Who overclaims? An analysis of PISA 2012 data

Objectives

Comparing the United States with 63 other education systems that participated in the 2012 Program for International Student Assessment (PISA), this study examines the background questionnaire items designed to measure students' tendency to overstate what they know. In particular, this study (a) explores students' tendency to overclaim their familiarity with mathematical concepts across participating education systems, (b) attempts to adjust over-claiming response patterns, (c) identifies student subgroups based on their response patterns, and (d) examines the relationship between students' response patterns and their mathematics performance.

Perspectives and Theoretical Framework

The self-reported Likert scale is commonly used in social science research to understand participants' attitudes or beliefs in the topic of interest (Beaton et al., 2000). Large-scale international studies such as PISA are no exception: in addition to students' assessment data, they provide Likert scale data from background questionnaires reported from students, parents, teachers, and school principals. The relationship between the assessment data and the background questionnaire data is explored in a wide range of cross-cultural research (Haahr et al., 2005; Loveless 2017; Thomson, Bortoli and Underwood 2017).

However, literature points out many potential challenges facing self-reported Likert scale data (Buckley 2009; Ludeke and Makransky 2015). For instance, social desirability bias is participants' tendency to choose answers that are viewed as desirable by society at large (Paulhus 2002). There is also evidence of individuals overstating the levels of traits that they themselves see as desirable (Ludeke, Weisberg and DeYoung 2013). In making cross-cultural comparisons based on self-reported data, such problems become more pronounced, as differences in responses to the background questionnaire items may be due, in part, to differences in response styles across gender (Watkins and Cheung 1995), race (Marin, Gamba and Marin 1992), and cultures in general (Javaras and Ripley 2007; King et al., 2004). For example, Chen, Lee, and Stevenson (1995) found that Chinese and Japanese secondary students are more likely to use the midpoint of a seven-point Likert-type item than students from other regions. Therefore, interpreting responses to background questionnaire items at face value would cause validity threats to the research results, which would then incorrectly inform education policy.

Efforts to address these problems include methods such as anchoring vignettes, forced-choice comparisons, situational-judgment tests, bi-factor models, and the overclaiming technique (Brown and Maydeu-Olivares 2011; Cheung and Rensvold 2000; He, Buchholz and Klieme 2017; Kyllonen and Bertling 2014; Rossi, Gilula and Allenby 2001). They all help alleviate the comparability issue, although the literature is limited and there is no consensus on which method is the best (He and Van de Vijver 2016).

Background questionnaire items to detect students' tendency to overclaim were included in PISA 2012 as one way to enable adjustments for cross-cultural differences in response tendencies (OECD 2014). However, they have not received much research attention. No previous studies have examined these questions at the item level or identified student subgroups who tend to overclaim. This analysis aims to fill these gaps by comparing, in a global context, students' responses to the PISA overclaiming questions and by exploring the characteristics of students who tend to overclaim.

Methods and Data Sources

PISA is an assessment of 15-year-old students coordinated by the Organization for Economic Cooperation and Development (OECD). This study uses data from the PISA 2012 mathematics assessment (the last time in which mathematics was the major domain) and the student background questionnaire, which asked students about their familiarity with 16 mathematical concepts (see Appendix A). There are 13 actual mathematical concepts, such as "exponential function," "complex number," and "polygon." In addition, there are three "pseudo concepts" designed to detect overclaiming: "proper number," "subjunctive scaling," and "declarative fraction."

The response options for both the real and the pseudo concepts are the same: (a) never heard of it, (b) heard of it once or twice, (c) heard of it a few times, (d) heard of it often, and (e) know it well, understand the concept. These options were assigned values from 1 to 5, respectively, and three indices were calculated from students' responses. The first index (REAL_MEAN) is a simple mean score of students' responses to the 13 real mathematical concepts. The second index (PSEUDO_MEAN) is the mean score of students' responses to the three pseudo concepts. The last index (REAL_MEAN_ADJUSTED) is the difference between the first index and the second index, which is a conventional way of correcting overclaiming (Paulhus et al., 2003, Zimmerman et al., 1977).

