–0.240, –0.005]	.042					
Science–reading	wr	–0.285	[–1.021, 0.451]	.448	82	342	2783.15	3	12
profile score	smm	0.275	[–0.607, 1.158]	.541					
female students	per	–0.048	[–0.591, 0.495]	.862					
	ser	–0.211	[–0.592, 0.169]	.279					
	ter	**–0.096**	[–0.182, –0.011]	.027					
Science–reading	wr	–0.379	[–1.127, 0.370]	.321	82	342	4353.32	3	16
profile score	smm	0.405	[–0.474, 1.284]	.366					
male students	per	0.050	[–0.623, 0.723|	.884					
	ser	–0.251	[–0.626, 0.125]	.194					
	ter	–0.049	[–0.140, 0.041]	.286					
Math–science	wr	–0.206	[–1.091, 0.678]	.648	82	343	4268.07	14	14
profile score	smm	**–0.985**	[–1.905, –0.064]	.036					
female students	per	–0.200	[–0.712, 0.312]	.445					
	ser	0.136	[–0.359, 0.630]	.592					
	ter	–0.014	[–0.121, 0.094]	.801					
Math–science	wr	–0.184	[–1.019, 0.651]	.666	82	343	4853.94	10	21
profile score	smm	–0.830	[–1.742, 0.082]	.075					
male students	per	–0.249	[–0.778, 0.281]	.360					
	ser	0.160	[–0.289, 0.609]	.486					
	ter	–0.071	[–0.175, 0.034]	.186					
Nonoverlap	wr	0.001	[–0.051, 0.054]	.956	82	342	654.69	5	21
math–reading	smm	–0.003	[–0.062, 0.056]	.918					
profile	per	0.000	[–0.009, 0.008]	.928					
	ser	0.000	[–0.006, 0.006]	.908					
	ter	0.000	[–0.003, 0.003]	.937					
Nonoverlap	wr	0.002	[–0.052, 0.056]	.946	82	342	505.73	4	24
science–reading	smm	–0.003	[–0.064, 0.059]	.935					
profile	per	–0.001	[–0.010, 0.009]	.877					
	ser	0.000	[–0.006, 0.007]	.928					
	ter	0.000	[–0.004, 0.003]	.805					

(table continues)

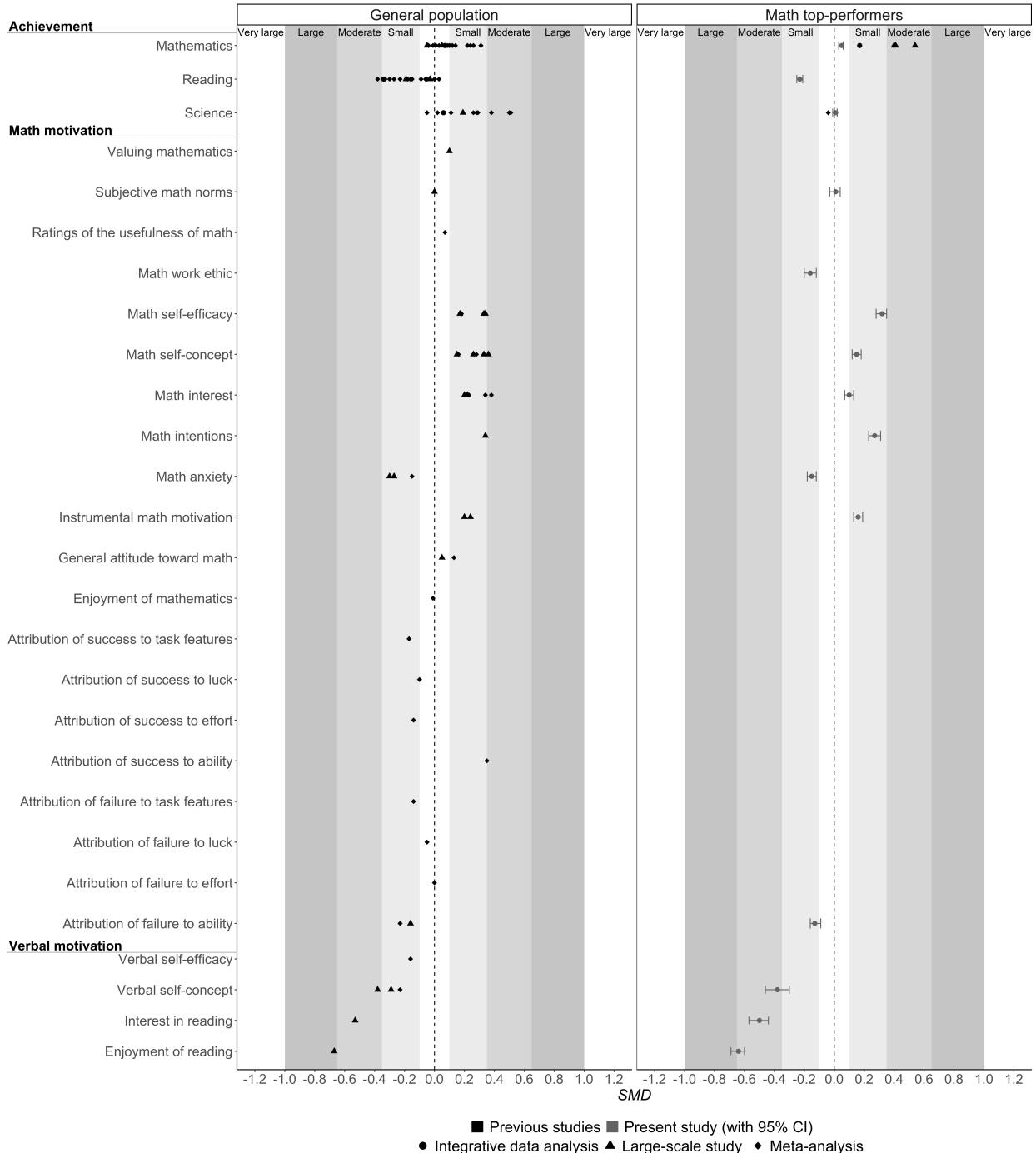
Table 6 *(Continued)*

Outcome	Moderator	*b*	95% CI	*p*	N_{CNT}	*k*	*Q*	R^2_{L2}	R^2_{L3}
Nonoverlap between male and female students' distributions of individual profile scores									
Nonoverlap	wr	0.001	[–0.055, 0.057]	.972	82	343	204.46	71	9
math–science	smm	0.000	[–0.056, 0.057]	.987					
profile	per	0.000	[–0.007, 0.008]	.951					
	ser	0.000	[–0.006, 0.005]	.964					
	ter	0.000	[–0.003, 0.003]	.957					
% of male and female students demonstrating a certain tilt in their individual profile scores									
Math–reading	wr	–0.015	[–0.189, 0.159]	.863	82	342	4785.42	4	19
profile math tilt	smm	–0.019	[–0.192, 0.154]	.832					
female students	per	–0.009	[–0.043, 0.024]	.583					
	ser	–0.002	[–0.022, 0.019]	.860					
	ter	–0.004	[–0.015, 0.007]	.441					
Math–reading	wr	–0.025	[–0.203, 0.153]	.781	82	342	5722.47	3	15
profile math tilt	smm	–0.004	[–0.188, 0.180]	.967					
male students	per	–0.008	[–0.046, 0.030]	.681					
	ser	–0.002	[–0.024, 0.020]	.853					
	ter	–0.004	[–0.015, 0.008]	.510					
Science–reading	wr	–0.011	[–0.147, 0.126]	.879	82	342	3631.24	3	9
profile science	smm	0.009	[–0.145, 0.163]	.906					
tilt female	per	–0.002	[–0.029, 0.024]	.856					
students	ser	–0.008	[–0.028, 0.012]	.446					
	ter	–0.002	[–0.012, 0.007]	.600					
Science–reading	wr	–0.017	[–0.163, 0.128]	.814	82	342	5395.50	5	17
profile science	smm	0.024	[–0.139, 0.186]	.776					
tilt male students	per	0.002	[–0.031, 0.034]	.911					
	ser	–0.011	[–0.032, 0.010]	.313					
	ter	0.000	[–0.010, 0.009]	.927					
% of male and female students demonstrating a certain tilt in their individual profile scores									
Math–science	wr	–0.008	[–0.164, 0.148]	.920	82	343	3987.47	11	10
profile math tilt	smm	–0.030	[–0.187, 0.128]	.713					
female students	per	–0.005	[–0.031, 0.022]	.729					
	ser	0.003	[–0.015, 0.021]	.725					
	ter	–0.001	[–0.011, 0.009]	.818					
Math–science	wr	–0.009	[–1.159, 0.140]	.901	82	343	5616.37	6	19
profile math tilt	smm	–0.021	[–1.179, 0.136]	.790					
male students	per	–0.007	[–0.031, 0.022]	.585					
	ser	0.003	[–0.014, 0.021]	.709					
	ter	–0.002	[–0.012, 0.007]	.621					

Note. N_{CNT} = number of countries; R^2_{L2} = variance explained within countries in %; R^2_{L3} = variance explained between countries in %; wr = women's share of research positions in percent; smm = women's share of employment in senior and middle management (i.e., legislators, senior officials, managers) in percent; per = log-transformed ratio of female to male students enrolled in primary education; ser = log-transformed ratio of female to male students enrolled in secondary education; ter = log-transformed ratio of female to male students enrolled in tertiary education. Bold values indicate significant results ($p < .05$).

Figure 1

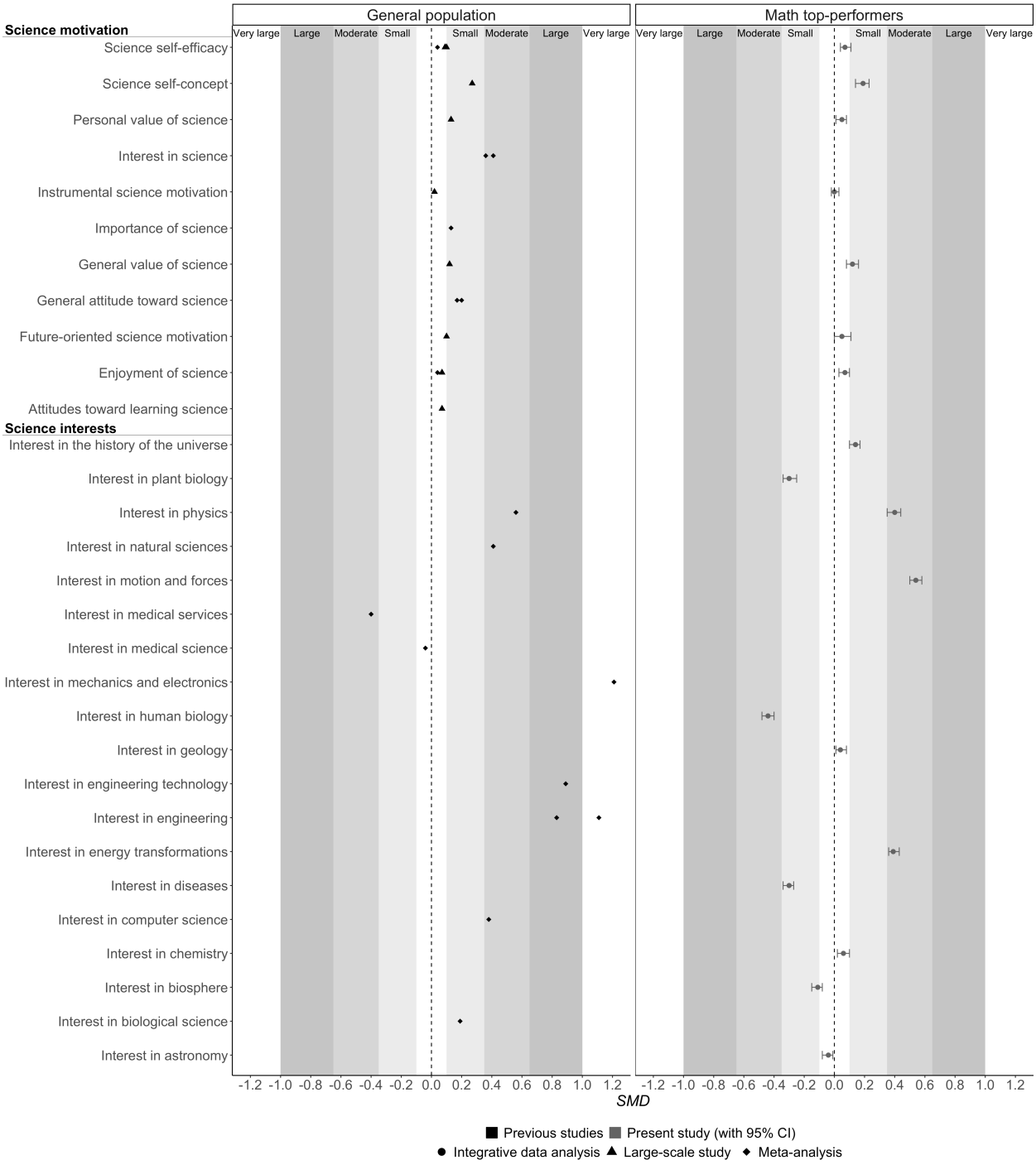
Overview of the Results From Integrative Data Analyses, Large-Scale Studies, and Meta-Analyses on Gender Differences in Math, Reading, and Science Achievement and Math and Verbal Achievement Motivation



Note. Negative values indicate an advantage of female students, positive values an advantage of male students. See Tables S1 and S2 in the supplemental materials on OSF for more details on all included studies and results on gender ratios.

Figure 2

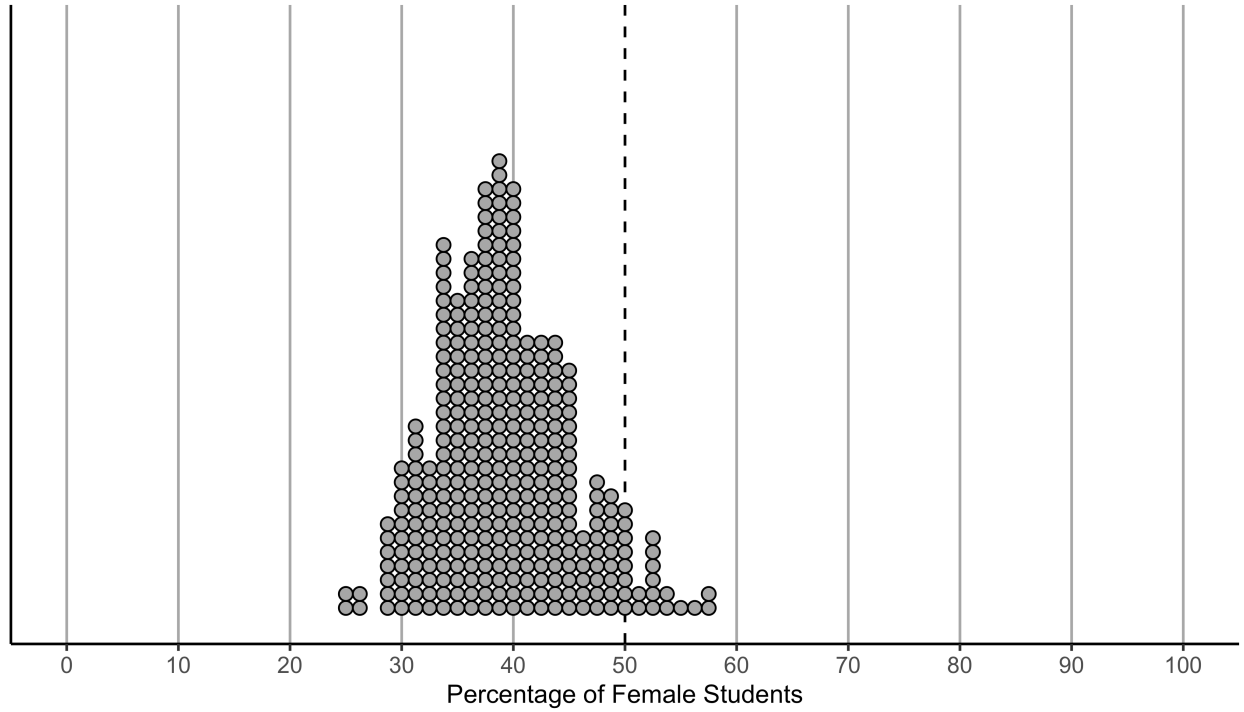
Overview of the Results From Integrative Data Analyses, Large-Scale Studies, and Meta-Analyses on Gender Differences in Science Achievement Motivation



Note. Negative values indicate an advantage of female students, positive values an advantage of male students. See Tables S1 and S2 in the supplemental materials on OSF for more details on all included studies.

Figure 3

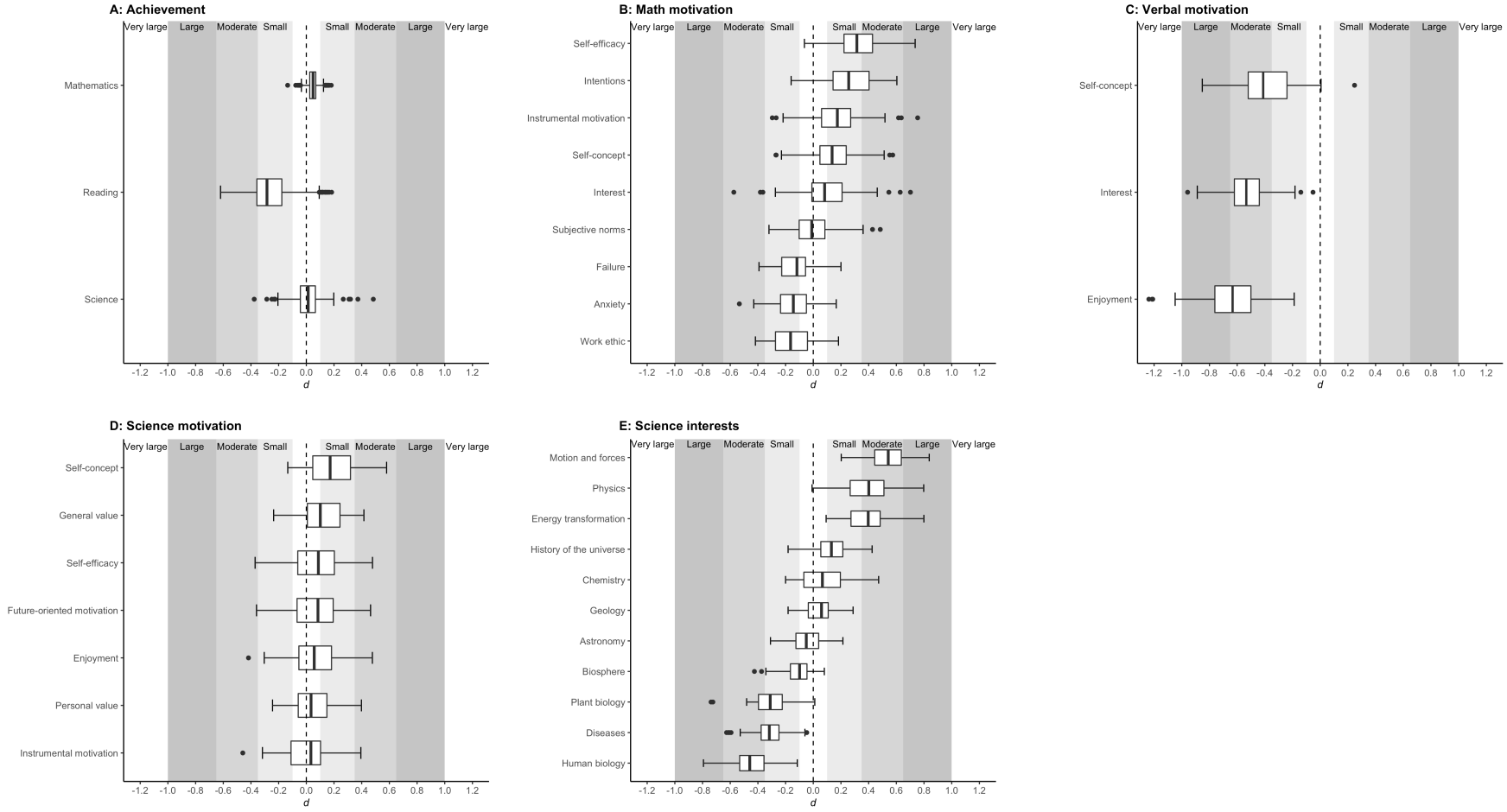
Distribution of the Average Percentages of Female Students Belonging to the Top 5% in Mathematics Across 82 Countries (k =343)



Note. Each dot represents one effect size. The vertical dashed line indicates gender parity.

Figure 4

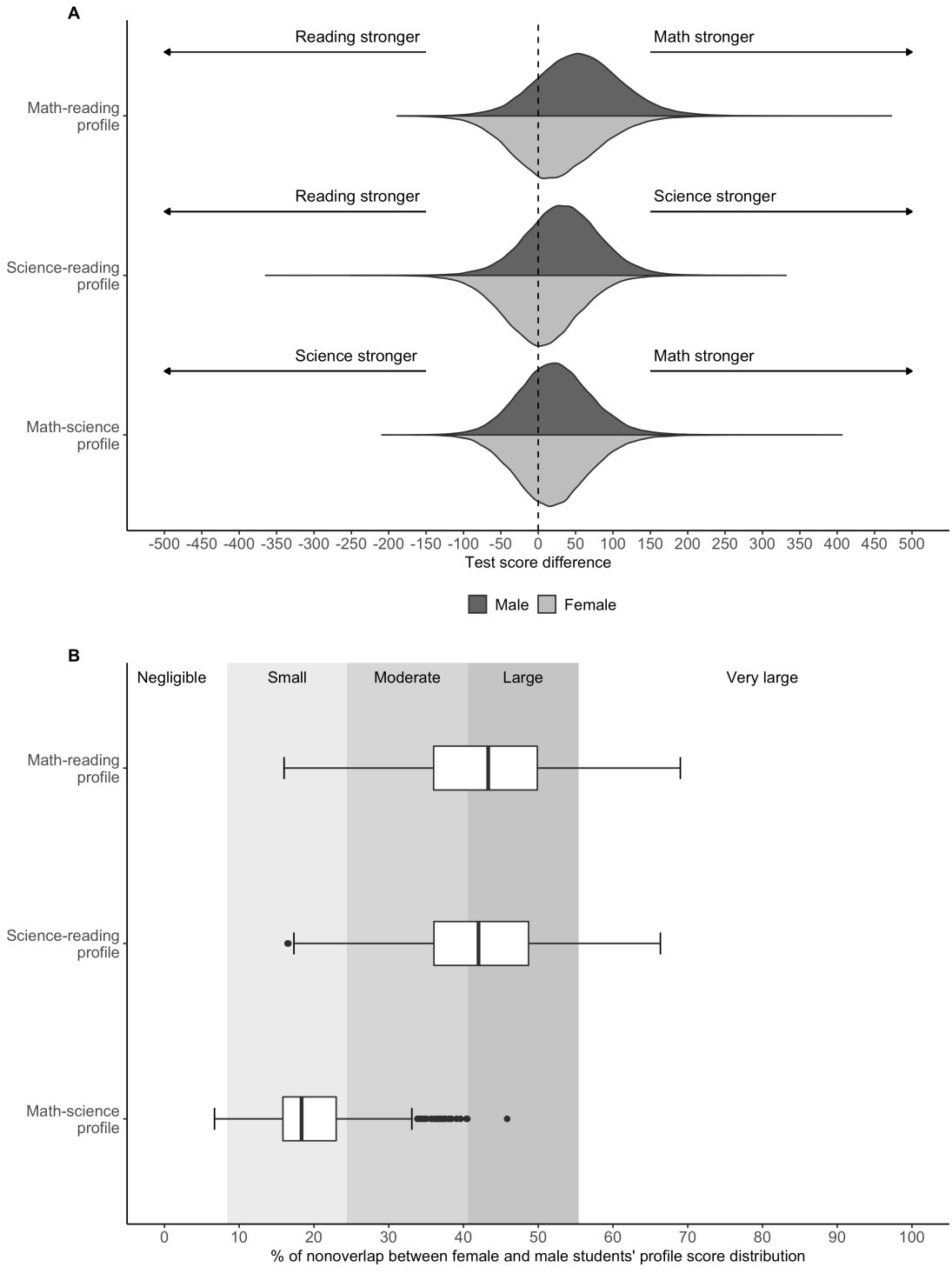
Distributions of Gender Differences (Cohen's d) in Top-Performing Math Students



Note. Panel A: Achievement. Panel B: Math motivation. Panel C: Verbal motivation. Panel D: Science motivation. Panel E: Science interests. Boxplots comprise the median value of *d* (solid line in box), the 25th percentile (left line of the box), and the 75th percentile (right line of the box) of the *d* distribution. Negative values indicate an advantage of female students, positive values an advantage of male students.

Figure 5

Distributions of Gender Differences in Achievement Profiles



Note. Panel A: Distributions of achievement profile scores by gender in top-performing math students. $N = 113{,}864$. The figure is based on individual student data and the respective first plausible value. Panel B: Percentages of nonoverlap between female and male students' distributions of profile scores.

Supplemental Online Materials for

Top-Performing Math Students in 82 Countries: An Integrative Data Analysis of Gender Differences in Achievement, Achievement Profiles, and Achievement Motivation

Lena Keller, Franzis Preckel, Jacquelynne S. Eccles, & Martin Brunner

S1: Identification of International Large-Scale Assessments

To identify all potential international large-scale assessment data to be included in our integrative data analysis, we combined several search strategies. First, we screened the (systematic) reviews by Cresswell et al. (2015), Naemi et al. (2013), and Tobin et al. (2015) for international large-scale assessments in education. Second, we conducted a computerized database search of ERIC. We used the search terms "international large-scale assessment*" + DESCRIPTORS: 'International Assessment AND Mathematics Achievement AND Science Achievement AND Reading Achievement'. The database search identified 26 publications that may examine data from international large-scale assessments using achievement tests from several domains. Third, we used Google Scholar to conduct forward citing searches that cited the (systematic) reviews on international large-scale assessments by Cresswell et al. (2015), Naemi et al. (2013), and Tobin et al. (2015). In doing so, we identified additional 13, 15, and 18 publications, respectively. For all publications that were published in English (n = 65 publications, after duplicates were removed), full texts were screened to identify potential international large-scale assessments. The screenings and evaluations of eligibility were conducted by two raters (i.e., the first author and a trained research assistant). The research assistant screened all full texts for potential international large-scale assessments; the first author screened a randomly selected subsample (i.e., 33 publications) to allow the most complete

identification possible. Then, a combined list of all potential international large-scale assessments was created (n = 122), and the same two raters hierarchically evaluated whether (a) the assessment involved two or more sovereign countries and (b) the assessment met Kirsch et al.'s (2012) definition so that international large-scale assessments could be distinguished from other large-scale programs (e.g., national large-scale assessments such as NAEP or large-scale testing programs such as the SAT):

> Broadly defined, large-scale assessments are surveys of knowledge, skills, or behaviors in a given domain. The goal of large-scale assessments is to describe a population, or populations, of interest. As such, these assessments focus on group scores and can be distinguished from large-scale testing programs that focus on assessing individuals. (Kirsch et al., 2012, p. 1)

A total of 53 international large-scale assessments remained. These were further evaluated according to the following set of hierarchical inclusion criteria: (a) assessment of secondary student populations (i.e., students in Grades 7 to 13) because educational and occupational choices leading to STEM careers are shaped by pre-college factors during adolescence; (b) assessment of mathematics, reading, and science performance of the very same students to allow for gender differences in achievement profiles relevant to STEM choices to be examined; (c) assessment of students' domain-specific motivation in mathematics, reading, or science because gender differences in preferences contribute to gender disparities in STEM over and above gender differences in achievement or achievement profiles; (d) availability of a public use file; (e) full documentation of the study (by July 2019); (f) high standardization in all phases of the study ranging from framework and instrument development, translation and verification procedures, test design, sample design, field operations, scaling methodology, data processing, and management to quality assurance to allow comparisons to be made between countries. A

hierarchical evaluation implies that if a rater decided that a criterion was not fulfilled, the (international large-scale) assessment was ineligible, and screening stopped (Polanin et al., 2019). Following the best practice guidelines for screening by Polanin et al. (2019), the raters reconciled disagreements throughout the evaluation process, which increased its reliability. As a consequence, traditional reliability statistics were not computed because they require independent ratings throughout the entire eligibility evaluation process (Polanin et al., 2019). After evaluation, only PISA met all the inclusion criteria.

S2: PISA Sampling Procedures

PISA sets high-quality standards for collecting representative probability samples. Specifically, at least 4,500 students in each country participated in each PISA cycle, or the full student population was included if it was smaller than this size. To this end, most countries applied a two-stage sampling design in all PISA cycles. In the first sampling stage, individual schools with 15-year-old students were systematically sampled from a stratified list of all schools with sampling probabilities proportional to the number of 15-year-old students enrolled. Strata were specific for each country and included, for example, geographic regions or school types. In each country, a minimum of 150 schools had to be selected; if a country had fewer than 150 schools, all schools were selected. Also, in most countries, approximately 35 students who were 15 years of age were randomly selected within schools; if a school had fewer than 35 students at age 15, all students in this age group were selected. In every PISA cycle, the school staff, students, and parents were informed about the nature of the test and the test date, and parental permission was secured if requested by the school or education system (e.g., OECD, 2014).

S3: Achievement Measures

In PISA, the literacy concept is the theoretical framework that defines students' domain-specific achievement. Thus, in general, the PISA test items require students to apply domain-

specific knowledge in real-world contexts, with problems varying in their complexity. In every PISA cycle, achievement tests in mathematics, reading, and science were comprised of multiple-choice, short-answer, or extended-response items. Steps were taken to ensure that the selected achievement items were appropriate for all cultures and were not biased against any particular group of students (e.g., considering gender). Compared with similar assessments (e.g., NAEP or TIMSS), PISA is considered more challenging than most other mathematics assessments (Else-Quest et al., 2010; Hyde et al., 2008).

S4: Data Analysis: General Procedure

In our integrative data analysis we applied the same analysis protocol to examine gender differences in top-performing students' achievement, achievement profiles, and achievement motivation in mathematics, reading, and science. In accordance with the analysis strategy proposed by Cheung and Jak (2016) for big data, we proceeded in three steps.

Step 1: Effect Size Computation

When computing effect sizes and corresponding standard errors or sampling variances, we followed the detailed PISA guidelines for statistical analyses on how to deal with plausible values as achievement indicators, how to apply sample weights, and how to estimate the standard errors of statistical parameters (OECD, 2014). Because PISA assesses students' achievement by applying a planned missing design, achievement scores are provided as five (PISA 2000–2012) or 10 (PISA 2015) plausible values for each student on each achievement scale (e.g., OECD, 2013a, 2014, see von Davier et al., 2009 for an introduction). Using plausible values offers the methodological advantage of unbiased population estimates of students' achievement (e.g., means and standard deviations). Consequently, all effect sizes were computed five (10) times and were then pooled to compute the final effect sizes and their standard errors (see OECD, 2014). To this end, we used the R package "intsvy" (Version 2.4; Caro & Biecek, 2017) or we coded our

own algorithms (see OSF, https://osf.io/ych6q/). The pooled effect sizes and standard errors were then used to integrate the results with meta-analytical methods in Step 2.

Percentage of Female Students in the Top 5% in Mathematics

For each country and PISA cycle, we computed the proportion of female students in the top 5% in mathematics. Standard errors for the percentage of female students in the top 5% in mathematics as obtained for a certain plausible value were calculated using the formula $\sqrt{\frac{p(1-p)}{n}}$, where p = the proportion of female students in the group of top-performing math students and n = the sample size (Lipsey & Wilson, 2001).

Effect Sizes for Gender Differences in Achievement and Achievement Motivation in Terms of Cohen's d

Country-specific d was computed, with $d = (M_m - M_f)/SD_{OECD}$, M_m = the mean for male students, M_f = the mean for female students, and SD_{OECD} = the standard deviation of the total student sample from the OECD countries. Using SD_{OECD} as the denominator has two major advantages (see Cumming & Calin-Jagemen, 2016). First, using SD_{OECD} facilitates the comparison of mean gender differences across countries: When computing Cohen's d, country-specific variation in mean differences between male and female students' achievement (or achievement motivation) is not confounded with country-specific variation in male or female students' variability in achievement (or achievement motivation). Second, using SD_{OECD} as a standardizer also facilitates the integration of effect sizes obtained for gender differences in top-performing students with those obtained for the general student population in previous research (see Tables S1 and S2). Third, using the SD_{OECD} (rather than the country-specific pooled standard deviation obtained for top-performing math students) results in smaller variance estimates of Cohen's d because the SD_{OECD} is based on a very large student sample (i.e., up to 298,452 students in the present study). In contrast, the country-specific estimates of male and female

students' standard deviations are based on data from about 200 top-performing math students per country and are thus subject to considerably larger sampling variability. Therefore, using the SD_{OECD} also reduces unwanted heterogeneity in effect sizes, which in turn could improve precision in the present study (Hempel et al., 2013; Valentine et al., 2010).

Effect Sizes for Achievement Profiles

We computed three effect sizes to capture gender differences in achievement profiles: country-specific mean profile scores for male and female students, the gender-specific percentage of tilts within each profile score, and the percentage of nonoverlap in gender-specific profile distributions. The country-specific mean profile scores for mathematically top-performing male and female students can be interpreted as follows: For example, a mean profile score of 20.33 points for the difference between mathematics and reading achievement as obtained for female students in Germany in PISA 2012 (Table S17) indicated that female students' mathematics score was on average 20.33 points larger than their reading score.

To examine tilts for each individual profile score, we computed the percentages among mathematically top-performing male and female students for whom the mathematics score was higher/lower than the reading score (math $tilt_{M–R}$/verbal $tilt_{M–R}$), the science score was higher/lower than the reading score (science $tilt_{S–R}$/verbal $tilt_{S–R}$), and the mathematics score was higher/lower than the science score (math $tilt_{M–S}$/science $tilt_{M–S}$). To obtain unbiased meta-analytic estimates of the percentages of female and male students with specific achievement tilts in the respective profiles, we followed the logit method by Lipsey and Wilson (2001). In this method, proportions are first converted to logits, and the analyses are conducted on the logit as the effect size. Then, the results are converted back into proportions (Lipsey & Wilson, 2001). In a few countries, all or no female or male students showed a specific achievement tilt, resulting in proportions of 1 or 0, respectively. However, when proportions are 1 or 0, converting proportions

into logits is not feasible. In these cases, we replaced 0 or 1 with the values 0.00001 or 0.99999, respectively.

To capture gender differences in achievement profiles with respect to the complete profile distribution (and not only with respect to mean differences in profiles), we also examined how strongly the (areas of) gender-specific profile distributions did *not* overlap using the R package "overlapping" (Pastore, 2018) in which less overlap indicates greater gender differences. Specifically, we computed the percentage of nonoverlap (i.e., Cohen's U_1) for each achievement profile distribution for each country in every PISA cycle (Figure 5). Sampling variances for the percentage of nonoverlap were computed with a bootstrap method (Pastore, 2018). Drawing on the seminal work by Cohen (1988) and in accordance with Hyde's (2005) guidelines, nonoverlaps of 8%/24%/41%/55% can be considered to represent small/medium/large/very large effects, respectively. We calculated these thresholds by transforming Cohen's *d* into Cohen's U_1 using the formula $U_1 = \frac{F\left(\frac{d}{2}\right) - 1}{F\left(\frac{d}{2}\right)}$, with $F()$ representing the cumulative normal distribution function.

Step 3: Mixed-Effects Models and Moderator Analysis

We ran multivariate metaregression models for each effect size using the following set of moderator variables: women's share of employment in senior and middle management, women's share of research positions, and enrollment ratios in primary, secondary, and tertiary education. Because data on moderator variables were incomplete (i.e., gender equality indicators were not available for all countries), we followed the recommendations by Pigott (2019) and Tipton et al. (2019) and used multilevel multiple imputation (e.g., Grund et al., 2018) to estimate unreported values and to account for the clustered data structure (effect sizes nested in countries). To perform a multilevel multiple imputation, we used the R package "jomo" (Version 2.6-9;

Quartagno et al., 2019). Missing values on the moderator variables were imputed 100 times with the country as the cluster variable. Then, we used the R package "metaSEM" (Version 1.2.2; Cheung, 2015) to perform the metaregressions on all imputed data sets and pooled across the analyses in accordance with Rubin's (1987) rules. For seven out of 3,100 metaregression models (based on multiply imputed data sets), standard errors could not be estimated in the regressions due to convergence problems, probably caused by a small number of effect sizes in the clusters (Jak & Cheung, 2018). In these cases, we excluded the incomplete metaregression models before pooling.

Table S1

Meta-Analyses and Large-Scale Studies on Gender Differences in Mathematics, Reading, and Science Achievement (in Alphabetical Order)

						General population				Top-performing math students					
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	Mea-sure[d]	*k*	*N*	SMD[e]	Range	*k*	*N*	SMD[e]	Range	F-m ratio	Range
Mathematics achievement															
Baye & Monseur (2016)	TIMSS 1995–2007 & PISA 2000–2012	IDA	I	2	1	622	–	0.07	–	622	–	0.17[1]	–	–	–
Else-Quest et al. (2010)	TIMSS 2003	L	I	2	1	46	219,612	–0.01	–0.42 to 0.40	–	–	–	–	–	–
Else-Quest et al. (2010)	PISA 2003	L	I	2	1	41	273,883	0.11	–0.17 to 0.29	–	–	–	–	–	–
Guiso et al. (2008)	PISA 2003	L	I	2	1	40	276,165	0.11	–0.23 to 0.15	–	–	–	–	–	–
Hedges & Nowell (1995)	PT	L	N	2	1	1	73,425	0.12	–	–	–	–	–	1:1.50[1]	–
Hedges & Nowell (1995)	NLS-72: AR	L	N	2	1	1	16,860	0.24	–	–	–	–	–	1:2.34[2]	–
Hedges & Nowell (1995)	NLS-72: MK	L	N	2	1	1	16,860	0.26	–	–	–	–	–	1:2.20[1]	–
Hedges & Nowell (1995)	NLSY	L	N	2, 3	1	1	11,914	0.08	–	–	–	–	–	1:1.90[1]	–
Hedges & Nowell (1995)	HS&B:80	L	N	2	1	1	25,069	0.22	–	–	–	–	–	1:2.06[1]	–
Hedges & Nowell (1995)	NELS:88	L	N	2	1	1	24,599	0.03	–	–	–	–	–	1:1.64[1]	–
Hyde et al. (2008)	NAEP	L	N	2	1	66	6,706,230	0.0065	–0.13 to 0.10	–	–	–	–	1:1.45[3]	–
Hyde, Fennema, & Lamon (1990)	Various	M	I	1, 2, 3, 4	1	259	3,985,682	–0.05	–0.70 to 0.86	–	–	–	–	–	–
Hyde, Fennema, & Lamon (1990)	Various	M	I	3, 4	1	–	–	–	–	18	389,790	0.54[1]	0.18 to 0.83	–	–
Hyde, Fennema, & Lamon (1990)	Various	M	I	2, 4	1	–	–	–	–	15	52,774	0.41[1]	–0.49 to 0.76	–	–
Lindberg et al. (2010)	Various	M	I	0, 1, 2, 3, 4	1	441	1,286,350	0.05	–2.17 to 1.79	27	–	0.40[1]	–	–	–
Lindberg et al. (2010)	Various	L	N	1, 2	1	56	1,309,586	0.07	–0.15 to 0.22	–	–	–	–	–	–
Machin & Pekkarinen (2008)	PISA 2003	L	I	2	1	41	276,165	0.10	–0.04 to 0.42	41	276,165	–	–	1:1.70[1]	1:0.91 to 1:2.55
Makel et al. (2016)	SAT	T	I	2	1	–	–	–	–	–	39,553	–	–	1:1.37[4,5]	–
Makel et al. (2016)	ACT	T	I	2	1	–	–	–	–	–	46,806	–	–	1:1.43[4,5]	–
Makel et al. (2016)	EXPLORE	T	I	2	1	–	–	–	–	–	400	–	–	1:3.00[4,6]	–
Mullis, Martin, Foy, & Arora (2012)	TIMSS 2011a	L	I	1	1	57	> 600,000[9]	0.01[7]	–0.35 to 0.12	–	–	–	–	–	–

(table continues)

Table S1 *(Continued)*

						General population				Top-performing math students					
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	Mea-sure[d]	*k*	*N*	SMD[e]	Range	*k*	*N*	SMD[e]	Range	F-m ratio	Range
Mathematics achievement															
Mullis, Martin, Foy, & Arora (2012)	TIMSS 2011b	L	I	2	1	56	> 600,000[9]	–0.04[7]	–0.63 to 0.23	–	–	–	–	–	–
Nowell & Hedges (1998)	PT:AR	L	N	2	1	1	5,622	0.31	–	–	–	–	–	–	–
Nowell & Hedges (1998)	EEO	L	N	2	1	1	97,660	0.31	–	–	–	–	–	1:3.14[1]	–
Nowell & Hedges (1998)	NLS-72	L	N	2	1	1	22,583	0.24	–	–	–	–	–	1:2.34[1]	–
Nowell & Hedges (1998)	HS&B:80	L	N	2	1	1	25,069	0.22	–	–	–	–	–	1:2.06[1]	–
Nowell & Hedges (1998)	NLSY:MK	L	N	2	1	1	1,184	0.11	–	–	–	–	–	1:3.12[1]	–
Nowell & Hedges (1998)	NLSY:AR	L	N	2	1	1	1,184	0.31	–	–	–	–	–	1:4.09[1]	–
Nowell & Hedges (1998)	HS&B:82	L	N	2	1	1	28,119	0.14	–	–	–	–	–	1:1.96[1]	–
Nowell & Hedges (1998)	NELS:88	L	N	2	1	1	21,188	0.09	–	–	–	–	–	1:1.62[1]	–
Olszewski–Kubilius & Lee (2011)	SAT	T	N	2	1	–	–	–	–	9	257,829[10]	–	–	–	1:2.5 to 1:3.7[8]
Olszewski–Kubilius & Lee (2011)	ACT	T	N	2	1	–	–	–	–	9	257,829[10]	–	–	–	1:1.9 to 1:5.8[8]
Olszewski–Kubilius & Lee (2011)	EXPLORE	T	N	1	1	–	–	–	–	9	257,829[10]	–	–	–	1:1.7 to 1:3.4[2]
Penner (2008)	TIMSS 1995	L	I	2	1	22	52,854	–	0.05 to 0.63	–	–	–	–	–	1:1.59 to 1:4.55[9]
Reilly et al. (2015)	NAEP	L	N	1, 2	1	25	1,925,100	0.07	–0.02 to 0.16	–	–	–	–	1: 1.85	–
Reilly et al. (2015)	NAEPa	L	N	1	1	–	–	–	–	9	974,700	–	–	1: 1.51	–
Reilly et al. (2015)	NAEPb	L	N	2	1	–	–	–	–	9	845,400	–	–	1:1.30	–
Reilly et al. (2015)	NAEPc	L	N	2	1	–	–	–	–	7	104,900	–	–	1:2.13	–
Reilly et al. (2019a)	TIMSS 2011b	L	I	2	1	45	261,738	–0.04	–0.60 to 0.31	–	–	–	–	–	–
Stoet & Geary (2013)	PISA 2000–2009	L	I	2	1	75	< 1,500,000	–	0.08 to 0.10[7]	75	< 1,500,000[10]	–	0.17 to 0.22[12]	–	1:1.6 to 1:1.9
Reading achievement															
Baye & Monseur (2016)	PIRLS 2001–2011 & PISA 2000–2012	IDA	I	1, 2	1	410	–	–0.34	–	–	–	–	–	–	–
Guiso et al. (2008)	PISA 2003	L	I	2	1	40	276,165	–0.33	–0.61 to –0.25	–	–	–	–	–	–

(table continues)

Table S1 *(Continued)*

						General population				Top-performing math students (top 5%)					
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	Mea-sure[d]	*k*	*N*	SMD[e]	Range	*k*	*N*	SMD[e]	Range	F-m ratio	Range
Reading achievement															
Hedges & Nowell (1995)	PT	L	N	2	1	1	73,425	–0.15	–	–	–	–	–	–	–
Hedges & Nowell (1995)	NLS-72	L	N	2	1	1	16,860	–0.05	–	–	–	–	–	–	–
Hedges & Nowell (1995)	NLSY	L	N	2, 3	1	1	11,914	–0.18	–	–	–	–	–	–	–
Hedges & Nowell (1995)	HS&B:80	L	N	2	1	1	25,069	0.002	–	–	–	–	–	–	–
Hedges & Nowell (1995)	NELS:88	L	N	2	1	1	24,599	–0.09	–	–	–	–	–	–	–
Hyde & Linn (1988)	Various	M	I	0, 1, 2, 3	1	18	74,367	–0.03	–0.44 to 0.32	–	–	–	–	–	–
Lietz (2006)	Various	M	I	1, 2	1	139	–	–0.19	–0.59 to 0.87	–	–	–	–	–	–
Machin & Pekkarinen (2008)	PISA 2003	L	I	2	1	41	276,165	–0.30	–0.59 to –0.19	–	–	–	–	–	–
Mullis, Martin, Foy, & Stanco (2012)	PIRLS 2011	L	I	1	1	54	< 325,000[10]	–0.16	–0.54 to 0.01	–	–	–	–	–	–
Nowell & Hedges (1998)	PT	L	N	2	1	1	5,622	–0.06	–	–	–	–	–	–	–
Nowell & Hedges (1998)	EEO	L	N	2	1	1	97,660	–0.16	–	–	–	–	–	–	–
Nowell & Hedges (1998)	NLS-72	L	N	2	1	1	22,583	–0.05	–	–	–	–	–	–	–
Nowell & Hedges (1998)	HS&B:80	L	N	2	1	1	25,069	0.00	–	–	–	–	–	–	–
Nowell & Hedges (1998)	NLSY	L	N	2	1	1	1,184	–0.16	–	–	–	–	–	–	–
Nowell & Hedges (1998)	HS&B:82	L	N	2	1	1	28,119	0.03	–	–	–	–	–	–	–
Nowell & Hedges (1998)	NLS:92	L	N	2	1	1	21,188	–0.23	–	–	–	–	–	–	–
OECD (2015)	PISA 2012	L	I	2	1	65	> 510,000[10]	–0.38	–0.75 to –0.15	–	–	–	–	–	–
Petersen (2018)	Various	L	N	1, 2	1	117	9,863,429	–0.19	–0.21 to 0.63	–	–	–	–	–	–
Reilly et al. (2019b)	NAEP	L	N	1, 2	1	37	3,035,000	–0.27	–	–	–	–	–	–	–
Stoet & Geary (2013)	PISA 2000–2009	L	I	2	1	75	< 1,500,000	–	–0.32 to –0.40[7]	–	–	–	–	–	–

(table continues)

Table S1 *(Continued)*

						General population				Top-performing math students (top 5%)					
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	Mea-sure[d]	*k*	*N*	SMD[e]	Range	*k*	*N*	SMD[e]	Range	F-m ratio	Range
Science achievement															
Baye & Monseur (2016)	TIMSS 1995–2007 & PISA 2000–2012	IDA	I	1, 2	1	622	–	0.06	–	–	–	–	–	–	–
Hedges & Nowell (1995)	PT:PS	L	N	2	1	1	73,425	0.50	–	–	–	–	–	–	–
Hedges & Nowell (1995)	PT:BS	L	N	2	1	1	73,425	0.29	–	–	–	–	–	–	–
Hedges & Nowell (1995)	NLSY	L	N	2, 3	1	1	11,914	0.38	–	–	–	–	–	–	–
Hedges & Nowell (1995)	NELS:88	L	N	2	1	1	24,599	0.11	–	–	–	–	–	–	–
Martin, Mullis, Foy, & Stanco (2012)	TIMSS 2011a	L	I	1	1	57	> 600,000[10]	–0.04[7]	–0.63 to 0.23	–	–	–	–	–	–
Martin, Mullis, Foy, & Stanco (2012)	TIMSS 2011b	L	I	2	1	56	> 600,000[10]	0.01[7]	–0.35 to 0.12	–	–	–	–	–	–
Nowell & Hedges (1998)	PT	L	N	2	1	1	5,622	0.51	–	–	–	–	–	–	–
Nowell & Hedges (1998)	NLSY	L	N	2	1	1	1,184	0.50	–	–	–	–	–	–	–
Nowell & Hedges (1998)	HS&B:82	L	N	2	1	1	28,119	0.26	–	–	–	–	–	–	–
Nowell & Hedges (1998)	NELS:92	L	N	2	1	1	21,188	0.28	–	–	–	–	–	–	–
OECD (2007a)	PISA 2006	L	I	2	1	57	> 400,000[10]	0.02	–0.24 to 0.39	–	–	–	–	–	
Reilly et al. (2015)	NAEP	L	N	1, 2	1	13	878,916	0.11	0.03 to 0.20	–	–	–	–	–	
Reilly et al. (2019a)	TIMSS 2011b	L	I	2	1	45	261,738	–0.05	–0.74 to 0.27	–	–	–	–	–	–
Steinkamp & Maehr (1984)	Various	M	2	1, 2	2	406	> 14,000,000[10]	0.19	–	–	–	–	–	–	–

Note. Ppt = participants; *k* = number of effect sizes. *N* represents the exact sample size for the calculation of the effect size or the female-to-male ratio for a construct. When this information was not available, *N* represents the full sample size used in the study. SMD = standardized mean difference (i.e., Cohen's *d* or Hedge's *g*); F-m ratio = ratio of female to male students. ACT = American College Test. AR = arithmetic reasoning. BS = biological science information. EEO = equality of educational opportunity. EXPLORE = ACT EXPLORE. HS&B:80 = High School and Beyond 1980. HS&B:82 = High School and Beyond 1982. MK = mathematics knowledge. NAEP = National Assessment of Educational Progress. NAEPa = National Assessment of Educational Progress, Grade 4. NAEPb = National Assessment of Educational Progress, Grade 8. NAEP = National Assessment of Educational Progress, Grade 12. NELS:88 = National Education Longitudinal Study of 1988. NELS:92 = National Education Longitudinal Study of 1992. NLS-72 = National Longitudinal Study of 1972. NLSY = National Longitudinal Survey of Youth 1980. PIRLS = Progress in International Reading Literary Study. PISA = Programme for International Student Assessment. PS = physical science information. PT = Project Talent. SAT = Scholastic Assessment Test. TIMSS 1995 = Third International Mathematics and Science Study 1995: Grade 8. TIMSS 2003 = Trends in International Mathematics and Science Study 2003: Grade 8. TIMSS 2011a = Trends in International Mathematics and Science Study 2011, Grade 4. TIMSS 2011b = Trends in International Mathematics and Science Study 2011, Grade 8. TIMSS 2015 = Trends in International Mathematics and Science Study 2015: Grades 4 and 8.

[a] M = meta-analysis; IDA = integrative data analysis; L = large-scale study; T = talent search data. [b] N = national data, I = international data. [c] 1 = primary school age; 2 = secondary school age; 3 = college age; 4 = adults. [d] 1 = standardized achievement tests; 2 = tests, not specified. [e] Positive values reflect an advantage for male students; negative values reflect an advantage for female students.

[1]These figures are for the top 5%. [2]These figures are for the top 3%. [3]Female–male student ratio among white students in Minnesota in Grade 11. [4]U.S. data. [5]These figures are for the top 0.5%. [6]These figures are for perfect scores. [7]*d* was computed using the total student level standard deviation. [8]These figures are for the top 2%. [9]These figures are for the top 10%. [10]Full sample size. [11]Relative risk for students attaining advanced proficiency in mathematics. [12]Comparing the top 5% of male students with the top 5% of female students in mathematics.
– Data not available.

Table S2

Meta-Analyses and Large-Scale Studies on Gender Differences in Mathematics, Reading, and Science Achievement Motivation (in Alphabetical Order)

					General population				Top-performing math students			
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	*k*	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
Mathematics interest												
Else-Quest et al. (2010)	PISA 2003	L	I	2	41	273,883	0.20	0.01 to 0.60	–	–	–	–
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	0.22	–0.12 to 0.51	–	–	–	–
Su & Armstrong (2015)	Various	M	I	2, 3, 4	9	33,042	0.38	–	–	–	–	–
Su & Armstrong (2015)[†]	Various	M	I	2, 3, 4	9	122,826	0.23	–	–	–	–	–
Su et al. (2009)	Various	M	I	2, 3, 4	30	503,188[1]	0.34	–	–	–	–	–
Mathematics self–efficacy												
Else-Quest et al. (2010)	PISA 2003	L	I	2	41	273,883	0.33	0.08 to 0.65	–	–	–	–
Huang (2013)	Various	M	I	1, 2, 3, 4	78	21,850	0.18	–0.96 to 0.81	–	–	–	–
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	0.34	–0.45 to 0.94	–	–	–	–
Reilly et al. (2019b)	TIMSS 2011	L	I	1, 2	45	261,738	0.17	–0.17 to 0.46	–	–	–	–
Mathematics self–concept												
Brunner et al. (2009)	PISA 2000	L	I	2	26	106,680	0.26[2]	0.00 to 0.63[2]	–	–	–	–
Else-Quest et al. (2010)	TIMSS 2003	L	I	2	46	219,612	0.15	–0.12 to 0.43	–	–	–	–
Else-Quest et al. (2010)	PISA 2003	L	I	2	41	273,883	0.33	0.07 to 0.77	–	–	–	–
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	56	63,229[1]	0.16	–0.40 to 0.88	–	–	–	–
OECD (2013b)	PISA 2012	L	I	2	65	510,000[1]	0.36	–0.52 to 0.44	–	–	–	–

(table continues)

Table S2 *(Continued)*

					General population				Top-performing math students			
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	*k*	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
Mathematics self–concept												
OECD (2013b)	PISA 2012	L	I	2	65	510,000[1]	0.36	–0.52 to 0.44	–	–	–	–
Wilgenbusch & Merell (1999)	Various	M	I	1, 2	10	10,669	0.28	–	–	–	–	–
Valuing mathematics												
Else-Quest et al. (2010)	TIMSS 2003	L	I	2	46	219,612	0.10	–0.16 to 0.46	–	–	–	–
General attitude toward mathematics												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	23	63,229[1]	0.13	–0.40 to 0.37	–	–	–	–
Reilly et al. (2019a)	TIMSS 2011	L	I	2	45	261,738	0.05	–0.32 to 0.36	–	–	–	–
Attribution of success in mathematics to ability												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	7	63,229[1]	0.35	0.00 to 0.93	–	–	–	–
Attribution of success in mathematics to luck												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	4	63,229[1]	–0.10	–0.14 to 0.00	–	–	–	–
Attribution of success in mathematics to task features												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	4	63,229[1]	–0.17	–0.57 to –0.03	–	–	–	–
Attribution of success in mathematics to effort												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	8	63,229[1]	–0.14	–0.47 to 0.38	–	–	–	–
Attribution of failure in mathematics to ability												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	7	63,229[1]	–0.23	–0.39 to 0.22	–	–	–	–

(table continues)

Table S2 *(Continued)*

					General population				Top-performing math students			
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	*k*	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
Attribution of failure in mathematics to ability												
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	–0.16	–0.45 to 0.21	–	–	–	–
Attribution of failure in mathematics to luck												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	4	63,229[1]	–0.05	–0.26 to 0.09	–	–	–	–
Attribution of failure in mathematics to task features												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	4	63,229[1]	–0.14	–0.30 to 0.029	–	–	–	–
Attribution of failure in mathematics to effort												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	7	63,229[1]	0.00	–0.50 to 0.22	–	–	–	–
Mathematics anxiety												
Else-Quest et al. (2010)	PISA 2003	L	I	2	41	273,883	–0.27	–0.61 to –0.03	–	–	–	–
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	53	63,229[1]	–0.15	–2.70 to 0.76	5	63,229[1]	–0.09[3]	–
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	–0.30	–0.39 to 0.65	–	–	–	–
Ratings of the usefulness of mathematics												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	6	63,229[1]	0.07	–0.28 to 0.43	–	–	–	–
Enjoyment of mathematics												
Hyde, Fennema, Ryan, et al. (1990)	Various	M	I	1, 2, 3	6	63,229[1]	–0.01	–0.08 to 0.06	–	–	–	–
Instrumental motivation in mathematics												
Else-Quest et al. (2010)	PISA 2003	L	I	2	41	273,883	0.24	–0.20 to 0.89	–	–	–	–

(table continues)

Table S2 *(Continued)*

					General population				Top-performing math students			
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	*k*	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
Instrumental motivation in mathematics												
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	0.20	–0.17 to 0.56	–	–	–	–
Mathematics intentions												
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	0.34	–0.45 to 0.35	–	–	–	–
Subjective norms in mathematics												
OECD (2013b)	PISA 2012	L	I	2	65	> 510,000[1]	0.00	–0.45 to 1.08	–	–	–	–
Verbal self–efficacy												
Huang (2013)	Various	M	I	1, 2, 3, 4	34	12,397	–0.16	–0.90 to 0.90	–	–	–	–
Interest in reading												
OECD (2003)	PISA 2000	L	I	2	28	> 265,000[1]	–0.53	–0.96 to –0.02	–	–	–	–
Verbal self–concept												
Brunner et al. (2009)	PISA 2000	L	I	2	26	106,680	–0.37[2]	–0.56 to 0.06	–	–	–	–
OECD (2003)	PISA 2000	L	I	2	28	> 265,000[1]	–0.29	–0.51 to –0.03	–	–	–	–
Wilgenbusch & Merrell (1999)	Various	M	I	1, 2	10	10,669	–0.23	–	–	–	–	–
Enjoyment of reading												
OECD (2010)	PISA 2009	L	I	2	75	> 470,000[1]	–0.67	–1.05 to –0.32	–	–	–	–
General attitude toward science												
Steinkamp & Maehr (1984)	Various	M	I	1, 2	22	> 14,000,000[1]	0.17	–	–	–	–	–

(table continues)

Table S2 *(Continued)*

Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	General population				Top-performing math students			
					k	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
General attitude toward science												
Weinburgh (1995)	Various	M	I	–	31	6,753	0.20	–0.61 to 1.59	–	–	–	–
Science self–efficacy												
Huang (2013)	Various	M	I	1, 2, 3, 4	25	7,521	0.04	–0.55 to 0.54	–	–	–	–
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.09	–0.19 to 0.32	–	–	–	–
Reilly et al. (2019a)	TIMSS 2011	L	I	2	45	261,738	0.10	–0.29 to 0.49	–	–	–	–
Attitudes toward learning science												
Reilly et al. (2019a)	TIMSS 2011	L	I	2	45	261,738	0.07	–0.27 to 0.48	–	–	–	–
Enjoyment of science												
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.07	–0.24 to 0.51	–	–	–	–
Steinkamp & Maehr (1984)	Various	M	I	1, 2	54	> 14,000,000[1]	0.04	–	–	–	–	–
Interest in science												
Su et al. (2009)	Various	M	I	2, 3, 4	34	503,188[1]	0.36	–	–	–	–	–
Su & Rounds (2015)	Various	M	I	2, 3, 4	6	15,436	0.41	–	–	–	–	–
Interest in engineering												
Su et al. (2009)	Various	M	I	2, 3, 4	45	503,188[1]	1.11	–	–	–	–	–
Su & Rounds (2015)	Various	M	I	2, 3, 4	22	355,531	0.83					
Interest in physical science												
Su & Rounds (2015)	Various	M	I	2, 3, 4	15	57,669	0.56	–	–	–	–	–
Interest in natural sciences												
Su & Rounds (2015)	Various	M	I	2, 3, 4	6	15,436	0.41	–	–	–	–	–

(table continues)

Table S2 *(Continued)*

Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	General population				Top-performing math students			
					k	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
Interest in mechanics and electronics												
Su & Rounds (2015)	Various	M	I	2, 3, 4	31	255,508	1.21	–	–	–	–	–
Interest in computer science												
Su & Rounds (2015)	Various	M	I	2, 3, 4	1	2,250	0.38	–	–	–	–	–
Interest in engineering technology												
Su & Rounds (2015)	Various	M	I	2, 3, 4	8	49,322	0.89	–	–	–	–	–
Interest in biological science												
Su & Rounds (2015)	Various	M	I	2, 3, 4	3	4,500	0.19	–	–	–	–	–
Interest in medical science												
Su & Rounds (2015)	Various	M	I	2, 3, 4	16	98,919	–0.04	–	–	–	–	–
Interest in medical services												
Su & Rounds (2015)	Various	M	I	2, 3, 4	26	193,130	–0.40	–	–	–	–	–
Importance of science												
Steinkamp & Maehr (1984)	Various	M	I	1, 2	13	> 14,000,000[1]	0.13	–	–	–	–	–
General value of science												
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.12	–0.19 to 0.30	–	–	–	–
Personal value of science												
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.13	–0.22 to 0.28	–	–	–	–
Science self–concept												
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.27	–0.03 to 0.53	–	–	–	–
Instrumental science motivation												
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.02	–0.23 to 0.41	–	–	–	–

(table continues)

Table S2 *(Continued)*

					General population				Top-performing math students			
Study	Data	Study type[a]	Inter-natio-nality[b]	Ppt[c]	*k*	*N*	SMD[d]	Range	*k*	*N*	SMD[d]	Range
Future–oriented science motivation												
OECD (2007b)	PISA 2006	L	I	2	57	> 400,000[1]	0.10	–0.24 to 0.61	–	–	–	–

Note. Ppt = participants; *k* = number of effect sizes. *N* represents the exact sample size for the calculation of the effect size or the female-to-male ratio for a construct. When this information was not available, *N* represents the full sample size of the study. SMD = standardized mean difference (i.e., Cohen's *d* or Hedge's *g*). PISA = Programme for International Student Assessment. TIMSS = Trends in International Mathematics and Science Study, Grade 8.
[a]M = meta-analysis; L = large-scale study. [b]N = national data; I = international data; [c] 0 = preschool age; 1 = primary school age; 2 = secondary school age; 3 = college age; 4 = adults. [d]Positive values reflect an advantage for male students; negative values reflect an advantage for female students.
[1]Full sample size. [2]Converted from *r*. [3]These figures are for the top 5%.
[†]Applied mathematics.
– Data not available.

Table S3

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Effect Sizes (Cohen's d) for Gender Differences in Achievement in Mathematics, Reading, and Science in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Albania	2000	138	52	0.09	138	52	–0.16	56	52	0.11
	2009	230	50	0.01	230	50	–0.37	230	50	–0.14
	2012	237	46	–0.04	237	46	–0.08	237	46	–0.04
	2015	261	50	0.05	261	50	0.05	261	50	0.05
Algeria	2015	276	56	–0.08	276	56	–0.08	276	56	–0.08
Argentina	2000	112	49	–0.01	112	49	–0.32	44	49	0.09
	2006	217	47	–0.05	217	47	–0.40	217	47	–0.23
	2009	239	40	–0.01	239	40	–0.36	239	40	–0.09
	2012	295	37	0.08	295	37	–0.45	295	37	–0.11
Australia	2000	142	34	0.05	142	34	–0.26	56	34	–0.01
	2003	628	38	0.06	628	38	–0.30	628	38	0.08
	2006	708	34	0.08	708	34	–0.36	708	34	–0.06
	2009	713	41	0.05	713	41	–0.30	713	41	0.01
	2012	724	37	0.06	724	37	–0.30	724	37	0.01
	2015	726	41	0.02	726	41	0.02	726	41	0.02
Austria	2000	130	29	0.10	130	29	–0.37	54	29	–0.05
	2003	230	35	0.01	230	35	–0.39	230	35	–0.05
	2006	246	29	0.06	246	29	–0.37	246	29	0.01
	2009	330	32	0.05	330	32	–0.52	330	32	–0.04
	2012	238	29	0.06	238	29	–0.32	238	29	0.09
	2015	350	28	0.12	350	28	0.12	350	28	0.12
Azerbaijan	2006	259	40	–0.13	259	40	0.18	259	40	0.12
	2009	235	44	–0.02	235	44	–0.08	235	44	–0.07
Beijing–Shanghai–Jiangsu–Guangdong	2015	492	40	0.05	492	40	0.05	492	40	0.05
Belgium	2000	188	31	0.04	188	31	–0.28	77	31	–0.09
	2003	440	33	0.06	440	33	–0.26	440	33	0.04
	2006	443	33	0.04	443	33	–0.28	443	33	0.04
	2009	425	33	0.05	425	33	–0.28	425	33	0.01
	2012	430	38	0.02	430	38	–0.34	430	38	0.05

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Belgium	2015	483	34	0.09	483	34	0.09	483	34	0.09
Brazil	2000	134	34	0.11	134	34	–0.27	53	34	–0.25
	2003	222	38	0.16	222	38	–0.08	222	38	0.08
	2006	465	41	0.09	465	41	–0.24	465	41	0.07
	2009	1006	41	0.06	1006	41	–0.33	1006	41	–0.04
	2012	960	37	0.06	960	37	–0.30	960	37	–0.08
	2015	1157	41	0.06	1157	41	0.06	1157	41	0.06
Buenos Aires	2015	83	31	0.17	83	31	0.17	83	31	0.17
Bulgaria	2000	131	40	0.03	131	40	–0.31	52	40	–0.16
	2006	225	41	0.07	225	41	–0.32	225	41	–0.02
	2009	225	45	0.03	225	45	–0.38	225	45	–0.01
	2012	264	42	0.00	264	42	–0.51	264	42	–0.11
	2015	296	39	–0.03	296	39	–0.03	296	39	–0.03
Canada	2000	816	38	0.05	816	38	–0.29	328	38	0.00
	2003	1361	38	0.02	1361	38	–0.27	1361	38	0.07
	2006	1132	38	0.02	1132	38	–0.29	1132	38	0.01
	2009	1160	39	0.05	1160	39	–0.40	1160	39	–0.07
	2012	1077	39	0.04	1077	39	–0.36	1077	39	–0.01
	2015	1003	39	0.08	1003	39	0.08	1003	39	0.08
Chile	2000	136	43	0.03	136	43	–0.26	55	43	0.04
	2006	262	25	0.10	262	25	–0.24	262	25	0.00
	2009	283	34	0.05	283	34	–0.29	283	34	–0.05
	2012	343	31	0.02	343	31	–0.32	343	31	–0.07
	2015	353	37	0.04	353	37	0.04	353	37	0.04
Chinese	2006	441	40	0.02	441	40	–0.26	441	40	–0.01
Taipei	2009	292	45	–0.06	292	45	–0.38	292	45	–0.04
	2012	302	45	0.02	302	45	–0.26	302	45	–0.02
	2015	385	43	0.01	385	43	0.01	385	43	0.01
Colombia	2006	224	39	0.04	224	39	–0.25	224	39	0.12
	2009	396	26	0.03	396	26	–0.33	396	26	–0.12
	2012	454	30	0.04	454	30	–0.31	454	30	0.02
	2015	590	43	0.04	590	43	0.04	590	43	0.04
Costa Rica	2009	229	32	0.10	229	32	–0.19	229	32	0.07
	2012	230	33	0.10	230	33	–0.27	230	33	0.02
	2015	343	36	0.00	343	36	0.00	343	36	0.00

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Croatia	2006	261	33	0.08	261	33	–0.48	261	33	–0.07
	2009	250	35	0.05	250	35	–0.45	250	35	–0.11
	2012	250	33	0.06	250	33	–0.44	250	33	0.01
	2015	290	39	0.07	290	39	0.07	290	39	0.07
Czech Republic	2000	153	35	0.05	153	35	–0.42	66	35	–0.21
	2003	316	37	0.03	316	37	–0.29	316	37	0.03
	2006	297	36	0.01	297	36	–0.45	297	36	–0.02
	2009	303	37	0.04	303	37	–0.40	303	37	–0.06
	2012	266	41	0.05	266	41	–0.33	266	41	0.03
	2015	345	38	0.08	345	38	0.08	345	38	0.08
Denmark	2000	119	31	0.06	119	31	–0.23	48	31	0.37
	2003	211	41	0.03	211	41	–0.28	211	41	0.11
	2006	227	45	0.01	227	45	–0.36	227	45	0.00
	2009	296	39	0.02	296	39	–0.36	296	39	0.10
	2012	374	43	0.03	374	43	–0.27	374	43	0.11
	2015	358	39	0.05	358	39	0.05	358	39	0.05
Dominican Republic	2015	237	52	0.03	237	52	0.03	237	52	0.03
Estonia	2006	243	40	0.04	243	40	–0.42	243	40	0.01
	2009	236	39	0.00	236	39	–0.48	236	39	–0.15
	2012	239	43	0.06	239	43	–0.39	239	43	0.01
	2015	279	41	0.07	279	41	0.07	279	41	0.07
Finland	2000	135	49	0.00	135	49	–0.47	54	49	–0.01
	2003	290	39	0.06	290	39	–0.36	290	39	–0.03
	2006	236	36	0.05	236	36	–0.47	236	36	0.01
	2009	290	40	0.02	290	40	–0.49	290	40	–0.14
	2012	441	41	0.01	441	41	–0.50	441	41	–0.04
	2015	294	42	0.06	294	42	0.06	294	42	0.06
France	2000	129	35	0.08	129	35	–0.28	52	35	–0.12
	2003	215	38	0.05	215	38	–0.31	215	38	0.02
	2006	236	40	0.03	236	40	–0.20	236	40	0.09
	2009	215	35	0.07	215	35	–0.39	215	35	0.04
	2012	231	37	0.05	231	37	–0.32	231	37	0.00
	2015	305	41	0.05	305	41	0.05	305	41	0.05
Georgia	2009	232	45	0.10	232	45	–0.41	232	45	0.03
	2015	266	43	0.09	266	43	0.09	266	43	0.09

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Germany	2000	140	37	0.08	140	37	–0.31	57	37	–0.01
	2003	231	37	0.07	231	37	–0.21	231	37	0.09
	2006	245	33	0.05	245	33	–0.51	245	33	–0.07
	2009	249	36	0.07	249	36	–0.42	249	36	0.04
	2012	250	35	0.04	250	35	–0.41	250	35	–0.06
	2015	325	33	0.06	325	33	0.06	325	33	0.06
Greece	2000	129	38	0.04	129	38	–0.26	52	38	–0.11
	2003	231	32	0.09	231	32	–0.23	231	32	0.14
	2006	244	37	0.05	244	37	–0.34	244	37	0.01
	2009	248	35	0.00	248	35	–0.55	248	35	–0.23
	2012	256	36	0.06	256	36	–0.27	256	36	–0.06
	2015	277	40	0.09	277	40	0.09	277	40	0.09
Hong Kong	2000	122	30	0.05	122	30	–0.18	48	30	–0.07
	2003	224	32	0.07	224	32	–0.26	224	32	0.05
	2006	232	34	0.07	232	34	–0.33	232	34	0.03
	2009	242	32	0.04	242	32	–0.32	242	32	–0.03
	2012	234	26	0.06	234	26	–0.24	234	26	0.06
	2015	268	43	0.03	268	43	0.03	268	43	0.03
Hungary	2000	139	40	0.06	139	40	–0.27	61	40	–0.17
	2003	238	35	0.05	238	35	–0.26	238	35	–0.03
	2006	224	35	0.08	224	35	–0.33	224	35	0.03
	2009	230	35	0.07	230	35	–0.33	230	35	–0.03
	2012	240	38	0.08	240	38	–0.33	240	38	0.03
	2015	283	41	0.02	283	41	0.02	283	41	0.02
Iceland	2000	93	45	0.02	93	45	–0.25	37	45	–0.03
	2003	168	49	0.00	168	49	–0.38	168	49	0.04
	2006	189	46	–0.01	189	46	–0.34	189	46	0.00
	2009	182	42	–0.02	182	42	–0.43	182	42	0.02
	2012	175	48	0.06	175	48	–0.31	175	48	0.11
	2015	169	52	0.10	169	52	0.10	169	52	0.10
India	2009	241	48	0.01	241	48	–0.32	241	48	–0.02
Indonesia	2000	204	45	0.08	204	45	–0.27	81	45	0.00
	2003	538	48	0.03	538	48	–0.21	538	48	–0.04
	2006	532	40	0.03	532	40	–0.24	532	40	0.01
	2009	257	45	0.03	257	45	–0.31	257	45	–0.03
	2012	281	44	–0.01	281	44	–0.27	281	44	–0.05
	2015	326	54	0.02	326	54	0.02	326	54	0.02

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Ireland	2000	106	38	0.03	106	38	–0.32	42	38	–0.04
	2003	194	34	0.02	194	34	–0.29	194	34	–0.02
	2006	229	36	0.08	229	36	–0.29	229	36	–0.02
	2009	197	38	0.04	197	38	–0.41	197	38	–0.06
	2012	251	38	0.05	251	38	–0.28	251	38	–0.03
	2015	287	30	0.09	287	30	0.09	287	30	0.09
Israel	2000	124	42	0.10	124	42	0.09	50	42	0.48
	2006	229	35	0.09	229	35	–0.19	229	35	0.20
	2009	288	37	0.08	288	37	–0.33	288	37	0.03
	2012	253	31	0.02	253	31	–0.43	253	31	–0.06
	2015	330	40	0.14	330	40	0.14	330	40	0.14
Italy	2000	137	36	0.03	137	36	–0.43	55	36	0.16
	2003	582	31	0.10	582	31	–0.38	582	31	0.05
	2006	1089	31	0.02	1089	31	–0.29	1089	31	–0.02
	2009	1545	28	0.05	1545	28	–0.34	1545	28	–0.02
	2012	1554	29	0.04	1554	29	–0.40	1554	29	–0.06
	2015	579	33	0.05	579	33	0.05	579	33	0.05
Japan	2000	146	33	0.02	146	33	–0.37	58	33	–0.14
	2003	235	32	0.06	235	32	–0.17	235	32	0.14
	2006	298	33	0.01	298	33	–0.36	298	33	–0.06
	2009	304	34	0.01	304	34	–0.36	304	34	–0.12
	2012	318	30	0.04	318	30	–0.22	318	30	0.04
	2015	332	37	0.05	332	37	0.05	332	37	0.05
Jordan	2006	325	50	0.07	325	50	–0.21	325	50	–0.08
	2009	324	52	0.02	324	52	–0.31	324	52	–0.13
	2012	352	52	0.18	352	52	–0.32	352	52	–0.05
	2015	363	48	0.06	363	48	0.06	363	48	0.06
Kazakhstan	2009	271	46	–0.01	271	46	–0.35	271	46	–0.01
	2012	290	47	0.02	290	47	–0.24	290	47	0.02
Korea	2000	138	31	0.06	138	31	–0.20	55	31	0.09
	2003	272	30	0.06	272	30	–0.33	272	30	0.06
	2006	259	38	0.02	259	38	–0.40	259	38	–0.06
	2009	249	37	0.06	249	37	–0.25	249	37	0.09
	2012	252	26	0.09	252	26	–0.27	252	26	0.00
	2015	279	40	0.08	279	40	0.08	279	40	0.08
Kosovo	2015	241	35	0.03	241	35	0.03	241	35	0.03

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Kyrgyzstan	2006	295	43	0.03	295	43	–0.48	295	43	0.08
	2009	249	50	0.01	249	50	–0.42	249	50	–0.10
Latvia	2000	106	44	0.07	106	44	–0.36	42	44	–0.07
	2003	231	38	0.06	231	38	–0.30	231	38	0.11
	2006	236	42	0.05	236	42	–0.44	236	42	0.01
	2009	225	44	0.04	225	44	–0.33	225	44	0.04
	2012	215	44	0.02	215	44	–0.36	215	44	–0.04
	2015	243	40	0.07	243	40	0.07	243	40	0.07
Lebanon	2015	227	38	0.15	227	38	0.15	227	38	0.15
Lithuania	2006	237	45	0.04	237	45	–0.49	237	45	–0.11
	2009	226	49	0.00	226	49	–0.48	226	49	–0.06
	2012	231	38	0.02	231	38	–0.45	231	38	–0.03
	2015	326	43	–0.04	326	43	–0.04	326	43	–0.04
Luxembourg	2000	97	31	0.06	97	31	–0.32	39	31	–0.38
	2003	196	34	0.03	196	34	–0.28	196	34	0.09
	2006	228	33	0.06	228	33	–0.28	228	33	0.05
	2009	231	29	0.02	231	29	–0.41	231	29	–0.03
	2012	263	29	0.08	263	29	–0.38	263	29	0.05
	2015	265	36	0.12	265	36	0.12	265	36	0.12
Macao	2003	62	39	0.15	62	39	–0.06	62	39	0.07
	2006	238	39	0.00	238	39	–0.18	238	39	–0.01
	2009	298	36	0.05	298	36	–0.28	298	36	–0.04
	2012	267	43	0.00	267	43	–0.30	267	43	0.00
	2015	224	50	0.04	224	50	0.04	224	50	0.04
Macedonia	2000	126	45	–0.01	126	45	–0.31	52	45	–0.09
	2015	266	46	0.10	266	46	0.10	266	46	0.10
Malaysia	2009	250	47	0.05	250	47	–0.20	250	47	0.01
	2012	260	52	0.02	260	52	–0.27	260	52	–0.01
Malta	2009	173	47	0.02	173	47	–0.62	173	47	–0.29
	2015	182	40	0.05	182	40	0.05	182	40	0.05
Mauritius	2009	233	49	0.05	233	49	–0.32	233	49	–0.06
Mexico	2000	125	31	0.07	125	31	–0.21	50	31	0.10
	2003	1499	38	0.04	1499	38	–0.18	1499	38	0.09

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Mexico	2006	1549	40	0.06	1549	40	–0.28	1549	40	0.01
	2009	1912	36	0.06	1912	36	–0.28	1912	36	0.01
	2012	1690	38	0.05	1690	38	–0.25	1690	38	0.03
	2015	378	38	0.03	378	38	0.03	378	38	0.03
Miranda (Venezuela)	2009	145	41	0.07	145	41	–0.13	145	41	–0.01
Montenegro	2006	223	42	0.00	223	42	–0.46	223	42	–0.10
	2009	241	36	0.05	241	36	–0.53	241	36	–0.17
	2012	237	45	0.05	237	45	–0.46	237	45	–0.06
	2015	283	42	0.09	283	42	0.09	283	42	0.09
Netherlands	2000	69	36	0.03	69	36	–0.33	28	36	–0.12
	2003	200	43	0.04	200	43	–0.12	200	43	0.12
	2006	244	37	0.04	244	37	–0.26	244	37	–0.02
	2009	238	34	0.07	238	34	–0.26	238	34	–0.06
	2012	223	38	0.02	223	38	–0.28	223	38	–0.10
	2015	269	42	0.04	269	42	0.04	269	42	0.04
New Zealand	2000	102	41	0.08	102	41	–0.28	40	41	0.11
	2003	226	34	0.02	226	34	–0.28	226	34	0.14
	2006	241	37	0.08	241	37	–0.31	241	37	0.07
	2009	232	33	0.04	232	33	–0.39	232	33	0.04
	2012	215	35	0.02	215	35	–0.44	215	35	–0.03
	2015	226	39	0.09	226	39	0.09	226	39	0.09
Norway	2000	113	34	0.12	113	34	–0.33	45	34	0.02
	2003	203	39	0.06	203	39	–0.37	203	39	0.08
	2006	235	39	0.04	235	39	–0.31	235	39	0.01
	2009	233	42	0.01	233	42	–0.40	233	42	0.01
	2012	234	45	0.03	234	45	–0.39	234	45	–0.02
	2015	273	46	0.11	273	46	0.11	273	46	0.11
Panama	2009	198	46	0.10	198	46	–0.36	198	46	–0.15
Perm	2012	88	31	0.02	88	31	–0.39	88	31	0.08
Peru	2000	122	49	0.14	122	49	–0.19	49	49	0.27
	2009	299	37	0.12	299	37	–0.21	299	37	0.08
	2012	302	37	0.05	302	37	–0.40	302	37	–0.07
	2015	349	43	–0.01	349	43	–0.01	349	43	–0.01

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Poland	2000	99	34	0.06	99	34	–0.34	39	34	0.01
	2003	219	36	0.05	219	36	–0.32	219	36	0.04
	2006	277	39	0.05	277	39	–0.33	277	39	0.02
	2009	246	39	0.07	246	39	–0.38	246	39	0.02
	2012	230	40	0.08	230	40	–0.37	230	40	–0.06
	2015	224	35	0.15	224	35	0.15	224	35	0.15
Portugal	2000	126	37	–0.05	126	37	–0.35	51	37	–0.23
	2003	230	34	0.08	230	34	–0.26	230	34	0.08
	2006	255	33	0.05	255	33	–0.34	255	33	0.00
	2009	315	39	0.07	315	39	–0.30	315	39	0.00
	2012	286	36	0.09	286	36	–0.26	286	36	0.01
	2015	366	35	0.07	366	35	0.07	366	35	0.07
Qatar	2006	313	44	0.15	313	44	–0.21	313	44	0.06
	2009	454	41	0.07	454	41	–0.27	454	41	0.01
	2012	548	43	–0.01	548	43	–0.38	548	43	–0.15
	2015	604	42	0.09	604	42	0.09	604	42	0.09
Republic of Moldova	2009	260	42	0.04	260	42	–0.37	260	42	–0.11
	2015	266	45	0.04	266	45	0.04	266	45	0.04
Romania	2000	134	57	0.05	134	57	–0.04	54	57	–0.16
	2006	256	38	0.11	256	38	–0.26	256	38	0.10
	2009	239	40	0.05	239	40	–0.18	239	40	0.08
	2012	254	43	0.09	254	43	–0.24	254	43	0.10
	2015	244	47	0.06	244	47	0.06	244	47	0.06
Russian Federation	2000	186	46	0.05	186	46	–0.15	74	46	–0.13
	2003	299	35	0.05	299	35	–0.17	299	35	0.16
	2006	290	43	–0.03	290	43	–0.29	290	43	0.06
	2009	265	45	0.04	265	45	–0.40	265	45	0.04
	2012	262	49	–0.03	262	49	–0.36	262	49	0.01
	2015	302	42	0.02	302	42	0.02	302	42	0.02
Serbia	2006	240	39	0.09	240	39	–0.33	240	39	0.06
	2009	276	35	0.03	276	35	–0.35	276	35	–0.01
	2012	234	38	0.04	234	38	–0.40	234	38	–0.04
Shanghai	2009	256	45	0.04	256	45	–0.34	256	45	0.08
	2012	259	43	0.05	259	43	–0.21	259	43	0.03
Singapore	2009	264	44	–0.01	264	44	–0.34	264	44	0.03

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Singapore	2012	277	45	0.04	277	45	–0.26	277	45	0.14
	2015	306	38	0.09	306	38	0.09	306	38	0.09
Slovak	2003	367	31	0.05	367	31	–0.34	367	31	0.08
Republic	2006	237	36	0.06	237	36	–0.43	237	36	0.01
	2009	228	40	0.05	228	40	–0.43	228	40	0.05
	2012	234	32	0.06	234	32	–0.36	234	32	0.05
	2015	318	39	0.11	318	39	0.11	318	39	0.11
Slovenia	2006	330	37	0.07	330	37	–0.34	330	37	–0.01
	2009	308	43	0.00	308	43	–0.43	308	43	–0.06
	2012	296	40	0.02	296	40	–0.44	296	40	–0.10
	2015	320	39	0.02	320	39	0.02	320	39	0.02
Spain	2000	168	31	0.07	168	31	–0.29	66	31	–0.09
	2003	540	36	0.03	540	36	–0.33	540	36	–0.07
	2006	980	36	0.07	980	36	–0.26	980	36	0.08
	2009	1294	34	0.03	1294	34	–0.31	1294	34	0.01
	2012	1266	34	0.03	1266	34	–0.31	1266	34	–0.06
	2015	337	32	0.12	337	32	0.12	337	32	0.12
Sweden	2000	122	43	0.03	122	43	–0.40	48	43	0.15
	2003	231	40	0.04	231	40	–0.32	231	40	0.09
	2006	222	44	0.01	222	44	–0.36	222	44	0.02
	2009	228	46	0.02	228	46	–0.35	228	46	0.08
	2012	237	44	0.05	237	44	–0.36	237	44	0.03
	2015	273	42	0.05	273	42	0.05	273	42	0.05
Switzerland	2000	168	37	0.07	168	37	–0.23	69	37	0.31
	2003	421	31	0.05	421	31	–0.33	421	31	–0.02
	2006	610	39	0.03	610	39	–0.32	610	39	–0.06
	2009	590	34	0.07	590	34	–0.40	590	34	0.00
	2012	561	40	0.06	561	40	–0.31	561	40	0.07
	2015	293	31	0.06	293	31	0.06	293	31	0.06
Thailand	2000	148	55	0.06	148	55	–0.11	59	55	0.10
	2003	262	53	0.00	262	53	–0.31	262	53	–0.08
	2006	310	51	0.05	310	51	–0.34	310	51	0.01
	2009	311	50	–0.01	311	50	–0.35	311	50	–0.13
	2012	330	57	–0.02	330	57	–0.26	330	57	0.01
	2015	412	50	–0.06	412	50	–0.06	412	50	–0.06

(table continues)

Table S3 *(Continued)*

		Mathematics			Reading			Science		
Country	Cycle	*N*	%F	*d*	*N*	%F	*d*	*N*	%F	*d*
Trinidad and	2009	239	54	–0.02	239	54	–0.41	239	54	0.11
Tobago	2015	235	52	–0.01	235	52	–0.01	235	52	–0.01
Tunisia	2003	236	38	0.06	236	38	–0.22	236	38	0.01
	2006	232	42	0.07	232	42	–0.18	232	42	–0.15
	2009	248	35	0.07	248	35	–0.34	248	35	–0.09
	2012	220	47	0.07	220	47	–0.18	220	47	0.04
	2015	269	47	0.05	269	47	0.05	269	47	0.05
Turkey	2003	243	30	0.12	243	30	–0.28	243	30	–0.10
	2006	247	31	0.06	247	31	–0.28	247	31	–0.09
	2009	250	40	0.04	250	40	–0.39	250	40	–0.14
	2012	242	31	0.03	242	31	–0.35	242	31	–0.05
	2015	295	45	0.07	295	45	0.07	295	45	0.07
United Arab	2009	543	40	0.07	543	40	–0.29	543	40	–0.09
Emirates	2012	575	40	0.08	575	40	–0.33	575	40	–0.10
	2015	708	39	0.13	708	39	0.13	708	39	0.13
United	2000	256	39	0.06	256	39	–0.20	103	39	–0.08
Kingdom	2003	477	43	0.00	477	43	–0.28	477	43	0.01
	2006	658	37	0.03	658	37	–0.31	658	37	0.03
	2009	609	34	0.03	609	34	–0.26	609	34	0.02
	2012	633	44	–0.01	633	44	–0.34	633	44	0.02
	2015	708	35	0.07	708	35	0.07	708	35	0.07
United States	2000	107	42	0.05	107	42	–0.23	42	42	0.01
	2003	273	38	0.09	273	38	–0.26	273	38	0.07
	2006	280	41	0.03	280	41	–	280	41	–0.05
	2009	262	39	0.04	262	39	–0.36	262	39	–0.02
	2012	249	42	–0.02	249	42	–0.26	249	42	0.03
	2015	286	40	0.02	286	40	0.02	286	40	0.02
Uruguay	2003	292	36	0.10	292	36	–0.15	292	36	0.32
	2006	242	36	0.04	242	36	–0.27	242	36	0.15
	2009	298	42	0.07	298	42	–0.32	298	42	–0.02
	2012	266	37	0.06	266	37	–0.25	266	37	0.02
	2015	303	37	0.09	303	37	0.09	303	37	0.09
Viet Nam	2012	248	40	0.08	248	40	–0.27	248	40	–0.03
	2015	291	49	0.00	291	49	0.00	291	49	0.00
Yugoslavia	2003	220	34	0.07	220	34	–0.23	220	34	0.04

Note. – Data were not obtained.

Table S4

Cut-Off Values by Country (95th Percentile in Achievement Scores) to Determine the Top 5% of Students in Mathematics

Country	2000	2003	2006	2009	2012	2015
Albania	551.34	–	–	525.98	539.90	555.85
Algeria	–	–	–	–	–	481.18
Argentina	574.14	–	542.80	542.65	514.09	–
Australia	679.14	675.68	663.46	664.91	663.13	645.17
Austria	660.82	658.17	657.14	650.39	653.77	647.88
Azerbaijan	–	–	556.37	541.40	–	–
Beijing-Shanghai-Jiangsu-Guangdong	–	–	–	–	–	695.36
Belgium	672.20	693.41	677.89	675.30	677.21	657.31
Brazil	499.04	528.29	529.95	531.18	527.68	533.49
Buenos Aires	–	–	–	–	–	599.25
Bulgaria	603.18	–	582.58	592.78	597.44	601.46
Canada	668.09	675.46	664.19	664.80	663.43	657.07
Chile	531.71	–	560.56	559.11	563.18	563.02
Chinese Taipei	–	–	706.58	708.64	738.19	700.85
Colombia	–	–	515.26	509.18	506.02	521.91
Costa Rica	–	–	–	530.50	525.45	516.89
Croatia	–	–	604.68	606.46	623.41	611.61
Czech Republic	655.02	671.90	677.06	649.41	652.69	639.45
Denmark	648.92	661.99	648.85	644.35	635.17	639.43
Dominican Republic	–	–	–	–	–	445.81
Estonia	–	–	645.66	642.92	656.50	650.22
Finland	663.91	680.17	677.92	668.88	656.93	641.77
France	656.93	656.16	645.73	651.73	651.68	639.48
Georgia	–	–	–	521.87	–	558.71
Germany	649.42	661.93	663.88	666.19	666.86	649.51
Greece	617.46	597.76	607.00	612.91	597.17	598.29
Hong Kong	699.00	699.52	691.85	702.97	708.73	686.87
Hungary	648.43	643.79	642.72	637.08	636.90	627.40
Iceland	650.01	657.85	646.20	651.75	641.32	639.53
India	–	–	–	467.22	–	–
Indonesia	508.32	498.80	528.21	492.93	501.07	527.88
Ireland	630.10	641.02	634.14	617.36	639.56	632.50
Israel	636.99	–	615.49	614.52	638.61	633.75
Italy	600.64	623.24	616.07	632.02	638.57	640.45
Japan	687.69	690.19	667.64	677.43	685.66	671.77
Jordan	–	–	518.89	520.09	514.39	518.57
Kazakhstan	–	–	–	548.38	553.91	–
Korea	675.92	690.23	694.31	688.96	709.84	680.60
Kosovo	–	–	–	–	–	486.78
Kyrgyzstan	–	–	465.14	472.98	–	–
Latvia	625.79	626.28	619.40	611.51	625.73	608.27

(table continues)

Table S4 *(Continued)*

Country	2000	2003	2006	2009	2012	2015
Lebanon	–	–	–	–	–	567.69
Lithuania	–	–	631.87	621.43	627.24	620.38
Luxembourg	588.26	641.43	640.66	643.21	643.93	637.83
Macao	–	668.41	660.28	662.92	685.41	669.18
Macedonia	538.32	–	–	–	–	533.42
Malaysia	–	–	–	528.02	561.53	–
Malta	–	–	–	625.89	–	647.64
Mauritius	–	–	–	565.89	–	–
Mexico	527.52	526.90	545.53	547.31	539.30	532.74
Miranda (Venezuela)	–	–	–	533.95	–	–
Montenegro	–	–	542.87	542.59	552.02	562.61
Netherlands	694.43	683.49	671.84	664.94	664.66	654.56
New Zealand	689.04	682.30	673.51	671.37	664.88	645.77
Norway	643.24	644.77	638.36	636.15	637.94	637.95
Panama	–	–	–	503.23	–	–
Perm	–	–	–	–	632.96	–
Peru	470.04	–	–	515.85	516.54	525.83
Poland	631.71	639.93	638.22	638.44	669.35	648.85
Portugal	596.30	609.91	612.03	635.29	639.62	644.33
Qatar	–	–	485.91	556.62	560.18	572.99
Republic of Moldova	–	–	–	538.21	–	567.69
Romania	617.19	–	557.11	559.67	587.59	590.18
Russian Federation	647.83	622.40	625.35	609.11	626.01	628.53
Serbia	–	–	583.91	592.43	602.63	–
Shanghai	–	–	–	757.26	765.22	–
Singapore	–	–	–	724.57	737.40	710.78
Slovak Republic	–	648.45	640.33	653.65	647.34	625.15
Slovenia	–	–	653.68	658.93	655.33	651.38
Spain	621.15	626.03	621.93	625.49	625.60	621.02
Sweden	656.16	661.93	648.96	642.68	627.01	638.04
Switzerland	681.90	683.95	681.69	689.41	681.22	671.23
Thailand	573.97	560.04	557.85	553.63	574.52	554.58
Trinidad and Tobago	–	–	–	580.33	–	578.34
Tunisia	–	501.36	522.19	498.76	522.99	510.41
Turkey	–	613.58	594.98	613.42	614.40	558.50
United Arab Emirates	–	–	–	580.31	590.74	593.29
United Kingdom	676.56	659.34	642.96	634.72	648.26	640.52
United States	652.37	637.97	624.89	636.70	633.75	613.28
Uruguay	–	583.36	587.01	577.85	558.27	565.48
Viet Nam	–	–	–	–	654.08	636.13
Yugoslavia	–	579.25	–	–	–	–

Note. – Data were not obtained.

Table S5

Percentage (and Standard Errors) of Students in the Top 5% in Mathematics Scoring at Different Proficiency Levels (PL)

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Albania	0	–	–	–	–	–	–	0.05 (0.23)	0.12 (0.53)	0 (0)	0 (0)	0 (0)	0 (0)	0.17 (0.42)	0.05 (0.34)	0.11 (0.47)
	1	–	–	–	–	–	–	1.29 (1.77)	1.51 (2.12)	1.09 (2.14)	0.10 (0.31)	0.12 (0.52)	0.10 (0.45)	1.95 (1.65)	1.57 (1.89)	1.79 (1.98)
	2	–	–	–	–	–	–	12.6 (8.97)	13.6 (9.93)	11.67 (9.49)	4.03 (3.24)	4.54 (3.95)	3.61 (3.56)	9.23 (4.55)	9.87 (5.29)	8.39 (5.02)
	3	–	–	–	–	–	–	43.27 (6.8)	41.52 (8.23)	44.81 (9.63)	32.76 (14.53)	32.55 (14.67)	32.87 (15.66)	29.27 (11.64)	31.97 (13.51)	28.21 (11.83)
	4	–	–	–	–	–	–	35.41 (12.19)	37.29 (12.58)	33.72 (13.87)	48.03 (16.25)	45.73 (16.36)	49.9 (17.34)	44.25 (13.14)	43.79 (15.24)	43.86 (10.85)
	5	–	–	–	–	–	–	7.13 (2.98)	5.97 (4.52)	8.25 (3.36)	14.46 (3.65)	16.21 (4.74)	13.08 (4.5)	13.71 (4.3)	11.27 (4.92)	16.31 (7.7)
	6	–	–	–	–	–	–	0.24 (0.38)	0 (0)	0.46 (0.75)	0.62 (0.89)	0.84 (1.34)	0.44 (0.93)	1.43 (1.43)	1.47 (1.93)	1.33 (1.42)
Algeria	0	–	–	–	–	–	–	–	–	–	–	–	–	2.26 (1.46)	1.90 (1.83)	3.39 (2.62)
	1	–	–	–	–	–	–	–	–	–	–	–	–	11.25 (5.19)	10.39 (5.69)	12.88 (6.41)
	2	–	–	–	–	–	–	–	–	–	–	–	–	32.00 (10.01)	32.03 (11.53)	30.77 (9.51)
	3	–	–	–	–	–	–	–	–	–	–	–	–	41.71 (13.56)	40.92 (14.51)	42.74 (13.25)
	4	–	–	–	–	–	–	–	–	–	–	–	–	11.83 (3.64)	13.46 (4.51)	9.64 (4.62)
	5	–	–	–	–	–	–	–	–	–	–	–	–	0.90 (0.93)	1.22 (1.2)	0.55 (1.31)
	6	–	–	–	–	–	–	–	–	–	–	–	–	0.05 (0.18)	0.07 (0.32)	0.03 (0.13)
Argentina	0	–	–	–	0.03 (0.16)	0.06 (0.35)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	1	–	–	–	0.59 (0.76)	0.70 (1.18)	0.48 (0.87)	0.27 (0.61)	0.13 (0.48)	0.36 (0.94)	0.07 (0.33)	0.12 (0.67)	0.05 (0.36)	–	–	–
	2	–	–	–	6.84 (5.07)	7.56 (6.36)	6.19 (5.26)	5.21 (3.79)	7.47 (5.92)	3.76 (3.21)	5.24 (4.43)	5.83 (5.92)	4.90 (4.83)	–	–	–
	3	–	–	–	27.07 (14.76)	25.18 (14.21)	28.75 (16.51)	29.82 (14.27)	33.94 (18.21)	27.19 (12.76)	47.18 (6.34)	54.53 (9.38)	43.03 (6.67)	–	–	–
	4	–	–	–	46.81 (18.13)	44.76 (18.54)	48.72 (19.08)	49.7 (16.59)	43.47 (21.13)	53.68 (14.82)	39.93 (8.65)	34.73 (11.16)	42.87 (8.89)	–	–	–
	5	–	–	–	16.21 (4.50)	18.36 (7.58)	14.25 (5.28)	13.73 (3.98)	13.21 (5.38)	14.07 (4.61)	7.27 (2.83)	4.79 (2.88)	8.66 (3.49)	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Argentina	6	–	–	–	2.45 (1.97)	3.37 (3.84)	1.60 (1.52)	1.27 (1.26)	1.79 (2.33)	0.94 (1.13)	0.31 (0.60)	0 (0)	0.49 (0.94)	–	–	–
Australia	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.05)	0.01 (0.11)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.07)	0 (0.02)	0.01 (0.11)	0 (0)	0 (0)	0 (0)	0.26 (0.34)	0.19 (0.44)	0.12 (0.26)
	3	0.05 (0.15)	0.04 (0.27)	0.05 (0.19)	0.27 (0.36)	0.38 (0.67)	0.21 (0.38)	0.66 (0.66)	0.70 (1.08)	0.61 (0.79)	0.02 (0.08)	0 (0)	0.02 (0.12)	3.44 (1.80)	3.81 (2.33)	2.97 (1.80)
	4	2.7 (1.93)	3.71 (3.08)	2.07 (1.76)	6.73 (4.43)	8.54 (5.98)	5.80 (4.08)	8.88 (5.73)	10.08 (6.88)	8.02 (5.25)	3.13 (2.22)	4.07 (3.16)	2.58 (2.03)	19.52 (7.63)	20.67 (8.62)	19.14 (7.62)
	5	25.53 (15.87)	29.47 (18.61)	23.11 (14.62)	36.73 (11.57)	41.08 (13.01)	34.53 (11.59)	37.13 (10.65)	38.71 (11.55)	36.01 (10.62)	37.20 (6.94)	39.31 (8.34)	35.93 (7.28)	44.58 (4.41)	44.69 (6.38)	44.73 (5.27)
	6	71.73 (17.57)	66.78 (20.99)	74.77 (15.91)	56.28 (15.73)	50.01 (17.99)	59.46 (15.07)	53.32 (16.37)	50.51 (17.77)	55.34 (15.73)	59.66 (8.72)	56.62 (10.52)	61.47 (8.58)	32.20 (5.94)	30.63 (6.20)	33.05 (5.57)
Austria	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.02 (0.15)	0 (0)	0.03 (0.22)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.04 (0.18)	0.11 (0.58)	0.04 (0.22)
	3	0.13 (0.37)	0.25 (0.85)	0.07 (0.37)	0.31 (0.59)	0.71 (1.73)	0.15 (0.42)	0.58 (0.74)	1.22 (1.66)	0.27 (0.62)	0.10 (0.34)	0.26 (0.92)	0.04 (0.23)	1.71 (1.36)	3.51 (3.62)	1.55 (1.45)
	4	4.90 (3.71)	5.37 (4.96)	4.64 (3.83)	8.96 (6.28)	10.85 (9.05)	8.15 (5.99)	11.50 (7.83)	15.45 (11.59)	9.61 (7.03)	5.08 (3.86)	6.72 (6.25)	4.40 (3.46)	15.25 (6.42)	21.11 (10.24)	13.82 (6.83)
	5	36.05 (11.75)	35.45 (12.21)	36.34 (13.07)	43.72 (11.65)	46.76 (14.68)	42.40 (11.61)	45.33 (6.50)	48.78 (9.25)	43.65 (7.75)	44.21 (7.78)	48.05 (11.42)	42.63 (8.63)	46.94 (4.46)	47.83 (8.37)	46.53 (4.94)
	6	58.91 (14.45)	58.93 (14.89)	58.96 (15.49)	46.98 (16.89)	41.67 (20.36)	49.27 (16.20)	42.60 (12.45)	34.55 (16.32)	46.47 (11.70)	50.61 (10.42)	44.97 (13.78)	52.93 (10.61)	36.05 (8.55)	27.45 (10.31)	38.05 (7.33)
Azerbaijan	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–
	1	–	–	–	0 (0)	0 (0)	0 (0)	0.22 (0.55)	0.23 (0.87)	0.21 (0.73)	–	–	–	–	–	–
	2	–	–	–	0.02 (0.13)	0 (0)	0.03 (0.24)	4.28 (3.39)	3.62 (4.08)	4.82 (4.04)	–	–	–	–	–	–
	3	–	–	–	14.75 (9.77)	15.62 (10.99)	13.94 (9.95)	25.12 (16.36)	23.31 (16.4)	26.60 (17.42)	–	–	–	–	–	–
	4	–	–	–	66.72 (9.72)	65.01 (11.9)	68.15 (10.50)	46.39 (18.38)	46.53 (17.46)	46.33 (19.99)	–	–	–	–	–	–
	5	–	–	–	13.49 (4.03)	8.34 (3.74)	17.72 (6.30)	18.75 (5.65)	20.97 (6.89)	16.88 (5.66)	–	–	–	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Azerbaijan	6	–	–	–	5.02 (2.89)	11.04 (6.04)	0.16 (0.54)	5.23 (2.41)	5.34 (3.20)	5.16 (3.22)	–	–	–	–	–	–
Beijing-Shanghai-Jiangsu-Guangdong	0	–	–	–	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)
	1	–	–	–	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)
	2	–	–	–	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)
	3	–	–	–	–	–	–	–	–	–	–	–	–	0.10 (0.27)	0.06 (0.39)	0.13 (0.27)
	4	–	–	–	–	–	–	–	–	–	–	–	–	2.77 (1.93)	2.82 (2.93)	2.27 (1.97)
	5	–	–	–	–	–	–	–	–	–	–	–	–	22.48 (9.23)	23.54 (10.50)	20.03 (9.07)
	6	–	–	–	–	–	–	–	–	–	–	–	–	74.66 (10.26)	73.58 (11.43)	77.57 (9.91)
Belgium	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.03)	0 (0)	0 (0.04)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.02 (0.09)	0.05 (0.23)	0.01 (0.07)
	3	0.02 (0.13)	0 (0)	0.03 (0.18)	0.02 (0.09)	0 (0)	0.02 (0.13)	0.1 (0.30)	0.09 (0.42)	0.10 (0.36)	0 (0)	0 (0)	0 (0)	0.84 (0.69)	1.19 (1.31)	0.67 (0.69)
	4	1.37 (1.22)	1.79 (1.92)	1.17 (1.26)	3.25 (2.34)	4.15 (3.79)	2.78 (2.29)	4.6 (3.10)	6.66 (5.05)	3.64 (2.66)	1.21 (1.21)	1.41 (1.89)	1.09 (1.23)	11.40 (4.72)	13.72 (6.53)	9.88 (4.39)
	5	19.52 (12.23)	23.10 (15.07)	17.77 (11.36)	27.99 (17.45)	30.23 (19.44)	26.83 (16.89)	30.73 (19.08)	35.31 (22.35)	28.54 (17.94)	21.26 (13.27)	22.17 (14.25)	20.70 (13.07)	44.12 (7.61)	46.75 (9.52)	42.88 (9.23)
	6	79.08 (13.08)	75.11 (16.13)	81.02 (12.11)	68.74 (19.40)	65.62 (21.92)	70.36 (18.53)	64.57 (21.95)	57.94 (26.38)	67.72 (20.15)	77.54 (14.00)	76.42 (15.14)	78.21 (13.71)	43.62 (11.84)	38.29 (14.34)	46.56 (12.62)
Brazil	0	0.02 (0.16)	0 (0)	0.03 (0.25)	0 (0.01)	0 (0.01)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.22 (0.25)	0.33 (0.51)	0.21 (0.28)
	1	0.33 (0.64)	0.11 (0.36)	0.45 (0.98)	0.44 (0.68)	0.40 (1.05)	0.48 (0.79)	0.11 (0.22)	0.09 (0.26)	0.13 (0.28)	0.05 (0.14)	0 (0.01)	0.09 (0.23)	2.48 (1.33)	3.67 (2.15)	2.31 (1.31)
	2	3.64 (2.90)	4.50 (4.19)	3.13 (2.85)	5.20 (3.68)	6.55 (5.23)	4.13 (3.39)	4.83 (3.42)	5.74 (4.34)	4.16 (3.18)	4.00 (2.71)	4.66 (3.61)	3.59 (2.60)	13.40 (5.38)	14.73 (6.31)	12.72 (5.23)
	3	31.64 (6.05)	38.06 (9.58)	27.84 (6.23)	31.65 (5.63)	34.69 (6.99)	29.24 (6.51)	40.97 (3.68)	44.11 (4.65)	38.70 (4.57)	41.69 (3.66)	45.61 (5.60)	39.29 (3.87)	36.04 (3.79)	37.04 (4.33)	35.08 (3.71)
	4	41.92 (7.05)	42.12 (10.76)	41.83 (7.94)	43.54 (8.14)	42.09 (10.41)	44.71 (8.19)	41.63 (4.09)	40.17 (5.52)	42.69 (4.77)	41.64 (4.31)	39.58 (5.88)	42.91 (4.32)	34.06 (7.78)	31.99 (7.94)	35.01 (7.43)
	5	17.22 (5.26)	13.06 (5.84)	19.68 (6.21)	15.63 (3.59)	14.50 (4.93)	16.52 (4.32)	11.33 (2.42)	9.47 (2.46)	12.67 (3.10)	11.84 (2.30)	9.38 (3.29)	13.34 (2.41)	11.61 (2.36)	10.5 (3.09)	12.18 (2.60)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Brazil	6	5.22 (2.70)	2.16 (3.23)	7.03 (3.72)	3.54 (1.69)	1.78 (1.58)	4.92 (2.53)	1.14 (0.75)	0.41 (0.54)	1.66 (1.21)	0.77 (0.50)	0.77 (0.88)	0.78 (0.54)	2.19 (1.40)	1.76 (1.51)	2.48 (1.55)
Buenos Aires	0	–	–	–	–	–	–	–	–	–	–	–	–	0.02 (0.23)	0 (0)	0 (0)
	1	–	–	–	–	–	–	–	–	–	–	–	–	0.12 (0.58)	0.07 (0.74)	0.05 (0.41)
	2	–	–	–	–	–	–	–	–	–	–	–	–	1.80 (2.43)	2.03 (4.35)	1.77 (2.62)
	3	–	–	–	–	–	–	–	–	–	–	–	–	14.06 (7.48)	21.01 (12.93)	10.60 (6.70)
	4	–	–	–	–	–	–	–	–	–	–	–	–	42.00 (10.66)	45.3 (15.96)	40.19 (10.26)
	5	–	–	–	–	–	–	–	–	–	–	–	–	34.56 (14.34)	27.89 (19.88)	37.98 (12.81)
	6	–	–	–	–	–	–	–	–	–	–	–	–	7.43 (4.18)	3.71 (5.11)	9.41 (5.66)
Bulgaria	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.05)	0 (0)	0 (0)
	1	–	–	–	0.13 (0.52)	0.31 (1.25)	0 (0)	0.02 (0.14)	0.04 (0.31)	0 (0)	0 (0)	0 (0)	0 (0)	0.04 (0.17)	0.01 (0.13)	0.06 (0.28)
	2	–	–	–	1.27 (1.47)	1.36 (1.94)	1.21 (1.83)	0.46 (0.72)	0.63 (1.27)	0.33 (0.83)	0 (0)	0 (0)	0 (0)	1.15 (1.04)	1.24 (1.53)	1.09 (1.15)
	3	–	–	–	10.72 (7.54)	11.84 (9.12)	9.93 (7.27)	7.7 (5.79)	6.98 (6.01)	8.23 (6.44)	2.39 (1.94)	2.36 (2.54)	2.39 (2.3)	10.57 (4.73)	9.92 (5.40)	10.45 (5.11)
	4	–	–	–	40.41 (5.6)	42.65 (8.39)	38.83 (7.17)	33.51 (7.42)	36.79 (10.06)	30.95 (7.6)	33.19 (11.01)	32.26 (12.97)	33.74 (10.98)	33.45 (9.70)	32.68 (12.41)	34.06 (11.48)
	5	–	–	–	36.14 (8.99)	34.91 (11.14)	37.01 (10.03)	43.92 (10.92)	43.11 (13.59)	44.58 (11.40)	50.67 (12.04)	51.28 (14.04)	50.34 (11.99)	40.72 (12.52)	40.97 (14.27)	40.8 (13.99)
	6	–	–	–	11.32 (3.79)	8.93 (4.98)	13.02 (4.64)	14.39 (4.89)	12.45 (4.32)	15.91 (7.08)	13.75 (2.75)	14.10 (3.89)	13.53 (4.04)	14.07 (4.07)	15.18 (5.38)	13.55 (5.19)
Canada	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0.01 (0.05)	0.02 (0.13)	0 (0)	0.02 (0.10)	0.05 (0.25)	0.01 (0.06)	0.02 (0.09)	0.03 (0.19)	0.02 (0.10)	0 (0)	0 (0)	0 (0)	0.11 (0.18)	0.28 (0.49)	0.07 (0.15)
	3	0.09 (0.23)	0.14 (0.41)	0.06 (0.21)	0.48 (0.55)	0.38 (0.80)	0.53 (0.7)	0.51 (0.53)	0.59 (0.72)	0.47 (0.68)	0.04 (0.10)	0.06 (0.22)	0.02 (0.09)	2.43 (1.26)	3.52 (2.05)	1.72 (1.10)
	4	4.32 (3.03)	5.09 (3.97)	3.85 (2.88)	8.92 (5.71)	9.90 (6.72)	8.33 (5.58)	10.09 (6.45)	11.42 (7.71)	9.23 (6.07)	5.07 (3.31)	6.30 (4.44)	4.28 (2.95)	17.08 (6.62)	19.43 (7.93)	15.29 (6.14)
	5	35.12 (16.38)	36.54 (16.69)	34.23 (16.56)	40.96 (9.01)	42.53 (9.64)	40.02 (9.53)	41.91 (8.52)	44.97 (9.49)	40.01 (8.60)	41.70 (5.97)	45.32 (6.57)	39.42 (6.46)	43.68 (2.96)	44.23 (4.73)	43.23 (3.87)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Canada	6	60.47 (18.92)	58.21 (19.49)	61.86 (18.84)	49.62 (14.47)	47.14 (15.29)	51.11 (14.45)	47.47 (14.88)	42.99 (16.44)	50.28 (14.27)	53.20 (8.93)	48.31 (10.10)	56.29 (8.84)	36.69 (6.98)	32.53 (8.20)	39.68 (6.64)
Chile	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	0.03 (0.16)	0.05 (0.40)	0.02 (0.17)	0.01 (0.11)	0.04 (0.31)	0 (0)	0 (0)	0 (0)	0 (0)	0.06 (0.34)	0.02 (0.34)	0.02 (0.23)
	2	–	–	–	1.21 (1.34)	1.89 (3.16)	0.94 (1.23)	0.83 (1.10)	1.17 (1.98)	0.64 (1.09)	0 (0)	0 (0)	0 (0)	1.00 (1.39)	0.61 (1.25)	0.54 (1.02)
	3	–	–	–	16.10 (10.91)	22.55 (17.07)	13.72 (9.48)	15.24 (9.92)	16.30 (11.44)	14.56 (10.01)	3.20 (2.85)	3.12 (3.96)	3.22 (3.07)	16.20 (7.22)	16.69 (8.73)	14.17 (7.25)
	4	–	–	–	54.44 (9.29)	58.17 (16.90)	53.18 (8.04)	57.98 (9.40)	59.32 (11.12)	57.27 (10.03)	41.99 (8.59)	44.44 (10.43)	40.93 (9.53)	47.48 (4.96)	49.82 (7.58)	45.37 (6.55)
	5	–	–	–	25.41 (5.06)	16.20 (7.41)	28.72 (5.98)	23.43 (4.69)	22.19 (6.62)	24.20 (5.59)	49.34 (9.78)	48.12 (11.54)	49.89 (10.45)	30.96 (7.89)	29.04 (9.18)	34.76 (8.81)
	6	–	–	–	2.82 (1.40)	1.14 (2.39)	3.42 (1.46)	2.51 (1.80)	0.98 (1.13)	3.34 (2.64)	5.47 (1.66)	4.32 (2.81)	5.96 (2.01)	4.30 (1.86)	3.82 (2.50)	5.13 (2.74)
Chinese Taipei	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.06)	0 (0)	0.01 (0.10)
	2	–	–	–	0 (0)	0 (0)	0 (0)	0.02 (0.13)	0.04 (0.32)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.05)	0 (0)	0 (0)
	3	–	–	–	0.02 (0.09)	0.01 (0.07)	0.02 (0.15)	0.14 (0.38)	0.13 (0.50)	0.15 (0.56)	0 (0)	0 (0)	0 (0)	0.22 (0.37)	0.30 (0.63)	0.23 (0.46)
	4	–	–	–	1.26 (1.06)	1.43 (1.82)	1.13 (1.20)	3.22 (2.77)	3.61 (3.65)	2.91 (3.26)	0.08 (0.27)	0.12 (0.54)	0.04 (0.23)	3.97 (2.19)	3.63 (2.61)	3.7 (2.51)
	5	–	–	–	16.17 (10.3)	16.74 (11.17)	15.81 (10.40)	17.30 (11.28)	16.36 (11.86)	18.02 (11.86)	3.64 (2.80)	3.95 (3.53)	3.37 (2.87)	23.35 (9.44)	23.98 (10.24)	23.07 (9.97)
	6	–	–	–	82.56 (11.06)	81.83 (12.10)	83.03 (11.11)	79.32 (13.37)	79.86 (14.23)	78.92 (13.91)	96.28 (2.84)	95.93 (3.57)	96.59 (2.93)	72.45 (11.03)	72.09 (11.69)	72.99 (11.35)
Colombia	0	–	–	–	0.12 (0.39)	0 (0)	0.21 (0.67)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.11)	0 (0)	0.07 (0.28)
	1	–	–	–	1.07 (1.44)	0.98 (2.39)	1.12 (1.57)	0.35 (0.71)	0.51 (1.87)	0.29 (0.69)	0.11 (0.34)	0.23 (1.07)	0.07 (0.33)	0.85 (0.82)	0.91 (1.17)	0.99 (1.14)
	2	–	–	–	12.15 (8.30)	13.21 (11.01)	11.12 (8.36)	10.34 (6.88)	12.70 (10.48)	9.56 (6.54)	6.63 (4.89)	8.72 (7.63)	5.81 (4.67)	11.57 (5.06)	11.97 (5.93)	11.42 (5.29)
	3	–	–	–	44.56 (6.98)	48.33 (11.57)	41.88 (7.70)	54.01 (6.22)	53.07 (10.56)	54.31 (6.57)	48.95 (4.65)	52.33 (8.88)	47.63 (5.56)	45.66 (4.43)	48.47 (6.20)	45.16 (5.75)
	4	–	–	–	33.43 (8.30)	29.48 (13.09)	36.43 (8.03)	32.37 (7.38)	33.16 (11.04)	32.12 (7.45)	36.50 (5.21)	30.84 (7.66)	38.68 (5.92)	35.18 (7.42)	34.03 (8.74)	34.45 (8.76)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Colombia	5	–	–	–	7.88 (3.35)	7.34 (3.68)	8.35 (4.44)	2.92 (1.51)	0.56 (0.98)	3.72 (1.99)	7.17 (2.28)	7.14 (4.28)	7.21 (2.27)	6.41 (2.13)	4.47 (1.78)	7.49 (3.43)
	6	–	–	–	0.79 (0.75)	0.67 (1.02)	0.88 (0.99)	0 (0.01)	0 (0)	0.01 (0.02)	0.64 (0.46)	0.74 (0.96)	0.60 (0.50)	0.31 (0.48)	0.15 (0.44)	0.42 (0.70)
Costa Rica	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.04 (0.17)	0.01 (0.11)	0.08 (0.26)
	1	–	–	–	–	–	–	0.03 (0.18)	0.05 (0.37)	0.02 (0.18)	0.09 (0.30)	0.14 (0.73)	0.06 (0.28)	1.25 (1.08)	1.37 (1.64)	0.86 (1.03)
	2	–	–	–	–	–	–	7.25 (5.35)	10.11 (8.33)	5.93 (4.63)	5.51 (4.10)	6.43 (6.43)	5.05 (4.30)	16.77 (7.10)	16.88 (8.33)	16.84 (7.29)
	3	–	–	–	–	–	–	46.39 (6.52)	54.33 (8.60)	42.74 (7.9)0	44.57 (4.94)	50.54 (8.22)	41.69 (6.09)	49.33 (4.95)	48.03 (7.29)	50.35 (5.77)
	4	–	–	–	–	–	–	40.71 (10.05)	33.52 (12.31)	44.05 (10.53)	39.64 (6.03)	37.09 (8.30)	40.89 (6.49)	27.76 (5.38)	28.98 (8.25)	26.88 (6.69)
	5	–	–	–	–	–	–	5.52 (2.56)	2.00 (2.44)	7.10 (3.30)	9.04 (2.38)	5.80 (3.03)	10.59 (3.08)	4.63 (1.78)	4.73 (2.62)	4.66 (2.17)
	6	–	–	–	–	–	–	0.10 (0.33)	0 (0)	0.15 (0.48)	1.16 (0.89)	0 (0)	1.71 (1.32)	0.21 (0.37)	0 (0)	0.33 (0.58)
Croatia	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.04)	0 (0)	0 (0)
	2	–	–	–	0.01 (0.11)	0 (0)	0.02 (0.16)	0.06 (0.25)	0 (0)	0.08 (0.36)	0 (0)	0 (0)	0 (0)	0.28 (0.47)	0.38 (0.92)	0.17 (0.5)
	3	–	–	–	4.54 (3.59)	5.32 (5.06)	4.16 (3.51)	3.90 (3.22)	5.09 (5.05)	3.28 (2.94)	0.72 (0.93)	0.76 (1.57)	0.69 (0.95)	5.45 (2.78)	7.00 (4.48)	4.84 (3.06)
	4	–	–	–	30.56 (14.58)	36.22 (17.49)	27.68 (13.80)	29.32 (17.06)	33.02 (20.34)	27.35 (16.06)	16.72 (10.88)	19.83 (13.56)	15.04 (9.98)	28.54 (11.25)	30.54 (12.7)	26.39 (10.81)
	5	–	–	–	51.27 (16.80)	50.12 (20.09)	51.88 (15.87)	55.41 (18.65)	52.01 (22.47)	57.21 (17.22)	54.23 (10.95)	55.43 (13.38)	53.61 (10.6)	48.75 (12.48)	45.98 (15.11)	50.19 (12.29)
	6	–	–	–	13.62 (3.77)	8.33 (5.04)	16.26 (4.71)	11.31 (3.25)	9.87 (4.72)	12.08 (3.32)	28.33 (5.49)	23.99 (6.17)	30.66 (6.41)	16.98 (3.21)	16.11 (4.45)	18.4 (4.43)
Czech Republic	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.12)	0 (0.06)	0.02 (0.19)
	3	0.06 (0.26)	0.16 (0.69)	0 (0)	0.16 (0.76)	0 (0)	0.24 (1.13)	0.24 (0.61)	0.30 (1.29)	0.21 (0.62)	0 (0)	0 (0)	0 (0)	0.77 (0.87)	0.86 (1.39)	0.69 (0.91)
	4	1.63 (1.86)	2.35 (3.29)	1.18 (1.84)	2.49 (2.61)	1.65 (2.70)	2.99 (3.65)	5.15 (4.13)	7.23 (7.18)	4.06 (3.94)	1.51 (1.98)	2.12 (3.88)	1.12 (1.78)	12.41 (5.52)	13.73 (7.04)	11.04 (5.58)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Czech Republic	5	17.72 (11.73)	18.15 (12.94)	17.44 (11.82)	18.82 (12.63)	20.68 (15.79)	17.62 (12.28)	29.10 (18.60)	33.96 (22.19)	26.47 (17.58)	26.4 (17.01)	29.00 (19.38)	24.67 (16.79)	47.18 (4.9)	52.5 (7.37)	45.14 (5.9)
	6	80.59 (12.65)	79.34 (14.26)	81.38 (12.51)	78.53 (14.26)	77.67 (16.57)	79.15 (14.24)	65.50 (21.87)	58.51 (26.65)	69.26 (20.03)	72.09 (17.82)	68.88 (20.61)	74.22 (17.27)	39.63 (8.45)	32.91 (10.28)	43.11 (8.53)
Denmark	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.05 (0.18)	0.05 (0.27)	0.04 (0.25)	0 (0)	0 (0)	0 (0)	0.03 (0.14)	0.08 (0.37)	0.02 (0.16)
	3	0.51 (1.18)	0.33 (1.05)	0.63 (1.74)	0.42 (0.67)	0.49 (1.11)	0.36 (0.75)	1.92 (1.77)	2.10 (2.43)	1.80 (2.11)	0.10 (0.25)	0.16 (0.53)	0.06 (0.23)	1.85 (1.28)	2.51 (2.11)	1.50 (1.45)
	4	5.90 (4.45)	6.58 (5.76)	5.40 (4.73)	10.39 (7.03)	9.73 (7.67)	10.89 (7.73)	18.27 (11.66)	18.40 (12.49)	18.13 (11.93)	12.81 (8.35)	14.55 (10.27)	11.6 (8.21)	21.30 (8.55)	22.41 (10.11)	20.9 (8.76)
	5	35.58 (13.00)	36.19 (14.46)	35.14 (13.27)	48.52 (5.31)	47.13 (8.27)	49.37 (6.69)	48.86 (8.68)	49.50 (10.45)	48.45 (9.07)	61.67 (8.48)	62.51 (10.52)	61.14 (8.76)	53.96 (7.15)	54.61 (9.26)	53.45 (8.56)
	6	58.01 (16.38)	56.90 (17.91)	58.84 (16.36)	40.67 (9.30)	42.64 (10.26)	39.38 (10.49)	30.91 (7.85)	29.95 (8.34)	31.57 (8.75)	25.42 (4.91)	22.79 (5.67)	27.2 (5.82)	22.85 (4.88)	20.38 (5.69)	24.13 (4.77)
Dominican Republic	0	–	–	–	–	–	–	–	–	–	–	–	–	1.06 (1.18)	1.30 (1.60)	1.04 (1.60)
	1	–	–	–	–	–	–	–	–	–	–	–	–	16.07 (7.25)	18.27 (8.49)	17.10 (9.18)
	2	–	–	–	–	–	–	–	–	–	–	–	–	52.06 (7.05)	50.72 (8.25)	51.11 (8.94)
	3	–	–	–	–	–	–	–	–	–	–	–	–	26.47 (5.86)	24.88 (7.36)	27.03 (6.14)
	4	–	–	–	–	–	–	–	–	–	–	–	–	4.10 (2.10)	4.83 (2.66)	3.25 (2.46)
	5	–	–	–	–	–	–	–	–	–	–	–	–	0.24 (0.36)	0 (0)	0.48 (0.73)
	6	–	–	–	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)
Estonia	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	–	–	–	0.02 (0.13)	0.04 (0.32)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.10)	0 (0)	0 (0.06)
	3	–	–	–	0.39 (0.72)	0.50 (1.22)	0.31 (0.81)	0.90 (0.96)	0.90 (1.38)	0.90 (1.19)	0.03 (0.16)	0 (0)	0.05 (0.27)	1.00 (0.99)	1.11 (1.57)	0.57 (0.94)
	4	–	–	–	9.73 (6.99)	11.47 (8.66)	8.56 (6.77)	12.96 (8.87)	14.92 (11.31)	11.51 (8.35)	3.67 (2.87)	3.70 (3.81)	3.66 (3.21)	14.07 (6.22)	16.38 (8.19)	11.58 (6.01)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Estonia	5	–	–	–	48.53 (4.50)	51.34 (6.85)	46.66 (5.87)	52.35 (7.28)	49.43 (8.92)	54.46 (8.81)	39.22 (9.84)	39.33 (11.31)	39.12 (10.2)	47.71 (6.18)	48.73 (8.5)	46.98 (7.78)
	6	–	–	–	41.33 (8.96)	36.64 (11.17)	44.47 (9.15)	33.79 (9.22)	34.75 (10.73)	33.13 (10.52)	57.08 (11.74)	56.97 (13.16)	57.17 (11.93)	37.21 (9.85)	33.78 (11.73)	40.86 (10.81)
Finland	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.11)	0 (0)	0.02 (0.18)	0 (0)	0 (0)	0 (0)	0.04 (0.17)	0.07 (0.35)	0.04 (0.22)
	3	0.06 (0.24)	0 (0)	0.10 (0.40)	0.09 (0.33)	0.25 (0.90)	0 (0)	0.77 (0.85)	0.92 (1.6)	0.66 (1.08)	0.06 (0.21)	0.06 (0.29)	0.06 (0.29)	1.75 (1.36)	2.24 (1.87)	1.55 (1.54)
	4	2.98 (2.2)	3.65 (3.53)	2.52 (2.38)	4.79 (3.68)	6.10 (5.88)	4.05 (3.38)	10.37 (6.85)	12.05 (8.67)	9.23 (6.59)	5.63 (4.09)	5.79 (4.49)	5.52 (4.52)	17.6 (7.29)	20.49 (9.09)	16.09 (7.62)
	5	27.56 (17.33)	32.24 (20.67)	24.75 (16.03)	29.60 (18.59)	33.42 (21.58)	27.40 (17.56)	35.92 (18.21)	37.92 (19.87)	34.61 (17.72)	45.69 (6.47)	46.74 (7.78)	44.95 (7.70)	50.36 (5.23)	50.05 (7.82)	50.25 (5.97)
	6	69.39 (19.11)	64.11 (22.8)	72.63 (17.53)	65.51 (21.52)	60.23 (25.65)	68.54 (19.94)	52.94 (24.93)	49.11 (27.74)	55.48 (23.55)	48.63 (9.32)	47.41 (9.98)	49.47 (10.13)	30.25 (6.84)	27.14 (7.43)	32.07 (7.51)
France	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0.05 (0.42)	0.13 (0.99)	0 (0)	0 (0)	0 (0)	0 (0)	0.04 (0.20)	0.05 (0.39)	0.03 (0.20)	0 (0)	0 (0)	0 (0)	0.06 (0.19)	0.18 (0.53)	0.01 (0.13)
	3	0.22 (0.56)	0.35 (1.26)	0.13 (0.45)	0.94 (1.12)	1.41 (1.90)	0.62 (1.11)	0.99 (1.29)	1.74 (2.72)	0.59 (0.95)	0.03 (0.18)	0 (0)	0.05 (0.29)	1.87 (1.35)	2.92 (2.32)	1.75 (1.6)
	4	7.08 (5.11)	8.76 (6.71)	5.97 (5.29)	13.02 (8.73)	13.86 (10.06)	12.47 (9.00)	12.05 (7.97)	15.00 (10.73)	10.42 (7.66)	3.43 (2.82)	3.96 (4.02)	3.10 (2.76)	18.97 (7.75)	20.14 (9.15)	17.49 (7.48)
	5	41.41 (10.87)	42.96 (13.33)	40.47 (11.73)	49.02 (5.16)	49.48 (7.58)	48.72 (7.42)	41.67 (7.54)	40.30 (10.28)	42.39 (9.58)	42.81 (6.20)	44.89 (7.81)	41.54 (7.38)	52.46 (4.91)	52.95 (7.15)	52.72 (4.59)
	6	51.22 (15.01)	47.80 (18.26)	53.42 (14.46)	37.01 (10.29)	35.25 (12.08)	38.19 (10.84)	45.25 (14.64)	42.90 (16.34)	46.58 (15.28)	53.73 (8.19)	51.16 (9.52)	55.31 (8.85)	26.65 (6.57)	23.82 (8.69)	28.02 (7.57)
Georgia	0	–	–	–	–	–	–	0.09 (0.33)	0.14 (0.61)	0.06 (0.36)	–	–	–	0.03 (0.15)	0 (0)	0.01 (0.11)
	1	–	–	–	–	–	–	1.73 (1.62)	1.94 (2.19)	1.54 (2.03)	–	–	–	0.55 (0.81)	0.53 (1.03)	0.64 (1.06)
	2	–	–	–	–	–	–	11.80 (7.97)	12.76 (9.39)	10.93 (8.02)	–	–	–	4.85 (2.80)	6.54 (4.42)	4.16 (2.96)
	3	–	–	–	–	–	–	39.64 (5.54)	43.33 (7.94)	36.57 (6.92)	–	–	–	23.90 (9.85)	25.54 (11.37)	22.53 (10.11)
	4	–	–	–	–	–	–	35.26 (9.25)	32.27 (10.33)	37.79 (10.13)	–	–	–	44.59 (9.85)	45.42 (10.28)	44.17 (9.60)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Georgia	5	–	–	–	–	–	–	9.08 (2.60)	8.48 (3.55)	9.63 (3.62)	–	–	–	22.15 (5.28)	19.02 (7.14)	23.95 (6.37)
	6	–	–	–	–	–	–	2.40 (1.34)	1.08 (1.07)	3.47 (2.02)	–	–	–	3.93 (2.04)	2.94 (2.80)	4.55 (2.72)
Germany	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.02 (0.11)	0.02 (0.22)	0.03 (0.18)
	3	0.10 (0.39)	0.15 (0.62)	0.07 (0.33)	0.11 (0.38)	0.12 (0.89)	0.10 (0.40)	0.28 (0.47)	0.48 (1.15)	0.17 (0.43)	0 (0)	0 (0)	0 (0)	1.08 (1.01)	1.14 (1.61)	1.00 (1.01)
	4	4.08 (3.03)	4.44 (4.17)	3.89 (3.26)	5.06 (3.79)	6.38 (5.32)	4.38 (3.66)	5.43 (3.87)	7.03 (5.85)	4.53 (3.8)	1.68 (1.53)	2.55 (2.84)	1.19 (1.50)	13.17 (5.53)	14.84 (7.31)	11.82 (5.20)
	5	38.02 (16.12)	44.29 (19.35)	34.46 (15.02)	33.27 (15.32)	35.64 (17.59)	32.02 (15.02)	33.58 (15.92)	37.51 (19.21)	31.43 (15.01)	31.00 (16.74)	35.79 (20.65)	28.37 (15.42)	45.37 (5.12)	47.67 (7.88)	44.48 (5.02)
	6	57.80 (18.41)	51.12 (21.70)	61.57 (17.15)	61.57 (18.32)	57.86 (21.36)	63.50 (17.57)	60.71 (19.19)	54.97 (22.95)	63.87 (17.78)	67.32 (17.73)	61.66 (22.15)	70.43 (16.11)	40.35 (8.95)	36.32 (10.24)	42.66 (8.71)
Greece	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0.02 (0.17)	0.06 (0.43)	0 (0)	0.02 (0.12)	0.05 (0.37)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.07)	0.01 (0.10)	0.04 (0.21)
	2	0.16 (0.45)	0.24 (0.90)	0.12 (0.47)	0.47 (0.89)	0.94 (1.95)	0.21 (0.55)	0.62 (0.94)	0.95 (2.15)	0.47 (0.73)	0.14 (0.36)	0.11 (0.49)	0.15 (0.43)	0.54 (0.75)	0.92 (1.64)	0.50 (0.79)
	3	5.73 (4.26)	7.90 (6.94)	4.68 (3.75)	5.97 (4.58)	6.71 (6.29)	5.55 (4.56)	6.63 (4.60)	7.47 (6.62)	6.23 (4.56)	4.34 (3.21)	5.43 (4.90)	3.68 (3.52)	9.20 (4.48)	10.05 (6.37)	7.81 (4.28)
	4	37.54 (8.98)	42.48 (11.15)	35.20 (9.45)	26.52 (16.88)	28.68 (19.31)	25.29 (16.35)	26.95 (16.92)	28.24 (18.72)	26.29 (16.80)	37.67 (10.75)	41.98 (12.81)	35.15 (11.28)	39.36 (11.14)	42.68 (11.83)	37.79 (11.88)
	5	45.24 (12.06)	42.36 (14.96)	46.62 (11.94)	51.41 (19.16)	51.11 (22.01)	51.60 (18.71)	53.23 (19.02)	50.97 (22.18)	54.32 (18.21)	45.53 (13.10)	44.07 (15.03)	46.4 (12.94)	41.96 (13.82)	40.18 (14.12)	42.83 (15.17)
	6	11.32 (2.77)	7.02 (3.68)	13.37 (3.89)	15.61 (3.38)	12.51 (5.49)	17.35 (4.44)	12.55 (3.51)	12.32 (4.97)	12.69 (4.31)	12.33 (2.64)	8.42 (4.02)	14.62 (3.40)	8.93 (2.70)	6.15 (3.54)	11.05 (3.59)
Hong Kong	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.10)	0 (0)	0.01 (0.10)
	3	0.03 (0.18)	0.05 (0.39)	0.02 (0.19)	0.12 (0.39)	0 (0)	0.18 (0.59)	0.05 (0.23)	0.16 (0.73)	0 (0)	0 (0)	0 (0)	0 (0)	0.52 (0.75)	0.89 (1.42)	0.65 (1.00)
	4	1.14 (1.35)	1.81 (2.61)	0.82 (1.31)	1.81 (1.78)	2.03 (2.50)	1.69 (1.98)	1.48 (1.57)	2.34 (3.41)	1.05 (1.24)	0.46 (0.74)	0.95 (2.18)	0.29 (0.61)	6.86 (3.45)	8.02 (4.82)	6.97 (4.19)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Hong Kong	5	15.94 (10.32)	21.50 (14.76)	13.20 (8.89)	21.79 (14.12)	25.20 (16.93)	19.92 (13.47)	18.04 (11.70)	21.25 (14.80)	16.49 (11.06)	9.92 (6.90)	11.08 (9.45)	9.52 (7.06)	31.12 (12.27)	33.15 (13.75)	31.04 (12.6)
	6	82.89 (11.10)	76.64 (15.9)	85.94 (9.42)	76.28 (15.24)	72.76 (18.18)	78.21 (14.51)	80.43 (12.56)	76.25 (16.24)	82.46 (11.64)	89.62 (7.17)	87.97 (9.91)	90.19 (7.20)	61.49 (14.97)	57.95 (17.03)	61.33 (15.39)
Hungary	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0.01 (0.07)	0 (0)	0.01 (0.10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.07 (0.25)	0.14 (0.47)	0.11 (0.35)
	3	0.46 (0.74)	0.43 (1.08)	0.47 (0.91)	0.33 (0.55)	0.53 (1.32)	0.22 (0.55)	0.65 (1.03)	1.20 (2.37)	0.35 (0.87)	0.04 (0.20)	0.10 (0.50)	0 (0)	2.21 (1.51)	2.50 (2.44)	2.18 (1.79)
	4	11.11 (7.42)	12.19 (9.01)	10.52 (7.25)	7.77 (5.50)	9.75 (7.80)	6.73 (5.04)	12.50 (8.33)	15.84 (11.01)	10.72 (7.64)	5.89 (4.36)	8.24 (6.42)	4.38 (3.91)	20.86 (8.58)	21.99 (9.89)	19.35 (8.55)
	5	48.48 (5.94)	53.81 (8.98)	45.70 (6.24)	45.71 (5.55)	48.32 (7.95)	44.37 (6.52)	53.27 (5.85)	57.16 (8.85)	51.21 (6.19)	53.95 (4.65)	58.67 (7.98)	51.01 (6.08)	52.08 (6.86)	50.87 (8.00)	52.44 (7.57)
	6	39.94 (7.54)	33.57 (10.07)	43.30 (7.85)	46.19 (8.55)	41.41 (10.89)	48.68 (8.67)	33.57 (6.91)	25.80 (7.90)	37.72 (7.69)	40.12 (5.95)	32.98 (8.60)	44.60 (7.16)	24.77 (4.90)	24.51 (7.53)	25.92 (5.58)
Iceland	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.02 (0.17)	0 (0)	0.02 (0.24)
	2	0.02 (0.17)	0.05 (0.36)	0 (0)	0.04 (0.21)	0.09 (0.47)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.26 (0.65)	0.54 (1.29)	0.16 (0.62)
	3	0.18 (0.49)	0.14 (0.63)	0.22 (0.72)	0.87 (1.19)	0.84 (1.46)	0.88 (1.58)	0.96 (1.31)	0.79 (1.65)	1.06 (1.68)	0.47 (0.84)	0.53 (1.29)	0.40 (0.95)	3.49 (2.65)	3.57 (3.44)	2.97 (2.97)
	4	8.44 (5.90)	8.86 (6.69)	8.07 (6.39)	12.04 (7.97)	12.53 (9.36)	11.62 (8.12)	10.70 (7.22)	10.13 (7.81)	11.08 (8.32)	10.54 (7.14)	10.04 (8.02)	10.91 (7.59)	20.09 (8.52)	23.38 (10.71)	16.69 (8.45)
	5	39.27 (10.44)	40.55 (11.97)	37.96 (11.08)	51.05 (5.34)	50.42 (9.29)	51.38 (6.95)	46.81 (7.37)	44.74 (9.14)	48.25 (9.78)	53.69 (5.44)	57.52 (7.32)	50.18 (8.13)	45.37 (6.54)	46.63 (9.04)	44.30 (8.72)
	6	52.10 (15.20)	50.40 (16.67)	53.76 (15.10)	36.00 (9.51)	36.12 (12.06)	36.11 (9.94)	41.53 (12.75)	44.35 (13.05)	39.61 (14.33)	35.31 (8.21)	31.91 (9.34)	38.50 (10.21)	30.76 (7.18)	25.88 (7.96)	35.86 (7.83)
India	0	–	–	–	–	–	–	0.10 (0.35)	0.04 (0.14)	0.18 (0.86)	–	–	–	–	–	–
	1	–	–	–	–	–	–	6.30 (5.06)	4.99 (4.71)	8.40 (7.39)	–	–	–	–	–	–
	2	–	–	–	–	–	–	46.37 (9.05)	43.43 (10.04)	50.96 (12.15)	–	–	–	–	–	–
	3	–	–	–	–	–	–	38.19 (8.40)	44.78 (10.86)	27.75 (8.52)	–	–	–	–	–	–
	4	–	–	–	–	–	–	8.42 (5.29)	6.57 (4.10)	11.38 (10.03)	–	–	–	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
India	5	–	–	–	–	–	–	0.60 (0.85)	0.18 (0.61)	1.27 (2.15)	–	–	–	–	–	–
	6	–	–	–	–	–	–	0.02 (0.07)	0 (0)	0.05 (0.20)	–	–	–	–	–	–
Indonesia	0	0.04 (0.17)	0.02 (0.14)	0.07 (0.32)	0 (0.03)	0.01 (0.09)	0 (0)	0.03 (0.16)	0.03 (0.19)	0.03 (0.24)	0 (0)	0 (0)	0 (0)	0.08 (0.25)	0.11 (0.39)	0.01 (0.13)
	1	1.54 (1.41)	1.19 (1.57)	1.92 (2.28)	0.60 (0.78)	0.47 (1.01)	0.67 (1.04)	2.69 (2.61)	3.03 (3.33)	2.40 (2.83)	0.54 (0.79)	0.63 (1.24)	0.47 (0.84)	1.42 (1.22)	1.64 (1.52)	1.24 (1.35)
	2	17.74 (11.49)	18.55 (12.73)	16.79 (11.14)	11.71 (8.00)	12.24 (9.44)	11.42 (7.97)	22.4 (14.33)	23.78 (15.87)	21.25 (13.99)	13.43 (9.19)	13.48 (10.14)	13.35 (9.18)	9.52 (4.54)	8.7 (4.67)	8.32 (5.33)
	3	52.53 (11.31)	54.05 (12.54)	50.85 (11.12)	51.37 (5.99)	51.09 (8.38)	51.51 (6.73)	57.21 (14.55)	57.88 (16.17)	56.74 (14.22)	55.79 (9.60)	53.56 (11.22)	57.48 (10.34)	35.89 (7.35)	34.52 (8.42)	37.55 (8.40)
	4	23.51 (4.61)	21.77 (5.56)	25.48 (5.64)	31.06 (5.80)	32.14 (7.31)	30.50 (6.42)	16.11 (4.48)	14.70 (5.73)	17.25 (5.30)	25.24 (4.92)	27.86 (7.97)	23.29 (5.27)	38.95 (10.05)	41.23 (10.17)	37.92 (10.65)
	5	4.39 (1.54)	4.37 (1.90)	4.42 (2.23)	4.98 (1.57)	4.06 (2.25)	5.48 (2.29)	1.56 (0.92)	0.58 (1.01)	2.33 (1.57)	4.92 (2.38)	4.28 (2.43)	5.40 (2.83)	12.74 (3.07)	12.98 (4.08)	12.84 (4.04)
	6	0.24 (0.34)	0.05 (0.16)	0.46 (0.75)	0.27 (0.33)	0 (0)	0.42 (0.51)	0 (0)	0 (0)	0 (0)	0.08 (0.25)	0.18 (0.59)	0 (0)	1.41 (1.21)	0.81 (1.23)	2.13 (1.94)
Ireland	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.02 (0.16)	0.05 (0.39)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.03 (0.17)	0.11 (0.49)	0 (0.06)
	3	0.21 (0.56)	0.05 (0.36)	0.30 (0.81)	0.76 (0.96)	0.86 (1.44)	0.72 (1.20)	1.94 (1.86)	2.66 (3.34)	1.51 (1.82)	0.18 (0.48)	0.20 (0.73)	0.17 (0.56)	1.98 (1.58)	3.36 (3.14)	1.70 (1.50)
	4	9.67 (6.64)	14.34 (10.89)	7.00 (5.30)	16.78 (10.97)	19.15 (14.22)	15.38 (10.09)	25.09 (16.09)	28.54 (19.09)	22.99 (14.95)	8.78 (6.12)	9.92 (8.05)	8.11 (6.05)	21.37 (8.61)	26.94 (12.42)	19.45 (8.25)
	5	52.60 (5.79)	52.18 (8.47)	52.77 (7.44)	56.53 (8.23)	60.85 (12.09)	54.02 (8.04)	56.43 (16.49)	55.73 (20.16)	56.83 (15.47)	53.71 (4.61)	58.17 (8.11)	51.17 (5.99)	54.35 (6.96)	54.12 (11.32)	54.43 (6.42)
	6	37.52 (7.81)	33.44 (10.54)	39.93 (8.38)	25.91 (5.47)	19.09 (6.32)	29.88 (6.61)	16.54 (3.60)	13.07 (5.23)	18.67 (5.75)	37.33 (5.17)	31.71 (7.16)	40.55 (6.07)	22.26 (4.41)	15.47 (6.11)	24.41 (5.37)
Israel	0	–	–	–	0 (0)	0 (0)	0 (0)	0.01 (0.09)	0 (0)	0.02 (0.14)	0 (0)	0 (0)	0 (0)	0 (0.04)	0 (0)	0 (0)
	1	–	–	–	0 (0)	0 (0)	0 (0)	0.01 (0.09)	0 (0)	0.02 (0.14)	0 (0)	0 (0)	0 (0)	0.01 (0.09)	0 (0)	0.01 (0.14)
	2	–	–	–	0.48 (0.85)	0.84 (1.61)	0.28 (0.80)	0.23 (0.49)	0.41 (1.02)	0.13 (0.39)	0 (0)	0 (0)	0 (0)	0.21 (0.40)	0.23 (0.61)	0.22 (0.49)
	3	–	–	–	5.53 (4.03)	7.00 (5.98)	4.72 (4.19)	4.57 (3.36)	6.32 (5.13)	3.67 (3.20)	0.39 (0.79)	0.36 (1.12)	0.40 (0.91)	3.48 (2.17)	4.70 (3.06)	2.76 (2.24)
	4	–	–	–	24.04 (15.31)	26.70 (17.65)	22.68 (14.84)	25.25 (15.96)	28.01 (18.21)	23.82 (15.33)	9.07 (6.13)	11.23 (8.58)	8.25 (6.02)	20.62 (8.38)	25.17 (10.64)	18.64 (7.97)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Israel	5	–	–	–	48.03 (16.27)	49.61 (19.97)	47.23 (15.17)	49.68 (16.74)	49.24 (20.32)	49.91 (15.64)	53.71 (5.36)	56.2 (8.83)	52.79 (5.82)	48.11 (6.44)	50.19 (8.83)	46.04 (6.81)
	6	–	–	–	21.92 (4.68)	15.84 (6.55)	25.08 (5.40)	20.25 (4.46)	16.02 (5.85)	22.43 (5.63)	36.82 (5.75)	32.22 (8.77)	38.56 (6.49)	27.57 (5.80)	19.71 (6.80)	32.34 (6.37)
Italy	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0.01)	0.01 (0.04)	0.02 (0.14)	0 (0.02)	0.02 (0.08)	0.02 (0.08)	0.03 (0.09)	0 (0)	0 (0)	0 (0)	0.04 (0.14)	0.02 (0.18)	0.04 (0.17)
	3	0.53 (0.87)	0.74 (1.46)	0.44 (1.07)	1.11 (1.02)	0.99 (1.32)	1.16 (1.14)	1.45 (1.08)	1.82 (1.59)	1.30 (1.10)	0.12 (0.19)	0.11 (0.37)	0.12 (0.22)	1.49 (1.22)	1.53 (1.89)	1.31 (1.25)
	4	10.12 (6.75)	13.44 (9.57)	8.79 (6.28)	17.63 (11.17)	18.85 (12.71)	17.06 (10.84)	16.89 (10.49)	21.35 (13.46)	15.00 (9.41)	8.30 (5.24)	9.89 (6.69)	7.68 (4.94)	15.91 (6.73)	18.63 (8.78)	15.57 (6.89)
	5	47.35 (4.74)	54.92 (7.95)	44.37 (5.27)	52.15 (9.87)	51.7 (12.78)	52.36 (9.49)	55.01 (7.13)	56.74 (10.57)	54.26 (6.43)	52.62 (2.91)	55.89 (4.55)	51.36 (3.25)	44.32 (4.17)	44.90 (6.57)	44.38 (4.57)
	6	42.00 (7.67)	30.91 (8.94)	46.40 (7.97)	29.10 (5.35)	28.44 (8.10)	29.41 (5.33)	26.62 (4.84)	20.07 (5.85)	29.42 (5.17)	38.96 (4.91)	34.12 (6.41)	40.84 (4.87)	38.24 (7.35)	34.90 (8.18)	38.69 (7.18)
Japan	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.05)	0 (0)	0 (0.08)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.02 (0.12)	0.12 (0.45)	0 (0.06)
	3	0 (0)	0 (0)	0 (0)	0.34 (0.56)	0.28 (0.85)	0.36 (0.68)	0.09 (0.35)	0.11 (0.73)	0.08 (0.37)	0 (0)	0 (0)	0 (0)	0.69 (0.76)	1.05 (1.43)	0.40 (0.83)
	4	2.03 (2.00)	2.67 (3.48)	1.72 (1.95)	5.90 (4.18)	7.75 (6.38)	5.02 (3.99)	4.53 (3.36)	4.88 (4.32)	4.37 (3.45)	0.81 (0.88)	1.10 (1.96)	0.67 (0.91)	8.50 (4.00)	10.40 (5.82)	7.65 (3.97)
	5	20.52 (13.44)	25.66 (17.13)	18.17 (12.39)	30.84 (18.29)	29.67 (18.66)	31.38 (18.77)	29.27 (18.33)	31.07 (20.50)	28.24 (17.97)	19.87 (12.60)	23.58 (16.06)	18.21 (11.92)	34.89 (13.37)	36.21 (14.28)	34.65 (13.94)
	6	77.45 (14.60)	71.67 (18.74)	80.11 (13.41)	62.92 (22.05)	62.30 (23.00)	63.24 (21.93)	66.10 (21.15)	63.94 (23.27)	67.31 (20.66)	79.32 (13.10)	75.32 (16.79)	81.12 (12.33)	55.90 (16.80)	52.23 (18.37)	57.28 (17.00)
Jordan	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.41 (0.55)	0.56 (0.98)	0.39 (0.75)
	1	–	–	–	0.70 (0.78)	0.93 (1.53)	0.51 (0.93)	0.19 (0.47)	0.17 (0.55)	0.21 (0.82)	0.38 (0.66)	0.52 (1.00)	0.24 (0.65)	3.92 (2.25)	5.00 (3.54)	3.43 (2.89)
	2	–	–	–	12.43 (8.06)	14.68 (9.99)	10.74 (7.57)	7.30 (5.27)	7.48 (5.94)	7.06 (5.83)	10.83 (7.37)	12.42 (8.51)	9.16 (7.12)	18.27 (7.51)	20.59 (8.93)	16.24 (7.16)
	3	–	–	–	49.41 (5.31)	52.31 (8.15)	47.19 (6.52)	48.79 (4.68)	51.69 (6.24)	45.78 (7.46)	51.50 (8.66)	57.90 (8.59)	44.95 (10.95)	46.34 (4.71)	45.41 (7.78)	46.21 (5.35)
	4	–	–	–	32.90 (6.95)	29.10 (9.48)	35.81 (7.99)	37.95 (7.39)	35.35 (8.79)	40.70 (8.33)	27.68 (3.85)	25.67 (7.14)	29.76 (6.45)	26.77 (7.08)	25.74 (7.95)	28.19 (8.77)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Jordan	5	–	–	–	4.51 (2.28)	2.98 (1.77)	5.67 (3.81)	5.76 (3.19)	5.30 (3.16)	6.23 (4.58)	8.32 (5.11)	3.49 (2.47)	13.27 (8.88)	4.03 (1.69)	2.65 (1.87)	5.16 (2.52)
	6	–	–	–	0.04 (0.14)	0 (0)	0.07 (0.24)	0.01 (0.03)	0 (0)	0.02 (0.07)	1.30 (1.70)	0 (0)	2.62 (3.38)	0.26 (0.43)	0.06 (0.27)	0.38 (0.75)
Kazakhstan	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	1	–	–	–	–	–	–	0.15 (0.34)	0.12 (0.46)	0.17 (0.49)	0.02 (0.13)	0.02 (0.17)	0.02 (0.19)	–	–	–
	2	–	–	–	–	–	–	3.05 (2.58)	3.81 (3.60)	2.43 (2.42)	1.33 (1.33)	1.24 (1.75)	1.41 (1.62)	–	–	–
	3	–	–	–	–	–	–	22.42 (14.51)	22.93 (15.45)	21.97 (14.52)	24.08 (15.31)	24.18 (15.87)	23.92 (15.64)	–	–	–
	4	–	–	–	–	–	–	50.98 (15.48)	48.62 (16.95)	52.84 (15.51)	57.13 (15.37)	58.76 (16.15)	55.74 (15.64)	–	–	–
	5	–	–	–	–	–	–	17.65 (4.21)	19.55 (6.83)	16.21 (4.61)	15.83 (4.24)	13.93 (5.75)	17.53 (5.03)	–	–	–
	6	–	–	–	–	–	–	5.75 (3.65)	4.97 (4.11)	6.38 (3.94)	1.60 (0.84)	1.86 (1.36)	1.38 (1.26)	–	–	–
Korea	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.03 (0.14)	0.02 (0.18)	0 (0)
	3	0.02 (0.12)	0.06 (0.47)	0 (0)	0.06 (0.21)	0.07 (0.39)	0.05 (0.26)	0.09 (0.31)	0.08 (0.44)	0.10 (0.37)	0 (0)	0 (0)	0 (0)	0.79 (0.90)	0.62 (1.32)	0.59 (0.92)
	4	1.43 (1.39)	1.58 (2.12)	1.35 (1.56)	2.03 (1.85)	2.12 (2.43)	1.97 (2.02)	3.67 (2.95)	4.45 (4.25)	3.21 (3.17)	0.26 (0.51)	0.48 (1.33)	0.18 (0.48)	8.20 (3.93)	10.29 (5.86)	6.84 (3.67)
	5	18.35 (11.74)	19.45 (13.66)	17.86 (11.57)	19.51 (12.63)	19.53 (13.28)	19.48 (12.94)	26.24 (16.77)	28.6 (18.64)	24.77 (16.46)	9.79 (6.70)	15.25 (11.33)	7.85 (5.68)	30.05 (11.69)	34.11 (13.91)	28.49 (11.86)
	6	80.20 (12.66)	78.91 (14.72)	80.79 (12.44)	78.41 (13.95)	78.28 (14.7)	78.5 (14.16)	70.00 (19.12)	66.87 (21.3)	71.92 (18.61)	89.96 (6.86)	84.27 (11.57)	91.97 (5.82)	60.94 (14.94)	54.96 (17.7)	64.08 (14.38)
Kosovo	0	–	–	–	–	–	–	–	–	–	–	–	–	0.36 (0.53)	0.29 (0.84)	0.42 (0.70)
	1	–	–	–	–	–	–	–	–	–	–	–	–	6.43 (3.56)	7.14 (5.17)	6.28 (4.07)
	2	–	–	–	–	–	–	–	–	–	–	–	–	33.86 (13.20)	37.45 (15.43)	32.47 (13.18)
	3	–	–	–	–	–	–	–	–	–	–	–	–	48.38 (15.02)	46.23 (18.34)	49.20 (14.44)
	4	–	–	–	–	–	–	–	–	–	–	–	–	10.2 (3.50)	8.47 (4.46)	10.67 (4.48)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Kosovo	5	–	–	–	–	–	–	–	–	–	–	–	–	0.74 (0.84)	0.42 (1.05)	0.92 (1.15)
	6	–	–	–	–	–	–	–	–	–	–	–	–	0.03 (0.08)	0 (0)	0.04 (0.13)
Kyrgyzstan	0	–	–	–	0.64 (0.90)	0.85 (1.46)	0.47 (1.01)	0.21 (0.45)	0.35 (0.87)	0.09 (0.41)	–	–	–	–	–	–
	1	–	–	–	6.98 (5.08)	7.99 (6.3)	6.15 (4.93)	4.47 (3.54)	5.06 (4.53)	3.90 (3.35)	–	–	–	–	–	–
	2	–	–	–	32.89 (5.73)	34.34 (7.38)	31.7 (7.05)	28.35 (13.67)	28.89 (14.62)	27.82 (13.75)	–	–	–	–	–	–
	3	–	–	–	44.32 (9.56)	42.25 (11.46)	46.01 (9.52)	51.43 (15.38)	50.76 (17.15)	52.07 (14.87)	–	–	–	–	–	–
	4	–	–	–	13.97 (3.74)	13.62 (5.14)	14.30 (3.78)	14.66 (4.06)	14.47 (4.07)	14.86 (6.45)	–	–	–	–	–	–
	5	–	–	–	1.01 (1.18)	0.84 (1.21)	1.15 (1.57)	0.88 (0.78)	0.49 (0.83)	1.25 (1.34)	–	–	–	–	–	–
	6	–	–	–	0.18 (0.26)	0.12 (0.41)	0.22 (0.42)	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–
Latvia	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.05)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.10 (0.54)	0.25 (1.35)	0 (0)	0.01 (0.09)	0.03 (0.22)	0 (0)	0 (0)	0 (0)	0 (0)	0.19 (0.44)	0.22 (0.77)	0.10 (0.36)
	3	1.30 (1.66)	1.41 (2.39)	1.23 (2.06)	2.44 (2.30)	2.44 (3.12)	2.43 (3.15)	4.03 (3.35)	3.95 (4.34)	4.08 (4.04)	0.54 (1.26)	0.70 (2.11)	0.42 (1.19)	5.75 (3.08)	7.89 (4.96)	4.06 (3.15)
	4	17.80 (11.88)	20.01 (13.99)	16.43 (11.63)	22.70 (14.35)	26.84 (17.88)	19.53 (12.95)	29.61 (18.53)	33.89 (22.13)	26.38 (16.81)	14.62 (9.77)	16.08 (11.57)	13.48 (9.38)	35.4 (13.63)	37.04 (15.48)	34.56 (14.12)
	5	50.86 (9.88)	53.18 (12.16)	49.41 (10.79)	54.48 (13.72)	54.13 (16.53)	54.72 (13.23)	55.13 (19.25)	53.09 (23.72)	56.69 (17.36)	55.39 (8.64)	55.99 (10.59)	54.92 (9.47)	48.08 (15.03)	46.58 (18.54)	49.18 (14.42)
	6	30.04 (6.39)	25.41 (8.43)	32.93 (7.62)	20.28 (5.40)	16.34 (8.41)	23.32 (6.01)	11.22 (3.11)	9.05 (4.72)	12.85 (4.42)	29.44 (5.08)	27.24 (7.04)	31.18 (6.90)	10.59 (2.57)	8.26 (3.85)	12.10 (3.60)
Lebanon	0	–	–	–	–	–	–	–	–	–	–	–	–	0.04 (0.25)	0.21 (0.92)	0.02 (0.22)
	1	–	–	–	–	–	–	–	–	–	–	–	–	0.54 (0.85)	0.74 (1.36)	0.40 (0.98)
	2	–	–	–	–	–	–	–	–	–	–	–	–	4.63 (2.65)	6.54 (4.85)	3.82 (2.78)
	3	–	–	–	–	–	–	–	–	–	–	–	–	20.15 (8.71)	22.67 (11.23)	17.49 (8.26)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Lebanon	4	–	–	–	–	–	–	–	–	–	–	–	–	43.29 (7.11)	43.14 (9.34)	43.09 (7.49)
	5	–	–	–	–	–	–	–	–	–	–	–	–	25.86 (5.95)	24.15 (9.13)	28.12 (7.08)
	6	–	–	–	–	–	–	–	–	–	–	–	–	5.48 (2.10)	2.53 (2.56)	7.05 (2.96)
Lithuania	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.09)	0.02 (0.19)	0 (0)
	2	–	–	–	0.02 (0.13)	0 (0)	0.03 (0.23)	0.02 (0.15)	0.04 (0.33)	0 (0)	0 (0)	0 (0)	0 (0)	0.19 (0.4)	0.11 (0.48)	0.22 (0.63)
	3	–	–	–	1.21 (1.34)	1.39 (1.68)	1.08 (1.69)	1.94 (1.79)	2.03 (2.30)	1.84 (2.19)	0.48 (0.76)	0.49 (1.23)	0.47 (0.81)	4.53 (2.44)	5.03 (3.25)	4.33 (2.64)
	4	–	–	–	16.95 (10.87)	16.93 (11.35)	16.99 (11.54)	22.23 (14.2)	22.20 (14.98)	22.20 (14.46)	14.91 (9.83)	16.76 (11.59)	13.74 (9.42)	29.51 (11.51)	30.21 (12.35)	29.34 (11.95)
	5	–	–	–	54.65 (9.02)	56.48 (10.51)	53.18 (10.05)	52.99 (13.47)	51.80 (15.42)	54.11 (13.84)	59.07 (8.57)	60.96 (10.19)	57.88 (8.94)	49.22 (11.73)	46.19 (12.01)	51.33 (12.18)
	6	–	–	–	27.17 (6.31)	25.20 (6.23)	28.72 (8.10)	22.82 (4.59)	23.92 (6.27)	21.85 (6.19)	25.54 (4.34)	21.80 (6.03)	27.90 (5.06)	16.55 (3.37)	18.45 (5.21)	14.78 (3.91)
Luxembourg	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.02 (0.14)	0.05 (0.41)	0 (0)	0.15 (0.42)	0.18 (0.94)	0.15 (0.50)	0 (0)	0 (0)	0 (0)	0.07 (0.23)	0.11 (0.49)	0.01 (0.13)
	3	0.42 (0.78)	0.69 (1.56)	0.28 (0.76)	1.09 (1.20)	1.31 (2.08)	0.98 (1.26)	1.50 (1.43)	2.45 (3.02)	1.12 (1.38)	0.20 (0.46)	0.31 (0.91)	0.15 (0.46)	2.32 (1.66)	3.99 (3.26)	1.63 (1.71)
	4	10.14 (7.02)	12.31 (9.44)	9.02 (6.53)	13.57 (8.87)	13.93 (10.76)	13.35 (9.07)	16.44 (10.58)	22.08 (15.36)	14.06 (9.43)	9.61 (6.72)	14.08 (10.16)	7.74 (5.76)	18.39 (7.68)	21.56 (10.31)	15.55 (7.08)
	5	51.62 (6.15)	54.33 (10.15)	50.24 (7.33)	50.82 (5.28)	53.60 (9.03)	49.47 (6.21)	48.36 (5.80)	48.95 (10.19)	48.14 (6.22)	47.03 (4.34)	51.62 (7.27)	45.09 (5.25)	47.39 (5.31)	48.47 (8.01)	47.00 (5.41)
	6	37.81 (7.83)	32.67 (10.71)	40.47 (8.77)	34.50 (8.89)	31.11 (10.34)	36.2 (9.49)	33.54 (11.22)	26.34 (12.61)	36.54 (11.28)	43.17 (7.44)	34.00 (9.62)	47.02 (7.67)	31.82 (6.04)	25.88 (8.15)	35.81 (6.33)
Macao	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.09 (0.47)	0 (0)	0.13 (0.72)	0.09 (0.26)	0.19 (0.62)	0.04 (0.23)	0 (0)	0 (0)	0 (0)	0.05 (0.21)	0.08 (0.39)	0.01 (0.13)
	3	0.30 (1.03)	0.30 (1.67)	0.28 (1.23)	0.98 (1.32)	0.86 (1.53)	1.04 (1.78)	1.48 (1.52)	2.12 (2.77)	1.10 (1.38)	0.01 (0.12)	0.03 (0.27)	0 (0)	0.76 (0.85)	0.92 (1.31)	0.52 (1.02)
	4	5.51 (5.43)	8.25 (9.58)	3.97 (5.42)	9.70 (6.72)	9.54 (7.39)	9.77 (7.23)	11.52 (7.68)	14.96 (10.77)	9.58 (6.50)	1.18 (1.24)	1.64 (2.08)	0.84 (1.38)	10.80 (4.89)	11.38 (5.88)	10.01 (5.27)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Macao	5	35.39 (18.97)	41.35 (23.16)	31.95 (21.02)	42.57 (12.33)	41.46 (14.53)	43.16 (12.62)	35.85 (14.11)	37.83 (16.46)	34.62 (13.55)	20.08 (12.64)	19.68 (13.24)	20.32 (13.19)	38.16 (14.16)	40.31 (16.18)	36.84 (14.74)
	6	58.80 (21.96)	50.10 (26.85)	63.80 (22.63)	46.65 (18.52)	48.14 (19.77)	45.90 (18.63)	51.06 (21.92)	44.92 (26.31)	54.66 (19.84)	78.73 (13.38)	78.64 (14.27)	78.84 (13.57)	50.24 (18.16)	47.3 (20.06)	52.62 (18.32)
Macedonia	0	–	–	–	–	–	–	–	–	–	–	–	–	0.41 (0.56)	0.30 (0.73)	0.54 (0.86)
	1	–	–	–	–	–	–	–	–	–	–	–	–	2.68 (1.78)	3.40 (2.73)	1.82 (1.84)
	2	–	–	–	–	–	–	–	–	–	–	–	–	12.79 (5.69)	14.40 (7.16)	10.82 (5.79)
	3	–	–	–	–	–	–	–	–	–	–	–	–	35.37 (5.17)	37.62 (7.66)	34.96 (5.93)
	4	–	–	–	–	–	–	–	–	–	–	–	–	35.54 (8.72)	33.06 (9.67)	36.09 (9.46)
	5	–	–	–	–	–	–	–	–	–	–	–	–	10.61 (2.98)	9.41 (3.96)	12.47 (4.20)
	6	–	–	–	–	–	–	–	–	–	–	–	–	2.60 (1.48)	1.82 (2.10)	3.30 (2.08)
Malaysia	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	1	–	–	–	–	–	–	0.60 (1.00)	0.72 (1.39)	0.47 (1.21)	0 (0)	0 (0)	0 (0)	–	–	–
	2	–	–	–	–	–	–	8.84 (6.22)	10.07 (7.58)	7.70 (6.14)	0.12 (0.33)	0.14 (0.52)	0.11 (0.44)	–	–	–
	3	–	–	–	–	–	–	41.53 (8.85)	42.41 (9.08)	40.63 (10.39)	14.46 (9.48)	15.65 (10.64)	13.14 (9.48)	–	–	–
	4	–	–	–	–	–	–	41.16 (13.67)	41.06 (14.34)	41.30 (14.05)	59.87 (9.02)	60.33 (10.65)	59.37 (9.08)	–	–	–
	5	–	–	–	–	–	–	7.61 (2.55)	5.74 (2.51)	9.37 (3.74)	23.35 (3.62)	21.90 (4.87)	24.95 (4.84)	–	–	–
	6	–	–	–	–	–	–	0.27 (0.45)	0 (0)	0.53 (0.87)	2.19 (0.96)	1.97 (1.33)	2.44 (2.03)	–	–	–
Malta	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–	0 (0)	0 (0)	0 (0)
	1	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–	0.02 (0.17)	0 (0)	0 (0)
	2	–	–	–	–	–	–	0.23 (0.55)	0.33 (0.91)	0.14 (0.60)	–	–	–	0.30 (0.63)	0.09 (0.52)	0.08 (0.46)
	3	–	–	–	–	–	–	3.91 (3.19)	4.50 (4.28)	3.39 (3.45)	–	–	–	2.92 (2.09)	3.50 (3.51)	2.38 (2.39)
	4	–	–	–	–	–	–	22.55 (14.40)	23.10 (15.67)	21.93 (14.75)	–	–	–	16.34 (7.35)	17.24 (8.78)	14.53 (7.18)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Malta	5	–	–	–	–	–	–	50.37 (12.48)	49.81 (14.05)	50.89 (13.49)	–	–	–	40.72 (5.24)	41.00 (7.15)	40.95 (6.84)
	6	–	–	–	–	–	–	22.95 (6.60)	22.26 (7.18)	23.65 (8.51)	–	–	–	39.71 (9.99)	38.19 (11.81)	42.07 (10.88)
Mauritius	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–
	1	–	–	–	–	–	–	0.04 (0.27)	0.09 (0.63)	0 (0)	–	–	–	–	–	–
	2	–	–	–	–	–	–	2.07 (1.85)	1.70 (2.48)	2.34 (2.47)	–	–	–	–	–	–
	3	–	–	–	–	–	–	16.50 (10.82)	18.54 (12.99)	15.01 (10.41)	–	–	–	–	–	–
	4	–	–	–	–	–	–	53.83 (9.68)	57.23 (12.47)	51.32 (10.22)	–	–	–	–	–	–
	5	–	–	–	–	–	–	25.00 (4.44)	21.20 (6.28)	27.79 (5.53)	–	–	–	–	–	–
	6	–	–	–	–	–	–	2.56 (1.59)	1.23 (2.22)	3.53 (2.59)	–	–	–	–	–	–
Mexico	0	0.01 (0.06)	0 (0)	0.01 (0.10)	0.01 (0.05)	0.02 (0.11)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.02 (0.10)	0 (0.06)	0 (0)
	1	0.15 (0.44)	0.14 (0.48)	0.15 (0.49)	0.14 (0.40)	0.13 (0.30)	0.15 (0.58)	0.03 (0.10)	0.06 (0.27)	0.01 (0.06)	0.01 (0.06)	0.04 (0.17)	0 (0.01)	0.74 (0.83)	1.26 (1.49)	0.62 (0.88)
	2	3.97 (2.96)	5.02 (4.16)	3.26 (2.68)	3.17 (2.19)	3.77 (2.81)	2.74 (2.18)	2.46 (1.85)	3.65 (3.06)	1.80 (1.55)	1.81 (1.32)	1.99 (1.64)	1.71 (1.39)	10.35 (4.79)	11.17 (5.85)	9.85 (4.75)
	3	36.47 (9.94)	38.87 (12.19)	34.79 (10.03)	25.65 (16.00)	27.93 (17.74)	24.02 (15.07)	27.61 (17.09)	30.77 (19.14)	25.86 (16.12)	28.52 (16.10)	31.04 (17.43)	27.07 (15.52)	42.75 (8.73)	44.05 (10.06)	41.79 (9.77)
	4	49.79 (12.13)	48.25 (14.48)	50.87 (11.68)	55.00 (17.00)	55.36 (19.24)	54.77 (15.91)	56.49 (18.03)	55.05 (20.86)	57.29 (16.66)	56.01 (16.89)	56.93 (18.35)	55.5 (16.23)	39.84 (12.15)	37.48 (14.08)	41.40 (12.85)
	5	9.20 (1.83)	7.28 (2.14)	10.51 (2.30)	14.83 (3.21)	12.16 (3.87)	16.73 (4.30)	12.43 (1.65)	9.99 (2.46)	13.78 (2.25)	12.86 (1.49)	9.71 (1.95)	14.64 (2.27)	5.94 (2.00)	5.83 (2.77)	5.91 (2.65)
	6	0.42 (0.30)	0.44 (0.82)	0.40 (0.22)	1.19 (0.79)	0.64 (0.65)	1.59 (1.05)	0.97 (0.45)	0.47 (0.4)	1.25 (0.62)	0.80 (0.42)	0.29 (0.36)	1.08 (0.70)	0.36 (0.51)	0.22 (0.73)	0.44 (0.76)
Miranda (Venezuela)	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–
	1	–	–	–	–	–	–	0.16 (0.49)	0.17 (0.77)	0.16 (0.67)	–	–	–	–	–	–
	2	–	–	–	–	–	–	6.29 (4.75)	6.77 (6.19)	5.95 (4.88)	–	–	–	–	–	–
	3	–	–	–	–	–	–	39.45 (13.56)	41.67 (16.32)	37.97 (14.01)	–	–	–	–	–	–
	4	–	–	–	–	–	–	47.17 (17.01)	47.87 (19.5)	46.69 (17.12)	–	–	–	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Miranda (Venezuela)	5	–	–	–	–	–	–	6.45 (2.69)	3.52 (3.46)	8.43 (3.96)	–	–	–	–	–	–
	6	–	–	–	–	–	–	0.48 (0.74)	0 (0)	0.81 (1.24)	–	–	–	–	–	–
Montenegro	0	–	–	–	0.05 (0.29)	0 (0)	0.09 (0.48)	0.01 (0.09)	0.03 (0.25)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.07)	0.01 (0.14)	0 (0)
	1	–	–	–	0.38 (0.65)	0.68 (1.40)	0.18 (0.54)	0.35 (0.64)	0.35 (0.91)	0.34 (0.77)	0 (0)	0 (0)	0 (0)	0.42 (0.54)	0.27 (0.75)	0.59 (0.88)
	2	–	–	–	6.24 (4.62)	5.69 (5.15)	6.63 (5.47)	6.23 (4.46)	7.46 (6.24)	5.60 (4.45)	1.41 (1.49)	1.63 (2.02)	1.20 (1.69)	5.12 (2.64)	5.34 (3.77)	4.98 (3.07)
	3	–	–	–	32.76 (11.75)	31.37 (12.47)	33.65 (12.84)	31.11 (12.04)	35.93 (13.89)	28.62 (12.04)	23.54 (14.02)	24.08 (15.03)	23.04 (14.69)	25.09 (9.92)	29.36 (12.30)	22.61 (9.49)
	4	–	–	–	47.11 (14.80)	48.03 (16.10)	46.53 (15.71)	46.27 (15.03)	43.71 (17.09)	47.6 (14.85)	57.86 (14.77)	60.41 (15.81)	55.65 (15.83)	47.18 (9.75)	47.21 (11.88)	46.11 (10.56)
	5	–	–	–	12.55 (3.27)	13.64 (6.04)	11.82 (4.18)	15.07 (3.48)	11.81 (5.08)	16.76 (4.59)	15.29 (3.13)	12.39 (5.14)	17.86 (5.75)	19.14 (3.95)	15.87 (5.08)	21.85 (4.60)
	6	–	–	–	0.90 (1.23)	0.60 (1.15)	1.10 (1.77)	0.96 (0.91)	0.71 (1.59)	1.09 (1.16)	1.89 (1.31)	1.49 (1.53)	2.25 (2.48)	3.04 (1.27)	1.94 (1.67)	3.87 (1.94)
Netherlands	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.09)	0.04 (0.29)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.08)	0 (0)	0.01 (0.14)
	3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.09 (0.29)	0.22 (0.84)	0.02 (0.16)	0 (0)	0 (0)	0 (0)	0.49 (0.66)	0.46 (1.04)	0.46 (0.82)
	4	0.72 (1.09)	1.18 (2.30)	0.39 (1.04)	1.73 (1.92)	1.88 (2.85)	1.63 (1.95)	4.99 (3.88)	7.27 (6.31)	3.88 (3.33)	1.81 (2.03)	1.92 (2.42)	1.73 (2.4)	11.63 (5.26)	12.52 (6.89)	11.80 (5.82)
	5	22.84 (14.66)	24.19 (16.94)	21.83 (14.21)	26.18 (16.61)	29.70 (20.15)	23.99 (15.55)	36.42 (21.03)	41.72 (24.91)	33.72 (19.74)	36.99 (14.11)	38.94 (15.25)	35.70 (14.63)	46.58 (5.86)	45.87 (8.64)	46.03 (6.13)
	6	76.44 (15.01)	74.63 (17.57)	77.78 (14.47)	72.09 (17.69)	68.42 (21.42)	74.38 (16.53)	58.49 (24.17)	50.76 (29.55)	62.38 (22.02)	61.20 (15.04)	59.14 (16.20)	62.57 (15.50)	41.29 (9.40)	41.14 (10.93)	41.70 (8.91)
New Zealand	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.08 (0.29)	0.15 (0.58)	0.03 (0.29)
	3	0.08 (0.32)	0 (0)	0.13 (0.52)	0.25 (0.62)	0.31 (0.98)	0.20 (0.64)	0.31 (0.64)	0.49 (1.30)	0.21 (0.59)	0 (0)	0 (0)	0 (0)	2.45 (1.82)	2.62 (2.60)	2.04 (2.06)
	4	1.83 (1.73)	2.59 (3.30)	1.42 (1.89)	4.46 (3.38)	6.01 (5.28)	3.48 (3.16)	5.37 (4.18)	8.62 (7.32)	3.64 (3.54)	2.47 (2.12)	2.41 (2.60)	2.51 (2.44)	16.26 (6.98)	17.95 (8.89)	14.73 (7.07)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
New Zealand	5	22.94 (14.60)	24.39 (16.45)	22.09 (14.41)	29.56 (18.60)	32.07 (20.95)	27.98 (17.8)	33.64 (20.99)	35.13 (22.95)	32.83 (20.85)	28.27 (13.36)	31.55 (16.57)	26.56 (12.93)	42.36 (5.10)	44.96 (8.47)	41.4 (5.85)
	6	75.15 (15.70)	73.02 (17.83)	76.36 (15.21)	65.74 (21.37)	61.6 (24.61)	68.33 (19.96)	60.68 (24.44)	55.76 (28.13)	63.31 (23.13)	69.26 (14.73)	66.04 (17.72)	70.94 (14.19)	38.85 (8.16)	34.33 (10.94)	41.81 (8.63)
Norway	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.05)	0.01 (0.11)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.03 (0.14)	0.03 (0.21)	0.03 (0.19)	0.01 (0.12)	0 (0)	0.03 (0.20)	0 (0)	0 (0)	0 (0)	0.13 (0.35)	0.17 (0.69)	0.07 (0.33)
	3	0.28 (0.57)	0.36 (1.10)	0.22 (0.58)	1.43 (1.47)	1.69 (2.24)	1.28 (1.66)	1.91 (1.87)	2.36 (2.64)	1.60 (1.91)	0.37 (0.68)	0.42 (1.05)	0.33 (0.82)	2.72 (1.82)	3.16 (2.53)	1.97 (1.85)
	4	9.20 (6.40)	11.21 (8.47)	7.94 (5.90)	15.01 (9.97)	16.92 (12.14)	13.83 (9.63)	19.54 (12.38)	20.86 (13.9)	18.64 (12.19)	10.37 (6.99)	10.94 (7.90)	9.85 (7.48)	21.28 (8.62)	23.78 (10.34)	19.34 (8.55)
	5	47.67 (5.72)	50.36 (7.85)	45.97 (7.39)	51.74 (6.67)	53.16 (10.94)	50.82 (6.54)	52.48 (9.00)	50.64 (11.38)	53.73 (8.71)	53.16 (5.69)	54.41 (8.69)	52.14 (7.7)	49.7 (6.65)	50.86 (7.55)	49.08 (7.03)
	6	42.85 (9.06)	38.07 (11.01)	45.87 (9.85)	31.78 (7.17)	28.2 (9.56)	34.05 (7.22)	26.06 (7.25)	26.15 (7.95)	26.01 (8.13)	36.10 (5.20)	34.24 (6.98)	37.68 (7.42)	26.16 (5.91)	22.02 (6.85)	29.55 (7.53)
Panama	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–
	1	–	–	–	–	–	–	0.35 (0.87)	0.40 (1.34)	0.29 (0.98)	–	–	–	–	–	–
	2	–	–	–	–	–	–	10.84 (7.98)	11.47 (10.54)	10.00 (8.75)	–	–	–	–	–	–
	3	–	–	–	–	–	–	52.42 (8.85)	56.65 (11.62)	47.90 (10.62)	–	–	–	–	–	–
	4	–	–	–	–	–	–	27.8 (5.27)	26.6 (7.69)	29.22 (7.88)	–	–	–	–	–	–
	5	–	–	–	–	–	–	8.06 (4.41)	4.53 (4.26)	11.85 (5.58)	–	–	–	–	–	–
	6	–	–	–	–	–	–	0.53 (0.74)	0.35 (1.18)	0.74 (1.23)	–	–	–	–	–	–
Perm	0	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–
	1	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–
	2	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–
	3	–	–	–	–	–	–	–	–	–	0.14 (0.62)	0 (0)	0.20 (0.90)	–	–	–
	4	–	–	–	–	–	–	–	–	–	10.06 (7.76)	9.41 (10.66)	10.20 (8.3)	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Perm	5	–	–	–	–	–	–	–	–	–	49.32 (8.92)	52.82 (11.84)	47.71 (10.04)	–	–	–
	6	–	–	–	–	–	–	–	–	–	40.48 (9.87)	37.76 (12.46)	41.90 (10.72)	–	–	–
Peru	0	–	–	–	–	–	–	0.05 (0.33)	0.09 (0.7)	0.02 (0.15)	0 (0)	0 (0)	0 (0)	0.04 (0.16)	0.01 (0.16)	0.02 (0.12)
	1	–	–	–	–	–	–	1.19 (1.30)	1.30 (2.11)	1.12 (1.39)	0.09 (0.25)	0.10 (0.45)	0.08 (0.32)	1.08 (0.91)	0.64 (1.07)	1.52 (1.31)
	2	–	–	–	–	–	–	11.48 (7.62)	12.73 (9.43)	10.71 (7.30)	7.72 (5.28)	8.58 (6.64)	7.12 (5.25)	12.15 (5.24)	12.61 (6.02)	11.26 (5.37)
	3	–	–	–	–	–	–	41.07 (5.19)	46.52 (7.30)	37.75 (6.12)	46.54 (5.43)	49.81 (6.60)	44.46 (7.19)	43.63 (4.72)	45.41 (6.23)	44.03 (5.67)
	4	–	–	–	–	–	–	33.95 (5.85)	31.99 (8.07)	35.16 (6.43)	34.84 (4.04)	31.01 (6.11)	37.31 (5.18)	35.92 (7.93)	34.98 (8.63)	35.52 (7.74)
	5	–	–	–	–	–	–	10.28 (2.46)	6.72 (2.89)	12.44 (3.56)	10.30 (2.81)	10.39 (3.81)	10.26 (3.44)	6.86 (2.06)	6.01 (2.98)	7.34 (2.77)
	6	–	–	–	–	–	–	1.99 (1.32)	0.64 (1.36)	2.80 (2.10)	0.51 (0.47)	0.11 (0.38)	0.76 (0.66)	0.32 (0.44)	0.34 (0.60)	0.30 (0.57)
Poland	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.02 (0.16)	0 (0)	0.03 (0.25)	0 (0)	0 (0)	0 (0)	0.04 (0.21)	0.23 (0.96)	0.01 (0.13)
	3	0.56 (0.93)	0.97 (1.69)	0.33 (0.88)	0.25 (0.64)	0.34 (1.15)	0.21 (0.61)	0.76 (0.98)	0.83 (1.53)	0.69 (1.31)	0 (0)	0 (0)	0 (0)	1.07 (1.14)	2.40 (3.07)	0.78 (1.04)
	4	10.24 (6.72)	11.09 (8.45)	9.74 (6.73)	11.32 (7.58)	13.22 (10.3)	10.30 (7.08)	14.55 (9.75)	16.32 (11.73)	13.36 (9.38)	1.42 (1.58)	1.75 (2.49)	1.18 (1.69)	12.21 (5.49)	17.15 (9.00)	10.29 (5.54)
	5	50.56 (4.71)	55.01 (7.21)	48.08 (5.73)	51.24 (4.75)	54.00 (8.36)	49.73 (6.36)	48.77 (5.70)	52.51 (8.66)	46.27 (6.65)	23.18 (14.81)	27.38 (17.84)	20.49 (13.64)	45.96 (5.24)	46.37 (9.29)	45.15 (6.12)
	6	38.64 (6.12)	32.92 (8.04)	41.85 (6.71)	37.19 (9.43)	32.44 (11.00)	39.76 (10.32)	35.91 (10.77)	30.34 (12.05)	39.66 (11.11)	75.41 (15.63)	70.87 (19.07)	78.34 (14.29)	40.72 (8.11)	33.85 (9.64)	43.77 (7.61)
Portugal	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.04)	0 (0)	0 (0.06)
	2	0.03 (0.17)	0.03 (0.25)	0.03 (0.25)	0.20 (0.37)	0.22 (0.74)	0.18 (0.47)	0.04 (0.25)	0 (0)	0.06 (0.40)	0 (0)	0 (0)	0 (0)	0.05 (0.18)	0.05 (0.28)	0.10 (0.30)
	3	1.98 (1.92)	2.10 (2.64)	1.94 (2.15)	3.07 (2.44)	3.87 (3.77)	2.67 (2.63)	1.76 (1.82)	2.04 (2.44)	1.59 (1.87)	0.10 (0.33)	0.04 (0.29)	0.14 (0.48)	2.07 (1.40)	3.75 (2.91)	1.39 (1.23)
	4	25.05 (15.88)	26.45 (18.00)	24.14 (15.85)	25.46 (16.15)	30.11 (19.62)	23.22 (14.97)	17.59 (11.22)	19.78 (13.35)	16.22 (10.66)	9.62 (6.46)	10.48 (7.82)	9.09 (6.45)	18.78 (7.59)	22.32 (9.78)	17.58 (7.35)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Portugal	5	57.95 (16.33)	62.13 (19.02)	55.73 (16.44)	56.60 (16.78)	56.10 (21.02)	56.88 (15.38)	52.36 (8.20)	55.76 (10.6)	50.25 (8.31)	54.43 (5.94)	60.51 (9.34)	50.78 (6.55)	47.44 (5.31)	47.55 (7.61)	47.26 (5.83)
	6	14.99 (3.29)	9.29 (5.01)	18.16 (4.24)	14.67 (3.57)	9.70 (3.94)	17.04 (4.78)	28.25 (6.07)	22.42 (7.58)	31.88 (6.51)	35.85 (5.68)	28.97 (8.24)	39.99 (6.51)	31.66 (5.57)	26.34 (8.26)	33.66 (5.59)
Qatar	0	–	–	–	0.10 (0.34)	0.14 (0.55)	0.08 (0.35)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.03)	0 (0)	0 (0.04)
	1	–	–	–	2.95 (2.27)	3.52 (3.13)	2.51 (2.23)	0.17 (0.34)	0.26 (0.51)	0.10 (0.44)	0.01 (0.06)	0 (0)	0.01 (0.10)	0.16 (0.25)	0.12 (0.32)	0.17 (0.30)
	2	–	–	–	16.05 (9.53)	18.26 (11.28)	14.42 (9.04)	2.31 (1.74)	3.12 (2.62)	1.78 (1.58)	0.50 (0.53)	0.50 (0.72)	0.50 (0.61)	2.59 (1.33)	3.24 (1.96)	2.16 (1.41)
	3	–	–	–	44.41 (11.12)	47.58 (13.41)	42.07 (11.00)	17.38 (10.93)	19.90 (12.96)	15.71 (10.12)	12.33 (7.80)	13.31 (8.86)	11.56 (7.40)	17.50 (6.87)	19.79 (8.11)	15.48 (6.52)
	4	–	–	–	24.91 (3.36)	23.45 (4.12)	25.99 (4.51)	49.23 (10.71)	51.47 (12.96)	47.75 (9.93)	49.55 (7.50)	47.74 (8.35)	50.93 (7.84)	45.58 (4.93)	47.26 (5.95)	44.84 (5.32)
	5	–	–	–	9.92 (1.94)	6.43 (2.17)	12.49 (3.35)	25.53 (3.5)	21.11 (5.05)	28.46 (4.55)	31.48 (4.01)	31.45 (4.39)	31.51 (5.65)	27.92 (4.40)	25.39 (5.74)	29.68 (4.41)
	6	–	–	–	1.66 (0.93)	0.61 (0.85)	2.44 (1.36)	5.39 (1.46)	4.15 (2.38)	6.21 (1.86)	6.14 (1.33)	6.99 (2.24)	5.48 (1.55)	6.24 (1.25)	4.21 (2.08)	7.66 (1.88)
Republic of Moldova	0	–	–	–	–	–	–	0.09 (0.32)	0.16 (0.68)	0.03 (0.20)	–	–	–	0.12 (0.33)	0.28 (0.68)	0.10 (0.40)
	1	–	–	–	–	–	–	1.25 (1.35)	1.40 (2.03)	1.12 (1.49)	–	–	–	1.14 (1.09)	1.36 (1.66)	0.96 (1.06)
	2	–	–	–	–	–	–	9.45 (6.51)	11.53 (8.6)	7.94 (6.16)	–	–	–	6.80 (3.59)	6.74 (4.24)	6.34 (3.94)
	3	–	–	–	–	–	–	34.73 (12.43)	39.22 (14.13)	31.57 (12.47)	–	–	–	23.92 (9.65)	24.24 (11.11)	24.18 (10.05)
	4	–	–	–	–	–	–	42.79 (17.62)	37.54 (20.05)	46.56 (16.72)	–	–	–	44.4 (8.77)	43.46 (10.16)	44.08 (9.24)
	5	–	–	–	–	–	–	10.69 (2.92)	9.60 (4.26)	11.50 (3.47)	–	–	–	19.45 (5.25)	20.59 (7.31)	19.71 (5.96)
	6	–	–	–	–	–	–	0.99 (0.82)	0.56 (0.92)	1.29 (1.35)	–	–	–	4.18 (1.76)	3.34 (2.11)	4.64 (2.02)
Romania	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.08)	0 (0)	0.01 (0.10)
	1	–	–	–	0.22 (1.31)	0.46 (2.86)	0.02 (0.19)	0.02 (0.11)	0 (0)	0.03 (0.19)	0 (0)	0 (0)	0 (0)	0.11 (0.3)	0.09 (0.42)	0.09 (0.37)
	2	–	–	–	2.48 (3.16)	3.87 (6.30)	1.46 (1.78)	2.26 (2.17)	2.86 (3.41)	1.79 (2.27)	0.06 (0.25)	0.13 (0.55)	0 (0)	2.11 (1.57)	2.39 (2.3)	1.61 (1.98)
	3	–	–	–	18.88 (12.46)	24.14 (16.93)	15.50 (10.40)	21.37 (13.75)	22.99 (15.54)	20.12 (13.43)	6.36 (4.51)	7.16 (5.94)	5.66 (4.68)	13.81 (5.96)	15.90 (7.53)	11.29 (5.95)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Romania	4	–	–	–	55.72 (12.64)	55.28 (19.18)	56.08 (9.99)	55.81 (13.66)	58.01 (16.49)	54.27 (13.99)	42.14 (5.39)	44.34 (8.97)	40.31 (6.69)	41.81 (5.66)	42.22 (7.8)	39.95 (7.61)
	5	–	–	–	19.83 (4.20)	15.25 (6.89)	22.85 (5.44)	19.18 (4.41)	15.03 (7.56)	22.23 (5.74)	40.18 (7.29)	41.71 (10.01)	39.06 (7.99)	34.77 (9.29)	32.49 (11.23)	38.91 (10.28)
	6	–	–	–	2.87 (1.06)	1.01 (1.48)	4.09 (1.85)	1.37 (1.47)	1.10 (1.31)	1.57 (2.24)	11.25 (4.43)	6.66 (3.97)	14.98 (5.79)	7.38 (3.08)	6.92 (4.21)	8.15 (3.33)
Russian Federation	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0.01 (0.10)	0 (0)	0.02 (0.17)	0.01 (0.1)	0 (0)	0.03 (0.20)	0 (0)	0 (0)	0 (0)	0.02 (0.09)	0.01 (0.14)	0.03 (0.21)
	2	0.14 (0.43)	0.18 (0.86)	0.10 (0.35)	0.30 (0.53)	0.22 (0.64)	0.35 (0.86)	0.18 (0.38)	0.17 (0.59)	0.19 (0.57)	0 (0)	0 (0)	0 (0)	0.75 (0.89)	0.91 (1.23)	0.50 (0.86)
	3	1.97 (1.92)	2.63 (3.68)	1.60 (1.77)	3.23 (2.57)	2.83 (2.91)	3.53 (3.13)	4.53 (3.62)	4.89 (4.37)	4.22 (3.97)	0.51 (0.72)	0.64 (1.13)	0.39 (0.88)	6.66 (3.35)	6.95 (4.31)	6.56 (3.84)
	4	16.18 (10.42)	18.8 (13.67)	14.76 (10.01)	19.42 (12.52)	18.38 (12.60)	20.20 (13.46)	24.97 (15.83)	26.66 (17.12)	23.49 (15.52)	14.14 (9.24)	14.23 (9.98)	14.04 (9.59)	28.44 (11.29)	27.13 (11.39)	28.20 (11.90)
	5	49.97 (9.32)	50.21 (13.05)	49.84 (9.00)	48.03 (10.79)	47.91 (11.82)	48.12 (11.61)	51.60 (17.23)	51.15 (18.89)	52.01 (16.83)	57.55 (8.12)	55.56 (9.93)	59.48 (9.01)	45.27 (9.80)	48.36 (9.94)	44.44 (9.55)
	6	31.75 (6.17)	28.18 (6.99)	33.71 (8.15)	29.02 (6.63)	30.65 (8.70)	27.78 (6.88)	18.7 (4.39)	17.13 (5.59)	20.07 (5.87)	27.80 (4.610)	29.57 (6.03)	26.09 (6.20)	18.86 (5.75)	16.63 (7.08)	20.27 (7.08)
Serbia	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	1	–	–	–	0.07 (0.25)	0.04 (0.35)	0.08 (0.36)	0.02 (0.13)	0 (0)	0.03 (0.20)	0 (0)	0 (0)	0 (0)	–	–	–
	2	–	–	–	1.18 (1.17)	1.55 (2.20)	0.95 (1.30)	0.87 (1.00)	1.27 (2.05)	0.68 (0.94)	0.03 (0.23)	0.04 (0.33)	0.03 (0.21)	–	–	–
	3	–	–	–	11.24 (7.60)	13.07 (9.79)	10.03 (7.17)	9.92 (6.56)	11.35 (8.48)	9.20 (6.22)	2.28 (2.05)	2.67 (2.88)	2.04 (2.28)	–	–	–
	4	–	–	–	44.61 (5.20)	49.42 (9.14)	41.46 (6.04)	39.45 (5.58)	40.43 (7.50)	38.95 (6.67)	28.75 (10.48)	32.65 (12.76)	26.28 (10.19)	–	–	–
	5	–	–	–	35.09 (9.47)	31.41 (10.86)	37.51 (10.52)	38.73 (10.33)	37.69 (11.94)	39.27 (11.00)	49.14 (11.89)	48.78 (13.87)	49.38 (11.70)	–	–	–
	6	–	–	–	7.82 (2.47)	4.51 (2.78)	9.97 (3.72)	10.99 (2.66)	9.26 (4.57)	11.87 (3.22)	19.81 (4.04)	15.86 (4.39)	22.28 (5.40)	–	–	–
Shanghai	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	1	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	2	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–
	3	–	–	–	–	–	–	0.06 (0.25)	0.04 (0.29)	0.09 (0.40)	0 (0)	0 (0)	0 (0)	–	–	–
	4	–	–	–	–	–	–	0.78 (0.87)	0.89 (1.36)	0.69 (1.14)	0 (0)	0 (0)	0 (0)	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M	%	%F	%M
Shanghai	5	–	–	–	–	–	–	7.07 (5.16)	7.52 (6.18)	6.72 (5.34)	1.33 (1.49)	1.69 (2.25)	1.06 (1.52)	–	–	–
	6	–	–	–	–	–	–	92.08 (5.59)	91.55 (6.46)	92.49 (5.84)	98.67 (1.49)	98.31 (2.25)	98.94 (1.52)	–	–	–
Singapore	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	3	–	–	–	–	–	–	0.02 (0.17)	0 (0)	0.04 (0.29)	0 (0)	0 (0)	0 (0)	0.10 (0.29)	0.09 (0.46)	0.09 (0.34)
	4	–	–	–	–	–	–	1.03 (1.25)	0.87 (1.48)	1.17 (1.53)	0.01 (0.06)	0.02 (0.14)	0 (0)	2.81 (1.67)	2.98 (2.49)	2.93 (2.29)
	5	–	–	–	–	–	–	12.81 (8.38)	14.04 (10.29)	11.90 (8.39)	3.86 (2.85)	4.58 (3.89)	3.33 (2.77)	19.64 (8.15)	24.48 (10.82)	17.62 (7.64)
	6	–	–	–	–	–	–	86.13 (9.06)	85.09 (10.74)	86.9 (9.01)	96.14 (2.86)	95.41 (3.91)	96.67 (2.77)	77.44 (9.18)	72.44 (12.06)	79.35 (8.92)
Slovak Republic	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.08)	0.02 (0.22)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.02 (0.11)	0.05 (0.32)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.26 (0.48)	0.28 (0.73)	0.28 (0.63)
	3	0.15 (0.39)	0.14 (0.57)	0.16 (0.47)	0.90 (1.05)	1.04 (1.75)	0.82 (1.17)	0.61 (0.95)	0.84 (1.87)	0.46 (0.94)	0.07 (0.28)	0 (0)	0.09 (0.40)	4.23 (2.35)	5.81 (3.97)	3.89 (2.49)
	4	7.85 (5.47)	7.62 (6.35)	7.95 (5.69)	10.54 (7.51)	11.25 (8.69)	10.15 (7.60)	7.92 (5.50)	10.18 (7.90)	6.34 (4.94)	5.26 (4.06)	7.89 (7.09)	4.09 (3.57)	27.27 (10.88)	32.10 (13.43)	24.48 (10.26)
	5	43.82 (8.50)	49.35 (11.04)	41.38 (8.55)	49.45 (4.64)	52.77 (8.70)	47.63 (6.57)	39.73 (8.39)	44.15 (10.45)	36.6 (9.52)	38.82 (6.80)	41.27 (9.33)	37.72 (7.26)	48.66 (9.85)	47.93 (13.10)	47.17 (8.35)
	6	48.17 (12.80)	42.89 (14.43)	50.51 (12.76)	39.11 (8.88)	34.90 (10.07)	41.40 (10.24)	51.74 (13.06)	44.83 (15.63)	56.60 (12.83)	55.85 (9.30)	50.84 (11.75)	58.10 (9.40)	19.57 (4.56)	13.86 (5.68)	24.17 (6.36)
Slovenia	0	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	–	–	–	0 (0)	0 (0)	0 (0)	0.02 (0.10)	0.03 (0.22)	0.02 (0.07)	0 (0)	0 (0)	0 (0)	0.02 (0.08)	0 (0.03)	0.02 (0.13)
	3	–	–	–	0.72 (0.81)	0.74 (1.24)	0.70 (0.92)	0.73 (0.90)	1.05 (1.61)	0.47 (0.91)	0.07 (0.25)	0.14 (0.56)	0.02 (0.12)	1.04 (1.00)	1.19 (1.46)	1.09 (1.40)
	4	–	–	–	12.23 (7.92)	15.03 (10.44)	10.21 (6.77)	12.32 (8.08)	11.92 (8.25)	12.64 (8.73)	6.39 (4.53)	6.70 (5.81)	6.15 (5.04)	14.01 (6.01)	14.53 (7.29)	12.86 (5.94)
	5	–	–	–	51.31 (6.09)	55.18 (9.41)	48.49 (5.77)	48.52 (4.29)	48.02 (6.57)	48.92 (6.28)	52.19 (5.28)	53.8 (7.61)	50.99 (5.90)	51.93 (5.11)	51.63 (8.29)	53.08 (5.5)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Slovenia	6	–	–	–	35.74 (6.13)	29.06 (8.00)	40.60 (6.39)	38.41 (7.17)	38.98 (8.93)	37.95 (7.68)	41.35 (5.11)	39.35 (7.14)	42.84 (6.03)	33.01 (5.09)	32.64 (7.77)	32.95 (6.12)
Spain	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0.03 (0.16)	0.01 (0.05)	0.04 (0.25)	0 (0.01)	0 (0.03)	0 (0)	0.04 (0.10)	0.04 (0.23)	0.04 (0.09)	0 (0)	0 (0)	0 (0)	0.15 (0.31)	0.16 (0.53)	0.14 (0.41)
	3	1.35 (1.47)	1.56 (2.10)	1.22 (1.68)	0.39 (0.68)	0.46 (1.20)	0.35 (0.70)	1.40 (1.32)	1.52 (1.64)	1.35 (1.49)	0.22 (0.33)	0.19 (0.38)	0.24 (0.42)	4.10 (2.20)	6.58 (4.11)	3.48 (2.19)
	4	19.84 (12.55)	23.15 (15.37)	17.95 (11.58)	13.23 (8.55)	18.30 (12.91)	10.56 (7.35)	17.81 (11.30)	19.92 (12.99)	16.78 (10.84)	12.18 (7.97)	15.41 (10.43)	10.87 (7.35)	28.03 (11.08)	32.89 (14.03)	24.76 (10.10)
	5	51.95 (10.15)	51.17 (13.25)	52.39 (9.87)	56.11 (4.88)	59.38 (8.52)	54.5 (5.37)	54.25 (7.83)	56.00 (10.01)	53.38 (7.54)	59.5 (6.07)	60.01 (9.01)	59.29 (5.68)	51.25 (10.82)	48.78 (14.6)	52.97 (9.98)
	6	26.83 (5.85)	24.12 (8.88)	28.40 (6.10)	30.27 (6.48)	21.86 (7.86)	34.59 (6.97)	26.50 (5.51)	22.52 (6.36)	28.45 (5.92)	28.09 (4.59)	24.4 (5.93)	29.6 (4.87)	16.46 (3.62)	11.59 (4.76)	18.65 (4.32)
Sweden	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.09 (0.3)	0.04 (0.28)	0.13 (0.5)	0 (0)	0 (0)	0 (0)	0.15 (0.33)	0.34 (0.72)	0.07 (0.31)
	3	0.12 (0.42)	0.13 (0.66)	0.11 (0.44)	0.47 (0.75)	0.34 (1.02)	0.57 (1.04)	1.96 (1.92)	2.46 (2.53)	1.54 (2.35)	0.52 (0.94)	0.74 (1.63)	0.35 (0.86)	2.92 (1.86)	4.02 (3.17)	2.57 (2.01)
	4	5.51 (3.97)	6.71 (5.79)	4.65 (3.67)	11.02 (7.25)	10.87 (8.18)	11.13 (7.62)	15.28 (9.99)	16.18 (11.13)	14.50 (9.86)	14.83 (9.62)	16.82 (11.6)	13.26 (9.02)	20.76 (8.47)	23.75 (10.86)	18.70 (8.26)
	5	37.43 (11.91)	39.83 (13.66)	35.74 (12.42)	47.00 (6.68)	48.27 (9.44)	45.99 (7.52)	45.91 (5.30)	47.06 (8.18)	44.97 (6.88)	56.31 (9.01)	57.46 (10.94)	55.41 (8.79)	48.28 (6.59)	46.44 (8.70)	49.05 (7.10)
	6	56.95 (15.04)	53.33 (17.18)	59.51 (14.75)	41.5 (12.19)	40.53 (13.86)	42.31 (12.47)	36.76 (9.57)	34.26 (11.01)	38.86 (10.21)	28.33 (4.78)	24.98 (5.71)	30.98 (5.75)	27.89 (6.13)	25.45 (9.41)	29.62 (6.33)
Switzerland	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.03)	0.01 (0.09)	0 (0.01)	0 (0)	0 (0)	0 (0)	0.02 (0.12)	0.01 (0.19)	0.01 (0.11)
	3	0.05 (0.20)	0.12 (0.52)	0.02 (0.08)	0.12 (0.31)	0.10 (0.29)	0.14 (0.50)	0.34 (0.58)	0.30 (0.72)	0.36 (0.70)	0.08 (0.24)	0.13 (0.46)	0.04 (0.20)	0.79 (0.83)	0.99 (1.63)	0.58 (0.81)
	4	3.04 (2.48)	4.40 (4.06)	2.34 (2.28)	3.77 (2.73)	4.22 (3.48)	3.45 (2.94)	5.05 (3.53)	7.16 (5.86)	4.02 (3.12)	2.15 (1.68)	2.82 (2.71)	1.69 (1.52)	8.75 (4.13)	9.95 (5.91)	8.07 (4.18)
	5	25.24 (16.03)	27.18 (18.29)	24.20 (15.48)	27.32 (17.09)	29.72 (18.98)	25.63 (16.21)	25.10 (15.84)	29.81 (19.21)	22.78 (14.61)	25.26 (15.79)	27.13 (17.57)	23.88 (15.22)	34.08 (12.62)	36.11 (14.34)	33.59 (13.19)
	6	71.67 (17.92)	68.30 (21.15)	73.44 (16.92)	68.79 (19.41)	65.96 (21.53)	70.78 (18.31)	69.50 (19.04)	62.72 (23.44)	72.85 (17.28)	72.52 (17.13)	69.92 (19.33)	74.38 (16.25)	56.36 (16.02)	52.94 (18.45)	57.74 (16.24)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Thailand	0	0 (0)	0 (0)	0 (0)	0 (0.01)	0 (0.02)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.10)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0.07 (0.30)	0 (0.02)	0.14 (0.61)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.12 (0.42)	0.04 (0.32)	0.06 (0.44)
	2	0.32 (0.65)	0.26 (0.71)	0.37 (1.14)	1.24 (1.47)	1.27 (1.92)	1.21 (1.95)	1.18 (1.46)	1.16 (2.11)	1.18 (1.90)	0 (0)	0 (0)	0 (0)	1.70 (1.79)	1.14 (2.00)	1.47 (1.99)
	3	9.98 (6.93)	9.31 (7.29)	10.68 (8.15)	14.36 (9.68)	15.62 (10.99)	13.05 (9.60)	14.49 (9.81)	13.56 (9.83)	15.51 (10.98)	1.68 (2.12)	1.59 (2.52)	1.83 (3.14)	14.29 (6.96)	10.29 (7.27)	15.80 (8.34)
	4	50.63 (5.77)	51.03 (7.29)	50.16 (8.53)	50.79 (6.41)	52.31 (8.84)	49.17 (8.44)	47.98 (8.62)	47.49 (10.54)	48.23 (11.21)	22.71 (14.93)	23.38 (15.75)	21.41 (15.28)	42.72 (6.93)	42.61 (8.53)	42.94 (9.76)
	5	33.99 (5.72)	34.37 (8.40)	33.63 (6.77)	28.05 (6.96)	27.68 (8.34)	28.44 (8.37)	26.79 (6.16)	28.16 (8.45)	25.50 (7.32)	52.44 (15.45)	52.76 (16.48)	52.00 (16.89)	33.89 (8.91)	37.80 (10.05)	32.94 (11.47)
	6	5.08 (2.33)	5.02 (2.95)	5.16 (2.91)	5.49 (2.16)	3.11 (2.63)	7.98 (3.30)	9.57 (6.26)	9.63 (6.73)	9.58 (6.68)	23.16 (5.33)	22.26 (6.93)	24.76 (8.76)	7.28 (3.87)	8.12 (5.77)	6.79 (4.08)
Trinidad and Tobago	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	–	–	–	0 (0)	0 (0)	0 (0)
	1	–	–	–	–	–	–	0.01 (0.08)	0 (0)	0.02 (0.18)	–	–	–	0.15 (0.43)	0.16 (0.68)	0.03 (0.30)
	2	–	–	–	–	–	–	1.18 (1.42)	1.42 (1.83)	0.91 (1.71)	–	–	–	1.99 (1.80)	2.32 (2.23)	2.11 (2.27)
	3	–	–	–	–	–	–	12.53 (8.16)	12.02 (8.5)	13.09 (9.25)	–	–	–	14.64 (6.35)	13.96 (6.72)	15.11 (7.30)
	4	–	–	–	–	–	–	47.12 (5.68)	46.95 (7.54)	47.25 (8.01)	–	–	–	45.49 (5.70)	44.23 (6.67)	45.52 (7.19)
	5	–	–	–	–	–	–	32.74 (7.60)	31.88 (8.15)	33.75 (10.39)	–	–	–	31.28 (6.4)	32.61 (6.97)	30.75 (8.67)
	6	–	–	–	–	–	–	6.42 (2.61)	7.74 (3.36)	4.98 (3.44)	–	–	–	6.46 (2.36)	6.74 (4.33)	6.46 (2.87)
Tunisia	0	0 (0)	0 (0)	0 (0)	0.05 (0.30)	0.08 (0.47)	0.03 (0.26)	0.22 (0.51)	0.41 (1.32)	0.12 (0.36)	0 (0)	0 (0)	0 (0)	0.61 (0.77)	0.35 (0.89)	0.67 (1.06)
	1	1.25 (1.22)	1.64 (2.54)	1.03 (1.33)	1.10 (1.63)	1.05 (2.35)	1.10 (1.72)	3.88 (3.29)	4.94 (5.37)	3.29 (2.81)	0.04 (0.22)	0.08 (0.47)	0 (0)	4.72 (2.69)	4.94 (3.53)	4.65 (3.27)
	2	14.08 (9.21)	17.35 (12.64)	12.03 (8.09)	11.24 (7.72)	13.54 (10.45)	9.72 (7.13)	22.46 (14.43)	24.06 (16.78)	21.57 (14.12)	5.78 (4.62)	5.10 (4.59)	6.34 (5.43)	19.61 (8.22)	21.21 (9.93)	18.69 (8.6)
	3	53.46 (8.56)	54.35 (13.05)	52.92 (7.81)	42.97 (6.18)	44.42 (9.57)	42.03 (6.53)	47.26 (15.36)	47.33 (18.61)	47.18 (14.81)	39.52 (7.00)	40.15 (8.37)	38.90 (8.52)	40.92 (7.47)	41.29 (8.62)	39.66 (8.59)
	4	26.71 (4.07)	22.41 (7.75)	29.37 (4.92)	35.47 (8.96)	33.82 (10.91)	36.58 (9.67)	21.34 (5.74)	20.97 (9.43)	21.59 (5.71)	39.24 (6.45)	43.59 (8.20)	35.68 (7.78)	24.75 (5.98)	25.42 (8.43)	24.78 (6.12)
	5	4.33 (2.17)	4.25 (2.60)	4.38 (2.89)	8.68 (3.76)	6.91 (4.34)	9.84 (5.05)	4.47 (2.39)	2.10 (1.61)	5.80 (3.41)	13.43 (3.76)	10.50 (4.37)	15.91 (4.80)	7.88 (2.95)	6.03 (2.71)	9.39 (3.89)
	6	0.17 (0.31)	0 (0)	0.27 (0.50)	0.49 (0.71)	0.16 (0.63)	0.70 (1.21)	0.37 (0.70)	0.20 (0.61)	0.46 (0.8)	1.99 (1.43)	0.57 (0.90)	3.18 (2.56)	1.50 (1.21)	0.76 (0.89)	2.16 (2.05)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Turkey	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.37 (0.58)	0.73 (1.00)	0.49 (0.92)
	2	0.19 (0.57)	0.15 (0.60)	0.21 (0.72)	0.11 (0.38)	0.14 (0.65)	0.09 (0.42)	0.05 (0.20)	0.03 (0.25)	0.07 (0.31)	0 (0)	0 (0)	0 (0)	4.85 (2.76)	5.87 (3.45)	5.18 (3.58)
	3	1.76 (1.82)	2.33 (3.19)	1.45 (1.96)	3.34 (2.92)	3.66 (4.33)	3.17 (3.17)	2.29 (1.92)	2.81 (2.98)	1.92 (1.92)	0.78 (1.00)	1.13 (2.12)	0.56 (0.96)	30.44 (12.11)	32.89 (13.78)	28.83 (12.13)
	4	14.47 (10.09)	16.72 (12.78)	13.28 (9.58)	22.63 (11.05)	25.55 (13.43)	20.99 (11.07)	21.48 (14.12)	22.14 (15)	21.02 (14.02)	16.65 (10.93)	19.6 (14.33)	14.79 (9.94)	48.07 (12.75)	48.40 (14.71)	46.13 (13.12)
	5	40.58 (11.29)	43.15 (14.04)	39.23 (10.97)	48.56 (12.56)	47.12 (14.61)	49.36 (13.04)	54.02 (14.47)	54.04 (15.7)	54.03 (14.46)	56.55 (10.99)	55.08 (15.4)	57.47 (10.19)	14.87 (3.89)	11.71 (4.10)	17.13 (5.24)
	6	43.00 (10.21)	37.65 (13.48)	45.84 (9.78)	25.37 (7.38)	23.53 (7.73)	26.39 (8.69)	22.16 (5.25)	20.98 (6.45)	22.97 (5.89)	26.02 (6.58)	24.19 (10.17)	27.18 (5.85)	1.41 (1.21)	0.40 (0.73)	2.25 (1.87)
United Arab Emirates	0	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.04)	0.01 (0.08)	0.01 (0.04)
	1	–	–	–	–	–	–	0.03 (0.12)	0.03 (0.16)	0.02 (0.18)	0 (0)	0 (0)	0 (0)	0.14 (0.22)	0.18 (0.40)	0.08 (0.15)
	2	–	–	–	–	–	–	0.64 (0.67)	0.83 (1.21)	0.49 (0.71)	0.02 (0.09)	0.04 (0.22)	0 (0)	1.92 (1.16)	2.82 (2.04)	2.03 (1.49)
	3	–	–	–	–	–	–	8.26 (5.43)	9.97 (6.93)	7.07 (5.08)	3.96 (2.72)	5.15 (3.85)	3.12 (2.48)	12.42 (5.15)	16.10 (7.25)	10.88 (4.82)
	4	–	–	–	–	–	–	36.87 (5.68)	40.38 (7.10)	34.46 (6.37)	40.27 (4.24)	42.69 (6.02)	38.53 (5.29)	37.28 (5.05)	41.55 (6.76)	34.11 (6.56)
	5	–	–	–	–	–	–	41.18 (9.95)	38.24 (11.61)	43.22 (9.73)	45.53 (6.22)	45.02 (7.71)	45.92 (6.83)	38.3 (9.22)	33.19 (11.05)	40.71 (9.67)
	6	–	–	–	–	–	–	13.03 (2.09)	10.54 (2.90)	14.74 (2.85)	10.23 (1.75)	7.10 (2.92)	12.43 (2.67)	9.92 (1.95)	6.15 (2.44)	12.17 (2.94)
United Kingdom	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.02)	0 (0.04)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0 (0.01)	0 (0.02)	0 (0)	0.02 (0.13)	0.02 (0.09)	0.03 (0.18)	0 (0)	0 (0)	0 (0)	0.10 (0.24)	0.11 (0.43)	0.06 (0.22)
	3	0.01 (0.04)	0 (0.02)	0.02 (0.08)	0.71 (0.81)	0.81 (1.26)	0.65 (1.00)	1.39 (1.37)	1.28 (1.94)	1.44 (1.69)	0.15 (0.38)	0.05 (0.21)	0.25 (0.64)	2.34 (1.45)	2.97 (2.14)	2.47 (1.98)
	4	4.19 (3.15)	3.92 (3.60)	4.39 (3.66)	13.04 (8.36)	15.96 (10.83)	11.57 (7.56)	16.58 (10.61)	18.86 (12.5)	15.37 (10.21)	7.66 (5.19)	7.89 (5.79)	7.45 (5.31)	19.31 (7.78)	23.13 (10.11)	16.78 (7.02)
	5	38.46 (13.79)	40.46 (15.18)	36.53 (13.94)	49.6 (3.98)	51.62 (7.68)	48.56 (4.21)	55.07 (7.32)	56.61 (9.53)	54.26 (7.33)	51.08 (4.26)	50.82 (6.57)	51.3 (5.91)	48.36 (6.55)	48.35 (9.84)	48.46 (5.96)
	6	57.34 (16.24)	55.62 (17.43)	59.06 (16.39)	36.65 (7.86)	31.61 (10.27)	39.22 (7.72)	26.95 (6.32)	23.23 (8.37)	28.91 (6.33)	41.11 (5.88)	41.24 (7.84)	40.99 (7.28)	29.89 (4.83)	25.42 (5.87)	32.24 (5.27)

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
United States	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	0 (0)	0 (0)	0 (0)	0.05 (0.23)	0.10 (0.51)	0.02 (0.16)	0.11 (0.29)	0.13 (0.49)	0.10 (0.38)	0 (0)	0 (0)	0 (0)	0.26 (0.45)	0.18 (0.57)	0.29 (0.59)
	3	0.30 (0.58)	0.54 (1.13)	0.15 (0.48)	1.40 (1.37)	1.37 (1.97)	1.42 (1.56)	1.48 (1.46)	1.57 (2.21)	1.42 (1.74)	0.16 (0.45)	0.05 (0.38)	0.24 (0.73)	5.26 (2.74)	5.56 (3.66)	5.07 (2.96)
	4	11.49 (7.46)	15.20 (10.63)	9.18 (6.58)	18.56 (12.02)	18.59 (12.69)	18.52 (12.52)	18.08 (11.73)	18.50 (13.03)	17.78 (11.83)	8.57 (6.20)	8.71 (7.41)	8.37 (6.63)	32.01 (12.47)	31.29 (13.06)	32.71 (12.94)
	5	55.39 (5.78)	59.38 (9.86)	52.90 (6.27)	58.24 (11.09)	59.71 (12.87)	57.17 (11.8)	53.35 (9.82)	58.23 (12.61)	50.38 (9.96)	51.17 (5.41)	50.64 (7.82)	51.45 (7.42)	48.21 (13.30)	50.32 (14.50)	46.12 (14.23)
	6	32.82 (5.57)	24.88 (7.21)	37.76 (6.54)	21.75 (3.47)	20.23 (5.43)	22.88 (4.10)	26.97 (7.30)	21.57 (10.32)	30.33 (7.74)	40.10 (4.81)	40.59 (7.86)	39.94 (7.00)	14.27 (3.14)	12.64 (5.55)	15.81 (4.11)
Uruguay	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	0.01 (0.05)	0.02 (0.14)	0 (0)	0.12 (0.41)	0.20 (0.86)	0.07 (0.38)	0.15 (0.40)	0.24 (0.82)	0.10 (0.46)	0.03 (0.16)	0 (0)	0.05 (0.26)	0.10 (0.31)	0.11 (0.54)	0.03 (0.19)
	2	0.43 (0.80)	0.51 (1.25)	0.37 (0.87)	1.99 (2.09)	2.25 (2.89)	1.83 (2.39)	2.08 (1.80)	2.79 (2.69)	1.55 (1.71)	0.64 (0.82)	0.85 (1.49)	0.52 (0.84)	2.58 (1.79)	2.59 (2.35)	2.13 (1.79)
	3	7.04 (4.98)	8.76 (7.32)	5.98 (4.72)	10.24 (7.26)	14.01 (11.17)	8.17 (6.40)	14.93 (9.53)	18.14 (12.19)	12.52 (8.56)	16.38 (10.91)	18.75 (13.56)	14.91 (10.07)	20.37 (8.51)	24.42 (11.03)	18.36 (8.17)
	4	45.09 (5.37)	51.28 (8.94)	41.19 (5.88)	35.63 (8.96)	37.16 (11.43)	34.78 (9.24)	46.00 (5.96)	44.83 (9.02)	46.79 (6.52)	56.73 (11.09)	59.25 (14.17)	55.17 (11.16)	47.12 (7.94)	48.05 (11.08)	46.26 (7.96)
	5	37.44 (7.66)	34.41 (10.94)	39.37 (7.02)	40.68 (14.35)	37.30 (18.06)	42.55 (13.68)	30.59 (7.51)	29.87 (8.93)	31.23 (8.23)	23.76 (4.09)	20.13 (7.49)	25.99 (5.30)	25.94 (5.23)	22.74 (6.76)	28.34 (5.74)
	6	10.00 (3.02)	5.03 (2.97)	13.09 (4.00)	11.35 (3.19)	9.06 (4.16)	12.60 (3.88)	6.26 (2.21)	4.12 (3.11)	7.80 (2.59)	2.47 (1.47)	1.02 (1.31)	3.36 (2.09)	3.88 (1.69)	2.10 (2.75)	4.88 (2.01)
Viet Nam	0	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	2	–	–	–	–	–	–	–	–	–	0 (0)	0 (0)	0 (0)	0.18 (0.38)	0.26 (0.61)	0.08 (0.33)
	3	–	–	–	–	–	–	–	–	–	0.12 (0.34)	0.20 (0.75)	0.07 (0.33)	3.00 (2.00)	3.25 (2.56)	3.08 (2.35)
	4	–	–	–	–	–	–	–	–	–	5.10 (4.00)	6.28 (5.48)	4.31 (3.77)	19.51 (8.52)	19.61 (9.32)	19.06 (8.68)
	5	–	–	–	–	–	–	–	–	–	41.86 (7.56)	46.82 (9.63)	38.56 (7.96)	45.24 (6.88)	43.92 (7.72)	46.67 (7.82)
	6	–	–	–	–	–	–	–	–	–	52.92 (10.37)	46.70 (12.65)	57.05 (10.18)	32.07 (7.54)	32.96 (9.98)	31.11 (6.77)
Yugoslavia	0	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–	–	–	–	–	–	–

(table continues)

Table S5 *(Continued)*

		2003			2006			2009			2012			2015		
Country	PL	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$	%	$\%_F$	$\%_M$
Yugoslavia	1	0 (0)	0 (0)	0 (0)	–	–	–	–	–	–	–	–	–	–	–	–
	2	0.21 (0.50)	0.32 (1.01)	0.15 (0.48)	–	–	–	–	–	–	–	–	–	–	–	–
	3	10.73 (7.38)	14.20 (10.82)	8.93 (6.52)	–	–	–	–	–	–	–	–	–	–	–	–
	4	49.98 (6.36)	53.45 (10.24)	48.08 (6.79)	–	–	–	–	–	–	–	–	–	–	–	–
	5	34.54 (6.82)	29.84 (9.43)	37.08 (7.78)	–	–	–	–	–	–	–	–	–	–	–	–
	6	4.54 (1.96)	2.19 (2.44)	5.75 (3.09)	–	–	–	–	–	–	–	–	–	–	–	–

Note. Proficiency levels were not provided for the mathematics domain in PISA 2000. Lower score limits PISA 2003: 358.3, 420.4, 482.4, 544.4, 606.6, 668.7; lower score limits PISA 2006: 357.8, 420.1, 482.4, 544.7, 607.0, 669.3; lower score limits PISA 2009: 358, 420, 482, 545, 607, 669; lower score limits PISA 2012: 358, 420, 482, 545, 607, 669; lower score limits PISA 2015: 358, 420, 482, 545, 607, 669.

– Data were not obtained.

Table S6

Overview of Mathematics-Related Achievement Motivation Scales

Interest in mathematics
Thinking about your views on mathematics: To what extent do you agree with the following statements?
When I do mathematics, I sometimes get totally absorbed. [a, b, d]
Because doing mathematics is fun, I wouldn't want to give it up. [a, b, d]
Mathematics is important to me personally. [a, b, d]
I enjoy reading about mathematics. [b, c, e]
I look forward to my mathematics lessons. [b, c, e]
I do mathematics because I enjoy it. [b, c, e]
I am interested in the things I learn in mathematics. [b, c, e]
Self-concept in mathematics
Thinking about studying mathematics: To what extent do you agree with the following statements?
I get good <marks> in mathematics.[a, b, c, d, e]
Mathematics is one of my best subjects.[a, d]
I have always done well in mathematics.[a, d]
I am just not good at mathematics. (R)[b, c, e]
I learn mathematics quickly.[b, c, e]
I have always believed that mathematics is one of my best subjects.[b, c, e]
In my mathematics class, I understand even the most difficult work.[b, c, e]
Mathematics self-efficacy[f]
How confident do you feel about having to do the following mathematics tasks?
Using a <train timetable> to determine how long it would take to get from Zedville to Zedtown.[b]
Using a <train timetable> to work out how long it would take to get from one place to another.[c]
Calculating how much cheaper a TV would be after a 30 percent discount. [b, c]
Calculating how many square metres of tiles you need to cover a floor.
Understanding graphs presented in newspapers. [b, c]
Solving an equation like $3x + 5 = 17$. [b, c]
Finding the actual distance between two places on a map with a 1:10,000 scale. [b, c]
Solving an equation like $2(x+3) = (x + 3)(x – 3)$. [b, c]
Calculating the petrol consumption rate of a car. [b, c]
Mathematics anxiety[b, c, e]
How much do you disagree or agree with the following statements about how you feel when studying mathematics?
I often worry that it will be difficult for me in mathematics classes.
I get very tense when I have to do mathematics homework.
I get very nervous doing mathematics problems.
I feel helpless when doing a mathematics problem.
I worry that I will get poor <marks> in mathematics.

(table continues)

Table S6 *(Continued)*

Instrumental motivation to learn mathematics[b, c, e]
Thinking about your views on mathematics: To what extent do you agree with the following statements?
Making an effort in mathematics is worth it because it will help me in the work that I want to do later on.
Learning mathematics is worthwhile for me because it will improve my career <prospects, chances>.
Mathematics is an important subject for me because I need it for what I want to study later on.
I will learn many things in mathematics that will help me get a job.
Subjective norms in mathematics[c, e]
Thinking about how people important to you view mathematics: How strongly do you agree with the following statements?
Most of my friends do well in mathematics.
Most of my friends work hard at mathematics.
My friends enjoy taking mathematics tests.
My parents believe it's important for me to study mathematics.
My parents believe that mathematics is important for my career.
My parents like mathematics.
Self-responsibility for failing in mathematics[c, g]
Suppose that you are a student in the following situation: *Each week, your mathematics teacher gives a short quiz. Recently you have done badly on these quizzes. Today you are trying to figure out why.* How likely are you to have these thoughts or feelings in this situation?
I'm not very good at solving mathematics problems.
My teacher did not explain the concepts well this week.
This week I made bad guesses on the quiz.
Sometimes the course material is too hard.
The teacher did not get students interested in the material.
Sometimes I am just unlucky.
Mathematics work ethic[c, e]
Thinking about the mathematics you do for school: To what extent do you agree with the following statements?
I finish my homework in time for mathematics class.
I work hard on my mathematics homework.
I am prepared for my mathematics exams.
I study hard for mathematics quizzes.
I keep studying until I understand mathematics material.
I pay attention in mathematics class.
I listen in mathematics class.
I avoid distractions when I am studying mathematics.
I keep my mathematics work well organised.

(table continues)

Table S6 *(Continued)*

Mathematics intentions[c]
For each pair of statements, please choose the item that best describes you.
1. I intend to take additional mathematics courses after school finishes.
2. I intend to take additional <test language> courses after school finishes.
1. I plan on majoring in a subject in <college> that requires mathematics skills.
2. I plan on majoring in a subject in <college> that requires science skills.
1. I am willing to study harder in my mathematics classes than is required.
2. I am willing to study harder in my <test language> classes than is required.
1. I plan on <taking> as many mathematics classes as I can during my education.
2. I plan on <taking> as many science classes as I can during my education.
1. I am planning on pursuing a career that involves a lot of mathematics.
2. I am planning on pursuing a career that involves a lot of science.

Note. (R) = reversed.
[a] Used in PISA 2000.
[b] Used in PISA 2003.
[c] Used in PISA 2012.
[d] 4-point rating scale ranging from 1 (*disagree*) to 4 (*agree*) in PISA 2000.
[e] 4-point rating scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).
[f] 4-point rating scale ranging from 1 (*not at all confident*) to 4 (*very confident*).
[g] 4-point rating scale ranging from 1 (*very likely*) to 4 (*not at all likely*).

Table S7

Overview of Reading-Related Achievement Motivation Scales

Enjoyment of reading[a, b, c, d]
How much do you disagree or agree with these statements about reading?
I read only if I have to. (R)
Reading is one of my favorite hobbies.
I like talking about books with other people.
I find it hard to finish books.
I feel happy if I receive a book as a present.
For me, reading is a waste of time. (R)
I enjoy going to a bookstore or a library.
I read only to get information that I need. (R)
I cannot sit still and read for more than a few minutes. (R)
Interest in reading[a, c]
How much do you disagree or agree with each of the following?
Because reading is fun, I wouldn't want to give it up.
I read in my spare time.
When I read, I sometimes get totally absorbed.
Self-concept in reading[a, c]
How much do you disagree or agree with each of the following?
I'm hopeless in <test language>. (R)
I learn things quickly in the <test language> classes.
I get good marks in the <test language> classes.

Note. (R) = reversed.

[a] Used in PISA 2000.

[b] Used in PISA 2009.

[c] 4-point rating scale ranging from 1 (*disagree*) to 4 (*agree*).

[d] 4-point rating scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) in PISA 2009.

Table S8

Overview of Science-Related Achievement Motivation Scales

Interest in science learning[a, d]
How much interest do you have in learning about the following <broad science> topics?
Topics in physics
Topics in chemistry
The biology of plants
Human biology
Topics in astronomy
Topics in geology
Interest in broad science topics[a, e]
To what extent are you interested in the following <broad science> topics?
Biosphere (e.g. ecosystem services, sustainability)
Motion and forces (e.g. velocity, friction, magnetic and gravitational forces)
Energy and its transformation (e.g. conservation, chemical reactions)
The Universe and its history
How science can help us prevent disease
Enjoyment of science[b, d, e]
How much do you agree with the statements below?
I generally have fun when I am learning <broad science> topics.
I like reading about <broad science>.
I am happy doing <broad science> problems.
I enjoy acquiring new knowledge in <broad science>.
I am interested in learning about <broad science>.
Instrumental motivation to learn science[b]
How much do you agree with the statements below?
Making an effort in my <school science> subject(s) is worth it because this will help me in the work I want to do later on.[d, e]
What I learn in my <school science> subject(s) is important for me because I need this for what I want to study later on.[d, e]
I study <school science> because I know it is useful for me.[d]
Studying my <school science> subject(s) is worthwhile for me because what I learn will improve my career prospects.[d, e]
I will learn many things in my <school science> subject(s) that will help me get a job.[d, e]
Future-oriented science motivation[b, d]
How much do you agree with the statements below?
I would like to work in a career involving <broad science>.
I would like to study <broad science> after <secondary school>.
I would like to spend my life doing advanced <broad science>.
I would like to work on <broad science> projects as an adult.

(table continues)

Table S8 *(Continued)*

Science self-efficacy[c, d, e]
How easy do you think it would be for you to perform the following tasks on your own?
Recognize the science question that underlies a newspaper report on a health issue.
Explain why earthquakes occur more frequently in some areas than in others.
Describe the role of antibiotics in the treatment of disease.
Identify the science question associated with the disposal of garbage.
Predict how changes to an environment will affect the survival of certain species.
Interpret the scientific information provided on the labelling of food items.
Discuss how new evidence can lead you to change your understanding about the possibility of life on Mars.
Identify the better of two explanations for the formation of acid rain
Science self-concept[b, d]
How much do you agree with the statements below?
Learning advanced <school science> topics would be easy for me.
I can usually give good answers to <test questions> on <school science> topics.
I learn <school science> topics quickly.
<School science> topics are easy for me.
When I am being taught <school science>, I can understand the concepts very well.
I can easily understand new ideas in <school science>.
General value of science[b, d]
How much do you agree with the statements below?
Advances in <broad science and technology> usually improve people's living conditions.
<Broad science> is important for helping us to understand the natural world.
Advances in <broad science and technology> usually help improve the economy.
<Broad science> is valuable to society.
Advances in <broad science and technology> usually bring social benefits.
Personal value of science[b, d]
How much do you agree with the statements below?
Some concepts in <broad science> help me see how I relate to other people.
I will use <broad science> in many ways when I am an adult.
<Broad science> is very relevant to me.
I find that <broad science> helps me to understand the things around me.
When I leave school there will be many opportunities for me to use <broad science>.

[a] 4-point rating scale ranging from 1 (*no interest*) to 4 (*high interest*).
[b] 4-point rating scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).
[c] 4-point rating scale ranging from 1 (*I couldn't do this*) to 4 (*I could do this easily*).
[d] Used in PISA 2006.
[e] Used in PISA 2015.

Table S9

Reliabilities for the Achievement and Achievement Motivation Scales in the General Population as Observed in PISA 2000, 2003, 2006, 2009, 2012, and 2015

Variable	Cycle	Minimum	Maximum	Median	Source
Achievement					
Mathematics[a]	2003	.83	.93	.90	OECD, 2005, p. 410
	2006	.83	.93	.88	OECD, 2009, p. 217
	2009	.77	.92	.88	OECD, 2012, p. 198–199
	2012	.84	.94	.92	OECD, 2014, p. 234
	2015 (PBA)[b]	.67	.87	.80	OECD, 2017, p. 231
	2015 (CBA)[c]	.75	.90	.85	OECD, 2017, p. 231
Reading[a]	2003	.70	.88	.83	OECD, 2005, p. 410
	2006	.80	.93	.88	OECD, 2009, p. 217
	2009	.86	.94	.92	OECD, 2012, p. 198–199
	2012	.81	.93	.89	OECD, 2014, p. 234
	2015 (PBA)[b]	.72	.88	.82	OECD, 2017, p. 231
	2015 (CBA)[c]	.80	.90	.87	OECD, 2017, p. 231
Science[a]	2003	.68	.88	.82	OECD, 2005, p. 410
	2006	.84	.94	.91	OECD, 2009, p. 217
	2009	.79	.93	.89	OECD, 2012, p. 198–199
	2012	.80	.93	.89	OECD, 2014, p. 234
	2015 (PBA)[b]	.77	.92	.86	OECD, 2017, p. 231
	2015 (CBA)[c]	.82	.93	.91	OECD, 2017, p. 231
Mathematics motivation					
Interest	2000	.51	.83	.74	OECD, 2002, p. 234
	2003	.82	.92	.89	OECD, 2005, p. 291
	2012	.77	.92	.89	OECD, 2014, p. 320–321
Instrumental motivation	2000	.69	.85	.82	OECD, 2002, p. 234
	2003	.77	.91	.87	OECD, 2005, p. 291
	2012	.79	.92	.88	OECD, 2014, p. 320–321
Self-concept	2000	.84	.93	.87	OECD, 2002, p. 240
	2003	.75	.93	.89	OECD, 2005, p. 294
	2012	.70	.92	.88	OECD, 2014, p. 320–321
Self-efficacy	2003	.74	.87	.82	OECD, 2005, p. 294
	2012	.78	.91	.83	OECD, 2014, p. 320–321
Anxiety	2003	.65	.87	.82	OECD, 2005, p. 294
	2012	.51	.88	.82	OECD, 2014, p. 320–321
Self-responsibility for failing	2012	.45	.80	.65	OECD, 2014, p. 320–321
Work ethic	2012	.83	.92	.92	OECD, 2014, p. 320–321
Subjective norms	2012	.60	.81	.68	OECD, 2014, p. 320–321
Intentions	2012	.61	.85	.76	OECD, 2014, p. 320–321
Reading motivation					
Enjoyment	2000	.61	.77	.72	OECD, 2002, p. 232
	2009	.71	.93	.88	OECD, 2012, p. 291–292
Interest	2000	.61	.88	.83	OECD, 2002, p. 234
Self-concept	2000	.52	.82	.75	OECD, 2002, p. 240
Science motivation					
Enjoyment	2006	.77	.95	.90	OECD, 2009, p. 320
	2015	.79	.97	.93	OECD, 2017, p. 311
Interest in science learning	2006	.71	.90	.82	OECD, 2009, p. 320
Interest in broad science topics	2015	.72	.89	.81	OECD, 2017, p. 311
Self-concept	2006	.82	.94	.90	OECD, 2009, p. 324
Self-efficacy	2006	.66	.88	.81	OECD, 2009, p. 324
	2015	.73	.94	.89	OECD, 2017, p. 319
Future-oriented motivation	2006	.80	.95	.91	OECD, 2009, p. 322

(table continues)

Table S9 *(Continued)*

Science motivation					
Instrumental motivation	2006	.81	.95	.91	OECD, 2009, p. 322
	2015	.76	.96	.91	OECD, 2017, p. 313
General value	2006	.61	.82	.72	OECD, 2009, p. 326
Personal value	2006	.62	.87	.79	OECD, 2009, p. 326

[a] In PISA 2000, only averaged reliabilities of the international PISA scales were reported: mathematics = .81, reading = .89, science = .78 (OECD, 2002, p. 152).

[b] $N = 14$ countries.

[c] $N = 56$ countries.

Table S10

(Unimputed) Moderator Values for Each Country and PISA Cycle

Country	Cycle	smm	wr	per	ser	ter
Albania	2000	–	–	1.00	0.97	1.44
	2009	22.00	–	1.00	1.03	1.36
	2012	14.70	–	1.02	0.98	1.40
	2015	–	–	1.03	0.96	1.43
Algeria	2015	–	–	0.95	–	1.56
Argentina	2000	–	48.47	0.99	1.05	1.52
	2006	29.40	50.45	0.99	1.10	1.50
	2009	34.40	52.07	1.00	1.11	1.49
	2012	33.35	52.55	0.99	1.09	1.56
Australia	2000	22.90	–	1.02	–	–
	2003	–	–	1.02	–	–
	2006	–	25.29	1.01	–	–
	2009	–	28.44	1.00	–	–
	2012	31.10	–	1.00	–	–
	2015	33.20	–	1.00	0.87	1.44
Austria	2000	28.10	–	0.99	0.96	–
	2003	–	–	0.99	0.95	–
	2006	21.00	25.29	0.99	0.96	–
	2009	23.30	28.44	0.99	0.96	–
	2012	27.10	–	0.99	0.96	–
	2015	27.90	–	0.99	0.96	1.19
Azerbaijan	2006	–	51.54	0.94	–	1.05
	2009	–	52.35	0.99	–	0.99
Beijing-Shanghai-Jiangsu-Guangdong[1]	2015	–	–	1.00	–	1.19
Belgium	2000	24.50	–	0.99	1.11	1.15
	2003	–	28.14	0.99	1.10	1.20
	2006	31.10	30.65	0.99	1.13	1.26
	2009	34.60	32.71	1.00	1.15	1.25
	2012	31.70	–	1.00	1.14	1.28
	2015	31.00	–	1.00	1.14	1.31
Brazil	2000	–	–	–	–	–
	2003	–	–	0.94	1.11	1.31
	2006	36.30	–	–	–	–
	2009	35.20	–	0.96	1.12	1.32

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Brazil	2012	36.73	–	0.95	1.09	1.35
	2015	37.33	–	0.96	1.06	1.34
Buenos Aires[1]	2015	–	52.60	1.00	1.06	1.63
Bulgaria	2000	37.50	45.57	0.97	0.98	1.41
	2006	37.60	44.60	0.99	0.96	1.23
	2009	35.80	47.62	1.00	0.97	1.33
	2012	35.50	48.61	0.99	0.96	1.27
	2015	37.40	–	0.99	0.97	1.28
Canada	2000	–	–	1.00	1.02	1.34
	2003	–	–	–	–	–
	2006	–	–	0.99	0.98	–
	2009	–	–	1.00	0.98	1.40
	2012	–	–	1.01	1.00	1.34
Canada	2015	–	–	1.01	1.01	1.34
Chile	2000	–	–	0.98	1.02	0.92
	2006	28.60	–	0.96	1.02	1.00
	2009	28.30	32.30	0.95	1.03	1.06
	2012	–	30.97	0.97	1.04	1.12
	2015	–	33.02	0.97	1.01	1.11
Chinese Taipei[1]	2006	–	–	0.99	0.99	0.94
	2009	–	–	0.98	1.03	1.04
	2012	–	–	0.99	–	1.11
	2015	–	–	1.00	–	1.19
Colombia	2006	–	35.14	0.99	1.12	1.09
	2009	–	37.07	1.00	1.10	1.05
	2012	–	37.76	0.97	1.09	1.13
	2015	–	–	0.97	1.07	1.17
Costa Rica	2009	–	43.26	0.98	1.05	–
	2012	29.20	44.57	0.98	1.04	1.25
	2015	–	–	0.99	1.04	1.31
Croatia	2006	27.50	44.06	1.00	1.04	1.23
	2009	37.20	46.42	1.00	1.04	1.27
	2012	25.80	47.71	1.00	1.04	1.36
	2015	26.10	–	1.00	1.05	1.35

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Czech Republic	2000	26.40	27.83	1.00	1.02	1.04
	2003	–	28.34	0.98	1.03	1.07
	2006	30.70	28.47	0.99	1.02	1.22
Czech Republic	2009	28.90	28.86	1.00	1.01	1.38
	2012	23.10	27.50	1.00	1.00	1.42
	2015	27.80	26.95	1.00	1.01	1.41
Denmark	2000	19.70	–	1.00	1.04	1.37
	2003	–	28.11	–	1.06	1.41
	2006	20.40	–	1.00	1.03	1.38
	2009	20.40	31.75	1.00	1.02	1.46
	2012	28.80	35.41	0.99	1.01	1.42
	2015	26.90	–	0.99	1.05	1.40
Dominican Republic	2015	50.08	–	0.91	1.10	1.83
Estonia	2006	39.60	42.37	0.98	1.04	1.69
	2009	34.30	42.48	0.98	1.02	1.73
	2012	31.60	43.99	1.00	0.99	1.54
	2015	27.80	43.88	1.00	1.00	1.52
Finland	2000	27.60	28.52	0.99	1.09	1.21
	2003	–	29.82	0.99	1.10	1.20
	2006	33.90	31.55	1.00	1.04	1.22
	2009	34.70	31.42	0.99	1.05	1.23
	2012	29.70	32.25	0.99	1.05	1.21
	2015	33.50	32.29	0.99	1.10	1.20
France	2000	31.70	27.50	0.99	1.00	1.21
	2003	–	27.78	0.99	1.01	1.24
	2006	37.00	27.43	0.99	1.00	1.27
	2009	37.40	26.92	0.99	1.00	1.27
	2012	39.20	25.48	1.00	1.01	1.26
France	2015	30.90	–	0.99	1.01	1.24
Georgia	2009	–	–	1.01	–	1.29
	2015	–	50.62	1.00	1.03	1.24
Germany	2000	21.90	–	0.99	0.98	–
	2003	–	19.50	0.99	0.98	–
	2006	24.20	–	1.00	0.97	–
	2009	26.80	24.96	0.99	0.95	–
	2012	27.10	–	1.00	0.95	–

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Germany	2015	28.10	28.00	1.00	0.95	0.98
Greece	2000	19.90	–	1.00	1.06	1.09
	2003	–	37.07	0.99	1.00	1.12
	2006	22.50	–	0.98	0.95	1.10
	2009	27.00	–	–	–	–
	2012	22.20	–	0.98	0.97	1.06
	2015	24.70	–	0.99	0.93	–
Hong Kong	2000	–	–	–	–	–
	2003	–	–	–	1.00	0.97
	2006	–	–	–	1.01	0.99
	2009	–	–	–	1.01	0.96
	2012	–	–	1.00	1.01	1.06
	2015	–	–	1.02	0.98	1.13
Hungary	2000	34.20	34.21	0.98	1.01	1.22
	2003	–	35.15	0.98	1.00	1.37
	2006	40.90	33.47	0.98	0.99	1.46
	2009	39.90	32.11	0.99	0.99	1.37
	2012	36.30	30.94	0.99	0.98	1.31
	2015	39.10	30.84	1.00	1.01	1.26
Iceland	2000	30.40	–	0.98	1.07	1.66
	2003	–	39.35	0.98	1.07	1.79
	2006	34.00	38.55	0.99	1.02	1.89
	2009	38.40	42.59	1.00	1.03	1.87
	2012	38.20	–	1.00	0.99	1.71
	2015	39.50	45.65	1.00	1.01	1.79
India	2009	–	–	1.03	0.94	0.72
Indonesia	2000	–	–	0.97	0.97	0.89
	2003	–	–	0.98	0.99	0.80
	2006	–	–	0.97	1.01	0.91
	2009	18.10	–	0.98	0.99	0.95
	2012	–	–	1.00	1.03	1.04
	2015	21.50	–	0.97	1.00	1.11
Ireland	2000	35.20	–	0.99	1.09	1.21
	2003	–	30.24	0.99	1.09	1.28
	2006	41.40	31.23	0.99	1.08	1.26
	2009	41.00	34.23	1.00	1.07	1.15
	2012	30.50	–	1.00	1.03	1.06

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Ireland	2015	30.20	–	1.00	1.03	1.09
Israel	2000	–	–	0.99	1.00	1.43
	2006	–	–	1.01	1.00	1.27
	2009	–	–	1.01	1.02	1.30
	2012	31.65	–	1.00	1.02	1.32
Israel	2015	31.90	–	1.01	1.01	1.38
Italy	2000	–	27.86	1.00	0.96	1.29
	2003	–	29.30	0.99	0.98	1.34
	2006	21.80	33.34	0.99	0.99	1.39
	2009	21.60	33.84	0.99	0.99	1.43
	2012	22.20	35.50	0.99	0.99	1.42
	2015	21.80	–	1.00	1.00	1.37
Japan	2000	–	–	–	–	–
	2003	–	11.57	–	–	–
	2006	–	12.41	–	–	–
	2009	–	13.62	–	–	–
	2012	–	14.41	–	–	–
	2015	–	15.25	–	–	–
Jordan	2006	–	–	1.02	1.04	1.14
	2009	–	–	–	–	1.11
	2012	–	–	0.97	1.03	1.15
	2015	–	19.69	–	–	1.09
Kazakhstan	2009	–	48.46	1.00	–	–
	2012	–	48.73	1.00	1.01	1.27
Korea	2000	–	10.24	1.01	1.01	0.58
	2003	–	11.41	1.00	1.02	0.61
	2006	–	13.13	0.99	1.01	0.66
	2009	–	15.80	1.00	1.00	0.73
	2012	–	17.67	1.00	0.99	0.76
	2015	–	18.90	1.00	0.99	0.78
Kosovo	2015	–	–	–	–	–
Kyrgyzstan	2006	–	44.89	0.99	1.00	1.27
	2009	–	43.45	1.00	1.05	1.34
Latvia	2000	37.30	49.58	0.98	1.03	1.80

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Latvia	2003	–	53.07	0.97	0.99	1.67
	2006	40.90	47.47	0.98	1.00	1.80
	2009	41.50	52.37	0.97	1.01	1.84
	2012	44.60	52.81	0.99	0.97	1.56
	2015	44.30	51.03	1.00	0.98	1.56
Lebanon	2015	–	–	–	–	–
Lithuania	2006	42.80	49.33	0.99	0.99	1.54
	2009	40.30	51.01	0.99	1.00	1.49
	2012	35.30	52.36	0.99	0.96	1.48
	2015	38.10	–	1.00	0.96	1.44
Luxembourg	2000	24.10	–	1.01	1.06	–
	2003	–	17.45	1.00	1.05	1.19
	2006	21.20	–	1.01	1.04	1.13
	2009	15.40	21.21	–	–	–
	2012	17.00	–	1.00	1.03	1.13
	2015	14.00	–	1.00	1.04	1.11
Macao	2003	–	20.28	0.94	0.99	0.52
	2006	–	28.39	0.96	0.93	0.75
	2009	–	32.37	0.97	0.98	0.92
	2012	–	33.94	0.98	0.97	1.22
Macao	2015	–	33.71	0.98	0.99	1.30
Macedonia	2000	–	–	0.98	0.97	1.29
	2015	23.00	49.05	1.00	0.98	1.25
Malaysia	2009	–	50.91	1.01	1.08	1.32
	2012	20.80	49.92	1.01	1.05	1.34
Malta	2009	21.90	29.42	1.00	–	1.36
	2015	25.85	–	1.01	1.06	1.38
Mauritius	2009	–	–	1.00	1.04	1.19
Mexico	2000	–	–	0.98	1.02	0.91
	2003	–	31.57	0.98	1.06	0.96
	2006	–	–	0.98	1.05	0.97
	2009	–	–	0.98	1.08	0.98
	2012	–	32.76	0.99	1.07	0.98
	2015	34.80	–	1.00	1.07	0.98

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Miranda (Venezuela)[1]	2009	–	54.52	0.97	1.09	–
Montenegro	2006	–	38.37	1.01	1.03	1.56
	2009	–	–	1.00	1.03	1.30
	2012	24.80	–	1.03	1.03	–
	2015	17.60	47.57	1.00	1.02	–
Netherlands	2000	21.50	–	0.98	0.96	1.04
	2003	–	19.87	0.98	0.99	1.08
	2006	25.50	–	0.98	0.98	1.09
Netherlands	2009	26.00	25.88	0.99	0.98	1.12
	2012	28.25	23.95	1.00	0.98	1.10
	2015	24.65	–	1.00	1.02	1.14
New Zealand	2000	–	–	1.00	1.06	–
	2003	–	–	1.00	1.10	–
	2006	–	–	0.99	1.04	–
	2009	–	–	1.00	1.03	–
	2012	–	–	1.01	1.06	–
	2015	–	–	1.01	1.06	1.41
Norway	2000	24.70	–	1.00	1.02	1.45
	2003	–	29.28	1.00	1.02	1.53
	2006	34.00	–	1.01	1.00	1.54
	2009	34.60	35.23	1.00	0.98	1.63
	2012	31.20	36.20	1.00	0.99	1.58
	2015	33.70	37.38	1.00	0.98	1.46
Panama	2009	–	–	0.97	1.08	1.52
Perm[1]	2012	–	41.25	1.01	0.98	1.27
Peru	2000	–	–	1.00	0.95	–
	2009	27.50	–	1.00	1.03	–
	2012	34.60	–	1.00	0.97	–
	2015	41.30	–	1.00	1.00	–
Poland	2000	31.40	38.07	0.99	0.99	1.41
	2003	–	39.25	0.99	0.96	1.43
	2006	36.10	39.50	0.99	0.99	1.41
	2009	36.00	39.52	0.99	1.00	1.44
	2012	35.00	38.29	1.00	0.99	1.57
	2015	37.40	–	–	0.96	1.52

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Portugal	2000	22.00	43.39	0.96	1.07	1.34
	2003	–	44.33	0.95	1.09	1.35
	2006	31.40	43.84	0.95	1.09	1.28
	2009	34.40	44.33	0.97	1.04	1.18
	2012	27.90	45.02	0.97	1.00	1.18
	2015	30.40	–	0.96	0.97	1.13
Qatar	2006	–	–	1.06	1.01	3.45
	2009	–	–	1.03	–	5.91
	2012	–	21.86	1.04	–	6.34
	2015	–	–	1.01	–	7.06
Republic of Moldova	2009	–	47.32	0.98	1.02	1.39
	2015	45.40	49.14	0.99	1.01	1.34
Romania	2000	–	42.46	0.99	1.02	1.13
	2006	33.70	44.29	0.99	1.01	1.30
	2009	36.40	44.73	0.98	1.00	1.36
	2012	30.80	45.14	0.98	0.99	1.27
	2015	31.50	–	0.99	1.00	1.25
Russian Federation	2000	–	44.09	0.99	–	–
	2003	–	43.33	1.00	1.00	1.31
	2006	–	42.16	1.01	0.98	1.37
	2009	–	41.90	1.00	0.98	1.35
	2012	–	41.25	1.01	0.98	1.27
	2015	–	40.31	1.01	0.98	1.20
Serbia	2006	–	44.75	1.00	1.04	1.29
	2009	39.40	47.44	0.99	1.03	1.29
	2012	–	49.64	1.00	1.03	1.32
Shanghai[1]	2009	–	–	0.98	1.03	1.04
	2012	–	–	0.99	–	1.11
Singapore	2009	–	28.49	–	–	–
	2012	–	29.57	–	–	–
	2015	–	–	–	–	–
Slovak Republic	2003	–	40.62	–	–	–
	2006	27.40	41.75	–	–	–
	2009	31.70	42.47	–	–	–
	2012	30.40	42.26	–	–	–
	2015	27.80	42.19	–	–	–

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Slovenia	2006	42.00	35.28	0.99	1.00	1.46
	2009	44.70	35.66	1.00	1.00	1.48
	2012	40.30	35.80	1.01	1.00	1.48
	2015	37.00	–	1.01	1.01	1.47
Spain	2000	15.70	–	0.99	1.07	1.18
	2003	–	36.27	0.99	1.06	1.20
	2006	23.10	36.69	0.99	1.06	1.23
	2009	24.70	38.11	0.99	1.05	1.24
	2012	28.80	38.81	0.99	1.01	1.22
	2015	30.40	40.03	1.02	0.99	1.19
Sweden	2000	27.40	–	1.03	1.27	1.45
	2003	–	–	1.03	1.18	1.54
	2006	31.70	–	1.00	1.00	1.54
	2009	31.10	35.70	1.00	0.99	1.58
	2012	34.50	–	1.00	0.99	1.55
	2015	39.80	–	1.04	1.14	1.53
Switzerland	2000	16.10	20.31	1.00	0.94	0.75
	2003	–	–	1.00	0.94	0.81
	2006	–	–	1.00	0.94	0.90
	2009	–	–	1.00	0.96	1.01
	2012	31.35	32.41	1.00	0.97	1.00
	2015	33.30	33.55	1.00	0.97	1.03
Thailand	2000	–	–	0.97	–	1.21
	2003	–	45.58	–	–	1.15
	2006	–	–	0.98	1.06	1.06
	2009	–	51.08	0.99	1.08	1.20
	2012	25.60	–	0.99	1.07	1.32
	2015	29.40	56.08	0.94	0.96	–
Trinidad and Tobago	2009	–	52.86	0.96	–	–
	2015	–	–	–	–	–
Tunisia	2003	–	–	0.98	1.07	1.23
	2006	–	–	0.99	1.11	1.41
	2009	18.30	42.11	0.99	1.10	1.51
	2012	–	50.74	1.00	–	1.57
	2015	–	54.55	1.00	–	1.66
Turkey	2003	–	35.88	0.94	0.73	–
	2006	17.30	36.27	0.96	0.84	–

(table continues)

Table S10 *(Continued)*

Country	Cycle	smm	wr	per	ser	ter
Turkey	2009	20.10	36.29	0.98	0.91	–
	2012	14.30	36.15	0.99	0.95	–
	2015	14.40	37.29	0.99	0.97	–
United Arab Emirates	2009	–	–	–	–	–
	2012	–	–	1.02	–	–
	2015	–	–	1.00	–	–
United Kingdom	2000	34.70	–	1.00	1.01	1.18
	2003	–	–	1.00	1.03	1.30
	2006	34.30	–	1.00	1.03	1.41
	2009	35.40	37.93	1.00	1.01	1.36
	2012	32.40	37.83	1.00	1.00	1.33
	2015	32.40	–	1.00	1.03	1.33
United States	2000	–	–	0.98	1.02	1.32
	2003	–	–	1.00	1.00	1.38
	2006	37.00	–	1.01	1.00	1.43
	2009	38.10	–	1.00	1.02	1.40
	2012	39.10	–	0.98	1.01	1.39
	2015	39.40	–	1.00	1.01	1.36
Uruguay	2003	–	–	0.98	1.15	2.03
	2006	23.40	42.39	0.97	1.16	1.68
	2009	22.50	51.58	0.97	1.13	–
	2012	36.50	49.56	–	–	–
	2015	34.00	48.82	0.98	–	–
Viet Nam	2012	–	–	1.01	–	–
	2015	–	–	1.00	–	1.01
Yugoslavia	2003	–	–	–	–	–

Note. smm = women's share of employment in senior and middle management (i.e., legislators, senior officials, managers) in percent; wr = percentage of women in research positions; per = ratio of female to male students enrolled in primary education; ser = ratio of female to male students enrolled in secondary education; ter = ratio of female to male students enrolled in tertiary education. – Data were not obtained.

[1]For regions for which no indicators were available, the indicators of the respective country were used (e.g., the indicator of the Russian Federation were used for Perm).

Table S11

Descriptive Statistics and Intercorrelations between Moderators at the Country Level

	smm	wr	per	ser	ter
smm					
wr	0.386 ***				
per	–0.229 *	–0.290 **			
ser	0.232 *	0.243 *	–0.258 *		
ter	0.463 ***	0.292 **	0.024	0.288 **	
Descriptive statistics					
M	28.499	35.901	–0.008	0.015	0.240
SD	8.182	11.442	0.039	0.077	0.270
ICC	0.743	0.941	0.581	0.661	0.872

Note. $N = 82$ countries. Descriptive statistics and correlations were computed by pooling the results obtained at the country level for 100 imputed data sets according to formulas provided by Rubin (1987) where for each imputed data set moderator variables were averaged across PISA cycles for each country.
smm = women's share of employment in senior and middle management (i.e., legislators, senior officials, managers) in percent; wr = percentage of women in research positions; per = ratio of female to male students enrolled in primary education (log transformed values); ser = ratio of female to male students enrolled in secondary education (log transformed values); ter = ratio of female to male students enrolled in tertiary education (log transformed values); ICC = intraclass correlation coefficient, ICCs estimate the proportion of between country variance (nominator) to the sum of between country variance and variance within countries between PISA cycles (denominator).

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

Table S12

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Effect Sizes (Cohen's d) for Gender Differences in Mathematics Achievement Motivation in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Albania	2000	138	52	–0.05	–0.14	–0.07	–	–	–	–	–	–
	2012	237	46	–0.12	–0.04	0.10	–0.06	0.05	0.20	–0.06	–0.10	0.14
Argentina	2012	295	37	0.03	0.10	0.16	0.06	–0.17	–0.11	–0.32	–0.19	0.50
Australia	2000	142	34	0.19	0.23	0.11	–	–	–	–	–	–
	2003	628	38	0.18	0.18	0.25	0.49	–0.28	–	–	–	–
	2012	724	37	0.24	0.16	0.21	0.47	–0.37	–0.26	–0.02	0.04	0.41
Austria	2000	130	29	0.21	0.18	–0.07	–	–	–	–	–	–
	2003	230	35	0.05	0.35	0.12	0.47	–0.03	–	–	–	–
	2012	238	29	0.35	0.52	0.00	0.50	–0.06	–0.21	–0.02	0.19	0.45
Belgium	2000	188	31	–0.01	0.19	–0.08	–	–	–	–	–	–
	2003	440	33	0.05	0.21	0.21	0.40	–0.18	–	–	–	–
	2012	430	38	0.03	0.20	0.24	0.43	–0.39	–0.11	–0.25	–0.02	0.28
Brazil	2000	134	34	–0.08	–0.12	0.08	–	–	–	–	–	–
	2003	222	38	0.27	0.36	0.23	0.36	–0.07	–	–	–	–
	2012	960	37	0.22	0.23	0.24	0.16	–0.24	–0.13	–0.33	0.10	0.39
Bulgaria	2000	131	40	0.13	0.22	0.09	–	–	–	–	–	–
	2012	264	42	0.04	0.18	–0.14	0.31	0.01	–0.09	–0.17	0.10	0.32
Canada	2003	1361	38	0.04	0.08	0.22	0.41	–0.20	–	–	–	–
	2012	1077	39	0.21	0.05	0.18	0.29	–0.23	–0.19	–0.38	–0.14	0.25
Chile	2000	136	43	–0.12	0.07	0.03	–	–	–	–	–	–

(table continues)

Table S12 *(Continued)*

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Chile	2012	343	31	0.19	0.17	0.11	0.32	–0.08	–0.17	0.05	–0.01	0.35
Chinese Taipei	2012	302	45	0.37	0.08	0.51	0.13	–0.31	–0.09	–0.21	–0.17	0.10
Colombia	2012	454	30	0.10	0.17	0.02	0.11	0.00	–0.15	–0.16	0.12	0.10
Costa Rica	2012	230	33	–0.03	0.04	0.41	0.24	–0.35	–0.23	–0.21	–0.01	0.24
Croatia	2012	250	33	–0.18	0.10	0.02	0.32	0.15	–0.07	–0.27	–0.01	0.31
Czech Republic	2000	153	35	0.33	0.30	–0.04	–	–	–	–	–	–
	2003	316	37	0.08	0.41	0.12	0.38	–0.14	–	–	–	–
	2012	266	41	0.07	0.22	0.05	0.39	0.09	0.01	–0.24	–0.02	0.52
Denmark	2000	119	31	0.41	0.14	0.13	–	–	–	–	–	–
	2003	211	41	0.13	0.20	0.45	0.56	–0.32	–	–	–	–
	2012	374	43	0.17	0.19	0.33	0.39	–0.32	–0.09	0.02	–0.01	0.08
Estonia	2012	239	43	0.05	0.18	0.17	0.18	–0.22	–0.22	–0.31	–0.06	0.51
Finland	2000	135	49	0.06	0.18	0.07	–	–	–	–	–	–
	2003	290	39	0.27	0.38	0.42	0.74	–0.42	–	–	–	–
	2012	441	41	0.15	0.31	0.24	0.45	–0.39	–0.08	–0.04	0.34	0.58
France	2003	215	38	0.17	0.30	0.12	0.21	–0.06	–	–	–	–
	2012	231	37	–0.04	–0.04	0.09	0.26	–0.18	–0.07	–0.33	–0.04	0.34
Germany	2000	140	37	0.46	–0.30	0.45	–	–	–	–	–	–
	2003	231	37	0.12	0.25	0.02	0.32	–0.02	–	–	–	–
	2012	250	35	0.12	0.27	0.28	0.54	–0.08	–0.27	–0.26	0.15	0.00

(table continues)

Table S12 *(Continued)*

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Greece	2003	231	32	0.05	0.06	0.14	0.35	–0.10	–	–	–	–
	2012	256	36	0.21	0.28	0.07	0.28	0.01	–0.14	–0.05	0.17	0.36
Hong Kong	2000	122	30	0.01	–0.22	0.25	–	–	–	–	–	–
	2003	224	32	0.15	0.25	0.30	0.58	–0.38	–	–	–	–
	2012	234	26	0.22	0.07	0.17	0.50	–0.24	–0.13	–0.21	0.01	0.20
Hungary	2000	139	40	–0.13	–0.13	–0.27	–	–	–	–	–	–
	2003	238	35	0.19	0.43	0.12	0.37	–0.10	–	–	–	–
	2012	240	38	0.25	0.40	0.15	0.40	–0.13	–0.28	–0.16	0.43	0.56
Iceland	2000	93	45	–0.02	0.26	0.29	–	–	–	–	–	–
	2003	168	49	–0.16	0.01	0.13	0.40	–0.10	–	–	–	–
	2012	175	48	–0.14	–0.27	0.10	0.39	–0.04	–0.23	–0.42	–0.29	0.17
Indonesia	2003	538	48	0.01	0.03	0.05	0.11	0.02	–	–	–	–
	2012	281	44	0.16	0.08	0.06	0.00	–0.06	–0.08	–0.28	–0.23	–0.16
Ireland	2000	106	38	–0.36	–0.14	–0.23	–	–	–	–	–	–
	2003	194	34	–0.06	0.28	0.17	0.19	–0.18	–	–	–	–
	2012	251	38	0.07	0.14	0.15	0.31	–0.19	–0.05	0.06	0.01	0.47
Israel	2000	124	42	0.44	0.75	0.26	–	–	–	–	–	–
	2012	253	31	0.08	0.17	0.21	0.26	–0.40	–0.13	–0.04	–0.09	0.38
Italy	2000	137	36	0.07	0.24	0.18	–	–	–	–	–	–
	2003	582	31	0.08	0.37	0.15	0.47	–0.10	–	–	–	–
	2012	1554	29	0.03	0.13	0.01	0.30	0.00	–0.04	–0.23	–0.04	0.27
Japan	2003	235	32	0.17	0.16	0.25	0.52	–0.11	–	–	–	–

(table continues)

Table S12 *(Continued)*

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Japan	2012	318	30	0.25	0.09	0.57	0.39	–0.27	0.09	–0.19	–0.11	0.12
Jordan	2012	352	52	–0.01	–0.10	–0.15	0.29	0.17	–0.39	0.06	0.04	0.41
Kazakhstan	2012	290	47	0.14	0.19	–0.05	0.33	0.03	–0.06	0.18	0.04	0.33
Korea	2000	138	31	–0.01	0.02	0.14	–	–	–	–	–	–
	2003	272	30	0.17	–0.02	0.19	0.26	–0.12	–	–	–	–
	2012	252	26	0.36	0.34	0.37	0.56	–0.43	–0.28	0.15	0.11	0.22
Latvia	2000	106	44	0.20	0.00	–0.03	–	–	–	–	–	–
	2003	231	38	0.11	0.28	0.24	0.53	–0.19	–	–	–	–
	2012	215	44	–0.09	–0.19	–0.05	0.43	–0.16	–0.28	–0.28	–0.19	0.22
Lithuania	2012	231	38	0.26	0.21	0.05	0.53	–0.05	0.01	–0.18	0.05	0.33
Luxembourg	2000	97	31	0.22	0.31	–0.03	–	–	–	–	–	–
	2003	196	34	0.19	0.10	0.07	0.39	–0.06	–	–	–	–
	2012	263	29	0.26	0.39	0.23	0.61	–0.22	–0.35	–0.26	0.01	0.50
Macao	2003	62	39	0.32	–0.03	0.28	–0.04	–0.23	–	–	–	–
	2012	267	43	0.41	0.21	0.47	0.13	–0.53	0.04	–0.13	–0.02	0.24
Macedonia	2000	126	45	–0.01	0.42	0.01	–	–	–	–	–	–
Malaysia	2012	260	52	0.13	0.19	0.06	0.04	–0.01	–0.18	0.01	–0.05	0.14
Mexico	2000	125	31	0.04	0.06	0.05	–	–	–	–	–	–
	2003	1499	38	0.07	0.23	–0.04	0.30	0.05	–	–	–	–
	2012	1690	38	0.07	0.09	0.16	0.16	–0.18	0.02	–0.11	–0.13	0.18

(table continues)

Table S12 *(Continued)*

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Montenegro	2012	237	45	–0.06	0.07	0.06	0.43	–0.10	–0.09	–0.40	–0.03	0.55
Netherlands	2000	69	36	0.63	0.19	0.55	–	–	–	–	–	–
	2003	200	43	0.04	0.34	0.35	0.55	–0.28	–	–	–	–
	2012	223	38	0.02	0.08	0.17	0.42	–0.05	–0.17	–0.12	–0.10	–0.01
New Zealand	2000	102	41	0.07	0.07	0.24	–	–	–	–	–	–
	2003	226	34	0.08	0.08	0.16	0.43	–0.16	–	–	–	–
	2012	215	35	0.16	0.05	0.07	0.65	–0.14	–0.18	–0.08	–0.16	0.44
Norway	2000	113	34	0.70	0.26	0.45	–	–	–	–	–	–
	2003	203	39	0.27	0.29	0.38	0.57	–0.40	–	–	–	–
	2012	234	45	–0.07	0.04	0.10	0.36	–0.15	–0.28	–0.22	–0.05	0.10
Perm	2012	88	31	0.27	0.14	0.27	0.53	–0.19	–0.20	0.04	0.16	0.07
Peru	2012	302	37	0.21	0.19	0.28	0.10	–0.16	–0.12	–0.17	–0.02	0.21
Poland	2003	219	36	–0.03	0.15	–0.08	0.29	0.14	–	–	–	–
	2012	230	40	–0.18	–0.14	0.17	0.26	–0.07	0.00	–0.36	–0.32	0.59
Portugal	2000	126	37	–0.09	0.28	–0.07	–	–	–	–	–	–
	2003	230	34	–0.17	0.06	0.02	0.29	–0.09	–	–	–	–
	2012	286	36	0.05	0.19	0.15	0.17	–0.14	–0.12	–0.34	0.08	0.24
Qatar	2012	548	43	0.15	0.11	0.13	0.17	0.01	–0.07	–0.14	0.09	0.23
Romania	2000	134	57	–0.27	–0.18	–0.06	–	–	–	–	–	–
	2012	254	43	0.15	0.10	0.06	0.14	–0.14	–0.06	–0.36	–0.26	0.40

(table continues)

Table S12 *(Continued)*

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Russian	2000	186	46	–0.13	–0.05	–0.06	–	–	–	–	–	–
Federation	2003	299	35	–0.05	0.19	0.01	0.54	0.00	–	–	–	–
	2012	262	49	0.20	0.40	0.14	0.34	–0.18	–0.33	0.11	0.48	0.59
Serbia	2012	234	38	–0.38	0.14	–0.06	0.28	0.01	–0.01	–0.32	0.06	0.16
Shanghai	2012	259	43	0.21	0.09	0.37	0.31	–0.35	–0.33	–0.07	0.15	0.09
Singapore	2012	277	45	0.28	0.27	0.27	0.33	–0.29	–0.03	0.07	0.20	0.09
Slovak Republic	2003	367	31	0.13	0.41	0.06	0.31	–0.10	–	–	–	–
	2012	234	32	0.20	0.37	0.09	0.30	–0.08	–0.02	–0.12	0.36	0.51
Slovenia	2012	296	40	–0.11	–0.12	–0.12	0.21	0.02	–0.09	–0.40	–0.10	0.22
Spain	2003	540	36	0.03	0.15	0.13	0.22	–0.12	–	–	–	–
	2012	1266	34	0.07	0.40	0.21	0.17	–0.21	0.04	–0.33	0.01	0.35
Sweden	2000	122	43	0.31	0.62	0.21	–	–	–	–	–	–
	2003	231	40	0.17	0.35	0.26	0.19	–0.31	–	–	–	–
	2012	237	44	0.27	0.31	0.30	0.34	–0.19	–0.34	–0.06	–0.08	0.36
Switzerland	2000	168	37	0.12	0.34	0.27	–	–	–	–	–	–
	2003	421	31	0.41	0.64	0.41	0.48	–0.19	–	–	–	–
	2012	561	40	0.55	0.49	0.51	0.46	–0.41	–0.26	–0.11	0.25	0.60
Thailand	2000	148	55	0.07	0.00	0.06	–	–	–	–	–	–
	2003	262	53	0.04	–0.09	0.12	0.13	–0.07	–	–	–	–
	2012	330	57	0.05	–0.06	–0.02	0.02	0.00	0.02	–0.24	0.08	0.05

(table continues)

Table S12 *(Continued)*

Country	Cycle	*N*	%F	INT	INSTMOT	SC	SELFEFF	ANX	FAIL	WKETH	SUBNOR	INTEN
Tunisia	2003	236	38	0.18	0.22	0.14	0.33	–0.29	–	–	–	–
	2012	220	47	0.11	0.14	0.12	0.23	–0.24	–0.01	–0.09	–0.21	0.29
Turkey	2003	243	30	–0.08	–0.03	–0.01	0.11	0.04	–	–	–	–
	2012	242	31	–0.01	0.22	0.10	0.22	–0.01	0.02	0.01	–0.10	–0.06
United Arab Emirates	2012	575	40	0.13	0.27	0.22	0.27	–0.10	–0.30	0.09	0.06	0.22
United Kingdom	2000	256	39	–0.57	–0.03	–0.27	–	–	–	–	–	–
	2003	477	43	0.09	0.22	0.22	0.47	–0.17	–	–	–	–
	2012	633	44	–0.20	0.06	0.17	0.39	–0.23	–0.12	–0.31	–0.04	0.14
United States	2000	107	42	–0.06	0.16	–0.06	–	–	–	–	–	–
	2003	273	38	0.21	0.23	0.30	0.28	–0.26	–	–	–	–
	2012	249	42	–0.03	–0.04	0.19	0.17	–0.29	–0.08	–0.24	–0.22	0.15
Uruguay	2003	292	36	–0.19	0.07	–0.10	0.29	0.05	–	–	–	–
	2012	266	37	0.06	–0.10	0.21	0.30	–0.26	–0.31	–0.14	0.05	–0.02
Viet Nam	2012	248	40	0.28	0.11	0.27	0.24	–0.21	–0.23	0.18	–0.06	0.26
Yugoslavia	2003	220	34	–0.19	0.23	–0.21	0.24	–0.01	–	–	–	–

Note. INT = math Interest; INSTMOT = instrumental motivation in mathematics; SC = math self–concept; SELFEFF = math self–efficacy; ANX = math anxiety; FAIL = self–responsibility of failing in mathematics; WKETH = mathematics work ethics; SUBNOR = subjective norms in mathematics; INTEN = future–oriented mathematics intentions. – Data were not obtained.

Table S13

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Effect Sizes (Cohen's d) for Gender Differences in Achievement Motivation in Reading in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

Country	Cycle	*N*	%F	JOYREAD	INTREA	SCVERB
Albania	2000	138	52	–0.47	–0.57	–0.85
	2009	230	50	–0.62	–	–
Argentina	2000	112	49	–0.65	–	–
	2009	239	40	–0.70	–	–
Australia	2000	142	34	–0.62	–0.32	–0.09
	2009	713	41	–0.59	–	–
Austria	2000	130	29	–0.91	–0.70	–0.61
	2009	330	32	–1.21	–	–
Azerbaijan	2009	235	44	–0.19	–	–
Belgium	2000	188	31	–0.73	–0.62	–0.15
	2009	425	33	–0.63	–	–
Brazil	2000	134	34	–0.81	–0.53	–0.39
	2009	1006	41	–0.83	–	–
Bulgaria	2000	131	40	–0.55	–0.49	–0.70
	2009	225	45	–0.78	–	–
Canada	2000	816	38	–0.66	–	–
	2009	1160	39	–0.80	–	–
Chile	2000	136	43	–0.59	–0.14	–0.29
	2009	283	34	–0.56	–	–
Chinese Taipei	2009	292	45	–0.59	–	–
Colombia	2009	396	26	–0.42	–	–
Costa Rica	2009	229	32	–0.75	–	–
Croatia	2009	250	35	–0.88	–	–
Czech Republic	2000	153	35	–0.72	–0.84	–0.44
	2009	303	37	–0.73	–	–
Denmark	2000	119	31	–0.69	–0.60	–0.24

(table continues)

Table S13 *(Continued)*

Country	Cycle	*N*	%F	JOYREAD	INTREA	SCVERB
Denmark	2009	296	39	–0.60	–	–
Estonia	2009	236	39	–1.00	–	–
Finland	2000	135	49	–0.44	–0.66	–0.45
	2009	290	40	–0.97	–	–
France	2000	129	35	–0.46	–	–
	2009	215	35	–0.44	–	–
Georgia	2009	232	45	–0.50	–	–
Germany	2000	140	37	–0.94	–0.73	–0.61
	2009	249	36	–1.05	–	–
Greece	2000	129	38	–0.83	–	–
	2009	248	35	–0.93	–	–
Hong Kong	2000	122	30	–0.26	–0.37	–0.54
	2009	242	32	–0.47	–	–
Hungary	2000	139	40	–0.71	–0.62	–0.48
	2009	230	35	–0.80	–	–
Iceland	2000	93	45	–0.52	–0.41	–0.11
	2009	182	42	–0.76	–	–
India	2009	241	48	–0.23	–	–
Indonesia	2000	204	45	–0.31	–	–
	2009	257	45	–0.38	–	–
Ireland	2000	106	38	–0.97	–0.89	–0.41
	2009	197	38	–0.84	–	–
Israel	2000	124	42	–0.79	–0.83	–0.05
	2009	288	37	–0.76	–	
Italy	2000	137	36	–0.59	–0.55	–0.47
	2009	1545	28	–0.69	–	–
Japan	2000	146	33	–0.61	–	–
	2009	304	34	–0.39	–	–

(table continues)

Table S13 *(Continued)*

Country	Cycle	*N*	%F	JOYREAD	INTREA	SCVERB
Jordan	2009	324	52	–0.50	–	–
Kazakhstan	2009	271	46	–0.58	–	–
Korea	2000	138	31	–0.31	–0.05	0.01
	2009	249	37	–0.21	–	–
Kyrgyzstan	2009	249	50	–0.58	–	–
Latvia	2000	106	44	–0.42	–0.32	–0.59
	2009	225	44	–0.77	–	–
Lithuania	2009	226	49	–1.24	–	–
Luxembourg	2000	97	31	–0.63	–0.60	–0.29
	2009	231	29	–0.97	–	–
Macao	2009	298	36	–0.48	–	–
Macedonia	2000	126	45	–0.36	–0.48	–0.52
Malaysia	2009	250	47	–0.51	–	–
Malta	2009	173	47	–0.84	–	–
Mauritius	2009	233	49	–0.79	–	–
Mexico	2000	125	31	–0.59	–0.41	–0.55
	2009	1912	36	–0.52	–	–
Miranda (Venezuela)	2009	145	41	–0.29	–	–
Montenegro	2009	241	36	–0.66	–	–
Netherlands	2000	69	36	–0.65	–0.96	–0.46
	2009	238	34	–0.76	–	–
New Zealand	2000	102	41	–0.52	–0.44	–0.31
	2009	232	33	–0.71	–	–
Norway	2000	113	34	–0.49	–0.62	–0.40
	2009	233	42	–0.68	–	–
Panama	2009	198	46	–0.52	–	–

(table continues)

Table S13 *(Continued)*

Country	Cycle	*N*	%F	JOYREAD	INTREA	SCVERB
Peru	2000	122	49	–0.44	–	–
	2009	299	37	–0.41	–	–
Poland	2000	99	34	–0.62	–	–
	2009	246	39	–1.21	–	–
Portugal	2000	126	37	–0.63	–0.70	–0.39
	2009	315	39	–0.59	–	–
Qatar	2009	454	41	–0.86	–	–
Republic of Moldova	2009	260	42	–0.70	–	–
Romania	2000	134	57	–0.45	–0.58	–0.43
	2009	239	40	–0.73	–	–
Russian Federation	2000	186	46	–0.38	–0.51	–0.51
	2009	265	45	–0.60	–	–
Serbia	2009	276	35	–0.71	–	–
Shanghai	2009	256	45	–0.33	–	–
Singapore	2009	264	44	–0.48	–	–
Slovak Republic	2009	228	40	–0.68	–	–
Slovenia	2009	308	43	–0.79	–	–
Spain	2000	168	31	–0.57	–	–
	2009	1294	34	–0.70	–	–
Sweden	2000	122	43	–0.72	–0.44	–0.56
	2009	228	46	–0.69	–	–
Switzerland	2000	168	37	–0.73	–0.53	–0.17
	2009	590	34	–0.88	–	–
Thailand	2000	148	55	–0.32	–0.18	–0.05
	2009	311	50	–0.59	–	–
Trinidad and Tobago	2009	239	54	–0.76	–	–
Tunisia	2009	248	35	–0.58	–	–

(table continues)

Table S13 *(Continued)*

Country	Cycle	*N*	$\%_F$	JOYREAD	INTREA	SCVERB
Turkey	2009	250	40	–0.85	–	–
United Arab Emirates	2009	543	40	–0.61	–	–
United Kingdom	2000	256	39	–0.46	–0.53	0.25
	2009	609	34	–0.64	–	–
United States	2000	107	42	–0.48	–0.47	–0.27
	2009	262	39	–0.74	–	–
Uruguay	2009	298	42	–0.68	–	–

Note. JOYREAD = enjoyment of reading; INTREA = interest in reading; SCVERB = verbal self–concept; – Data were not obtained.

Table S14

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Effect Sizes (Cohen's d) for Gender Differences in Achievement Motivation in Science in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

Country	Cycle	*N*	%F	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Algeria	2015	276	56	–	–	0.06	–	–0.09	–	–0.32
Argentina	2006	217	47	0.21	0.09	0.06	0.00	–0.13	–0.01	–0.12
Australia	2006	708	34	0.18	0.17	0.06	0.06	0.14	0.04	0.03
	2015	726	41	–	–	0.22	–	0.24	–	0.02
Austria	2006	246	29	0.25	0.40	0.15	0.13	0.16	0.20	0.15
	2015	350	28	–	–	0.21	–	0.45	–	0.12
Azerbaijan	2006	259	40	–0.06	0.10	0.25	–0.28	–0.12	–0.12	–0.17
Beijing–Shanghai–Jiangsu–Guangdong	2015	492	40	–	–	0.09	–	0.22	–	0.02
Belgium	2006	443	33	0.37	0.19	0.30	0.18	0.17	0.18	0.06
	2015	483	34	–	–	0.34	–	0.26	–	–0.08
Brazil	2006	465	41	0.17	0.02	–0.06	0.02	–0.01	–0.07	0.06
	2015	1157	41	–	–	0.05	–	–0.09	–	–0.13
Buenos Aires	2015	83	31	–	–	–0.10	–	0.06	–	0.12
Bulgaria	2006	225	41	–0.03	–0.05	–0.06	–0.17	–0.08	–0.19	–0.28
	2015	296	39	–	–	–0.18	–	–0.14	–	–0.12

(table continues)

Table S14 *(Continued)*

Country	Cycle	*N*	%F	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Canada	2006	1132	38	0.16	0.25	0.19	0.10	0.09	0.12	–0.03
	2015	1003	39	–	–	0.36	–	0.29	–	0.05
Chile	2006	262	25	–0.02	0.05	–0.06	–0.14	–0.13	–0.24	–0.08
	2015	353	37	–	–	0.10	–	–0.12	–	0.07
Chinese Taipei	2006	441	40	0.49	0.26	–0.09	0.46	0.38	0.28	0.39
	2015	385	43	–	–	0.09	–	0.21	–	0.06
Colombia	2006	224	39	0.00	–0.12	–0.13	–0.21	–0.10	–0.11	–0.05
	2015	590	43	–	–	–0.16	–	–0.09	–	0.04
Costa Rica	2015	343	36	–	–	–0.08	–	–0.17	–	–0.18
Croatia	2006	261	33	0.06	0.12	–0.12	–0.08	–0.08	0.04	0.02
	2015	290	39	–	–	0.13	–	–0.10	–	–0.15
Czech Republic	2006	297	36	0.05	0.31	0.18	–0.36	–0.20	–0.06	–0.19
	2015	345	38	–	–	0.27	–	–0.04	–	–0.16
Denmark	2006	227	45	0.13	–0.02	0.10	–0.27	–0.11	–0.16	–0.23
	2015	358	39	–	–	0.45	–	0.24	–	–0.01
Dominican Republic	2015	237	52	–	–	–0.08	–	0.04	–	0.04
Estonia	2006	243	40	0.33	0.22	0.09	–0.05	0.12	0.06	0.11
	2015	279	41	–	–	0.03	–	–0.02	–	–0.09
Finland	2006	236	36	0.29	0.32	0.22	–0.05	–0.07	–0.01	0.04

(table continues)

Table S14 *(Continued)*

Country	Cycle	*N*	%$_F$	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Finland	2015	294	42	–	–	0.20	–	0.22	–	0.17
France	2006	236	40	0.39	0.08	0.33	0.24	0.21	0.11	0.17
	2015	305	41	–	–	0.30	–	0.35	–	0.16
Georgia	2015	266	43	–	–	–0.33	–	–0.06	–	0.04
Germany	2006	245	33	0.44	0.42	0.09	0.40	0.45	0.40	0.30
	2015	325	33	–	–	0.19	–	0.29	–	0.14
Greece	2006	244	37	0.13	0.17	0.04	0.13	0.12	–0.02	0.19
	2015	277	40	–	–	0.16	–	–0.03	–	–0.02
Hong Kong	2006	232	34	0.54	0.01	0.13	0.22	0.22	0.11	0.10
	2015	268	43	–	–	0.11	–	0.21	–	0.06
Hungary	2006	224	35	0.20	0.24	0.04	0.09	0.00	0.10	0.04
	2015	283	41	–	–	0.12	–	0.14	–	0.15
Iceland	2006	189	46	0.28	0.31	0.35	0.18	0.06	0.05	–0.01
	2015	169	52	–	–	0.37	–	0.23	–	–0.11
Indonesia	2006	532	40	0.09	–0.19	–0.22	–0.25	–0.12	–0.12	–0.23
	2015	326	54	–	–	–0.08	–	–0.02	–	0.03
Ireland	2006	229	36	–0.08	0.05	0.09	–0.15	–0.06	–0.09	–0.28
	2015	287	30	–	–	0.15	–	0.04	–	–0.21
Israel	2006	229	35	0.17	0.11	0.24	0.04	–0.16	0.17	0.06
	2015	330	40	–	–	0.23	–	0.11	–	0.02

(table continues)

Table S14 *(Continued)*

Country	Cycle	*N*	%$_F$	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Italy	2006	1089	31	0.13	0.30	0.11	0.24	0.08	0.16	0.09
	2015	579	33	–	–	0.30	–	0.05	–	0.08
Japan	2006	298	33	0.58	0.35	0.04	0.24	0.38	0.20	–0.02
	2015	332	37	–	–	0.01	–	0.38	–	0.03
Jordan	2006	325	50	–0.06	–0.24	–0.37	–0.02	0.11	–0.05	–0.13
	2015	363	48	–	–	–0.34	–	0.00	–	0.04
Korea	2006	259	38	0.32	0.13	–0.06	0.26	0.19	0.12	0.29
	2015	279	40	–	–	–0.04	–	0.39	–	0.07
Kosovo	2015	241	35	–	–	–0.15	–	–0.20	–	–0.12
Kyrgyzstan	2006	295	43	0.10	0.10	0.20	0.23	0.17	0.08	0.16
Latvia	2006	236	42	0.24	0.04	0.18	0.16	0.17	0.02	0.06
	2015	243	40	–	–	–0.03	–	0.08	–	–0.14
Lebanon	2015	227	38	–	–	0.21	–	0.24	–	0.03
Lithuania	2006	237	45	0.19	0.08	–0.07	–0.05	–0.08	0.01	0.11
	2015	326	43	–	–	0.22	–	–0.08	–	0.02
Luxembourg	2006	228	33	0.24	0.06	0.14	0.19	0.18	0.02	0.10
	2015	265	36	–	–	0.31	–	0.13	–	0.00
Macao	2006	238	39	0.36	0.00	0.13	0.08	0.15	0.01	0.03
	2015	224	50	–	–	0.16	–	0.23	–	0.11

(table continues)

Table S14 *(Continued)*

Country	Cycle	*N*	%$_F$	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Macedonia	2015	266	46	–	–	–0.19	–	–0.20	–	–0.13
Malta	2015	182	40	–	–	–0.02	–	–0.15	–	–0.26
Mexico	2006	1549	40	0.06	–0.02	–0.03	–0.06	0.03	0.01	–0.07
	2015	378	38	–	–	–0.03	–	0.00	–	–0.18
Montenegro	2006	223	42	0.02	0.14	–0.15	0.14	0.18	0.12	0.22
	2015	283	42	–	–	–0.20	–	0.09	–	0.07
Netherlands	2006	244	37	0.48	0.32	0.20	0.22	0.19	0.30	0.01
	2015	269	42	–	–	0.11	–	0.32	–	0.10
New Zealand	2006	241	37	0.14	0.05	0.28	–0.01	0.07	–0.07	–0.09
	2015	226	39	–	–	0.19	–	–0.05	–	–0.13
Norway	2006	235	39	0.40	0.19	0.13	0.21	0.26	0.14	0.11
	2015	273	46	–	–	0.33	–	0.48	–	–0.06
Peru	2015	349	43	–	–	–0.07	–	–0.04	–	–0.04
Poland	2006	277	39	0.01	–0.01	0.07	–0.23	–0.18	–0.24	–0.12
	2015	224	35	–	–	–0.09	–	–0.42	–	–0.46
Portugal	2006	255	33	0.07	0.00	–0.09	–0.06	0.03	0.04	–0.18
	2015	366	35	–	–	0.06	–	0.12	–	–0.10
Qatar	2006	313	44	0.04	–0.05	0.05	0.07	0.07	–0.08	0.09
	2015	604	42	–	–	0.07	–	0.04	–	0.06

(table continues)

Table S14 *(Continued)*

Country	Cycle	*N*	%F	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Republic of Moldova	2015	266	45	–	–	0.12	–	–0.04	–	0.10
Romania	2006	256	38	0.13	–0.08	0.00	0.14	0.02	–0.05	0.11
	2015	244	47	–	–	0.10	–	–0.02	–	–0.02
Russian Federation	2006	290	43	–0.01	0.09	–0.11	0.09	0.04	0.04	0.16
	2015	302	42	–	–	0.14	–	–0.05	–	0.12
Serbia	2006	240	39	0.00	0.20	–0.18	0.12	0.08	0.17	0.14
Singapore	2015	306	38	–	–	0.28	–	0.05	–	0.18
Slovak Republic	2006	237	36	0.21	0.20	0.08	0.19	0.15	0.22	0.15
	2015	318	39	–	–	–0.03	–	0.05	–	–0.02
Slovenia	2006	330	37	0.23	0.21	0.07	0.11	–0.03	–0.02	0.15
	2015	320	39	–	–	0.15	–	0.12	–	0.11
Spain	2006	980	36	0.21	0.09	0.14	–0.03	–0.04	0.02	–0.10
	2015	337	32	–	–	0.27	–	0.12	–	0.19
Sweden	2006	222	44	0.35	0.27	0.46	0.36	0.37	0.26	0.22
	2015	273	42	–	–	0.37	–	0.34	–	0.01
Switzerland	2006	610	39	0.48	0.29	0.23	0.26	0.18	0.20	0.16
	2015	293	31	–	–	0.09	–	–0.05	–	–0.17
Thailand	2006	310	51	–0.02	0.01	–0.08	–0.11	0.14	0.03	–0.30
	2015	412	50	–	–	0.04	–	0.07	–	–0.04

(table continues)

Table S14 *(Continued)*

Country	Cycle	*N*	%$_F$	SCSCIE	GENSCIE	SCIEEFF	SCIEFUT	JOYSCIE	PERSCIE	INSTSCIE
Trinidad and Tobago	2015	235	52	–	–	–0.06	–	–0.16	–	0.18
Tunisia	2006	232	42	0.08	0.04	0.08	–0.18	0.04	–0.12	–0.18
	2015	269	47	–	–	–0.09	–	–0.07	–	–0.17
Turkey	2006	247	31	–0.02	–0.13	–0.15	–0.15	–0.08	–0.23	–0.21
	2015	295	45	–	–	–0.21	–	0.05	–	–0.21
United Arab Emirates	2015	708	39	–	–	–0.10	–	0.04	–	0.05
United Kingdom	2006	658	37	0.36	0.28	0.24	0.23	0.16	0.20	0.10
	2015	708	35	–	–	0.32	–	0.12	–	0.03
United States	2006	280	41	0.34	0.41	0.32	0.21	0.26	0.22	0.08
	2015	286	40	–	–	0.48	–	0.36	–	0.04
Uruguay	2006	242	36	–0.13	–0.04	0.01	–0.24	–0.30	–0.23	–0.13
	2015	303	37	–	–	–0.17	–	0.03	–	0.05
Viet Nam	2015	291	49	–	–	–0.04	–	0.11	–	0.06

Note. SCSCIE = science self–concept; GENSCIE = general value of science; SCIEEFF = science self–efficacy; SCIEFUT = future–oriented science motivation; JOYSCIE = enjoyment of science; PERSCIE = personal value of science; INSTSCIE = instrumental science motivation. – Data were not obtained.

Table S15

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Effect Sizes (Cohen's d) for Gender Differences in Interest in the Topics Motion and Forces, Physics, Energy Transformation, History of the Universe, and Chemistry in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

Country	Cycle	*N*	%F	Motion and forces	Physics	Energy transformation	History of the universe	Chemistry
Argentina	2006	217	47	–	0.13	–	–	–0.08
Australia	2006	708	34	–	0.53	–	–	0.03
	2015	726	41	0.72		0.48	0.27	–
Austria	2006	246	29	–	0.50	–	–	0.17
	2015	350	28	0.77		0.80	0.05	–
Azerbaijan	2006	259	40	–	0.06	–	–	–0.19
Beijing–Shanghai–Jiangsu–Guangdong	2015	492	40	0.51		0.50	0.14	–
Belgium	2006	443	33	–	0.33	–	–	0.12
	2015	483	34	0.45		0.39	0.16	–
Brazil	2006	465	41	–	0.28	–	–	–0.04
	2015	1157	41	0.50		0.42	0.06	–
Bulgaria	2006	225	41	–	0.27	–	–	–0.02
	2015	296	39	0.20		0.16	–0.01	–
Canada	2006	1132	38	–	0.44	–	–	0.04
	2015	1003	39	0.62		0.33	0.19	–

(table continues)

Table S15 *(Continued)*

Country	Cycle	*N*	%F	Motion and forces	Physics	Energy transformation	History of the universe	Chemistry
Chile	2006	262	25	–	0.38	–	–	–0.06
	2015	353	37	0.66		0.36	0.09	–
Chinese Taipei	2006	441	40	–	0.49	–	–	0.28
	2015	385	43	0.48		0.31	0.26	–
Colombia	2006	224	39	–	0.43	–	–	–0.20
	2015	590	43	0.26	–	0.09	0.05	–
Costa Rica	2015	343	36	0.37	–	0.33	0.16	–
Croatia	2006	261	33	–	0.61	–	–	–0.17
	2015	290	39	0.63	–	0.39	0.24	–
Czech Republic	2006	297	36	–	0.75	–	–	0.13
	2015	345	38	0.60	–	0.54	0.21	–
Denmark	2006	227	45	–	0.20	–	–	0.07
	2015	358	39	0.59	–	0.55	0.19	–
Dominican Republic	2015	237	52	0.42	–	0.28	–0.10	–
Estonia	2006	243	40	–	0.55	–	–	0.23
	2015	279	41	0.72	–	0.52	0.00	–
Finland	2006	236	36	–	0.68	–	–	0.44
	2015	294	42	0.76	–	0.73	0.24	–

(table continues)

Table S15 *(Continued)*

Country	Cycle	*N*	%F	Motion and forces	Physics	Energy transformation	History of the universe	Chemistry
France	2006	236	40	–	0.40	–	–	0.27
	2015	305	41	0.64	–	0.44	0.22	–
Germany	2006	245	33	–	0.65	–	–	0.21
	2015	325	33	0.66	–	0.47	0.42	–
Greece	2006	244	37	–	0.35	–	–	–0.16
	2015	277	40	0.32	–	0.26	0.09	–
Hong Kong	2006	232	34	–	0.40	–	–	0.25
	2015	268	43	0.45	–	0.36	0.24	–
Hungary	2006	224	35	–	0.39	–	–	0.09
	2015	283	41	0.66	–	0.48	0.18	–
Iceland	2006	189	46	–	0.36	–	–	0.47
	2015	169	52	0.54	–	0.49	0.06	–
Indonesia	2006	532	40	–	0.16	–	–	–0.10
Ireland	2006	229	36	–	0.36	–	–	–0.18
	2015	287	30	0.40	–	0.21	0.04	–
Israel	2006	229	35	–	0.44	–	–	–0.03
	2015	330	40	0.46	–	0.13	0.23	–
Italy	2006	1089	31	–	0.54	–	–	0.23
	2015	579	33	0.37	–	0.34	0.07	–

(table continues)

Table S15 *(Continued)*

Country	Cycle	*N*	%F	Motion and forces	Physics	Energy transformation	History of the universe	Chemistry
Japan	2006	298	33	–	0.40	–	–	0.17
	2015	332	37	0.60	–	0.43	0.20	–
Jordan	2006	325	50	–	0.24	–	–	–0.14
Korea	2006	259	38	–	0.47	–	–	0.11
	2015	279	40	0.58	–	0.40	0.11	–
Kyrgyzstan	2006	295	43	–	0.35	–	–	–0.06
Latvia	2006	236	42	–	0.56	–	–	0.06
	2015	243	40	0.72	–	0.27	–0.03	–
Lithuania	2006	237	45	–	0.49	–	–	–0.06
	2015	326	43	0.60	–	0.42	–0.08	–
Luxembourg	2006	228	33	–	0.43	–	–	0.23
	2015	265	36	0.51	–	0.39	0.13	–
Macao	2006	238	39	–	0.32	–	–	0.19
	2015	224	50	0.54	–	0.48	–0.03	–
Mexico	2006	1549	40	–	0.22	–	–	0.08
	2015	378	38	0.37	–	0.19	0.20	–
Montenegro	2006	223	42	–	0.21	–	–	0.08
	2015	283	42	0.26	–	0.16	–0.18	–
Netherlands	2006	244	37	–	0.34	–	–	0.23

(table continues)

Table S15 *(Continued)*

Country	Cycle	*N*	%F	Motion and forces	Physics	Energy transformation	History of the universe	Chemistry
Netherlands	2015	269	42	0.47	–	0.56	0.34	–
New Zealand	2006	241	37	–	0.60	–	–	0.10
	2015	226	39	0.48	–	0.26	0.10	–
Norway	2006	235	39	–	0.25	–	–	0.23
	2015	273	46	0.72	–	0.56	0.20	–
Peru	2015	349	43	0.47	–	0.29	0.01	–
Poland	2006	277	39	–	0.45	–	–	–0.04
	2015	224	35	0.57	–	0.18	0.40	–
Portugal	2006	255	33	–	0.44	–	–	–0.10
	2015	366	35	0.56	–	0.27	0.07	–
Qatar	2006	313	44	–	0.40	–	–	0.12
	2015	604	42	0.57	–	0.43	0.20	–
Romania	2006	256	38	–	0.18	–	–	–0.05
Russian Federation	2006	290	43	–	0.50	–	–	0.00
	2015	302	42	0.61	–	0.40	–0.08	–
Serbia	2006	240	39	–	0.48	–	–	–0.16
Singapore	2015	306	38	0.53	–	0.40	0.09	–
Slovak Republic	2006	237	36	–	0.80	–	–	0.00

(table continues)

Table S15 *(Continued)*

Country	Cycle	*N*	%F	Motion and forces	Physics	Energy transformation	History of the universe	Chemistry
Slovak Republic	2015	318	39	0.50	–	0.43	0.31	–
Slovenia	2006	330	37	–	0.68	–	–	0.10
	2015	320	39	0.83	–	0.66	0.24	–
Spain	2006	980	36	–	0.23	–	–	–0.15
	2015	337	32	0.30	–	0.36	0.10	–
Sweden	2006	222	44	–	0.51	–	–	0.30
	2015	273	42	0.76	–	0.49	–0.05	–
Switzerland	2006	610	39	–	0.60	–	–	0.24
	2015	293	31	0.36	–	0.34	–0.01	–
Thailand	2006	310	51	–	–0.01	–	–	–0.10
	2015	412	50	0.44	–	0.45	0.23	–
Tunisia	2006	232	42	–	0.00	–	–	–0.15
	2015	269	47	0.37	–	0.15	0.10	–
Turkey	2006	247	31	–	0.06	–	–	0.02
	2015	295	45	0.56	–	0.27	0.13	–
United Arab Emirates	2015	708	39	0.61	–	0.49	0.17	–
United Kingdom	2006	658	37	–	0.58	–	–	0.12
	2015	708	35	0.67	–	0.43	0.14	–

Note. – Data were not obtained.

Table S16

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Effect Sizes (Cohen's d) for Gender Differences in Interest in the Topics Geology, Astronomy, Biosphere, Plant Biology, Diseases, and Human Biology in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

Country	Cycle	*N*	%F	Geology	Astronomy	Biosphere	Plant biology	Disease	Human biology
Argentina	2006	217	47	–0.11	–0.12	–	–0.32	–	–0.53
Australia	2006	708	34	0.00	0.09	–	–0.33	–	–0.45
	2015	726	41	–	–	–0.06	–	–0.32	–
Austria	2006	246	29	0.06	–0.22	–	–0.35	–	–0.47
	2015	350	28	–	–	–0.31	–	–0.45	–
Azerbaijan	2006	259	40	0.10	0.21	–	–0.30	–	–0.12
Beijing–Shanghai–Jiangsu–Guangdong	2015	492	40	–	–	–0.14	–	–0.40	–
Belgium	2006	443	33	0.26	–0.10	–	–0.23	–	–0.57
	2015	483	34	–	–	–0.14	–	–0.35	–
Brazil	2006	465	41	–0.02	–0.02	–	–0.22	–	–0.47
	2015	1157	41	–	–	–0.16	–	–0.15	–
Bulgaria	2006	225	41	–0.11	–0.31	–	–0.73	–	–0.50
	2015	296	39	–	–	–0.07	–	–0.37	–
Canada	2006	1132	38	0.12	–0.01	–	–0.25	–	–0.58
	2015	1003	39	–	–	–0.05	–	–0.32	–
Chile	2006	262	25	–0.18	–0.13	–	–0.45	–	–0.44
	2015	353	37	–	–	0.08	–	–0.11	–

(table continues)

Table S16 *(Continued)*

Country	Cycle	*N*	$\%_F$	Geology	Astronomy	Biosphere	Plant biology	Disease	Human biology
Chinese Taipei	2006	441	40	–0.12	–0.21	–	–0.33	–	–0.36
	2015	385	43	–	–	–0.12	–	–0.17	–
Colombia	2006	224	39	0.13	0.06	–	–0.12	–	–0.15
	2015	590	43	–	–	0.02	–	–0.20	–
Costa Rica	2015	343	36	–	–	–0.16	–	–0.33	–
Croatia	2006	261	33	0.20	–0.05	–	–0.40	–	–0.47
	2015	290	39	–	–	–0.21	–	–0.39	–
Czech Republic	2006	297	36	–0.04	–0.08	–	–0.74	–	–0.79
	2015	345	38	–	–	–0.25	–	–0.33	–
Denmark	2006	227	45	–0.13	–0.21	–	–0.29	–	–0.49
	2015	358	39	–	–	0.07	–	–0.18	–
Dominican Republic	2015	237	52	–	–	–0.02	–	–0.25	–
Estonia	2006	243	40	–0.03	–0.13	–	–0.13	–	–0.27
	2015	279	41	–	–	–0.26	–	–0.61	–
Finland	2006	236	36	–0.09	–0.07	–	–0.42	–	–0.48
	2015	294	42	–	–	0.04	–	–0.28	–
France	2006	236	40	0.14	0.14	–	–0.23	–	–0.40
	2015	305	41	–	–	–0.12	–	–0.39	–
Germany	2006	245	33	0.11	–0.05	–	–0.40	–	–0.57
	2015	325	33	–	–	–0.34	–	–0.26	–

(table continues)

Table S16 *(Continued)*

Country	Cycle	*N*	$\%_F$	Geology	Astronomy	Biosphere	Plant biology	Disease	Human biology
Greece	2006	244	37	0.01	–0.17	–	–0.27	–	–0.45
	2015	277	40	–	–	–0.04	–	–0.32	–
Hong Kong	2006	232	34	–0.02	0.01	–	–0.15	–	–0.46
	2015	268	43	–	–	–0.17	–	–0.12	–
Hungary	2006	224	35	0.11	–0.02	–	–0.28	–	–0.52
	2015	283	41	–	–	–0.08	–	–0.32	–
Iceland	2006	189	46	–0.11	0.01	–	–0.35	–	–0.47
	2015	169	52	–	–	–0.23	–	–0.34	–
Indonesia	2006	532	40	0.15	0.08	–	–0.39	–	–0.39
Ireland	2006	229	36	0.10	–0.08	–	–0.34	–	–0.51
	2015	287	30	–	–	–0.32	–	–0.46	–
Israel	2006	229	35	0.09	–0.06	–	–0.37	–	–0.46
	2015	330	40	–	–	0.03	–	–0.42	–
Italy	2006	1089	31	0.11	–0.13	–	–0.14	–	–0.44
	2015	579	33	–	–	–0.12	–	–0.24	–
Japan	2006	298	33	0.14	–0.02	–	–0.45	–	–0.35
	2015	332	37	–	–	–0.09	–	–0.23	–
Jordan	2006	325	50	–0.17	–0.28	–	–0.25	–	–0.17
Korea	2006	259	38	–	–	–0.16	–	–0.31	–
	2015	279	40	–	–	–0.13	–	–0.32	–

(table continues)

Table S16 *(Continued)*

Country	Cycle	*N*	$\%_F$	Geology	Astronomy	Biosphere	Plant biology	Disease	Human biology
Kyrgyzstan	2006	295	43	0.07	–0.17	–	–0.12	–	–0.17
Latvia	2006	236	42	–0.03	–0.31	–	–0.11	–	–0.39
	2015	243	40	–	–	–0.10	–	–0.30	–
Lithuania	2006	237	45	–0.07	0.03	–	–0.44	–	–0.39
	2015	326	43	–	–	–0.16	–	–0.35	–
Luxembourg	2006	228	33	0.22	0.05	–	–0.27	–	–0.56
	2015	265	36	–	–	–0.13	–	–0.53	–
Macao	2006	238	39	0.29	–0.05	–	–0.10	–	–0.31
	2015	224	50	–	–	0.01	–	–0.26	–
Mexico	2006	1549	40	–0.07	–0.08	–	–0.14	–	–0.27
	2015	378	38	–	–	0.01	–	–0.09	–
Montenegro	2006	223	42	0.27	0.06	–	–0.09	–	–0.31
	2015	283	42	–	–	–0.37	–	–0.38	–
Netherlands	2006	244	37	0.29	0.02	–	–0.45	–	–0.75
	2015	269	42	–	–	–0.05	–	–0.59	–
New Zealand	2006	241	37	–0.03	0.14	–	–0.35	–	–0.55
	2015	226	39	–	–	–0.34	–	–0.61	–
Norway	2006	235	39	–0.01	0.06	–	–0.25	–	–0.33
	2015	273	46	–	–	–0.07	–	–0.35	–

(table continues)

Table S16 *(Continued)*

Country	Cycle	*N*	$\%_F$	Geology	Astronomy	Biosphere	Plant biology	Disease	Human biology
Peru	2015	349	43	–	–	–0.14	–	–0.05	–
Poland	2006	277	39	–0.05	0.03	–	–0.46	–	–0.56
	2015	224	35	–	–	–0.43	–	–0.51	–
Portugal	2006	255	33	–0.06	0.19	–	–0.36	–	–0.60
	2015	366	35	–	–	–0.07	–	–0.30	–
Qatar	2006	313	44	0.07	0.00	–	–0.15	–	–0.30
	2015	604	42	–	–	–0.14	–	–0.32	–
Romania	2006	256	38	–0.05	–0.16	–	–0.48	–	–0.45
Russian Federation	2006	290	43	–0.02	–0.15	–	–0.36	–	–0.41
	2015	302	42	–	–	–0.04	–	–0.21	–
Serbia	2006	240	39	0.08	–0.08	–	–0.39	–	–0.48
Singapore	2015	306	38	–	–	–0.26	–	–0.06	–
Slovak Republic	2006	237	36	–0.01	0.10	–	–0.45	–	–0.58
	2015	318	39	–	–	–0.10	–	–0.28	–
Slovenia	2006	330	37	0.06	0.04	–	–0.40	–	–0.62
	2015	320	39	–	–	–0.04	–	–0.31	–
Spain	2006	980	36	–0.04	–0.13	–	–0.40	–	–0.62
	2015	337	32	–	–	0.00	–	–0.29	–
Sweden	2006	222	44	0.08	–0.12	–	–0.38	–	–0.53

(table continues)

Table S16 *(Continued)*

Country	Cycle	*N*	$\%_F$	Geology	Astronomy	Biosphere	Plant biology	Disease	Human biology
Sweden	2015	273	42	–	–	–0.26	–	–0.44	–
Switzerland	2006	610	39	0.06	0.02	–	–0.42	–	–0.70
	2015	293	31	–	–	–0.19	–	–0.63	–
Thailand	2006	310	51	0.15	–0.12	–	–0.27	–	–0.45
	2015	412	50	–	–	–0.08	–	–0.36	–
Tunisia	2006	232	42	0.22	0.03	–	–0.08	–	–0.26
	2015	269	47	–	–	–0.05	–	–0.24	–
Turkey	2006	247	31	0.10	–0.05	–	–0.14	–	–0.18
	2015	295	45	–	–	–0.02	–	–0.27	–
United Arab Emirates	2015	708	39	–	–	–0.06	–	–0.34	–
United Kingdom	2006	658	37	0.08	0.13	–	–0.27	–	–0.53
	2015	708	35	–	–	–0.08	–	–0.25	–
United States	2006	280	41	0.09	0.13	–	0.01	–	–0.25
	2015	286	40	–	–	–0.05	–	–0.26	–
Uruguay	2006	242	36	0.02	0.16	–	–0.27	–	–0.52
	2015	303	37	–	–	0.01	–	–0.27	–

Note. – Data were not obtained.

Table S17

Unweighted Mean Achievement Differences (Profile Scores) between Mathematics and Reading Scores (Math–Reading Profile), Mathematics and Science Scores (Math–Science Profile), and Science and Reading Scores (Science–Reading Profile) for Female and Male Students in the Top 5% of Mathematics

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Albania	2000	138	52	81.57	106.56	56	48	90.71	90.90	56	48	–11.11	16.07
	2009	230	50	11.89	50.11	230	50	20.84	35.75	230	50	–8.95	14.36
	2012	237	46	18.17	21.64	237	46	27.98	27.86	237	46	–9.82	–6.22
	2015	261	50	17.31	54.70	261	50	14.20	23.32	261	50	3.11	31.38
Algeria	2015	276	56	34.64	65.26	276	56	–0.18	8.77	276	56	34.81	56.48
Argentina	2000	112	49	25.98	56.71	44	48	60.33	57.20	44	48	–36.83	6.29
	2006	217	47	32.56	67.79	217	47	26.12	44.34	217	47	6.45	23.46
	2009	239	40	–10.74	24.23	239	40	–4.88	3.56	239	40	–5.86	20.68
	2012	295	37	–28.97	23.60	295	37	–13.04	5.80	295	37	–15.93	17.80
Australia	2000	142	34	7.36	38.01	56	38	21.66	24.86	56	38	–35.30	–5.82
	2003	628	38	30.33	66.84	628	38	23.33	21.84	628	38	7.00	44.99
	2006	708	34	10.68	54.97	708	34	–8.53	6.18	708	34	19.21	48.79
	2009	713	41	8.09	42.63	713	41	–5.74	–2.56	713	41	13.83	45.19
	2012	724	37	3.06	39.35	724	37	–2.90	1.66	724	37	5.96	37.69
	2015	726	41	–3.55	26.65	726	41	–12.29	–15.62	726	41	8.74	42.27
Austria	2000	130	29	22.05	69.50	54	30	36.62	53.73	54	30	–27.89	5.74
	2003	230	35	35.78	75.43	230	35	36.96	42.64	230	35	–1.18	32.79
	2006	246	29	30.11	73.00	246	29	18.70	23.92	246	29	11.41	49.07
	2009	330	32	33.70	90.42	330	32	10.76	19.46	330	32	22.94	70.95
	2012	238	29	35.13	72.98	238	29	25.34	21.63	238	29	9.79	51.35
	2015	350	28	8.98	57.68	350	28	5.24	12.51	350	28	3.73	45.17

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Azerbaijan	2006	259	40	181.26	149.49	259	40	124.54	99.29	259	40	56.72	50.19
	2009	235	44	128.64	135.45	235	44	114.44	119.86	235	44	14.20	15.59
Beijing–Shanghai–Jiangsu–Guangdong	2015	492	40	51.50	75.67	492	40	33.49	32.53	492	40	18.00	43.14
Belgium	2000	188	31	26.01	57.88	77	31	47.62	59.58	77	31	–39.73	–23.45
	2003	440	33	63.31	95.81	440	33	64.40	66.61	440	33	–1.08	29.21
	2006	443	33	46.24	78.65	443	33	42.93	43.04	443	33	3.32	35.60
	2009	425	33	34.22	66.49	425	33	39.44	43.19	425	33	–5.22	23.29
	2012	430	38	29.15	65.54	430	38	42.16	39.87	430	38	–13.01	25.68
	2015	483	34	21.90	45.77	483	34	15.62	14.22	483	34	6.29	31.55
Brazil	2000	134	34	–26.49	11.87	53	34	8.73	44.26	53	34	–41.14	–30.68
	2003	222	38	14.84	39.15	222	38	21.74	29.89	222	38	–6.90	9.26
	2006	465	41	–4.66	28.05	465	41	12.06	13.57	465	41	–16.72	14.49
	2009	1006	41	–38.55	0.82	1006	41	–12.11	–1.40	1006	41	–26.44	2.22
	2012	960	37	–9.38	26.45	960	37	3.53	17.76	960	37	–12.91	8.69
	2015	1157	41	–24.44	4.16	1157	41	–11.78	–6.96	1157	41	–12.66	11.11
Buenos Aires	2015	83	31	–2.80	33.59	83	31	4.14	9.73	83	31	–6.94	23.85
Bulgaria	2000	131	40	34.00	68.27	52	31	30.51	48.84	52	31	–12.40	14.79
	2006	225	41	27.76	66.69	225	41	–3.84	5.27	225	41	31.60	61.42
	2009	225	45	8.70	49.81	225	45	17.68	21.64	225	45	–8.99	28.18

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Bulgaria	2012	264	42	–12.29	38.83	264	42	4.33	15.19	264	42	–16.62	23.65
	2015	296	39	4.89	36.78	296	39	2.25	8.06	296	39	2.64	28.71
Canada	2000	816	38	2.00	36.77	328	38	25.27	29.81	328	38	–36.99	–5.65
	2003	1361	38	34.54	64.04	1361	38	31.90	26.78	1361	38	2.64	37.26
	2006	1132	38	15.68	47.47	1132	38	10.91	12.69	1132	38	4.77	34.78
	2009	1160	39	9.36	53.87	1160	39	16.38	27.85	1160	39	–7.01	26.02
	2012	1077	39	5.83	46.06	1077	39	13.68	18.76	1077	39	–7.86	27.30
	2015	1003	39	0.61	30.21	1003	39	–5.99	–1.46	1003	39	6.59	31.68
Chile	2000	136	43	–7.52	21.11	55	37	15.39	13.58	55	37	–31.86	–3.40
	2006	262	25	–21.18	12.94	262	25	–13.62	–2.78	262	25	–7.55	15.71
	2009	283	34	–16.09	18.33	283	34	–4.91	5.54	283	34	–11.18	12.79
	2012	343	31	16.56	50.17	343	31	5.90	14.71	343	31	10.67	35.47
	2015	353	37	–14.93	8.73	353	37	–2.98	–9.42	353	37	–11.95	18.16
Chinese	2006	441	40	110.19	138.61	441	40	58.54	61.44	441	40	51.65	77.17
Taipei	2009	292	45	101.33	132.64	292	45	85.03	82.90	292	45	16.30	49.74
	2012	302	45	93.02	121.02	302	45	108.37	112.08	302	45	–15.34	8.94
	2015	385	43	77.93	103.84	385	43	30.04	31.99	385	43	47.89	71.85
Colombia	2006	224	39	25.95	55.60	224	39	47.21	39.35	224	39	–21.26	16.25
	2009	396	26	–33.95	1.47	396	26	–12.51	1.53	396	26	–21.45	–0.05
	2012	454	30	–24.66	10.46	454	30	0.95	2.74	454	30	–25.62	7.72
	2015	590	43	–43.29	–17.69	590	43	–24.96	–24.40	590	43	–18.33	6.70
Costa Rica	2009	229	32	–33.19	–4.27	229	32	–8.11	–5.20	229	32	–25.08	0.92
	2012	230	33	–24.23	12.14	230	33	1.37	9.04	230	33	–25.60	3.10
	2015	343	36	–36.60	–1.63	343	36	–7.35	–8.41	343	36	–29.25	6.78

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Croatia	2006	261	33	–3.16	52.83	261	33	–19.31	–4.24	261	33	16.14	57.07
	2009	250	35	4.29	53.71	250	35	–6.99	8.35	250	35	11.28	45.36
	2012	250	33	4.62	54.68	250	33	15.70	20.47	250	33	–11.08	34.21
	2015	290	39	–8.39	22.23	290	39	2.61	0.86	290	39	–11.01	21.36
Czech Republic	2000	153	35	20.30	67.10	66	33	5.80	32.44	66	33	–1.05	21.09
	2003	316	37	66.12	98.04	316	37	26.44	26.43	316	37	39.68	71.61
	2006	297	36	49.86	95.82	297	36	36.04	39.12	297	36	13.82	56.70
	2009	303	37	39.06	82.68	303	37	14.93	24.66	303	37	24.12	58.02
	2012	266	41	33.71	71.97	266	41	29.43	31.71	266	41	4.28	40.26
	2015	345	38	5.61	35.81	345	38	3.00	2.71	345	38	2.61	33.10
Denmark	2000	119	31	11.54	40.97	48	34	68.15	38.86	48	34	–51.99	–4.54
	2003	211	41	73.82	104.41	211	41	69.47	61.12	211	41	4.35	43.30
	2006	227	45	34.30	71.19	227	45	24.51	25.77	227	45	9.80	45.42
	2009	296	39	31.60	69.54	296	39	25.89	18.15	296	39	5.71	51.39
	2012	374	43	13.03	43.04	374	43	9.96	2.25	374	43	3.06	40.80
	2015	358	39	18.73	43.48	358	39	8.20	4.68	358	39	10.53	38.81
Dominican Republic	2015	237	52	–52.21	–25.39	237	52	–4.06	–11.19	237	52	–48.15	–14.20
Estonia	2006	243	40	21.75	67.95	243	40	–4.64	–1.75	243	40	26.38	69.70
	2009	236	39	11.90	59.52	236	39	–4.64	10.15	236	39	16.54	49.38
	2012	239	43	13.84	58.22	239	43	2.98	7.36	239	43	10.86	50.85
	2015	279	41	3.09	37.78	279	41	–11.37	–15.63	279	41	14.46	53.41
Finland	2000	135	49	–2.21	44.73	54	40	29.42	35.82	54	40	–44.30	–5.02
	2003	290	39	40.46	82.86	290	39	19.52	28.60	290	39	20.94	54.27

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Finland	2006	236	36	14.89	67.13	236	36	1.15	5.49	236	36	13.75	61.64
	2009	290	40	13.26	64.64	290	40	–7.59	8.69	290	40	20.85	55.95
	2012	441	41	–8.51	42.39	441	41	–18.58	–12.78	441	41	10.07	55.18
	2015	294	42	–11.68	22.56	294	42	–27.41	–23.67	294	42	15.73	46.22
France	2000	129	35	33.91	69.10	52	36	37.01	56.64	52	36	–32.85	–10.50
	2003	215	38	47.35	83.46	215	38	13.60	15.93	215	38	33.75	67.53
	2006	236	40	56.08	78.86	236	40	24.70	18.49	236	40	31.38	60.37
	2009	215	35	9.64	56.05	215	35	22.06	25.44	215	35	–12.42	30.61
	2012	231	37	–5.40	31.90	231	37	18.84	23.45	231	37	–24.23	8.45
	2015	305	41	–12.02	16.88	305	41	1.84	3.85	305	41	–13.86	13.03
Georgia	2009	232	45	14.90	65.31	232	45	32.07	38.81	232	45	–17.17	26.51
	2015	266	43	3.73	43.55	266	43	20.87	27.04	266	43	–17.14	16.51
Germany	2000	140	37	14.16	52.30	57	39	35.49	45.56	57	39	–35.47	–2.07
	2003	231	37	45.33	72.71	231	37	19.36	17.48	231	37	25.97	55.23
	2006	245	33	13.19	68.90	245	33	7.73	19.59	245	33	5.45	49.31
	2009	249	36	35.06	83.34	249	36	12.20	14.36	249	36	22.86	68.99
	2012	250	35	20.33	64.96	250	35	8.17	17.56	250	35	12.16	47.40
	2015	325	33	4.80	30.23	325	33	–1.96	–8.07	325	33	6.76	38.30
Greece	2000	129	38	19.88	50.44	52	46	20.11	32.46	52	46	–3.76	20.01
	2003	231	32	21.47	54.21	231	32	18.10	13.33	231	32	3.37	40.89
	2006	244	37	35.54	74.83	244	37	24.54	28.50	244	37	10.99	46.33
	2009	248	35	–2.43	53.26	248	35	15.32	38.17	248	35	–17.74	15.09
	2012	256	36	1.73	35.05	256	36	9.98	22.00	256	36	–8.25	13.05
	2015	277	40	–2.91	26.18	277	40	5.49	9.32	277	40	–8.39	16.86

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Hong Kong	2000	122	30	68.31	91.24	48	24	63.31	77.33	48	24	–8.29	6.07
	2003	224	32	93.88	126.62	224	32	59.13	61.15	224	32	34.75	65.47
	2006	232	34	52.73	91.83	232	34	33.29	37.25	232	34	19.44	54.58
	2009	242	32	57.84	93.95	242	32	45.01	52.13	242	32	12.83	41.82
	2012	234	26	49.51	80.25	234	26	55.90	55.70	234	26	–6.38	24.55
	2015	268	43	52.44	77.11	268	43	57.56	57.28	268	43	–5.11	19.82
Hungary	2000	139	40	36.85	69.51	61	41	20.64	47.42	61	41	–2.52	16.48
	2003	238	35	55.96	87.71	238	35	24.07	32.86	238	35	31.89	54.85
	2006	224	35	36.10	76.74	224	35	19.85	24.09	224	35	16.26	52.65
	2009	230	35	13.60	53.82	230	35	14.48	24.92	230	35	–0.89	28.90
	2012	240	38	13.17	54.27	240	38	10.45	15.38	240	38	2.71	38.89
	2015	283	41	24.38	47.43	283	41	10.72	12.32	283	41	13.65	35.11
Iceland	2000	93	45	22.52	49.98	37	46	70.96	79.23	37	46	–46.80	–29.87
	2003	168	49	47.60	85.04	168	49	51.52	47.16	168	49	–3.92	37.88
	2006	189	46	36.32	69.89	189	46	27.54	26.32	189	46	8.79	43.57
	2009	182	42	16.35	58.17	182	42	25.95	22.03	182	42	–9.59	36.14
	2012	175	48	19.21	56.70	175	48	25.43	20.51	175	48	–6.22	36.19
	2015	169	52	13.56	53.56	169	52	35.05	29.17	169	52	–21.49	24.40
India	2009	241	48	6.36	39.62	241	48	21.13	24.43	241	48	–14.77	15.18
Indonesia	2000	204	45	43.00	77.56	81	41	25.02	32.56	81	41	15.73	51.77
	2003	538	48	28.92	52.17	538	48	24.34	31.19	538	48	4.58	20.98
	2006	532	40	19.22	47.05	532	40	32.95	34.95	532	40	–13.73	12.10
	2009	257	45	0.11	33.59	257	45	18.14	24.07	257	45	–18.03	9.52
	2012	281	44	2.21	28.66	281	44	28.56	32.56	281	44	–26.36	–3.90
	2015	326	54	30.79	55.50	326	54	21.69	27.25	326	54	9.10	28.24

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Ireland	2000	106	38	–23.07	12.19	42	33	–2.99	7.41	42	33	–29.29	–9.60
	2003	194	34	20.68	51.32	194	34	19.70	23.85	194	34	0.98	27.47
	2006	229	36	–14.28	22.71	229	36	–9.57	0.58	229	36	–4.71	22.13
	2009	197	38	–17.35	27.97	197	38	–33.52	–22.79	197	38	16.17	50.76
	2012	251	38	–14.30	18.09	251	38	–15.43	–8.04	251	38	1.13	26.12
	2015	287	30	–15.14	7.60	287	30	–5.19	–4.34	287	30	–9.95	11.95
Israel	2000	124	42	92.59	93.68	50	44	91.71	48.40	50	44	11.17	57.63
	2006	229	35	27.35	54.96	229	35	23.83	12.74	229	35	3.52	42.22
	2009	288	37	–15.94	24.09	288	37	14.46	19.35	288	37	–30.40	4.74
	2012	253	31	–13.45	31.04	253	31	10.18	17.75	253	31	–23.63	13.29
	2015	330	40	–4.27	18.50	330	40	4.76	8.01	330	40	–9.03	10.49
Italy	2000	137	36	–18.53	27.29	55	36	30.71	20.82	55	36	–58.73	–3.97
	2003	582	31	37.87	85.99	582	31	19.48	24.23	582	31	18.39	61.76
	2006	1089	31	46.51	77.04	1089	31	24.78	28.32	1089	31	21.74	48.72
	2009	1545	28	20.54	60.30	1545	28	15.01	22.02	1545	28	5.53	38.28
	2012	1554	29	7.26	51.15	1554	29	14.95	24.81	1554	29	–7.70	26.34
	2015	579	33	38.89	60.52	579	33	39.94	38.84	579	33	–1.05	21.68
Japan	2000	146	33	52.65	92.11	58	36	35.53	50.45	58	36	7.54	32.72
	2003	235	32	76.12	98.94	235	32	21.06	13.55	235	32	55.05	85.39
	2006	298	33	34.46	70.71	298	33	10.30	16.61	298	33	24.16	54.10
	2009	304	34	27.95	64.86	304	34	7.41	19.74	304	34	20.55	45.12
	2012	318	30	6.99	32.89	318	30	15.50	15.10	318	30	–8.52	17.79
	2015	332	37	40.69	56.02	332	37	13.00	4.27	332	37	27.69	51.74
Jordan	2006	325	50	11.61	39.00	325	50	–27.92	–13.40	325	50	39.53	52.40
	2009	324	52	–4.31	28.24	324	52	–17.12	–2.15	324	52	12.81	30.39

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Jordan	2012	352	52	–6.10	43.71	352	52	–11.37	11.74	352	52	5.28	31.97
	2015	363	48	–8.18	33.15	363	48	–9.94	10.30	363	48	1.76	22.84
Kazakhstan	2009	271	46	30.70	64.49	271	46	40.00	39.89	271	46	–9.30	24.60
	2012	290	47	76.72	102.39	290	47	50.07	49.51	290	47	26.65	52.88
Korea	2000	138	31	73.56	99.44	55	34	27.11	19.62	55	34	52.12	77.05
	2003	272	30	46.77	85.49	272	30	23.75	24.03	272	30	23.02	61.46
	2006	259	38	27.25	69.75	259	38	58.09	65.91	259	38	–30.85	3.84
	2009	249	37	46.06	77.72	249	37	52.54	50.17	249	37	–6.48	27.56
	2012	252	26	50.65	87.09	252	26	66.85	76.27	252	26	–16.19	10.81
	2015	279	40	33.34	68.96	279	40	30.95	35.87	279	40	2.39	33.09
Kosovo	2015	241	35	24.35	59.86	241	35	–3.12	10.57	241	35	27.47	49.29
Kyrgyzstan	2006	295	43	19.10	69.98	295	43	30.27	25.49	295	43	–11.17	44.49
	2009	249	50	–5.26	37.96	249	50	7.12	18.43	249	50	–12.38	19.53
Latvia	2000	106	44	42.35	85.66	42	43	48.86	77.60	42	43	–10.64	20.55
	2003	231	38	31.71	67.66	231	38	33.43	29.04	231	38	–1.72	38.62
	2006	236	42	16.65	65.47	236	42	16.12	20.03	236	42	0.52	45.44
	2009	225	44	17.66	54.77	225	44	18.39	18.00	225	44	–0.73	36.77
	2012	215	44	20.71	58.26	215	44	16.82	22.64	215	44	3.89	35.62
	2015	243	40	0.73	33.68	243	40	–5.43	–1.63	243	40	6.16	35.31
Lebanon	2015	227	38	31.36	62.67	227	38	32.39	49.58	227	38	–1.03	13.09
Lithuania	2006	237	45	30.26	83.24	237	45	8.42	23.87	237	45	21.85	59.37
	2009	226	49	21.63	68.95	226	49	11.32	17.15	226	49	10.31	51.80
	2012	231	38	16.80	64.47	231	38	13.48	18.82	231	38	3.32	45.65

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Lithuania	2015	326	43	16.02	42.37	326	43	4.06	7.20	326	43	11.96	35.17
Luxembourg	2000	97	31	9.54	47.88	39	31	–5.84	42.87	39	31	4.31	12.42
	2003	196	34	44.24	75.33	196	34	30.19	24.15	196	34	14.04	51.18
	2006	228	33	32.19	66.60	228	33	25.88	26.76	228	33	6.31	39.84
	2009	231	29	27.55	70.91	231	29	22.66	27.96	231	29	4.89	42.95
	2012	263	29	–4.59	41.34	263	29	9.49	12.66	263	29	–14.08	28.68
	2015	265	36	0.94	30.15	265	36	–0.78	2.17	265	36	1.72	27.98
Macao	2003	62	39	115.16	135.76	62	39	45.48	53.42	62	39	69.69	82.35
	2006	238	39	90.75	108.74	238	39	55.48	56.73	238	39	35.27	52.01
	2009	298	36	84.47	117.18	298	36	61.16	70.10	298	36	23.32	47.08
	2012	267	43	64.83	95.25	267	43	65.46	65.72	267	43	–0.63	29.53
	2015	224	50	55.43	69.54	224	50	31.85	25.01	224	50	23.58	44.52
Macedonia	2000	126	45	45.36	75.73	52	42	43.66	57.54	52	42	–1.65	17.64
	2015	266	46	42.57	70.18	266	46	25.97	35.04	266	46	16.60	35.14
Malaysia	2009	250	47	20.74	45.68	250	47	12.77	16.60	250	47	7.97	29.08
	2012	260	52	50.91	79.61	260	52	26.18	28.63	260	52	24.73	50.99
Malta	2009	173	47	11.84	75.58	173	47	–5.08	25.25	173	47	16.92	50.33
	2015	182	40	34.15	68.32	182	40	4.14	20.89	182	40	30.00	47.43
Mauritius	2009	233	49	27.13	63.70	233	49	14.65	25.83	233	49	12.48	37.88
Mexico	2000	125	31	–23.05	4.67	50	23	–2.96	–1.50	50	23	–14.01	2.55
	2003	1499	38	15.54	37.28	1499	38	23.98	18.60	1499	38	–8.43	18.68
	2006	1549	40	23.61	57.23	1549	40	24.16	29.08	1549	40	–0.56	28.15

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Mexico	2009	1912	36	–0.50	33.09	1912	36	26.82	31.00	1912	36	–27.32	2.09
	2012	1690	38	1.65	32.18	1690	38	33.32	35.39	1690	38	–31.66	–3.21
	2015	378	38	–3.81	17.63	378	38	13.78	8.57	378	38	–17.59	9.06
Miranda (Venezuela)	2009	145	41	–17.67	2.06	145	41	–11.97	–3.90	145	41	–5.70	5.96
Montenegro	2006	223	42	19.64	65.79	223	42	15.42	25.56	223	42	4.22	40.23
	2009	241	36	–13.99	44.29	241	36	6.97	29.73	241	36	–20.96	14.56
	2012	237	45	–11.65	39.50	237	45	11.88	23.36	237	45	–23.53	16.14
	2015	283	42	–1.20	27.20	283	42	22.63	21.00	283	42	–23.83	6.19
Netherlands	2000	69	36	35.85	71.46	28	34	21.76	31.08	28	34	4.59	13.84
	2003	200	43	58.79	75.43	200	43	30.38	22.67	200	43	28.41	52.77
	2006	244	37	42.13	72.66	244	37	14.98	21.12	244	37	27.15	51.54
	2009	238	34	27.55	59.68	238	34	10.42	22.81	238	34	17.13	36.87
	2012	223	38	26.51	56.66	223	38	10.08	21.91	223	38	16.43	34.75
	2015	269	42	5.58	29.45	269	42	3.35	–5.56	269	42	2.24	35.01
New Zealand	2000	102	41	14.49	49.70	40	37	39.85	35.51	40	37	–37.98	8.12
	2003	226	34	25.05	54.88	226	34	30.29	18.34	226	34	–5.24	36.54
	2006	241	37	18.89	58.00	241	37	–0.19	1.12	241	37	19.08	56.88
	2006	241	37	18.89	58.00	241	37	–0.19	1.12	241	37	19.08	56.88
	2009	232	33	–1.12	41.91	232	33	–2.96	–2.28	232	33	1.83	44.19
	2012	215	35	–9.97	35.64	215	35	1.98	6.58	215	35	–11.96	29.06
	2015	226	39	–9.27	20.89	226	39	–21.69	–19.25	226	39	12.42	40.14
Norway	2000	113	34	2.76	48.42	45	35	31.87	42.25	45	35	–29.87	15.73
	2003	203	39	13.47	56.07	203	39	28.19	26.18	203	39	–14.72	29.89

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Norway	2006	235	39	23.57	58.54	235	39	22.28	25.12	235	39	1.30	33.42
	2009	233	42	2.34	42.89	233	42	17.23	17.52	233	42	–14.89	25.38
	2012	234	45	–14.36	27.24	234	45	–0.29	4.26	234	45	–14.07	22.98
	2015	273	46	–16.99	20.86	273	46	–1.36	–6.21	273	46	–15.63	27.07
Panama	2009	198	46	–31.98	14.72	198	46	–14.02	11.15	198	46	–17.95	3.56
Perm	2012	88	31	29.20	70.40	88	31	50.81	45.37	88	31	–21.61	25.03
Peru	2000	122	49	16.65	49.17	49	50	64.82	59.60	49	50	–36.20	–2.62
	2009	299	37	1.08	33.84	299	37	25.34	29.36	299	37	–24.26	4.48
	2012	302	37	–19.43	25.15	302	37	33.60	45.05	302	37	–53.04	–19.90
	2015	349	43	–1.41	18.59	349	43	12.89	10.25	349	43	–14.31	8.34
Poland	2000	99	34	10.83	51.19	39	39	32.46	27.05	39	39	–30.42	22.66
	2003	219	36	22.82	59.96	219	36	9.02	9.83	219	36	13.81	50.13
	2006	277	39	0.22	38.53	277	39	13.72	17.53	277	39	–13.50	21.00
	2009	246	39	9.71	54.98	246	39	9.44	14.19	246	39	0.27	40.80
	2012	230	40	22.69	67.37	230	40	16.94	30.13	230	40	5.75	37.25
	2015	224	35	14.91	42.02	224	35	6.92	6.90	224	35	7.99	35.12
Portugal	2000	126	37	–5.49	24.59	51	41	40.09	53.48	51	41	–45.24	–27.68
	2003	230	34	28.60	62.38	230	34	30.03	29.65	230	34	–1.43	32.73
	2006	255	33	3.92	42.40	255	33	13.96	19.23	255	33	–10.03	23.17
	2009	315	39	26.40	63.34	315	39	29.55	36.07	315	39	–3.15	27.27
	2012	286	36	19.61	54.27	286	36	24.88	32.51	286	36	–5.27	21.76
	2015	366	35	22.43	44.69	366	35	11.18	9.78	366	35	11.25	34.91
Qatar	2006	313	44	–3.31	33.18	313	44	3.69	12.69	313	44	–7.00	20.49

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Qatar	2009	454	41	–16.71	17.15	454	41	–0.92	5.78	454	41	–15.79	11.37
	2012	548	43	–7.06	30.27	548	43	–4.98	9.77	548	43	–2.09	20.49
	2015	604	42	1.50	31.42	604	42	–6.68	–0.48	604	42	8.18	31.90
Republic of Moldova	2009	260	42	31.86	72.84	260	42	18.20	33.48	260	42	13.66	39.36
	2015	266	45	9.86	55.84	266	45	23.16	26.64	266	45	–13.30	29.20
Romania	2000	134	57	58.65	67.58	54	58	63.60	80.10	54	58	–24.24	–22.14
	2006	256	38	48.13	84.77	256	38	25.29	25.95	256	38	22.84	58.82
	2009	239	40	20.19	42.96	239	40	27.43	24.99	239	40	–7.24	17.96
	2012	254	43	24.79	57.93	254	43	39.84	38.35	254	43	–15.05	19.58
	2015	244	47	17.53	34.56	244	47	42.11	44.77	244	47	–24.58	–10.21
Russian Federation	2000	186	46	81.34	101.86	74	48	72.63	87.92	74	48	1.84	19.50
	2003	299	35	93.09	114.56	299	35	31.77	20.48	299	35	61.32	94.08
	2006	290	43	94.47	120.45	290	43	41.85	33.16	290	43	52.62	87.30
	2009	265	45	19.33	62.76	265	45	14.61	13.84	265	45	4.72	48.92
	2012	262	49	26.33	59.30	262	49	29.16	25.23	262	49	–2.82	34.07
	2015	302	42	23.66	49.18	302	42	27.28	23.19	302	42	–3.62	25.99
Serbia	2006	240	39	65.73	107.69	240	39	39.39	42.48	240	39	26.34	65.21
	2009	276	35	36.31	74.38	276	35	38.78	42.71	276	35	–2.47	31.66
	2012	234	38	14.57	58.99	234	38	32.53	40.97	234	38	–17.95	18.02
Shanghai	2009	256	45	99.39	137.02	256	45	92.79	89.11	256	45	6.60	47.92
	2012	259	43	86.92	112.44	259	43	85.67	87.24	259	43	1.25	25.19
Singapore	2009	264	44	63.43	96.15	264	44	48.50	44.63	264	44	14.93	51.52
	2012	277	45	47.78	77.61	277	45	43.35	33.31	277	45	4.43	44.30

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Singapore	2015	306	38	40.13	68.86	306	38	17.68	11.72	306	38	22.45	57.14
Slovak Republic	2003	367	31	66.02	104.24	367	31	27.10	23.61	367	31	38.91	80.63
	2006	237	36	35.92	84.53	237	36	26.46	31.44	237	36	9.46	53.09
	2009	228	40	48.77	97.07	228	40	40.85	40.81	228	40	7.93	56.26
	2012	234	32	34.09	76.14	234	32	30.78	32.53	234	32	3.31	43.62
	2015	318	39	19.74	52.30	318	39	20.77	17.64	318	39	–1.03	34.65
Slovenia	2006	330	37	42.11	83.02	330	37	–7.37	0.61	330	37	49.48	82.41
	2009	308	43	38.42	81.43	308	43	13.39	19.21	308	43	25.04	62.22
	2012	296	40	33.94	79.67	296	40	2.51	14.70	296	40	31.42	64.97
	2015	320	39	10.86	52.54	320	39	–7.69	2.62	320	39	18.55	49.92
Spain	2000	168	31	12.44	48.59	66	27	4.35	19.85	66	27	–7.46	12.72
	2003	540	36	45.75	81.82	540	36	26.20	35.99	540	36	19.55	45.83
	2006	980	36	63.55	96.01	980	36	21.72	20.34	980	36	41.83	75.67
	2009	1294	34	32.86	66.45	1294	34	36.94	38.37	1294	34	–4.08	28.08
	2012	1266	34	7.87	42.45	1266	34	10.22	19.50	1266	34	–2.35	22.96
	2015	337	32	7.96	35.24	337	32	0.24	0.72	337	32	7.72	34.53
Sweden	2000	122	43	12.23	55.36	48	43	44.24	43.14	48	43	–28.49	5.96
	2003	231	40	36.50	72.88	231	40	30.30	25.81	231	40	6.20	47.07
	2006	222	44	13.76	51.17	222	44	16.54	15.80	222	44	–2.78	35.36
	2009	228	46	12.74	49.95	228	46	16.14	10.38	228	46	–3.39	39.57
	2012	237	44	–11.64	29.45	237	44	5.69	6.82	237	44	–17.33	22.63
	2015	273	42	5.27	28.79	273	42	–4.83	–10.51	273	42	10.10	39.30
Switzerland	2000	168	37	51.73	81.54	69	43	78.05	53.63	69	43	–29.43	13.71
	2003	421	31	62.21	100.01	421	31	30.04	37.37	421	31	32.18	62.65

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
Switzerland	2006	610	39	60.32	95.23	610	39	34.29	43.20	610	39	26.04	52.04
	2009	590	34	59.04	105.88	590	34	45.86	53.47	590	34	13.18	52.41
	2012	561	40	38.51	75.78	561	40	44.79	44.27	561	40	–6.28	31.51
	2015	293	31	47.15	72.28	293	31	26.61	30.50	293	31	20.55	41.78
Thailand	2000	148	55	47.63	64.38	59	61	37.35	33.95	59	61	11.52	32.51
	2003	262	53	49.14	80.26	262	53	22.90	31.24	262	53	26.23	49.03
	2006	310	51	42.36	81.50	310	51	32.25	36.71	310	51	10.11	44.79
	2009	311	50	35.81	69.09	311	50	21.67	32.96	311	50	14.14	36.13
	2012	330	57	48.81	72.89	330	57	32.83	30.15	330	57	15.98	42.75
	2015	412	50	37.78	56.54	412	50	14.72	24.31	412	50	23.06	32.23
Trinidad and Tobago	2009	239	54	8.06	47.42	239	54	21.75	9.40	239	54	–13.69	38.02
	2015	235	52	–4.66	33.41	235	52	6.34	11.40	235	52	–10.99	22.00
Tunisia	2003	236	38	30.64	58.89	236	38	25.98	30.93	236	38	4.66	27.96
	2006	232	42	34.17	58.82	232	42	27.05	48.16	232	42	7.12	10.67
	2009	248	35	–17.61	22.97	248	35	–4.26	11.33	248	35	–13.35	11.64
	2012	220	47	18.81	44.45	220	47	36.47	39.31	220	47	–17.66	5.14
	2015	269	47	39.29	60.11	269	47	31.94	29.73	269	47	7.35	30.38
Turkey	2003	243	30	23.42	63.08	243	30	15.91	37.22	243	30	7.51	25.86
	2006	247	31	43.36	76.78	247	31	44.30	59.30	247	31	–0.94	17.48
	2009	250	40	32.35	75.37	250	40	42.71	60.42	250	40	–10.36	14.96
	2012	242	31	11.83	50.19	242	31	37.04	44.87	242	31	–25.21	5.32
	2015	295	45	3.95	39.26	295	45	6.25	18.26	295	45	–2.30	21.00
United Arab Emirates	2009	543	40	–0.75	35.79	543	40	–0.80	15.28	543	40	0.05	20.50
	2012	575	40	2.17	42.48	575	40	–4.91	13.05	575	40	7.08	29.42

(table continues)

Table S17 *(Continued)*

		Math–reading profile				Math–science profile				Reading–science profile			
Country	Cycle	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}	*N*	%F	PS_{female}	PS_{male}
United Arab Emirates	2015	708	39	–6.82	30.01	708	39	–15.41	3.11	708	39	8.60	26.90
United Kingdom	2000	256	39	–1.66	25.14	103	40	–8.42	8.65	103	40	–5.88	4.41
	2003	477	43	28.24	56.13	477	43	–0.34	–1.12	477	43	28.57	57.24
	2006	658	37	5.56	40.00	658	37	–21.53	–21.20	658	37	27.08	61.20
	2009	609	34	–3.49	25.55	609	34	–18.14	–16.97	609	34	14.65	42.52
	2012	633	44	0.68	33.47	633	44	–5.95	–8.99	633	44	6.63	42.46
	2015	708	35	1.63	37.09	708	35	–14.40	–7.88	708	35	16.03	44.96
United States	2000	107	42	–16.51	12.25	42	43	6.69	16.99	42	43	–20.83	–6.78
	2003	273	38	2.20	37.37	273	38	9.76	11.35	273	38	–7.56	26.03
	2006	280	41	–	–	280	41	–23.57	–15.00	280	41	–	–
	2009	262	39	–20.04	19.88	262	39	–10.34	–3.95	262	39	–9.71	23.83
	2012	249	42	–2.47	21.66	249	42	–3.52	–8.26	249	42	1.05	29.92
	2015	286	40	–23.60	–6.74	286	40	–30.49	–34.66	286	40	6.90	27.92
Uruguay	2003	292	36	31.68	56.85	292	36	56.30	34.72	292	36	–24.63	22.12
	2006	242	36	48.43	79.64	242	36	59.89	49.46	242	36	–11.46	30.18
	2009	298	42	14.91	54.12	298	42	20.68	29.59	298	42	–5.77	24.53
	2012	266	37	12.22	43.53	266	37	12.00	16.30	266	37	0.22	27.24
	2015	303	37	–25.52	9.82	303	37	–6.83	–0.68	303	37	–18.68	10.51
Viet Nam	2012	248	40	44.69	79.80	248	40	15.45	25.74	248	40	29.24	54.06
	2015	291	49	44.52	64.01	291	49	–8.63	–7.19	291	49	53.15	71.20
Yugoslavia	2003	220	34	75.71	106.63	220	34	47.35	50.69	220	34	28.36	55.94

Note. %F = percentage of female students; PS_{female} = female students' profile scores; PS_{male} = male students' profile scores. – Data were not obtained.

Table S18

Sample Sizes (N), Percentage of Female Students ($\%_F$), and Unweighted Percentage of Nonoverlap between Female and Male Students' Math–Reading, Math–Science, as well as Reading–Science Profiles in the Group of Top-Performing Math Students (Top 5%) by Country and PISA Cycle

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Albania	2000	138	52	31	56	48	21	56	48	35
	2009	230	50	42	230	50	28	230	50	30
	2012	237	46	18	237	46	17	237	46	17
	2015	261	50	35	261	50	16	261	50	32
Algeria	2015	276	56	32	276	56	19	276	56	26
Argentina	2000	112	49	40	44	48	23	44	48	43
	2006	217	47	38	217	47	30	217	47	26
	2009	239	40	43	239	40	23	239	40	36
	2012	295	37	46	295	37	26	295	37	31
Australia	2000	142	34	39	56	38	25	56	38	48
	2003	628	38	40	628	38	14	628	38	46
	2006	708	34	56	708	34	22	708	34	42
	2009	713	41	46	713	41	12	713	41	45
	2012	724	37	52	724	37	16	724	37	50
	2015	726	41	35	726	41	12	726	41	45
Austria	2000	130	29	56	54	30	40	54	30	61
	2003	230	35	44	230	35	18	230	35	43
	2006	246	29	49	246	29	22	246	29	47
	2009	330	32	60	330	32	20	330	32	65
	2012	238	29	55	238	29	19	238	29	56
	2015	350	28	48	350	28	16	350	28	51

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Azerbaijan	2006	259	40	16	259	40	16	259	40	23
	2009	235	44	22	235	44	13	235	44	16
Beijing-Shanghai-Jiangsu-Guangdong	2015	492	40	36	492	40	15	492	40	41
Belgium	2000	188	31	45	77	31	28	77	31	32
	2003	440	33	39	440	33	15	440	33	37
	2006	443	33	38	443	33	17	443	33	50
	2009	425	33	45	425	33	15	425	33	43
	2012	430	38	50	430	38	16	430	38	55
	2015	483	34	32	483	34	16	483	34	36
Brazil	2000	134	34	48	53	34	38	53	34	29
	2003	222	38	30	222	38	21	222	38	23
	2006	465	41	33	465	41	15	465	41	31
	2009	1006	41	51	1006	41	21	1006	41	43
	2012	960	37	51	960	37	26	960	37	37
	2015	1157	41	31	1157	41	13	1157	41	33
Buenos Aires	2015	83	31	44	83	31	25	83	31	38
Bulgaria	2000	131	40	34	52	31	27	52	31	37
	2006	225	41	36	225	41	21	225	41	34
	2009	225	45	46	225	45	17	225	45	44
	2012	264	42	55	264	42	23	264	42	50
	2015	296	39	35	296	39	24	296	39	38

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Canada	2000	816	38	42	328	38	15	328	38	48
	2003	1361	38	39	1361	38	10	1361	38	51
	2006	1132	38	39	1132	38	10	1132	38	39
	2009	1160	39	51	1160	39	12	1160	39	53
	2012	1077	39	46	1077	39	12	1077	39	45
	2015	1003	39	32	1003	39	13	1003	39	36
Chile	2000	136	43	43	55	37	30	55	37	38
	2006	262	25	37	262	25	28	262	25	25
	2009	283	34	49	283	34	25	283	34	36
	2012	343	31	48	343	31	17	343	31	37
	2015	353	37	31	353	37	20	353	37	42
Chinese	2006	441	40	39	441	40	15	441	40	39
Taipei	2009	292	45	45	292	45	14	292	45	53
	2012	302	45	45	302	45	20	302	45	45
	2015	385	43	33	385	43	16	385	43	37
Colombia	2006	224	39	28	224	39	15	224	39	32
	2009	396	26	46	396	26	28	396	26	33
	2012	454	30	47	454	30	13	454	30	42
	2015	590	43	34	590	43	14	590	43	43
Costa Rica	2009	229	32	43	229	32	20	229	32	36
	2012	230	33	48	230	33	19	230	33	37
	2015	343	36	39	343	36	14	343	36	50
Croatia	2006	261	33	62	261	33	27	261	33	54
	2009	250	35	60	250	35	32	250	35	51

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Croatia	2012	250	33	66	250	33	16	250	33	61
	2015	290	39	43	290	39	16	290	39	48
Czech Republic	2000	153	35	52	66	33	31	66	33	37
	2003	316	37	39	316	37	15	316	37	46
	2006	297	36	46	297	36	18	297	36	44
	2009	303	37	56	303	37	19	303	37	50
	2012	266	41	51	266	41	17	266	41	50
	2015	345	38	38	345	38	17	345	38	44
Denmark	2000	119	31	37	48	34	34	48	34	57
	2003	211	41	36	211	41	20	211	41	40
	2006	227	45	44	227	45	20	227	45	44
	2009	296	39	48	296	39	18	296	39	59
	2012	374	43	51	374	43	17	374	43	56
	2015	358	39	35	358	39	17	358	39	38
Dominican Republic	2015	237	52	37	237	52	20	237	52	51
Estonia	2006	243	40	62	243	40	12	243	40	57
	2009	236	39	61	236	39	22	236	39	51
	2012	239	43	60	239	43	16	239	43	53
	2015	279	41	44	279	41	16	279	41	53
Finland	2000	135	49	49	54	40	21	54	40	53
	2003	290	39	47	290	39	18	290	39	42
	2006	236	36	59	236	36	13	236	36	57
	2009	290	40	61	290	40	25	290	40	49

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Finland	2012	441	41	60	441	41	16	441	41	57
	2015	294	42	39	294	42	15	294	42	41
France	2000	129	35	38	52	36	37	52	36	31
	2003	215	38	45	215	38	15	215	38	41
	2006	236	40	28	236	40	20	236	40	37
	2009	215	35	55	215	35	20	215	35	57
	2012	231	37	49	231	37	18	231	37	43
	2015	305	41	35	305	41	15	305	41	39
Georgia	2009	232	45	52	232	45	18	232	45	46
	2015	266	43	43	266	43	19	266	43	31
Germany	2000	140	37	50	57	39	41	57	39	46
	2003	231	37	33	231	37	17	231	37	38
	2006	245	33	57	245	33	26	245	33	49
	2009	249	36	61	249	36	15	249	36	57
	2012	250	35	69	250	35	20	250	35	52
	2015	325	33	33	325	33	17	325	33	40
Greece	2000	129	38	36	52	46	39	52	46	37
	2003	231	32	34	231	32	16	231	32	34
	2006	244	37	40	244	37	13	244	37	41
	2009	248	35	54	248	35	27	248	35	42
	2012	256	36	40	256	36	20	256	36	30
	2015	277	40	36	277	40	16	277	40	36
Hong Kong	2000	122	30	34	48	24	35	48	24	29
	2003	224	32	45	224	32	21	224	32	39

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Hong Kong	2006	232	34	51	232	34	19	232	34	46
	2009	242	32	52	242	32	20	242	32	46
	2012	234	26	46	234	26	20	234	26	51
	2015	268	43	30	268	43	19	268	43	39
Hungary	2000	139	40	44	61	41	32	61	41	32
	2003	238	35	35	238	35	18	238	35	31
	2006	224	35	52	224	35	18	224	35	52
	2009	230	35	59	230	35	23	230	35	52
	2012	240	38	59	240	38	15	240	38	56
	2015	283	41	32	283	41	14	283	41	37
Iceland	2000	93	45	38	37	46	38	37	46	35
	2003	168	49	40	168	49	19	168	49	50
	2006	189	46	44	189	46	19	189	46	44
	2009	182	42	50	182	42	17	182	42	60
	2012	175	48	53	175	48	21	175	48	49
	2015	169	52	45	169	52	23	169	52	53
India	2009	241	48	47	241	48	24	241	48	38
Indonesia	2000	204	45	39	81	41	36	81	41	43
	2003	538	48	35	538	48	20	538	48	25
	2006	532	40	40	532	40	16	532	40	36
	2009	257	45	48	257	45	22	257	45	38
	2012	281	44	41	281	44	14	281	44	36
	2015	326	54	29	326	54	13	326	54	28
Ireland	2000	106	38	46	42	33	40	42	33	40

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Ireland	2003	194	34	41	194	34	19	194	34	34
	2006	229	36	47	229	36	17	229	36	42
	2009	197	38	56	197	38	24	197	38	49
	2012	251	38	51	251	38	15	251	38	45
	2015	287	30	33	287	30	19	287	30	37
Israel	2000	124	42	19	50	44	36	50	44	44
	2006	229	35	32	229	35	20	229	35	44
	2009	288	37	50	288	37	18	288	37	43
	2012	253	31	49	253	31	16	253	31	49
	2015	330	40	29	330	40	17	330	40	31
Italy	2000	137	36	53	55	36	37	55	36	55
	2003	582	31	51	582	31	15	582	31	43
	2006	1089	31	43	1089	31	16	1089	31	41
	2009	1545	28	52	1545	28	17	1545	28	45
	2012	1554	29	56	1554	29	19	1554	29	44
	2015	579	33	33	579	33	14	579	33	34
Japan	2000	146	33	51	58	36	27	58	36	38
	2003	235	32	26	235	32	15	235	32	33
	2006	298	33	35	298	33	18	298	33	35
	2009	304	34	45	304	34	24	304	34	40
	2012	318	30	34	318	30	17	318	30	35
	2015	332	37	23	332	37	19	332	37	34
Jordan	2006	325	50	28	325	50	23	325	50	18
	2009	324	52	44	324	52	23	324	52	26
	2012	352	52	60	352	52	29	352	52	42

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap
Jordan	2015	363	48	40	363	48	28	363	48	24
Kazakhstan	2009	271	46	35	271	46	17	271	46	43
	2012	290	47	31	290	47	12	290	47	39
Korea	2000	138	31	37	55	34	38	55	34	42
	2003	272	30	48	272	30	22	272	30	48
	2006	259	38	50	259	38	16	259	38	44
	2009	249	37	46	249	37	20	249	37	52
	2012	252	26	53	252	26	23	252	26	41
	2015	279	40	38	279	40	17	279	40	40
Kosovo	2015	241	35	43	241	35	30	241	35	31
Kyrgyzstan	2006	295	43	44	295	43	13	295	43	49
	2009	249	50	48	249	50	18	249	50	38
Latvia	2000	106	44	43	42	43	36	42	43	44
	2003	231	38	45	231	38	18	231	38	44
	2006	236	42	54	236	42	16	236	42	53
	2009	225	44	55	225	44	14	225	44	52
	2012	215	44	58	215	44	22	215	44	45
	2015	243	40	48	243	40	21	243	40	47
Lebanon	2015	227	38	32	227	38	22	227	38	22
Lithuania	2006	237	45	54	237	45	25	237	45	48
	2009	226	49	61	226	49	17	226	49	58
	2012	231	38	66	231	38	19	231	38	59

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap
Lithuania	2015	326	43	33	326	43	15	326	43	37
Luxembourg	2000	97	31	46	39	31	46	39	31	44
	2003	196	34	38	196	34	20	196	34	50
	2006	228	33	44	228	33	18	228	33	47
	2009	231	29	51	231	29	21	231	29	55
	2012	263	29	57	263	29	15	263	29	52
	2015	265	36	35	265	36	16	265	36	37
Macao	2003	62	39	27	62	39	32	62	39	29
	2006	238	39	23	238	39	15	238	39	22
	2009	298	36	38	298	36	20	298	36	33
	2012	267	43	44	267	43	15	267	43	48
	2015	224	50	20	224	50	21	224	50	37
Macedonia	2000	126	45	40	52	42	27	52	42	28
	2015	266	46	34	266	46	16	266	46	27
Malaysia	2009	250	47	34	250	47	14	250	47	32
	2012	260	52	44	260	52	13	260	52	39
Malta	2009	173	47	64	173	47	40	173	47	43
	2015	182	40	35	182	40	27	182	40	25
Mauritius	2009	233	49	51	233	49	30	233	49	38
Mexico	2000	125	31	39	50	23	33	50	23	32
	2003	1499	38	27	1499	38	11	1499	38	31
	2006	1549	40	37	1549	40	8	1549	40	37

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap
Mexico	2009	1912	36	50	1912	36	10	1912	36	43
	2012	1690	38	43	1690	38	7	1690	38	40
	2015	378	38	32	378	38	16	378	38	45
Miranda (Venezuela)	2009	145	41	31	145	41	21	145	41	25
Montenegro	2006	223	42	47	223	42	20	223	42	58
	2009	241	36	67	241	36	38	241	36	55
	2012	237	45	62	237	45	30	237	45	51
	2015	283	42	33	283	42	16	283	42	40
Netherlands	2000	69	36	46	28	34	37	28	34	39
	2003	200	43	32	200	43	17	200	43	40
	2006	244	37	44	244	37	13	244	37	36
	2009	238	34	47	238	34	19	238	34	43
	2012	223	38	44	223	38	22	223	38	35
	2015	269	42	35	269	42	19	269	42	45
New Zealand	2000	102	41	39	40	37	26	40	37	66
	2003	226	34	37	226	34	22	226	34	50
	2006	241	37	43	241	37	14	241	37	46
	2009	232	33	50	232	33	22	232	33	57
	2012	215	35	55	215	35	17	215	35	57
	2015	226	39	37	226	39	15	226	39	40
Norway	2000	113	34	47	45	35	35	45	35	52
	2003	203	39	45	203	39	23	203	39	50
	2006	235	39	43	235	39	16	235	39	42

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap
Norway	2009	233	42	51	233	42	18	233	42	51
	2012	234	45	51	234	45	19	234	45	46
	2015	273	46	38	273	46	20	273	46	49
Panama	2009	198	46	50	198	46	33	198	46	33
Perm	2012	88	31	43	88	31	29	88	31	51
Peru	2000	122	49	40	49	50	26	49	50	38
	2009	299	37	39	299	37	16	299	37	37
	2012	302	37	55	302	37	27	302	37	37
	2015	349	43	28	349	43	17	349	43	37
Poland	2000	99	34	54	39	39	23	39	39	58
	2003	219	36	42	219	36	18	219	36	40
	2006	277	39	44	277	39	16	277	39	45
	2009	246	39	57	246	39	13	246	39	54
	2012	230	40	58	230	40	19	230	40	52
	2015	224	35	39	224	35	20	224	35	39
Portugal	2000	126	37	44	51	41	34	51	41	34
	2003	230	34	41	230	34	16	230	34	47
	2006	255	33	45	255	33	16	255	33	45
	2009	315	39	49	315	39	18	315	39	42
	2012	286	36	47	286	36	18	286	36	40
	2015	366	35	29	366	35	16	366	35	32
Qatar	2006	313	44	34	313	44	14	313	44	34
	2009	454	41	47	454	41	16	454	41	39

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap
Qatar	2012	548	43	45	548	43	25	548	43	28
	2015	604	42	37	604	42	16	604	42	37
Republic of Moldova	2009	260	42	45	260	42	19	260	42	35
	2015	266	45	42	266	45	17	266	45	42
Romania	2000	134	57	20	54	58	27	54	58	25
	2006	256	38	46	256	38	19	256	38	48
	2009	239	40	59	239	40	18	239	40	46
	2012	254	43	40	254	43	13	254	43	43
	2015	244	47	23	244	47	17	244	47	23
Russian Federation	2000	186	46	29	74	48	27	74	48	33
	2003	299	35	22	299	35	18	299	35	35
	2006	290	43	30	290	43	19	290	43	42
	2009	265	45	53	265	45	17	265	45	56
	2012	262	49	39	262	49	19	262	49	48
	2015	302	42	28	302	42	15	302	42	37
Serbia	2006	240	39	43	240	39	17	240	39	45
	2009	276	35	46	276	35	17	276	35	45
	2012	234	38	55	234	38	20	234	38	46
Shanghai	2009	256	45	52	256	45	18	256	45	58
	2012	259	43	44	259	43	18	259	43	43
Singapore	2009	264	44	44	264	44	18	264	44	52
	2012	277	45	40	277	45	24	277	45	54
	2015	306	38	35	306	38	18	306	38	44

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap	*N*	%F	%Nonoverlap
Slovak	2003	367	31	43	367	31	14	367	31	46
Republic	2006	237	36	46	237	36	19	237	36	48
	2009	228	40	57	228	40	16	228	40	58
	2012	234	32	56	234	32	20	234	32	58
	2015	318	39	39	318	39	15	318	39	45
Slovenia	2006	330	37	52	330	37	20	330	37	51
	2009	308	43	63	308	43	19	308	43	52
	2012	296	40	57	296	40	19	296	40	54
	2015	320	39	49	320	39	18	320	39	48
Spain	2000	168	31	40	66	27	32	66	27	38
	2003	540	36	37	540	36	13	540	36	34
	2006	980	36	40	980	36	11	980	36	37
	2009	1294	34	47	1294	34	9	1294	34	50
	2012	1266	34	50	1266	34	13	1266	34	43
	2015	337	32	34	337	32	16	337	32	37
Sweden	2000	122	43	55	48	43	33	48	43	50
	2003	231	40	43	231	40	17	231	40	49
	2006	222	44	44	222	44	21	222	44	43
	2009	228	46	45	228	46	20	228	46	53
	2012	237	44	50	237	44	19	237	44	49
	2015	273	42	26	273	42	17	273	42	38
Switzerland	2000	168	37	39	69	43	32	69	43	56
	2003	421	31	46	421	31	15	421	31	45
	2006	610	39	42	610	39	14	610	39	41
	2009	590	34	50	590	34	14	590	34	52

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
Switzerland	2012	561	40	56	561	40	13	561	40	54
	2015	293	31	35	293	31	18	293	31	33
Thailand	2000	148	55	33	59	61	34	59	61	44
	2003	262	53	33	262	53	16	262	53	29
	2006	310	51	45	310	51	19	310	51	39
	2009	311	50	50	311	50	31	311	50	38
	2012	330	57	46	330	57	17	330	57	46
	2015	412	50	29	412	50	16	412	50	27
Trinidad and	2009	239	54	43	239	54	24	239	54	52
Tobago	2015	235	52	43	235	52	18	235	52	35
Tunisia	2003	236	38	25	236	38	22	236	38	21
	2006	232	42	32	232	42	29	232	42	17
	2009	248	35	50	248	35	26	248	35	36
	2012	220	47	32	220	47	16	220	47	29
	2015	269	47	28	269	47	17	269	47	36
Turkey	2003	243	30	38	243	30	30	243	30	26
	2006	247	31	41	247	31	36	247	31	24
	2009	250	40	59	250	40	34	250	40	39
	2012	242	31	54	242	31	27	242	31	43
	2015	295	45	42	295	45	22	295	45	38
United Arab	2009	543	40	45	543	40	28	543	40	25
Emirates	2012	575	40	54	575	40	25	575	40	44
	2015	708	39	37	708	39	24	708	39	27

(table continues)

Table S18 *(Continued)*

		Math–reading profile			Math–science profile			Reading–science profile		
Country	Cycle	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$	*N*	$\%_F$	$\%_{Nonoverlap}$
United	2000	256	39	40	103	40	27	103	40	41
Kingdom	2003	477	43	38	477	43	14	477	43	39
	2006	658	37	42	658	37	15	658	37	36
	2009	609	34	43	609	34	13	609	34	43
	2012	633	44	48	633	44	11	633	44	47
	2015	708	35	31	708	35	12	708	35	36
United States	2000	107	42	40	42	43	37	42	43	32
	2003	273	38	42	273	38	15	273	38	46
	2006	280	41	–	280	41	18	280	41	–
	2009	262	39	55	262	39	18	262	39	54
	2012	249	42	42	249	42	13	249	42	49
	2015	286	40	23	286	40	18	286	40	34
Uruguay	2003	292	36	22	292	36	22	292	36	34
	2006	242	36	32	242	36	19	242	36	32
	2009	298	42	42	298	42	18	298	42	33
	2012	266	37	40	266	37	14	266	37	36
	2015	303	37	38	303	37	16	303	37	42
Viet Nam	2012	248	40	48	248	40	21	248	40	37
	2015	291	49	30	291	49	14	291	49	33
Yugoslavia	2003	220	34	39	220	34	17	220	34	32

Note. $\%_F$ = percentage of female students; $\%_{Nonoverlap}$ = percentage of nonoverlap between female and male students' achievement profiles. – Data were not obtained.

Table S19

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Mean Percentage of Female and Male Students in the Top 5% in Mathematics Showing Mathematics or Reading Tilts in the Mathematics–Reading Profile by Country and PISA Cycle

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Albania	2000	138	52	94.20	5.80	96.34	3.66
	2009	230	50	56.91	43.09	82.36	17.64
	2012	237	46	59.20	40.80	62.81	37.19
	2015	261	50	61.93	38.07	78.48	21.52
Algeria	2015	276	56	71.29	28.71	83.89	16.11
Argentina	2000	112	49	66.47	33.53	84.37	15.63
	2006	217	47	64.74	35.26	82.58	17.42
	2009	239	40	42.65	57.35	70.85	29.15
	2012	295	37	33.54	66.46	63.21	36.79
Australia	2000	142	34	56.82	43.18	77.38	22.62
	2003	628	38	71.47	28.53	89.16	10.84
	2006	708	34	59.69	40.31	90.18	9.82
	2009	713	41	56.47	43.53	84.31	15.69
	2012	724	37	52.82	47.18	84.21	15.79
	2015	726	41	46.44	53.56	67.89	32.11
Austria	2000	130	29	68.34	31.66	93.16	6.84
	2003	230	35	74.66	25.34	92.03	7.97
	2006	246	29	69.20	30.80	92.38	7.62
	2009	330	32	76.97	23.03	97.41	2.59
	2012	238	29	80.25	19.75	97.41	2.59
	2015	350	28	59.10	40.90	85.62	14.38
Azerbaijan	2006	259	40	97.56	2.44	96.13	3.87
	2009	235	44	96.47	3.53	96.26	3.74
Beijing-Shanghai-Jiangsu-Guangdong	2015	492	40	81.83	18.17	91.73	8.27
Belgium	2000	188	31	70.10	29.90	89.14	10.86
	2003	440	33	88.40	11.60	95.99	4.01
	2006	443	33	84.25	15.75	92.52	7.48
	2009	425	33	81.72	18.28	94.91	5.09
	2012	430	38	78.84	21.16	94.03	5.97
	2015	483	34	66.14	33.86	81.77	18.23

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Brazil	2000	134	34	26.77	73.23	62.44	37.56
	2003	222	38	48.63	51.37	67.50	32.50
	2006	465	41	51.67	48.33	70.78	29.22
	2009	1006	41	21.14	78.86	54.68	45.32
	2012	960	37	39.12	60.88	73.27	26.73
	2015	1157	41	34.17	65.83	51.64	48.36
Buenos Aires	2015	83	31	49.50	50.50	73.66	26.34
Bulgaria	2000	131	40	75.86	24.14	89.14	10.86
	2006	225	41	69.04	30.96	84.71	15.29
	2009	225	45	55.40	44.60	81.75	18.25
	2012	264	42	41.77	58.23	78.06	21.94
	2015	296	39	52.54	47.46	72.99	27.01
Canada	2000	816	38	50.16	49.84	74.34	25.66
	2003	1361	38	75.36	24.64	90.38	9.62
	2006	1132	38	60.22	39.78	81.80	18.20
	2009	1160	39	57.61	42.39	87.31	12.69
	2012	1077	39	58.54	41.46	84.51	15.49
	2015	1003	39	49.67	50.33	68.91	31.09
Chile	2000	136	43	38.90	61.10	67.77	32.23
	2006	262	25	34.79	65.21	57.70	42.30
	2009	283	34	35.20	64.80	68.23	31.77
	2012	343	31	66.05	33.95	88.62	11.38
	2015	353	37	41.14	58.86	58.34	41.66
Chinese Taipei	2006	441	40	99.55	0.45	99.77	0.23
	2009	292	45	99.28	0.72	99.64	0.36
	2012	302	45	99.40	0.60	100.00	0.00
	2015	385	43	92.65	7.35	97.59	2.41
Colombia	2006	224	39	66.47	33.53	76.31	23.69
	2009	396	26	19.35	80.65	48.79	51.21
	2012	454	30	31.51	68.49	62.72	37.28
	2015	590	43	13.97	86.03	30.95	69.05
Costa Rica	2009	229	32	20.74	79.26	47.17	52.83
	2012	230	33	27.68	72.32	61.17	38.83
	2015	343	36	23.77	76.23	47.50	52.50

(table continues)

Table S19 (Continued)

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Croatia	2006	261	33	46.39	53.61	88.53	11.47
	2009	250	35	53.10	46.90	91.44	8.56
	2012	250	33	51.57	48.43	92.02	7.98
	2015	290	39	41.81	58.19	68.60	31.40
Czech Republic	2000	153	35	64.78	35.22	92.96	7.04
	2003	316	37	87.70	12.30	96.93	3.07
	2006	297	36	84.60	15.40	95.50	4.50
	2009	303	37	82.52	17.48	97.72	2.28
	2012	266	41	78.95	21.05	95.86	4.14
	2015	345	38	53.71	46.29	74.36	25.64
Denmark	2000	119	31	58.54	41.46	79.54	20.46
	2003	211	41	92.30	7.70	96.33	3.67
	2006	227	45	77.91	22.09	92.38	7.62
	2009	296	39	75.51	24.49	95.20	4.80
	2012	374	43	62.53	37.47	88.01	11.99
	2015	358	39	62.86	37.14	80.98	19.02
Dominican Republic	2015	237	52	12.87	87.13	32.00	68.00
Estonia	2006	243	40	71.68	28.32	97.98	2.02
	2009	236	39	60.97	39.03	92.05	7.95
	2012	239	43	66.76	33.24	93.39	6.61
	2015	279	41	51.45	48.55	75.07	24.93
Finland	2000	135	49	49.52	50.48	77.73	22.27
	2003	290	39	81.88	18.12	94.72	5.28
	2006	236	36	64.84	35.16	92.72	7.28
	2009	290	40	65.92	34.08	94.01	5.99
	2012	441	41	43.68	56.32	84.18	15.82
	2015	294	42	41.68	58.32	64.69	35.31
France	2000	129	35	73.40	26.60	88.89	11.11
	2003	215	38	82.22	17.78	92.86	7.14
	2006	236	40	83.81	16.19	91.31	8.69
	2009	215	35	59.39	40.61	90.03	9.97
	2012	231	37	43.19	56.81	76.10	23.90
	2015	305	41	41.11	58.89	63.09	36.91
Georgia	2009	232	45	60.86	39.14	89.80	10.20
	2015	266	43	51.19	48.81	75.56	24.44

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Germany	2000	140	37	61.63	38.37	87.55	12.45
	2003	231	37	79.97	20.03	90.72	9.28
	2006	245	33	57.16	42.84	90.54	9.46
	2009	249	36	80.73	19.27	97.89	2.11
	2012	250	35	75.12	24.88	98.55	1.45
	2015	325	33	52.88	38.77	71.75	28.25
Greece	2000	129	38	61.23	40.11	82.78	17.22
	2003	231	32	59.89	27.69	77.10	22.90
	2006	244	37	72.31	52.86	88.60	11.40
	2009	248	35	47.14	52.86	83.64	16.36
	2012	256	36	48.90	51.10	75.39	24.61
	2015	277	40	47.12	52.88	67.79	32.21
Hong Kong	2000	122	30	93.30	6.70	98.84	1.16
	2003	224	32	99.21	0.79	99.87	0.13
	2006	232	34	88.66	11.34	97.40	2.60
	2009	242	32	94.19	5.81	98.77	1.23
	2012	234	26	90.07	9.93	98.51	1.49
	2015	268	43	85.82	14.18	91.91	8.09
Hungary	2000	139	40	80.04	19.96	96.13	3.87
	2003	238	35	85.11	14.89	93.01	6.99
	2006	224	35	78.50	21.50	96.58	3.42
	2009	230	35	68.81	31.19	93.84	6.16
	2012	240	38	64.34	35.66	94.38	5.62
	2015	283	41	67.85	32.15	83.43	16.57
Iceland	2000	93	45	70.22	29.78	85.60	14.40
	2003	168	49	80.70	19.30	93.87	6.13
	2006	189	46	78.83	21.17	92.85	7.15
	2009	182	42	62.67	37.33	88.88	11.12
	2012	175	48	67.25	32.75	92.24	7.76
	2015	169	52	60.48	39.52	84.78	15.22
India	2009	241	48	60.05	39.95	84.29	15.71
Indonesia	2000	204	45	83.16	16.84	96.07	3.93
	2003	538	48	70.38	29.62	84.85	15.15
	2006	532	40	72.02	27.98	89.94	10.06
	2009	257	45	48.75	51.25	80.75	19.25

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Indonesia	2012	281	44	52.07	47.93	76.41	23.59
	2015	326	54	73.10	26.90	85.03	14.97
Ireland	2000	106	38	29.01	70.99	59.00	41.00
	2003	194	34	70.09	29.91	88.19	11.81
	2006	229	36	36.39	63.61	68.51	31.49
	2009	197	38	32.13	67.87	73.87	26.13
	2012	251	38	30.61	69.39	66.65	33.35
	2015	287	30	36.78	63.22	56.19	43.81
Israel	2000	124	42	89.66	10.34	94.15	5.85
	2006	229	35	65.42	34.58	79.68	20.32
	2009	288	37	35.79	64.21	71.72	28.28
	2012	253	31	39.40	60.60	72.99	27.01
	2015	330	40	46.49	53.51	62.60	37.40
Italy	2000	137	36	33.11	66.89	71.72	28.28
	2003	582	31	69.31	30.69	92.74	7.26
	2006	1089	31	70.94	29.06	88.99	11.01
	2009	1545	28	65.18	34.82	90.77	9.23
	2012	1554	29	59.54	40.46	89.70	10.30
	2015	579	33	73.51	26.49	87.53	12.47
Japan	2000	146	33	88.88	11.12	97.39	2.61
	2003	235	32	91.10	8.90	95.61	4.39
	2006	298	33	70.97	29.03	89.17	10.83
	2009	304	34	71.31	28.69	91.40	8.60
	2012	318	30	58.82	41.18	75.65	24.35
	2015	332	37	77.17	22.83	84.00	16.00
Jordan	2006	325	50	59.43	40.57	72.77	27.23
	2009	324	52	46.36	53.64	73.43	26.57
	2012	352	52	44.37	55.63	81.89	18.11
	2015	363	48	44.15	55.85	69.57	30.43
Kazakhstan	2009	271	46	69.12	30.88	87.37	12.63
	2012	290	47	91.52	8.48	98.27	1.73
Korea	2000	138	31	94.91	5.09	98.95	1.05
	2003	272	30	87.14	12.86	96.05	3.95
	2006	259	38	71.56	28.44	91.14	8.86
	2009	249	37	88.53	11.47	96.81	3.19
	2012	252	26	92.73	7.27	99.26	0.74

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Korea	2015	279	40	71.48	28.52	87.41	12.59
Kosovo	2015	241	35	71.60	28.40	90.84	9.16
Kyrgyzstan	2006	295	43	61.15	38.85	82.88	17.12
	2009	249	50	46.01	53.99	75.80	24.20
Latvia	2000	106	44	77.04	22.96	93.97	6.03
	2003	231	38	71.84	28.16	88.20	11.80
	2006	236	42	60.94	39.06	90.62	9.38
	2009	225	44	68.83	31.17	93.44	6.56
	2012	215	44	72.18	27.82	94.93	5.07
	2015	243	40	48.58	51.42	77.24	22.76
Lebanon	2015	227	38	68.93	31.07	85.23	14.77
Lithuania	2006	237	45	72.30	27.70	93.89	6.11
	2009	226	49	71.61	28.39	97.09	2.91
	2012	231	38	69.02	30.98	96.38	3.62
	2015	326	43	62.65	37.35	80.18	19.82
Luxembourg	2000	97	31	58.49	41.51	85.82	14.18
	2003	196	34	78.25	21.75	92.04	7.96
	2006	228	33	71.88	28.12	92.23	7.77
	2009	231	29	70.76	29.24	93.89	6.11
	2012	263	29	42.07	57.93	81.93	18.07
	2015	265	36	50.28	49.72	72.84	27.16
Macao	2003	62	39	99.00	1.00	99.03	0.97
	2006	238	39	95.92	4.08	98.49	1.51
	2009	298	36	96.97	3.03	99.78	0.22
	2012	267	43	96.15	3.85	98.82	1.18
	2015	224	50	85.30	14.70	92.03	7.97
Macedonia	2000	126	45	81.94	18.06	93.41	6.59
	2015	266	46	74.81	25.19	87.45	12.55
Malaysia	2009	250	47	66.79	33.21	83.40	16.60
	2012	260	52	89.39	10.61	96.16	3.84
Malta	2009	173	47	58.60	41.40	94.47	5.53
	2015	182	40	69.71	30.29	86.14	13.86

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Mauritius	2009	233	49	70.11	29.89	94.46	5.54
Mexico	2000	125	31	30.77	69.23	54.84	45.16
	2003	1499	38	60.02	39.98	73.49	26.51
	2006	1549	40	55.83	44.17	78.40	21.60
	2009	1912	36	50.93	49.07	80.75	19.25
	2012	1690	38	53.18	46.82	78.45	21.55
	2015	378	38	48.28	51.72	64.08	35.92
Miranda (Venezuela)	2009	145	41	34.07	65.93	49.90	50.10
Montenegro	2006	223	42	69.23	30.77	89.39	10.61
	2009	241	36	37.57	62.43	85.28	14.72
	2012	237	45	36.72	63.28	82.48	17.52
	2015	283	42	49.29	50.71	68.01	31.99
Netherlands	2000	69	36	81.93	18.07	94.66	5.34
	2003	200	43	93.70	6.30	98.78	1.22
	2006	244	37	82.77	17.23	94.90	5.10
	2009	238	34	78.48	21.52	93.80	6.20
	2012	223	38	77.86	22.14	91.89	8.11
	2015	269	42	52.46	47.54	73.52	26.48
New Zealand	2000	102	41	63.00	37.00	81.61	18.39
	2003	226	34	69.36	30.64	84.23	15.77
	2006	241	37	60.44	39.56	84.04	15.96
	2009	232	33	50.44	49.56	81.61	18.39
	2012	215	35	37.94	62.06	80.45	19.55
	2015	226	39	40.56	59.44	63.80	36.20
Norway	2000	113	34	49.57	50.43	79.37	20.63
	2003	203	39	62.25	37.75	81.61	18.39
	2006	235	39	66.13	33.87	86.41	13.59
	2009	233	42	49.81	50.19	80.57	19.43
	2012	234	45	37.71	62.29	70.42	29.58
	2015	273	46	37.57	62.43	61.27	38.73
Panama	2009	198	46	25.93	74.07	60.89	39.11
Perm	2012	88	31	70.82	29.18	94.79	5.21
Peru	2000	122	49	55.56	44.44	80.36	19.64
	2009	299	37	53.70	46.30	74.76	25.24

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Peru	2012	302	37	31.20	68.80	70.38	29.62
	2015	349	43	49.21	50.79	64.71	35.29
Poland	2000	99	34	59.27	40.73	87.68	12.32
	2003	219	36	65.41	34.59	86.30	13.70
	2006	277	39	49.56	50.44	76.88	23.12
	2009	246	39	60.96	39.04	90.97	9.03
	2012	230	40	71.19	28.81	94.53	5.47
	2015	224	35	61.82	38.18	81.69	18.31
Portugal	2000	126	37	42.56	57.44	71.92	28.08
	2003	230	34	69.66	30.34	88.02	11.98
	2006	255	33	56.72	43.28	83.42	16.58
	2009	315	39	75.80	24.20	92.91	7.09
	2012	286	36	69.63	30.37	91.98	8.02
	2015	366	35	66.23	33.77	79.22	20.78
Qatar	2006	313	44	49.07	50.93	68.31	31.69
	2009	454	41	34.38	65.62	65.57	34.43
	2012	548	43	44.46	55.54	71.99	28.01
	2015	604	42	51.14	48.86	72.39	27.61
Republic of Moldova	2009	260	42	73.73	26.27	92.71	7.29
	2015	266	45	55.67	44.33	80.12	19.88
Romania	2000	134	57	84.86	15.14	89.10	10.90
	2006	256	38	79.43	20.57	95.25	4.75
	2009	239	40	46.53	53.47	83.93	16.07
	2012	254	43	68.65	31.35	85.68	14.32
	2015	244	47	62.87	37.13	73.48	26.52
Russian Federation	2000	186	46	94.19	5.81	96.64	3.36
	2003	299	35	90.66	9.34	95.48	4.52
	2006	290	43	92.13	7.87	97.02	2.98
	2009	265	45	63.05	36.95	89.92	10.08
	2012	262	49	70.19	29.81	88.36	11.64
	2015	302	42	64.89	35.11	77.32	22.68
Serbia	2006	240	39	90.79	9.21	97.94	2.06
	2009	276	35	78.02	21.98	95.50	4.50
	2012	234	38	61.88	38.12	91.45	8.55
Shanghai	2009	256	45	100.00	0.00	99.71	0.29

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Shanghai	2012	259	43	100.00	0.00	100.00	0.00
Singapore	2009	264	44	95.15	4.85	99.21	0.79
	2012	277	45	89.81	10.19	96.60	3.40
	2015	306	38	77.20	22.80	89.71	10.29
Slovak Republic	2003	367	31	89.42	10.58	97.65	2.35
	2006	237	36	73.83	26.17	92.78	7.22
	2009	228	40	85.20	14.80	98.54	1.46
	2012	234	32	80.83	19.17	96.72	3.28
	2015	318	39	66.31	33.69	83.50	16.50
Slovenia	2006	330	37	86.30	13.70	96.82	3.18
	2009	308	43	87.03	12.97	99.10	0.90
	2012	296	40	81.45	18.55	97.09	2.91
	2015	320	39	59.61	40.39	86.19	13.81
Spain	2000	168	31	62.67	37.33	84.14	15.86
	2003	540	36	78.78	21.22	90.94	9.06
	2006	980	36	89.31	10.69	97.29	2.71
	2009	1294	34	76.43	23.57	94.35	5.65
	2012	1266	34	60.38	39.62	86.88	13.12
	2015	337	32	56.13	43.87	75.34	24.66
Sweden	2000	122	43	64.07	35.93	89.21	10.79
	2003	231	40	75.80	24.20	90.11	9.89
	2006	222	44	60.14	39.86	83.58	16.42
	2009	228	46	58.67	41.33	84.52	15.48
	2012	237	44	38.37	61.63	72.48	27.52
	2015	273	42	53.29	46.71	67.82	32.18
Switzerland	2000	168	37	89.49	10.51	93.66	6.34
	2003	421	31	89.17	10.83	97.72	2.28
	2006	610	39	93.19	6.81	98.44	1.56
	2009	590	34	91.47	8.53	98.82	1.18
	2012	561	40	88.49	11.51	98.15	1.85
	2015	293	31	82.49	17.51	90.71	9.29
Thailand	2000	148	55	83.93	16.07	93.47	6.53
	2003	262	53	81.40	18.60	89.94	10.06
	2006	310	51	79.88	20.12	95.58	4.42
	2009	311	50	75.87	24.13	95.54	4.46
	2012	330	57	81.69	18.31	97.00	3.00

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Thailand	2015	412	50	77.32	22.68	87.47	12.53
Trinidad and Tobago	2009	239	54	56.59	43.41	79.57	20.43
	2015	235	52	46.41	53.59	73.43	26.57
Tunisia	2003	236	38	64.83	35.17	77.94	22.06
	2006	232	42	73.96	26.04	85.19	14.81
	2009	248	35	32.51	67.49	68.98	31.02
	2012	220	47	63.97	36.03	80.76	19.24
	2015	269	47	75.39	24.61	85.37	14.63
Turkey	2003	243	30	67.83	32.17	86.33	13.67
	2006	247	31	75.75	24.25	90.29	9.71
	2009	250	40	81.43	18.57	97.37	2.63
	2012	242	31	57.76	42.24	89.92	10.08
	2015	295	45	53.94	46.06	79.38	20.62
United Arab Emirates	2009	543	40	47.04	52.96	74.97	25.03
	2012	575	40	52.41	47.59	85.20	14.80
	2015	708	39	46.58	53.42	68.45	31.55
United Kingdom	2000	256	39	47.93	52.07	72.31	27.69
	2003	477	43	71.51	28.49	88.76	11.24
	2006	658	37	56.49	43.51	79.91	20.09
	2009	609	34	47.70	52.30	74.47	25.53
	2012	633	44	50.93	49.07	79.82	20.18
	2015	708	35	51.97	48.03	68.62	31.38
United States	2000	107	42	34.07	65.93	61.73	38.27
	2003	273	38	53.18	46.82	77.57	22.43
	2006	280	41	–	–	–	–
	2009	262	39	33.78	66.22	72.59	27.41
	2012	249	42	45.75	54.25	72.80	27.20
	2015	286	40	31.61	68.39	43.69	56.31
Uruguay	2003	292	36	60.29	39.71	70.55	29.45
	2006	242	36	69.63	30.37	83.30	16.70
	2009	298	42	60.96	39.04	85.24	14.76
	2012	266	37	61.07	38.93	82.42	17.58
	2015	303	37	31.53	68.47	55.30	44.70
Viet Nam	2012	248	40	85.00	15.00	96.79	3.21
	2015	291	49	84.18	15.82	92.94	7.06

(table continues)

Table S19 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Reading tilt	%Math tilt	%Reading tilt
Yugoslavia	2003	220	34	92.63	7.37	97.94	2.06

Note. %Math tilt = percentage of female or male students showing a math tilt in the math–reading profile; %Reading tilt = percentage of female or male students showing a reading tilt in the math–reading profile. – Data were not obtained.

Table S20

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Mean Percentage of Female and Male Students in the Top 5% in Mathematics Showing Science or Reading Tilts in the Science–Reading Profile by Country and PISA Cycle

				Female students		Male students	
Country	Cycle	*N*	%F	%Science tilt	%Reading tilt	%Science tilt	%Reading tilt
Albania	2000	56	48	48.93	51.07	63.25	36.75
	2009	230	50	41.09	58.91	59.17	40.83
	2012	237	46	42.99	57.01	47.11	52.89
	2015	261	50	53.88	46.12	72.11	27.89
Algeria	2015	276	56	75.83	24.17	82.22	17.78
Argentina	2000	44	48	20.81	79.19	47.04	52.96
	2006	217	47	50.03	49.97	61.91	38.09
	2009	239	40	47.51	52.49	69.16	30.84
	2012	295	37	42.20	57.80	58.97	41.03
Australia	2000	56	38	15.29	84.71	44.59	55.41
	2003	628	38	55.56	44.44	82.31	17.69
	2006	708	34	66.33	33.67	87.77	12.23
	2009	713	41	65.81	34.19	88.65	11.35
	2012	724	37	56.87	43.13	86.29	13.71
	2015	726	41	57.36	42.64	81.27	18.73
Austria	2000	54	30	21.24	78.76	61.89	38.11
	2003	230	35	48.20	51.80	75.62	24.38
	2006	246	29	59.53	40.47	87.74	12.26
	2009	330	32	76.07	23.93	97.06	2.94
	2012	238	29	60.71	39.29	91.15	8.85
	2015	350	28	53.94	46.06	84.74	15.26
Azerbaijan	2006	259	40	86.90	13.10	76.35	23.65
	2009	235	44	58.74	41.26	57.76	42.24
Beijing-Shanghai-Jiangsu-Guangdong	2015	492	40	63.14	36.86	82.89	17.11
Belgium	2000	77	31	17.07	82.93	29.03	70.97
	2003	440	33	49.00	51.00	72.57	27.43
	2006	443	33	53.12	46.88	81.37	18.63
	2009	425	33	47.41	52.59	72.78	27.22
	2012	430	38	38.03	61.97	77.08	22.92
	2015	483	34	57.43	42.57	77.27	22.73

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Brazil	2000	53	34	27.24	72.76	40.43	59.57
	2003	222	38	41.71	58.29	52.66	47.34
	2006	465	41	42.65	57.35	61.48	38.52
	2009	1006	41	27.12	72.88	54.42	45.58
	2012	960	37	36.15	63.85	59.54	40.46
	2015	1157	41	39.83	60.17	60.20	39.80
Buenos Aires	2015	83	31	47.36	52.64	67.78	32.22
Bulgaria	2000	52	31	53.69	46.31	63.09	36.91
	2006	225	41	69.27	30.73	86.79	13.21
	2009	225	45	39.84	60.16	70.04	29.96
	2012	264	42	33.33	66.67	67.47	32.53
	2015	296	39	52.09	47.91	74.72	25.28
Canada	2000	328	38	14.83	85.17	43.02	56.98
	2003	1361	38	51.25	48.75	82.59	17.41
	2006	1132	38	54.30	45.70	77.70	22.30
	2009	1160	39	41.48	58.52	76.66	23.34
	2012	1077	39	44.96	55.04	73.69	26.31
	2015	1003	39	57.11	42.89	77.37	22.63
Chile	2000	55	37	22.77	77.23	43.27	56.73
	2006	262	25	48.39	51.61	57.58	42.42
	2009	283	34	41.45	58.55	63.01	36.99
	2012	343	31	62.02	37.98	82.27	17.73
	2015	353	37	40.05	59.95	67.24	32.76
Chinese	2006	441	40	90.38	9.62	97.26	2.74
Taipei	2009	292	45	68.86	31.14	92.65	7.35
	2012	302	45	31.28	68.72	61.49	38.51
	2015	385	43	89.23	10.77	96.46	3.54
Colombia	2006	224	39	39.43	60.57	56.89	43.11
	2009	396	26	28.57	71.43	45.47	54.53
	2012	454	30	31.64	68.36	59.81	40.19
	2015	590	43	27.27	72.73	54.75	45.25
Costa Rica	2009	229	32	27.57	72.43	51.23	48.77
	2012	230	33	28.62	71.38	50.91	49.09
	2015	343	36	22.42	77.58	56.17	43.83
Croatia	2006	261	33	64.72	35.28	91.28	8.72

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Croatia	2009	250	35	61.18	38.82	89.42	10.58
	2012	250	33	37.71	62.29	81.89	18.11
	2015	290	39	40.23	59.77	71.33	28.67
Czech Republic	2000	66	33	50.46	49.54	70.28	29.72
	2003	316	37	85.84	14.16	96.80	3.20
	2006	297	36	67.22	32.78	87.14	12.86
	2009	303	37	70.99	29.01	91.94	8.06
	2012	266	41	53.53	46.47	83.41	16.59
	2015	345	38	51.44	48.56	77.74	22.26
Denmark	2000	48	34	12.79	87.21	43.46	56.54
	2003	211	41	52.02	47.98	77.78	22.22
	2006	227	45	61.55	38.45	82.96	17.04
	2009	296	39	56.95	43.05	89.14	10.86
	2012	374	43	51.76	48.24	86.80	13.20
	2015	358	39	59.24	40.76	80.58	19.42
Dominican Republic	2015	237	52	10.21	89.79	35.93	64.07
Estonia	2006	243	40	76.18	23.82	96.48	3.52
	2009	236	39	62.78	37.22	89.96	10.04
	2012	239	43	61.95	38.05	90.75	9.25
	2015	279	41	63.81	36.19	90.31	9.69
Finland	2000	54	40	14.91	85.09	48.02	51.98
	2003	290	39	66.72	33.28	88.48	11.52
	2006	236	36	59.84	40.16	92.31	7.69
	2009	290	40	69.16	30.84	93.11	6.89
	2012	441	41	56.46	43.54	89.64	10.36
	2015	294	42	66.21	33.79	84.42	15.58
France	2000	52	36	20.63	79.37	42.03	57.97
	2003	215	38	75.55	24.45	88.80	11.20
	2006	236	40	74.28	25.72	88.23	11.77
	2009	215	35	32.90	67.10	76.96	23.04
	2012	231	37	27.70	72.30	58.85	41.15
	2015	305	41	36.87	63.13	63.73	36.27
Georgia	2009	232	45	38.92	61.08	70.20	29.80
	2015	266	43	39.79	60.21	58.40	41.60

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Germany	2000	57	39	21.34	78.66	50.28	49.72
	2003	231	37	71.33	28.67	84.27	15.73
	2006	245	33	53.66	46.34	84.77	15.23
	2009	249	36	70.71	29.29	97.02	2.98
	2012	250	35	61.26	38.74	92.63	7.37
	2015	325	33	55.74	44.26	80.20	19.80
Greece	2000	52	46	48.09	51.91	63.53	36.47
	2003	231	32	52.53	47.47	71.54	28.46
	2006	244	37	57.11	42.89	80.92	19.08
	2009	248	35	34.27	65.73	64.16	35.84
	2012	256	36	44.07	55.93	59.60	40.40
	2015	277	40	42.75	57.25	65.06	34.94
Hong Kong	2000	48	24	45.79	54.21	51.57	48.43
	2003	224	32	75.62	24.38	90.39	9.61
	2006	232	34	68.81	31.19	87.39	12.61
	2009	242	32	61.39	38.61	87.24	12.76
	2012	234	26	44.48	55.52	76.09	23.91
	2015	268	43	45.17	54.83	68.52	31.48
Hungary	2000	61	41	49.18	50.82	64.37	35.63
	2003	238	35	75.78	24.22	89.18	10.82
	2006	224	35	66.21	33.79	90.70	9.30
	2009	230	35	44.57	55.43	80.35	19.65
	2012	240	38	52.83	47.17	86.68	13.32
	2015	283	41	64.38	35.62	81.91	18.09
Iceland	2000	37	46	17.56	82.44	29.82	70.18
	2003	168	49	44.87	55.13	78.41	21.59
	2006	189	46	57.97	42.03	81.98	18.02
	2009	182	42	40.62	59.38	81.94	18.06
	2012	175	48	45.26	54.74	77.33	22.67
	2015	169	52	29.83	70.17	67.48	32.52
India	2009	241	48	38.45	61.55	64.30	35.70
Indonesia	2000	81	41	54.53	45.47	83.88	16.12
	2003	538	48	54.69	45.31	66.86	33.14
	2006	532	40	38.77	61.23	62.80	37.20
	2009	257	45	34.17	65.83	57.20	42.80
	2012	281	44	28.66	71.34	50.72	49.28
	2015	326	54	57.34	42.66	71.77	28.23

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Ireland	2000	42	33	22.46	77.54	37.70	62.30
	2003	194	34	53.28	46.72	73.79	26.21
	2006	229	36	41.57	58.43	69.80	30.20
	2009	197	38	67.99	32.01	90.82	9.18
	2012	251	38	51.79	48.21	76.38	23.62
	2015	287	30	39.75	60.25	60.35	39.65
Israel	2000	50	44	54.06	45.94	79.33	20.67
	2006	229	35	50.22	49.78	74.62	25.38
	2009	288	37	25.23	74.77	53.57	46.43
	2012	253	31	28.79	71.21	62.17	37.83
	2015	330	40	41.79	58.21	59.43	40.57
Italy	2000	55	36	15.25	84.75	47.03	52.97
	2003	582	31	59.22	40.78	84.80	15.20
	2006	1089	31	62.15	37.85	83.36	16.64
	2009	1545	28	56.86	43.14	82.60	17.40
	2012	1554	29	46.91	53.09	73.52	26.48
	2015	579	33	52.83	47.17	73.39	26.61
Japan	2000	58	36	57.34	42.66	79.84	20.16
	2003	235	32	85.15	14.85	95.70	4.30
	2006	298	33	66.78	33.22	82.44	17.56
	2009	304	34	70.74	29.26	86.59	13.41
	2012	318	30	43.67	56.33	64.17	35.83
	2015	332	37	71.89	28.11	88.37	11.63
Jordan	2006	325	50	76.85	23.15	78.74	21.26
	2009	324	52	63.91	36.09	73.24	26.76
	2012	352	52	57.02	42.98	77.43	22.57
	2015	363	48	51.65	48.35	66.80	33.20
Kazakhstan	2009	271	46	40.97	59.03	68.50	31.50
	2012	290	47	70.36	29.64	87.76	12.24
Korea	2000	55	34	92.89	7.11	97.33	2.67
	2003	272	30	68.26	31.74	89.59	10.41
	2006	259	38	23.56	76.44	50.04	49.96
	2009	249	37	39.99	60.01	75.94	24.06
	2012	252	26	33.94	66.06	58.19	41.81
	2015	279	40	52.34	47.66	75.23	24.77
Kosovo	2015	241	35	71.16	28.84	85.78	14.22

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Kyrgyzstan	2006	295	43	40.80	59.20	74.21	25.79
	2009	249	50	42.39	57.61	65.83	34.17
Latvia	2000	42	43	44.77	55.23	68.24	31.76
	2003	231	38	51.91	48.09	76.85	23.15
	2006	236	42	48.44	51.56	85.02	14.98
	2009	225	44	48.08	51.92	81.35	18.65
	2012	215	44	51.41	48.59	81.00	19.00
	2015	243	40	55.88	44.12	83.88	16.12
Lebanon	2015	227	38	49.98	50.02	60.44	39.56
Lithuania	2006	237	45	65.93	34.07	89.80	10.20
	2009	226	49	58.28	41.72	93.13	6.87
	2012	231	38	52.23	47.77	88.67	11.33
	2015	326	43	60.96	39.04	80.76	19.24
Luxembourg	2000	39	31	58.36	41.64	58.75	41.25
	2003	196	34	60.89	39.11	86.51	13.49
	2006	228	33	55.91	44.09	83.41	16.59
	2009	231	29	58.24	41.76	85.90	14.10
	2012	263	29	36.88	63.12	73.63	26.37
	2015	265	36	52.12	47.88	75.15	24.85
Macao	2003	62	39	94.22	5.78	95.55	4.45
	2006	238	39	74.11	25.89	84.09	15.91
	2009	298	36	69.68	30.32	83.10	16.90
	2012	267	43	48.66	51.34	79.42	20.58
	2015	224	50	76.74	23.26	88.62	11.38
Macedonia	2000	52	42	54.94	45.06	54.71	45.29
	2015	266	46	57.95	42.05	73.11	26.89
Malaysia	2009	250	47	58.63	41.37	74.27	25.73
	2012	260	52	72.48	27.52	90.21	9.79
Malta	2009	173	47	65.18	34.82	87.97	12.03
	2015	182	40	68.90	31.10	78.79	21.21
Mauritius	2009	233	49	61.01	38.99	81.02	18.98
Mexico	2000	50	23	37.31	62.69	51.08	48.92
	2003	1499	38	41.42	58.58	59.51	40.49

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Mexico	2006	1549	40	39.04	60.96	62.77	37.23
	2009	1912	36	24.37	75.63	50.32	49.68
	2012	1690	38	24.99	75.01	48.78	51.22
	2015	378	38	30.60	69.40	58.63	41.37
Miranda (Venezuela)	2009	145	41	44.46	55.54	54.56	45.44
Montenegro	2006	223	42	51.13	48.87	87.73	12.27
	2009	241	36	28.57	71.43	66.44	33.56
	2012	237	45	32.17	67.83	65.76	34.24
	2015	283	42	30.24	69.76	56.38	43.62
Netherlands	2000	28	34	54.48	45.52	69.86	30.14
	2003	200	43	80.63	19.37	93.54	6.46
	2006	244	37	74.97	25.03	89.14	10.86
	2009	238	34	71.35	28.65	87.47	12.53
	2012	223	38	65.53	34.47	80.76	19.24
	2015	269	42	53.18	46.82	79.80	20.20
New Zealand	2000	40	37	16.89	83.11	57.48	42.52
	2003	226	34	47.95	52.05	80.24	19.76
	2006	241	37	65.37	34.63	89.05	10.95
	2009	232	33	51.36	48.64	87.51	12.49
	2012	215	35	34.46	65.54	76.40	23.60
	2015	226	39	59.96	40.04	80.31	19.69
Norway	2000	45	35	26.61	73.39	63.38	36.62
	2003	203	39	36.79	63.21	72.28	27.72
	2006	235	39	50.13	49.87	77.80	22.20
	2009	233	42	36.16	63.84	72.21	27.79
	2012	234	45	37.85	62.15	67.59	32.41
	2015	273	46	36.72	63.28	70.46	29.54
Panama	2009	198	46	34.33	65.67	53.78	46.22
Perm	2012	88	31	32.77	67.23	64.60	35.40
Peru	2000	49	50	29.69	70.31	49.03	50.97
	2009	299	37	31.81	68.19	56.53	43.47
	2012	302	37	14.63	85.37	35.18	64.82
	2015	349	43	33.98	66.02	58.04	41.96

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Poland	2000	39	39	25.02	74.98	68.73	31.27
	2003	219	36	60.18	39.82	81.32	18.68
	2006	277	39	37.57	62.43	67.35	32.65
	2009	246	39	52.55	47.45	84.45	15.55
	2012	230	40	52.20	47.80	84.20	15.80
	2015	224	35	57.48	42.52	80.31	19.69
Portugal	2000	51	41	14.40	85.60	27.84	72.16
	2003	230	34	49.02	50.98	77.48	22.52
	2006	255	33	42.52	57.48	71.43	28.57
	2009	315	39	47.96	52.04	73.59	26.41
	2012	286	36	46.89	53.11	71.34	28.66
	2015	366	35	60.25	39.75	77.98	22.02
Qatar	2006	313	44	44.53	55.47	65.60	34.40
	2009	454	41	34.55	65.45	59.75	40.25
	2012	548	43	50.63	49.37	66.76	33.24
	2015	604	42	58.68	41.32	78.78	21.22
Republic of Moldova	2009	260	42	58.72	41.28	78.84	21.16
	2015	266	45	39.87	60.13	67.80	32.20
Romania	2000	54	58	29.80	70.20	31.36	68.64
	2006	256	38	65.75	34.25	88.50	11.50
	2009	239	40	36.29	63.71	67.17	32.83
	2012	254	43	37.97	62.03	64.91	35.09
	2015	244	47	33.47	66.53	44.03	55.97
Russian Federation	2000	74	48	50.91	49.09	67.50	32.50
	2003	299	35	83.13	16.87	93.20	6.80
	2006	290	43	82.07	17.93	91.81	8.19
	2009	265	45	53.74	46.26	85.05	14.95
	2012	262	49	47.04	52.96	77.76	22.24
	2015	302	42	46.74	53.26	70.17	29.83
Serbia	2006	240	39	73.17	26.83	90.79	9.21
	2009	276	35	47.09	52.91	76.75	23.25
	2012	234	38	33.32	66.68	64.97	35.03
Shanghai	2009	256	45	56.91	43.09	90.13	9.87
	2012	259	43	52.22	47.78	77.56	22.44
Singapore	2009	264	44	67.29	32.71	91.05	8.95

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	$\%_F$	$\%_{\text{Science tilt}}$	$\%_{\text{Reading tilt}}$	$\%_{\text{Science tilt}}$	$\%_{\text{Reading tilt}}$
Singapore	2012	277	45	56.86	43.14	87.51	12.49
	2015	306	38	71.87	28.13	90.27	9.73
Slovak Republic	2003	367	31	80.87	19.13	94.05	5.95
	2006	237	36	56.39	43.61	86.35	13.65
	2009	228	40	58.33	41.67	91.68	8.32
	2012	234	32	50.85	49.15	89.15	10.85
	2015	318	39	48.65	51.35	77.04	22.96
Slovenia	2006	330	37	90.66	9.34	98.18	1.82
	2009	308	43	75.00	25.00	93.88	6.12
	2012	296	40	82.42	17.58	97.64	2.36
	2015	320	39	69.68	30.32	90.77	9.23
Spain	2000	66	27	47.42	52.58	63.87	36.13
	2003	540	36	55.74	44.26	75.43	24.57
	2006	980	36	77.66	22.34	91.76	8.24
	2009	1294	34	44.17	55.83	75.66	24.34
	2012	1266	34	46.39	53.61	73.25	26.75
	2015	337	32	58.85	41.15	79.05	20.95
Sweden	2000	48	43	18.98	81.02	55.26	44.74
	2003	231	40	56.10	43.90	84.74	15.26
	2006	222	44	48.76	51.24	76.73	23.27
	2009	228	46	45.01	54.99	80.76	19.24
	2012	237	44	36.96	63.04	70.54	29.46
	2015	273	42	56.44	43.56	77.21	22.79
Switzerland	2000	69	43	19.04	80.96	57.75	42.25
	2003	421	31	68.45	31.55	89.53	10.47
	2006	610	39	74.38	25.62	92.24	7.76
	2009	590	34	64.32	35.68	88.14	11.86
	2012	561	40	44.84	55.16	81.48	18.52
	2015	293	31	67.53	32.47	82.73	17.27
Thailand	2000	59	61	60.97	39.03	82.58	17.42
	2003	262	53	69.34	30.66	82.88	17.12
	2006	310	51	65.65	34.35	85.11	14.89
	2009	311	50	62.22	37.78	82.89	17.11
	2012	330	57	58.87	41.13	84.12	15.88
	2015	412	50	78.05	21.95	86.62	13.38

(table continues)

Table S20 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$	%$_{Science\ tilt}$	%$_{Reading\ tilt}$
Trinidad and Tobago	2009	239	54	40.80	59.20	76.99	23.01
	2015	235	52	42.88	57.12	65.48	34.52
Tunisia	2003	236	38	52.53	47.47	61.30	38.70
	2006	232	42	55.43	44.57	59.38	40.62
	2009	248	35	39.10	60.90	61.85	38.15
	2012	220	47	37.60	62.40	54.78	45.22
	2015	269	47	56.69	43.31	77.03	22.97
Turkey	2003	243	30	54.28	45.72	68.70	31.30
	2006	247	31	49.62	50.38	62.14	37.86
	2009	250	40	41.68	58.32	64.16	35.84
	2012	242	31	24.52	75.48	52.61	47.39
	2015	295	45	47.18	52.82	70.23	29.77
United Arab Emirates	2009	543	40	56.62	43.38	69.75	30.25
	2012	575	40	54.27	45.73	80.76	19.24
	2015	708	39	57.82	42.18	72.17	27.83
United Kingdom	2000	103	40	27.44	72.56	55.27	44.73
	2003	477	43	70.68	29.32	87.54	12.46
	2006	658	37	75.10	24.90	89.36	10.64
	2009	609	34	63.82	36.18	84.42	15.58
	2012	633	44	58.02	41.98	84.25	15.75
	2015	708	35	64.82	35.18	83.06	16.94
United States	2000	42	43	28.60	71.40	35.07	64.93
	2003	273	38	44.68	55.32	74.76	25.24
	2006	280	41	–	–	–	–
	2009	262	39	41.66	58.34	76.57	23.43
	2012	249	42	48.67	51.33	79.09	20.91
	2015	286	40	57.96	42.04	76.05	23.95
Uruguay	2003	292	36	36.28	63.72	58.80	41.20
	2006	242	36	42.48	57.52	62.25	37.75
	2009	298	42	45.83	54.17	66.60	33.40
	2012	266	37	50.84	49.16	70.53	29.47
	2015	303	37	32.42	67.58	60.04	39.96
Viet Nam	2012	248	40	76.13	23.87	90.25	9.75
	2015	291	49	91.64	8.36	95.36	4.64
Yugoslavia	2003	220	34	70.68	29.32	84.21	15.79

Note. $\%_{\text{Science tilt}}$ = percentage of female or male students showing a science tilt in the science–reading profile; $\%_{\text{Reading tilt}}$ = percentage of female or male students showing a reading tilt in the science–reading profile. – Data were not obtained.

Table S21

Sample Sizes (N), Percentage of Female Students (%F), and Unweighted Mean Percentage of Female and Male Students in the Top 5% in Mathematics Showing Mathematics or Science Tilts in the Math–Science Profile by Country and PISA Cycle

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Science tilt	%Math tilt	%Science tilt
Albania	2000	56	48	92.89	7.11	91.04	8.96
	2009	230	50	67.65	32.35	78.49	21.51
	2012	237	46	69.91	30.09	70.67	29.33
	2015	261	50	60.61	39.39	67.11	32.89
Algeria	2015	276	56	48.79	51.21	55.87	44.13
Argentina	2000	44	48	80.18	19.82	84.15	15.85
	2006	217	47	68.00	32.00	75.30	24.70
	2009	239	40	46.87	53.13	49.73	50.27
	2012	295	37	41.35	58.65	56.30	43.70
Australia	2000	56	38	70.63	29.37	67.40	32.60
	2003	628	38	67.41	32.59	66.05	33.95
	2006	708	34	40.93	59.07	53.22	46.78
	2009	713	41	42.72	57.28	48.17	51.83
	2012	724	37	45.81	54.19	50.55	49.45
	2015	726	41	38.00	62.00	35.99	64.01
Austria	2000	54	30	79.48	20.52	89.58	10.42
	2003	230	35	79.93	20.07	84.96	15.04
	2006	246	29	64.08	35.92	71.04	28.96
	2009	330	32	60.54	39.46	69.91	30.09
	2012	238	29	77.69	22.31	72.73	27.27
	2015	350	28	53.44	46.56	59.94	40.06
Azerbaijan	2006	259	40	97.00	3.00	98.85	1.15
	2009	235	44	94.95	5.05	92.35	7.65
Beijing-Shanghai-Jiangsu-Guangdong	2015	492	40	78.28	21.72	79.06	20.94
Belgium	2000	77	31	84.89	15.11	87.88	12.12
	2003	440	33	87.67	12.33	90.90	9.10
	2006	443	33	88.00	12.00	85.31	14.69
	2009	425	33	80.92	19.08	85.07	14.93
	2012	430	38	87.76	12.24	86.07	13.93

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Math\ tilt}$	%$_{Science\ tilt}$	%$_{Math\ tilt}$	%$_{Science\ tilt}$
Belgium	2015	483	34	63.06	36.94	62.63	37.37
Brazil	2000	53	34	45.72	54.28	72.67	27.33
	2003	222	38	57.49	42.51	65.79	34.21
	2006	465	41	57.77	42.23	62.21	37.79
	2009	1006	41	38.99	61.01	50.22	49.78
	2012	960	37	54.33	45.67	68.66	31.34
	2015	1157	41	38.47	61.53	42.20	57.80
Buenos Aires	2015	83	31	54.13	45.87	55.99	44.01
Bulgaria	2000	52	31	64.63	35.37	74.41	25.59
	2006	225	41	45.06	54.94	56.30	43.70
	2009	225	45	60.53	39.47	64.58	35.42
	2012	264	42	52.54	47.46	64.29	35.71
	2015	296	39	52.77	47.23	56.71	43.29
Canada	2000	328	38	66.89	33.11	68.73	31.27
	2003	1361	38	71.72	28.28	70.08	29.92
	2006	1132	38	56.76	43.24	60.50	39.50
	2009	1160	39	64.53	35.47	69.56	30.44
	2012	1077	39	61.30	38.70	66.56	33.44
	2015	1003	39	43.44	56.56	46.50	53.50
Chile	2000	55	37	59.51	40.49	60.30	39.70
	2006	262	25	37.76	62.24	47.51	52.49
	2009	283	34	43.35	56.65	53.41	46.59
	2012	343	31	55.95	44.05	60.50	39.50
	2015	353	37	50.01	49.99	41.14	58.86
Chinese	2006	441	40	93.48	6.52	93.56	6.44
Taipei	2009	292	45	99.12	0.88	98.37	1.63
	2012	302	45	100.00	0.00	99.88	0.12
	2015	385	43	74.70	25.30	76.62	23.38
Colombia	2006	224	39	75.52	24.48	71.77	28.23
	2009	396	26	37.08	62.92	51.96	48.04
	2012	454	30	49.72	50.28	52.54	47.46
	2015	590	43	23.25	76.75	21.86	78.14
Costa Rica	2009	229	32	43.02	56.98	45.14	54.86
	2012	230	33	52.04	47.96	56.39	43.61
	2015	343	36	41.41	58.59	40.59	59.41

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Science tilt	%Math tilt	%Science tilt
Croatia	2006	261	33	28.74	71.26	45.23	54.77
	2009	250	35	39.96	60.04	60.19	39.81
	2012	250	33	66.36	33.64	70.95	29.05
	2015	290	39	52.33	47.67	49.66	50.34
Czech Republic	2000	66	33	54.12	45.88	71.25	28.75
	2003	316	37	66.25	33.75	67.80	32.20
	2006	297	36	78.10	21.90	81.13	18.87
	2009	303	37	62.64	37.36	70.98	29.02
	2012	266	41	75.87	24.13	79.07	20.93
	2015	345	38	51.63	48.37	50.87	49.13
Denmark	2000	48	34	83.84	16.16	75.44	24.56
	2003	211	41	88.04	11.96	83.56	16.44
	2006	227	45	69.17	30.83	74.73	25.27
	2009	296	39	74.89	25.11	67.32	32.68
	2012	374	43	60.78	39.22	55.92	44.08
	2015	358	39	54.82	45.18	54.75	45.25
Dominican Republic	2015	237	52	46.74	53.26	40.07	59.93
Estonia	2006	243	40	44.08	55.92	47.69	52.31
	2009	236	39	46.93	53.07	55.87	44.13
	2012	239	43	51.67	48.33	57.09	42.91
	2015	279	41	36.35	63.65	33.67	66.33
Finland	2000	54	40	69.67	30.33	70.53	29.47
	2003	290	39	65.82	34.18	71.46	28.54
	2006	236	36	52.77	47.23	54.33	45.67
	2009	290	40	44.08	55.92	57.19	42.81
	2012	441	41	38.13	61.87	40.57	59.43
	2015	294	42	24.78	75.22	28.24	71.76
France	2000	52	36	70.10	29.90	86.82	13.18
	2003	215	38	57.32	42.68	59.43	40.57
	2006	236	40	73.18	26.82	65.94	34.06
	2009	215	35	71.84	28.16	75.08	24.92
	2012	231	37	70.66	29.34	70.01	29.99
	2015	305	41	52.05	47.95	54.12	45.88
Georgia	2009	232	45	71.07	28.93	77.98	22.02
	2015	266	43	63.44	36.56	67.44	32.56

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Science tilt	%Math tilt	%Science tilt
Germany	2000	57	39	77.63	22.37	81.26	18.74
	2003	231	37	66.79	33.21	62.65	37.35
	2006	245	33	55.54	44.46	67.48	32.52
	2009	249	36	59.70	40.30	62.36	37.64
	2012	250	35	59.71	40.29	69.48	30.52
	2015	325	33	47.83	52.17	43.11	56.89
Greece	2000	52	46	63.39	36.61	82.37	17.63
	2003	231	32	61.66	38.34	56.57	43.43
	2006	244	37	67.73	32.27	70.25	29.75
	2009	248	35	61.66	38.34	75.24	24.76
	2012	256	36	60.54	39.46	70.43	29.57
	2015	277	40	54.76	45.24	59.38	40.62
Hong Kong	2000	48	24	87.33	12.67	94.09	5.91
	2003	224	32	90.74	9.26	90.43	9.57
	2006	232	34	82.62	17.38	81.33	18.67
	2009	242	32	89.90	10.10	91.01	8.99
	2012	234	26	93.52	6.48	95.16	4.84
	2015	268	43	92.31	7.69	90.61	9.39
Hungary	2000	61	41	63.60	36.40	76.51	23.49
	2003	238	35	65.10	34.90	73.67	26.33
	2006	224	35	67.82	32.18	74.73	25.27
	2009	230	35	69.61	30.39	77.55	22.45
	2012	240	38	62.30	37.70	68.97	31.03
	2015	283	41	61.36	38.64	62.62	37.38
Iceland	2000	37	46	90.18	9.82	88.53	11.47
	2003	168	49	83.29	16.71	81.66	18.34
	2006	189	46	69.76	30.24	74.55	25.45
	2009	182	42	76.76	23.24	70.50	29.50
	2012	175	48	72.46	27.54	69.84	30.16
	2015	169	52	79.08	20.92	74.38	25.62
India	2009	241	48	69.10	30.90	69.99	30.01
Indonesia	2000	81	41	75.68	24.32	78.69	21.31
	2003	538	48	66.97	33.03	74.30	25.70
	2006	532	40	81.78	18.22	86.97	13.03
	2009	257	45	68.30	31.70	76.51	23.49
	2012	281	44	75.54	24.46	77.81	22.19
	2015	326	54	70.50	29.50	71.62	28.38

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{\text{Math tilt}}$	%$_{\text{Science tilt}}$	%$_{\text{Math tilt}}$	%$_{\text{Science tilt}}$
Ireland	2000	42	33	45.41	54.59	59.17	40.83
	2003	194	34	69.29	30.71	70.12	29.88
	2006	229	36	43.24	56.76	48.63	51.37
	2009	197	38	16.36	83.64	26.30	73.70
	2012	251	38	34.75	65.25	40.14	59.86
	2015	287	30	45.14	54.86	45.65	54.35
Israel	2000	50	44	86.11	13.89	73.76	26.24
	2006	229	35	64.32	35.68	58.80	41.20
	2009	288	37	61.00	39.00	65.13	34.87
	2012	253	31	62.89	37.11	67.77	32.23
	2015	330	40	54.34	45.66	53.62	46.38
Italy	2000	55	36	67.55	32.45	55.75	44.25
	2003	582	31	59.71	40.29	65.74	34.26
	2006	1089	31	59.81	40.19	65.99	34.01
	2009	1545	28	58.59	41.41	66.55	33.45
	2012	1554	29	63.55	36.45	73.09	26.91
	2015	579	33	76.54	23.46	77.96	22.04
Japan	2000	58	36	76.98	23.02	85.64	14.36
	2003	235	32	60.20	39.80	59.24	40.76
	2006	298	33	59.04	40.96	62.86	37.14
	2009	304	34	59.25	40.75	67.72	32.28
	2012	318	30	66.09	33.91	64.11	35.89
	2015	332	37	60.33	39.67	53.03	46.97
Jordan	2006	325	50	27.57	72.43	40.17	59.83
	2009	324	52	29.56	70.44	40.24	59.76
	2012	352	52	38.73	61.27	54.31	45.69
	2015	363	48	41.23	58.77	55.85	44.15
Kazakhstan	2009	271	46	78.53	21.47	75.73	24.27
	2012	290	47	84.22	15.78	83.18	16.82
Korea	2000	55	34	77.25	22.75	66.89	33.11
	2003	272	30	69.77	30.23	66.35	33.65
	2006	259	38	91.55	8.45	93.64	6.36
	2009	249	37	92.69	7.31	89.69	10.31
	2012	252	26	97.86	2.14	98.08	1.92
	2015	279	40	75.95	24.05	78.00	22.00
Kosovo	2015	241	35	46.49	53.51	62.57	37.43

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Math\ tilt}$	%$_{Science\ tilt}$	%$_{Math\ tilt}$	%$_{Science\ tilt}$
Kyrgyzstan	2006	295	43	69.19	30.81	64.48	35.52
	2009	249	50	58.24	41.76	64.35	35.65
Latvia	2000	42	43	80.51	19.49	86.20	13.80
	2003	231	38	68.48	31.52	70.15	29.85
	2006	236	42	62.87	37.13	67.31	32.69
	2009	225	44	69.08	30.92	67.28	32.72
	2012	215	44	68.34	31.66	75.61	24.39
	2015	243	40	43.09	56.91	50.61	49.39
Lebanon	2015	227	38	72.76	27.24	81.38	18.62
Lithuania	2006	237	45	57.77	42.23	72.18	27.82
	2009	226	49	63.15	36.85	65.26	34.74
	2012	231	38	61.81	38.19	68.43	31.57
	2015	326	43	57.47	42.53	60.52	39.48
Luxembourg	2000	39	31	46.81	53.19	76.91	23.09
	2003	196	34	70.00	30.00	69.19	30.81
	2006	228	33	71.78	28.22	72.93	27.07
	2009	231	29	66.92	33.08	71.99	28.01
	2012	263	29	61.76	38.24	62.22	37.78
	2015	265	36	47.97	52.03	51.92	48.08
Macao	2003	62	39	80.10	19.90	80.62	19.38
	2006	238	39	91.63	8.37	92.72	7.28
	2009	298	36	94.35	5.65	95.00	5.00
	2012	267	43	96.15	3.85	97.40	2.60
	2015	224	50	78.56	21.44	70.96	29.04
Macedonia	2000	52	42	80.07	19.93	86.07	13.93
	2015	266	46	68.49	31.51	71.96	28.04
Malaysia	2009	250	47	60.36	39.64	61.23	38.77
	2012	260	52	76.87	23.13	77.01	22.99
Malta	2009	173	47	47.72	52.28	69.65	30.35
	2015	182	40	52.27	47.73	64.15	35.85
Mauritius	2009	233	49	63.22	36.78	75.89	24.11
Mexico	2000	50	23	54.36	45.64	48.00	52.00
	2003	1499	38	66.08	33.92	63.60	36.40

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Science tilt	%Math tilt	%Science tilt
Mexico	2006	1549	40	71.01	28.99	71.06	28.94
	2009	1912	36	77.24	22.76	79.32	20.68
	2012	1690	38	80.33	19.67	81.30	18.70
	2015	378	38	64.65	35.35	58.73	41.27
Miranda (Venezuela)	2009	145	41	40.46	59.54	44.88	55.12
Montenegro	2006	223	42	67.49	32.51	71.27	28.73
	2009	241	36	54.82	45.18	76.11	23.89
	2012	237	45	60.69	39.31	71.17	28.83
	2015	283	42	69.00	31.00	66.97	33.03
Netherlands	2000	28	34	65.00	35.00	70.60	29.40
	2003	200	43	76.88	23.12	70.53	29.47
	2006	244	37	65.42	34.58	71.07	28.93
	2009	238	34	61.76	38.24	70.13	29.87
	2012	223	38	63.70	36.30	72.58	27.42
	2015	269	42	53.10	46.90	44.18	55.82
New Zealand	2000	40	37	72.98	27.02	73.70	26.30
	2003	226	34	74.65	25.35	64.77	35.23
	2006	241	37	48.96	51.04	49.99	50.01
	2009	232	33	48.63	51.37	46.12	53.88
	2012	215	35	53.87	46.13	54.94	45.06
	2015	226	39	31.67	68.33	33.22	66.78
Norway	2000	45	35	70.88	29.12	75.60	24.40
	2003	203	39	72.65	27.35	66.89	33.11
	2006	235	39	68.17	31.83	73.57	26.43
	2009	233	42	63.18	36.82	66.05	33.95
	2012	234	45	49.00	51.00	53.97	46.03
	2015	273	46	49.70	50.30	42.46	57.54
Panama	2009	198	46	36.03	63.97	57.02	42.98
Perm	2012	88	31	83.73	16.27	87.54	12.46
Peru	2000	49	50	79.15	20.85	77.13	22.87
	2009	299	37	69.67	30.33	70.59	29.41
	2012	302	37	82.13	17.87	88.96	11.04
	2015	349	43	61.58	38.42	58.66	41.34

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{Math\ tilt}$	%$_{Science\ tilt}$	%$_{Math\ tilt}$	%$_{Science\ tilt}$
Poland	2000	39	39	71.37	28.63	67.80	32.20
	2003	219	36	57.20	42.80	55.79	44.21
	2006	277	39	62.67	37.33	68.41	31.59
	2009	246	39	59.77	40.23	62.24	37.76
	2012	230	40	69.72	30.28	73.79	26.21
	2015	224	35	56.44	43.56	57.63	42.37
Portugal	2000	51	41	80.57	19.43	80.36	19.64
	2003	230	34	70.19	29.81	69.30	30.70
	2006	255	33	61.31	38.69	70.89	29.11
	2009	315	39	77.42	22.58	81.94	18.06
	2012	286	36	75.69	24.31	81.76	18.24
	2015	366	35	57.85	42.15	57.94	42.06
Qatar	2006	313	44	54.43	45.57	58.47	41.53
	2009	454	41	49.03	50.97	56.28	43.72
	2012	548	43	46.54	53.46	59.13	40.87
	2015	604	42	44.61	55.39	49.54	50.46
Republic of Moldova	2009	260	42	65.69	34.31	72.11	27.89
	2015	266	45	65.72	34.28	66.90	33.10
Romania	2000	54	58	84.91	15.09	87.63	12.37
	2006	256	38	71.47	28.53	72.92	27.08
	2009	239	40	62.42	37.58	71.68	28.32
	2012	254	43	85.54	14.46	82.61	17.39
	2015	244	47	80.46	19.54	78.73	21.27
Russian Federation	2000	74	48	85.82	14.18	93.32	6.68
	2003	299	35	66.98	33.02	62.74	37.26
	2006	290	43	78.54	21.46	72.89	27.11
	2009	265	45	60.42	39.58	59.42	40.58
	2012	262	49	76.90	23.10	70.76	29.24
	2015	302	42	72.18	27.82	68.51	31.49
Serbia	2006	240	39	79.87	20.13	81.65	18.35
	2009	276	35	77.76	22.24	83.93	16.07
	2012	234	38	77.45	22.55	85.26	14.74
Shanghai	2009	256	45	99.32	0.68	97.85	2.15
	2012	259	43	99.82	0.18	99.46	0.54
Singapore	2009	264	44	88.93	11.07	85.52	14.48

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%F	%Math tilt	%Science tilt	%Math tilt	%Science tilt
Singapore	2012	277	45	91.90	8.10	81.35	18.65
	2015	306	38	60.99	39.01	60.45	39.55
Slovak Republic	2003	367	31	67.74	32.26	67.19	32.81
	2006	237	36	72.88	27.12	76.23	23.77
	2009	228	40	82.87	17.13	81.84	18.16
	2012	234	32	82.08	17.92	81.53	18.47
	2015	318	39	69.91	30.09	64.25	35.75
Slovenia	2006	330	37	45.42	54.58	54.18	45.82
	2009	308	43	64.68	35.32	72.31	27.69
	2012	296	40	52.64	47.36	63.10	36.90
	2015	320	39	42.61	57.39	51.46	48.54
Spain	2000	66	27	52.69	47.31	63.09	36.91
	2003	540	36	70.48	29.52	73.62	26.38
	2006	980	36	71.66	28.34	75.08	24.92
	2009	1294	34	81.85	18.15	80.18	19.82
	2012	1266	34	66.53	33.47	71.22	28.78
	2015	337	32	50.72	49.28	50.39	49.61
Sweden	2000	48	43	79.11	20.89	80.58	19.42
	2003	231	40	69.32	30.68	67.38	32.62
	2006	222	44	61.25	38.75	65.72	34.28
	2009	228	46	65.16	34.84	60.65	39.35
	2012	237	44	53.89	46.11	56.12	43.88
	2015	273	42	45.99	54.01	39.13	60.87
Switzerland	2000	69	43	94.54	5.46	87.44	12.56
	2003	421	31	73.44	26.56	76.80	23.20
	2006	610	39	82.30	17.70	87.29	12.71
	2009	590	34	87.03	12.97	88.23	11.77
	2012	561	40	89.13	10.87	89.14	10.86
	2015	293	31	74.45	25.55	75.75	24.25
Thailand	2000	59	61	75.59	24.41	66.52	33.48
	2003	262	53	64.96	35.04	67.84	32.16
	2006	310	51	72.50	27.50	75.04	24.96
	2009	311	50	63.19	36.81	78.63	21.37
	2012	330	57	79.75	20.25	80.23	19.77
	2015	412	50	57.02	42.98	62.77	37.23

(table continues)

Table S21 *(Continued)*

				Female students		Male students	
Country	Cycle	*N*	%$_F$	%$_{\text{Math tilt}}$	%$_{\text{Science tilt}}$	%$_{\text{Math tilt}}$	%$_{\text{Science tilt}}$
Trinidad and Tobago	2009	239	54	69.42	30.58	57.87	42.13
	2015	235	52	54.27	45.73	59.77	40.23
Tunisia	2003	236	38	63.44	36.56	69.02	30.98
	2006	232	42	70.93	29.07	77.93	22.07
	2009	248	35	43.32	56.68	59.16	40.84
	2012	220	47	77.42	22.58	79.97	20.03
	2015	269	47	77.01	22.99	75.89	24.11
Turkey	2003	243	30	64.14	35.86	79.10	20.90
	2006	247	31	85.09	14.91	94.61	5.39
	2009	250	40	87.42	12.58	95.08	4.92
	2012	242	31	81.69	18.31	90.68	9.32
	2015	295	45	56.66	43.34	67.06	32.94
United Arab Emirates	2009	543	40	44.19	55.81	59.43	40.57
	2012	575	40	45.90	54.10	60.48	39.52
	2015	708	39	38.21	61.79	50.86	49.14
United Kingdom	2000	103	40	47.05	52.95	60.11	39.89
	2003	477	43	49.05	50.95	49.19	50.81
	2006	658	37	28.99	71.01	31.16	68.84
	2009	609	34	34.42	65.58	38.74	61.26
	2012	633	44	42.70	57.30	39.18	60.82
	2015	708	35	35.91	64.09	36.88	63.12
United States	2000	42	43	56.78	43.22	68.93	31.07
	2003	273	38	59.62	40.38	58.52	41.48
	2006	280	41	29.55	70.45	35.02	64.98
	2009	262	39	42.68	57.32	47.58	52.42
	2012	249	42	41.47	58.53	39.99	60.01
	2015	286	40	22.77	77.23	20.73	79.27
Uruguay	2003	292	36	72.10	27.90	64.86	35.14
	2006	242	36	81.36	18.64	77.92	22.08
	2009	298	42	68.88	31.12	68.91	31.09
	2012	266	37	58.30	41.70	61.47	38.53
	2015	303	37	44.27	55.73	48.09	51.91
Viet Nam	2012	248	40	65.63	34.37	74.89	25.11
	2015	291	49	41.65	58.35	42.40	57.60
Yugoslavia	2003	220	34	77.67	22.33	80.18	19.82

Note. $\%_{\text{Math tilt}}$ = percentage of female or male students showing a math tilt in the math–science profile; $\%_{\text{Science tilt}}$ = percentage of female or male students showing a science tilt in the math–science profile.

Table S22

Comparison of Gender Equality Indicators (GEI) and Other Key Characteristics of Countries That Participated in PISA and Countries That Did Not

	PISA participants			Other countries			*t*-test			
IDC	*N*	*M*	*SD*	*N*	*M*	*SD*	*t*	*df*	*p*	*d*
Gender equality indicators										
smm[a,b]	55	30.52	7.86	30	30.32	11.15	–0.13	77.32	.898	0.02
wr[c,d]	59	38.16	10.28	56	34.82	11.71	–2.81	264.11	.005	0.31
per[c]	70	0.99	0.02	129	0.94	0.10	–11.36	711.16	.000	0.61
ser[c]	66	1.02	0.06	125	0.92	0.23	–8.51	591.46	.000	0.51
ter[c]	68	1.27	0.27	113	0.89	0.61	–10.48	535.94	.000	0.75
Other key characteristics										
GDP[a]	72	27,623	20,920	115	9,543	13,739	–11.25	333.39	.000	1.07
lexp[a]	72	76.05	4.41	119	64.89	8.85	–28.36	1108.96	.000	1.49
cmr[a]	71	12.86	12.60	122	57.77	48.00	16.92	445.82	.000	–1.15

Note. IDC = indicators; *N* = number of countries for which data for a certain indicator were available; *d* = Cohen's *d* with positive values indicating that a higher mean value was obtained for countries participating in PISA. smm = women's share of employment in senior and middle management (i.e., legislators, senior officials, managers) in percent; wr = women's share of research positions in percent; per = ratio of female to male students enrolled in primary education, > 1 higher proportion of female students, < 1 higher proportion of male students; ser = ratio of female to male students enrolled in secondary education, > 1 higher proportion of female students, < 1 higher proportion of male students; ter = ratio of female to male students enrolled in tertiary education, > 1 higher proportion of female students, < 1 higher proportion of male students; GDP = gross domestic product per capita in dollars; lexp = life expectancy at birth in years; cmr = child mortality rate; number of children dying between birth and exactly age 5, expressed per 1,000 live births.

[a]Available from https://hdr.undp.org/.

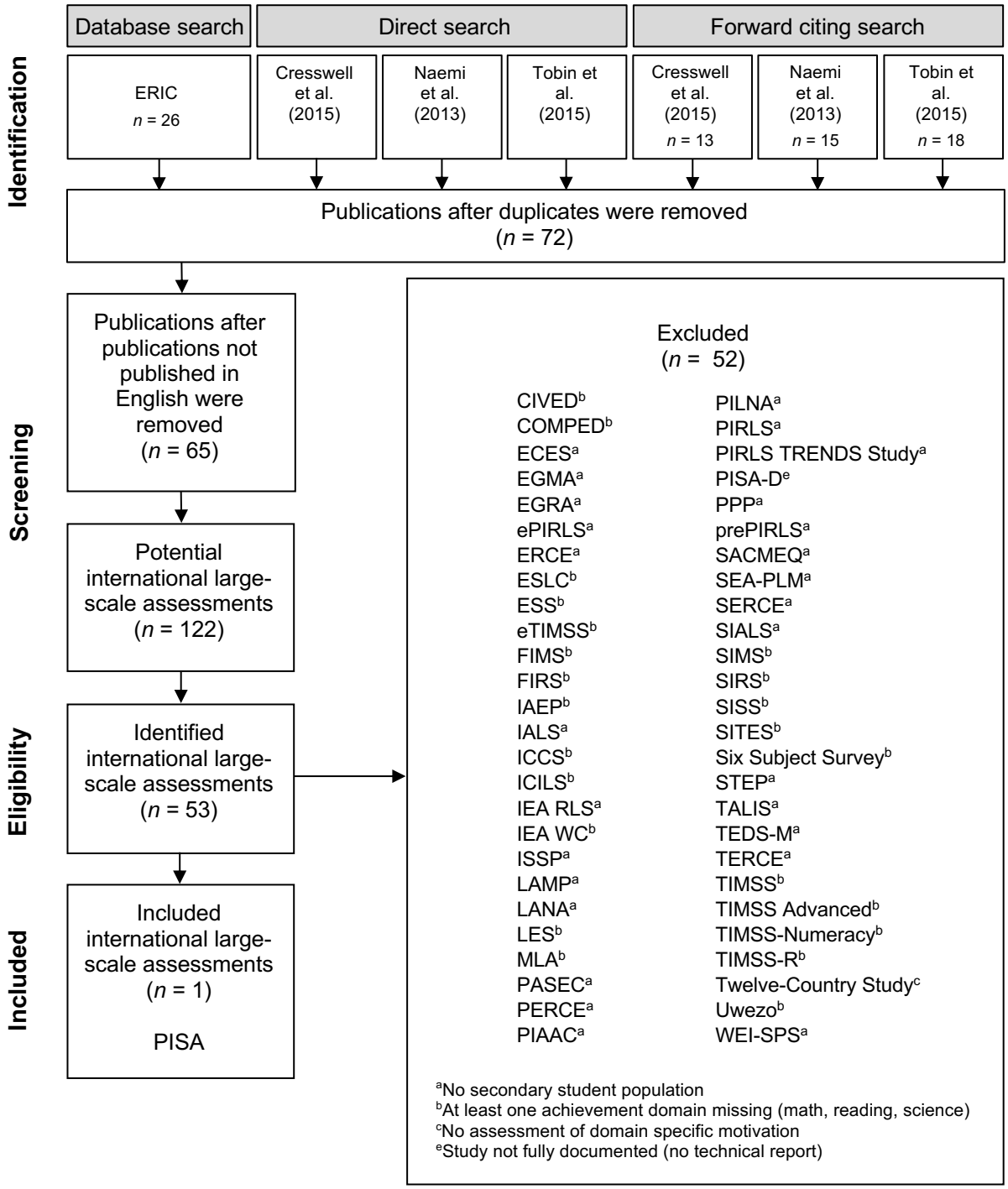
[b]Available from https://ilostat.ilo.org/data/.

[c]Available from https://data.uis.unesco.org.

[d]Available from https://stats.oecd.org.

Figure S1

PRISMA Flow Diagram



Note. Superscripts indicate which inclusion criterion led to the exclusion of the respective international large-scale assessment.

Figure S2

Countries Included in the Present Integrative Data Analysis

Note. Countries that were included are depicted in black, countries that were not included are in white. In some cases, the whole country did not participate (as shown in the figure), but some economic regions participated in some PISA cycles. These are: Beijing-Shanghai-Jiangsu-Guangdong (China; PISA 2015), Tamil Nadu and Himachal Pradesh (India; PISA 2009), Miranda (Venezuela; PISA 2009).

References

Baye, A., & Monseur, C. (2016). Gender differences in variability and extreme scores in an international context. *Large-scale Assessments in Education, 4*(1). https://doi.org/10.1186/s40536-015-0015

Brunner, M., Keller, U., Hornung, C., Reichert, M., & Martin, R. (2009). The cross-cultural generalizability of a new structural model of academic self-concepts. *Learning and Individual Differences, 19*(4), 387–403. https://doi.org/10.1016/j.lindif.2008.11.008

Caro, D. H., & Biecek, P. (2017). intsvy: An R package for analysing international large-scale assessment data. *Journal of Statistical Software, 81*(7). https://doi.org/10.18637/jss.v081.i07

Cheung, M. W.-L. (2015). metaSEM: An R package for meta-analysis using structural equation modeling. *Frontiers in Psychology, 5*(1521). https://doi.org/10.3389/fpsyg.2014.01521

Cheung, M. W.-L., & Jak, S. (2016). Analyzing big data in psychology: A split/analyze/meta-analyze approach. *Frontiers in Psychology, 7*(738). https://doi.org/10.3389/fpsyg.2016.00738

Cohen, J. (1988). *Statistical power analysis for the behavioral science*. Lawrence Erlbaum.

Cresswell, J., Schwantner, U., & Waters, C. (2015). *A review of international large-scale assessments in education: Assessing component skills and collecting contextual data.* OECD Publishing. https://dx.doi.org/10.1787/9789264248373-en

Cumming, G., & Calin-Jageman, R. (2016). *Introduction to the new statistics: Estimation, open science, and beyond*. Routledge.

Else-Quest, N. M., Hyde, J. S., Linn, M. C. (2010). Cross-national patterns of gender differences in mathematics: A meta-analysis. *Psychological Bulletin, 136*(1), 103–127. https://doi.org/10.1037/a0018053

Grund, S., Lüdtke, O., & Robitzsch, A. (2018). Multiple imputation of missing data for multilevel models: Simulations and recommendations. *Organizational Research Methods, 21*(1), 111–149. https://doi.org/10.1177/1094428117703686

Guiso, L., Monte, F., Sapienza, P., & Zingales, L. (2008). Diversity. Culture, gender, and math. *Science, 320*(5880), 1164–1165. https://doi.org/10.1126/science.1154094

Hedges, L. V., & Nowell, A. (1995). Sex differences in mental test scores, variability, and numbers of high-scoring individuals. *Science*(5220)*, 269,* 41–45. https://doi.org/10.1126/science.7604277

Hempel, S., Miles, J. N., Booth, M. J., Wang, Z., Morton, S. C., & Shekelle, P. G. (2013). Risk of bias: A simulation study of power to detect study-level moderator effects in meta-analysis. *Systematic Reviews, 2*, 107. https://doi.org/10.1186/2046-4053-2-107

Huang, C. (2013). Gender differences in academic self-efficacy: A meta-analysis. *European Journal of Psychology of Education, 28*(1), 1–35. https://doi.org/10.1007/s10212-011-0097-y

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60*(6), 581–592. https://doi.org/10.1037/0003-066X.60.6.581

Hyde, J. S., Fennema, E., Lamon, S. J. (1990). Gender differences in mathematics performance: A meta-analysis. *Psychological Bulletin, 107*(2), 139–155. https://doi.org/10.1037/0033-2909.107.2.139

Hyde, J. S., Fennema, E., Ryan, M., Frost, L. A., Hopp, C. (1990). Gender comparisons of mathematics attitudes and affect. *Psychology of Women Quarterly, 14*(3), 299–324. https://doi.org/10.1111/j.1471-6402.1990.tb00022.x

Hyde, J. S., Lindberg, S. M., Linn, M. C., Ellis, A. B., & Williams, C. C. (2008). Diversity. Gender similarities characterize math performance. *Science*(5888), *321*, 494–495. https://doi.org/10.1126/science.1160364

Hyde, J. S., & Linn, M. C. (1988). Gender differences in verbal ability: A meta-analysis. *Psychological Bulletin, 104*(1), 53–69. https://dx.doi.org/10.1037/0033-2909.104.1.53

Jak, S., & Cheung, M.W.-L. (2018). Testing moderator hypotheses in meta-analytic structural equation modeling using subgroup analysis. *Behavior Research Methods 50*(4), 1359–1373. https://doi.org/10.3758/s13428-018-1046-3

Kirsch, I., Lennon, M., von Davier, M., Gonzalez, E., & Yamamoto, K. (2012). On the growing importance of international large-scale assessments. In M. von Davier, E. Gonzalez I. Kirsch & K. Yamamoto (Eds.), *The role of international large-scale assessments: Perspectives from technology, economy, and educational research.* Springer. https://doi.org/10.1007/978-94-007-4629-9

Lietz, P. (2006). A meta-analysis of gender differences in reading achievement at the secondary school level. *Studies in Educational Evaluation, 32*(4), 317–344. https://doi.org/10.1016/j.stueduc.2006.10.002

Lindberg, S. M., Hyde, J. S., Petersen, J. L., & Linn, M. C. (2010). New trends in gender and mathematics performance: A meta-analysis. *Psychological Bulletin, 136*(6), 1123–1135. https://doi.org/10.1037/a0021276

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis.* Sage.

Machin, S., & Pekkarinen, T. (2008). Assessment. Global sex differences in test score variability. *Science, 322*(5906), 1331–1332. https://doi.org/10.1126/science.1162573

Makel, M. C., Wai, J., Peairs, K., & Putallaz, M. (2016). Sex differences in the right tail of cognitive abilities: An update and cross cultural extension. *Intelligence, 59,* 8–15. https://doi.org/10.1016/j.intell.2016.09.003

Martin, M. O., Mullis, I. V. S., Foy, P., & Stanco, G. M. (2012). *TIMSS 2011 International results in science.* TIMSS & PIRLS International Study Center.

Mullis, I. V. S., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 International results in mathematics.* TIMSS & PIRLS International Study Center.

Mullis, I. V. S., Martin, M. O., Foy, P., & Stanco, K. T. (2012). *PIRLS 2011 International results in reading.* TIMSS & PIRLS International Study Center.

Naemi, B., Gonzalez, E., Bertling, J., Betancourt, A., Burrus, J., Kyllonen, P. C., Minsky, J., Lietz, P., Klieme, E., Vieluf, S., Lee, J., & Roberts, R. D. (2013). Large-scale group score assessments: Past, present, and future. In D. H. Saklofske, C. R. Reynolds & V. L. Schwean (Eds.), *Oxford handbook of child psychological assessment* (pp. 129–149). Oxford University Press.

Nowell, A., & Hedges, L. V. (1998). Trends in gender differences in academic achievement from 1960 to 1994: An analysis of differences in mean, variance, and extreme scores. *Sex Roles, 39*(1–2), 21–43. https://doi.org/10.1023/A:1018873615316

OECD. (2002). *PISA 2000 technical report.* OECD Publishing.

OECD. (2003). *Learners for life: Student approaches to learning–Results from PISA 2000.* OECD Publishing.

OECD. (2005). *PISA 2003 technical report*. OECD Publishing.

OECD. (2007a). *PISA 2006 science competencies for tomorrow's world* (Vol. 1). OECD Publishing.

OECD. (2007b). *PISA 2006 volume 2: Data.* OECD Publishing.

OECD. (2009). *PISA 2006 technical report.* OECD Publishing.

OECD. (2010). *PISA 2009 results: Learning to learn – Student engagement, strategies and practices* (Vol. III). OECD Publishing. https://dx.doi.org/10.1787/9789264083943-en

OECD. (2013a). *PISA 2012 assessment and analytical framework: Mathematics, reading, science, problem solving and financial literacy.* OECD Publishing. https://dx.doi.org/10.1787/9789264190511-en

OECD. (2013b). *PISA 2012 results: Ready to learn: Students' engagement, drive and self-beliefs* (Vol. 3). OECD Publishing. https://dx.doi.org/10.1787/9789264201170-en

OECD. (2014). *PISA 2012 technical report.* OECD Publishing.

OECD. (2015). *The ABC of gender equality in education: Aptitude, behaviour, confidence.* OECD Publishing. https://dx.doi.org/10.1787/9789264229945-en

OECD. (2017). *PISA 2015 technical report.* OECD Publishing.

Olszewski-Kubilius, P., & Lee, S. Y. (2011). Gender and other group differences in performance on off-level tests: Changes in the 21st century. *Gifted Child Quarterly, 55*(1), 54–73. https://doi.org/10.1177/0016986210382574

Pastore, (2018). Overlapping: a R package for estimating overlapping in empirical distributions. *Journal of Open Source Software, 3*(32), 1023, https://doi.org/10.21105/joss.01023

Penner, A. M. (2008). Gender differences in extreme mathematical achievement: An international perspective on biological and social factors. *American Journal of Sociology, 114*(S1), 138–170. https://doi.org/10.1016/j.ssresearch.2007.06.012

Petersen, J. (2018). Gender difference in verbal performance: A meta-analysis of United States State performance assessments. *Educational Psychology Review, 30*(4), 1269–1281. https://doi.org/10.1007/s10648-018-9450-x

Pigott, T. D. (2019). Missing data in meta-analysis. In H. Cooper, L. V. Hedges & J. C. Valentine, *The handbook of research synthesis and meta-analysis* (3rd ed., pp. 367–382). Russell Sage Foundation.

Polanin, J. R., Pigott, T. D., Espelage, D. L., & Grotpeter, J. K. (2019). Best practice guidelines for abstract screening large-evidence systematic reviews and meta-analyses. *Research Synthesis Methods, 10*(3), 330–342. https://doi.org/10.1002/jrsm.1354

Quartagno, M., Grund, S., & Carpenter, J. (2019). jomo: A flexible package for two-level joint modelling multiple imputation. *R Journal.*

Reilly, D., Neumann, D. L., & Andrews, G. (2015). Sex differences in mathematics and science achievement: A meta-analysis of National Assessment of Educational Progress assessments. *Journal of Educational Psychology, 107*(3), 645–662. https://dx.doi.org/10.1037/edu0000012

Reilly, D., Neumann, D. L., & Andrews, G. (2019a). Investigating gender differences in mathematics and science: Results from the 2011 Trends in Mathematics and Science Survey. *Research in Science Education, 49*(1), 25–50. https://doi.org/10.1007/s11165-017-9630-6

Reilly, D., Neumann, D. L., & Andrews, G. (2019b). Gender differences in reading and writing achievement: Evidence from the National Assessment of Educational Progress (NAEP). *American Psychologist, 74*(4), 445–458. https://doi.org/10.1037/amp0000356

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys.* Wiley.

Steinkamp, M. W., & Maehr, M. L. (1984). Gender differences in motivational orientations toward achievement in school science: A quantitative synthesis. *American Educational Research Journal, 21*(1), 39–59. https://doi.org/10.3102/00028312021001039

Stoet, G., & Geary, D. C. (2013). Sex differences in mathematics and reading achievement are inversely related: Within-and across-nation assessment of 10 years of PISA data. *PLoS One, 8*(3), e57988. https://doi.org/10.1371/journal.pone.0057988

Su, R., & Rounds, J. (2015). All STEM fields are not created equal: People and things interests explain gender disparities across STEM fields. *Frontiers in Psychology, 6*, 189. https://doi.org/10.3389/fpsyg.2015.00189

Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin, 135*(6), 859–884. https://doi.org/10.1037/a0017364

Tipton, E., Pustejovsky, J. E., & Ahmadi, H. (2019). Current practices in meta-regression in psychology, education, and medicine. *Research Synthesis Methods, 10*(2), 180–194. https://doi.org/10.1002/jrsm.1339

Tobin, M., Lietz, P., Nugroho, D., Vivekanandan, R., & Nyamkhuu, T. (2015). *Using large-scale assessments of students' learning to inform education policy: Insights from the Asia-Pacific region.* ACER Publishing.

Valentine, J. C., Pigott, T. D., & Rothstein, H. R. (2010). How many studies do you need? A primer on statistical power for meta-analysis. *Journal of Educational and Behavioral Statistics, 35*(2), 215–247. https://doi.org/10.3102/1076998609346961

von Davier, M., Gonzalez, E., & Mislevy R. J. (2009). What are plausible values and why are they useful? In M. von Davier & D. Hastedt (Eds.), *IERI Monograph Series: Issues and methodologies in large scale assessments* (vol. 2, pp. 9–36). IEA-ETS Research Institute.

Weinburgh, M. (1995). Gender differences in student attitudes toward science: A meta-analysis of the literature from 1970 to 1991. *Journal of Research in Science Teaching, 32*(4), 387–398. https://doi.org/10.1002/tea.3660320407

Wilgenbusch, T., & Merrell, K. W. (1999). Gender differences in self-concept among children and adolescents: A meta-analysis of multidimensional studies. *School Psychology Quarterly, 14*(2), 101–120. https://dx.doi.org/10.1037/h0089000