Based on the quartile distribution of the scores of the first two indices, students in each education system were identified as being in one of the following four groups:[1]

- **Irrational respondents** are students who tend to choose "never heard of it" to real concepts but "know it well, understand the concept" to pseudo concepts.
- **Overclaimers** are students who tend to choose "know it well, understand the concept" to both real and pseudo concepts.
- **Low claimers** are students who tend to choose "never heard of it" to both the real and the pseudo concepts.
- **Ideal respondents** are students who tend to choose "know it well, understand the concept" to real concepts but "never heard of it" to pseudo concepts.

[1] A detailed categorization of these four groups into the bottom and/or top quartiles is included in Appendix B. A fifth group, "Others," includes students whose scores of REAL_MEAN and PSEUDO_MEAN are either in the 2nd or 3rd quartile.

Results are presented at the education system level for the United States and 63 other education systems around the world.[2] Two-tailed *t*-tests were performed for comparisons between student subgroups. Test results with *p*-values under .05 are considered statistically significant.

Results and Conclusions

Q1: How do students respond to real and pseudo mathematical concepts?

Although students' responses to each of the 16 mathematics familiarity questions varied, some general trends can be seen in their responses to the real versus pseudo mathematical concepts. Figure 1 illustrates students' reported familiarity level with an example real concept, "exponential function" to the left, and with an example pseudo concept, "proper number" to the right.

Across the 64 PISA participating education systems, the percentage of students who reported that they had never heard of the real concept "exponential function" ranged from 8% in Chinese Taipei to 80% in Tunisia. In the United States, 14% of students fell into this category.

When presented with the made-up item, "proper number," it would be expected that most students would report "never heard of it." However, this is the case in only 5 education systems: Iceland (73%), Spain (65%), Korea (63%), Chinese Taipei (61%), and Hong Kong–China (55%). In the remaining education systems, the percentage of students who reported "never heard of it" ranged from 48% in Sweden to 3% in Albania. In the United States, 15% of students reported that they have never heard of the pseudo concept. Similar patterns were found for the pseudo items not displayed.

These findings are a clear indication of the existence of the overclaiming response style common among PISA participating students. Given that students tend to overclaim with varying degrees across education systems, interpreting students' familiarity with real mathematical concepts without any adjustment would be misleading.

Q2: Can overclaiming be adjusted?

Across the 64 education systems, on average, students had an unadjusted familiarity rating of 3.4 for the real mathematical concepts (REAL_MEAN) and a familiarity rating of 2.3 for the pseudo concepts (PSEUDO_MEAN).

Table 1 reveals that, on average, the within-education-system correlation between the *unadjusted* familiarity ratings and math achievement is $r = 0.46$, ranging from -0.01 in Albania (not statistically different from 0) to 0.64 in Korea. The average within-education-system correlation between the *adjusted* familiarity ratings and math achievement is $r = 0.43$, ranging

[2] Norway is not included in the analysis because no data are available for the mathematics familiarity questions.

from 0.01 in Albania (still not statistically different from 0) to 0.69 in Liechtenstein. The change in the correlation brought by the adjustment varies by education system, ranging from a decrease of 0.27 in Macao–China to an increase of 0.26 in Sweden.

At the across-education-system level, before adjustment, there is a very weak relationship (r = 0.16) between students' familiarity and math performance. Although there may be a substantive explanation for having such a weak relationship at the across-education-system level but not at the within-education-system level, it is more reasonable to believe that the across-education-system level correlation of r = 0.16 does not tease out the bias brought by different response styles across education systems. After adjustment, the correlation increases to r = 0.68, which is in line with the findings from the field test of PISA 2012 (Kyllonen and Bertling 2014).

Q3: What percentage of students are identified as overclaimers in each education system?

Based on the average of students' responses to the real and the pseudo concepts, this analysis identifies four types of students in each education system: low claimers, irrational respondents, ideal respondents, and overclaimers. As seen in Figure 2, across the 64 education systems, the percentage of overclaimers ranged from 8% in Korea and Spain to 18% in Sweden. In the United States, 12% of students were identified as overclaimers.

Most of the education systems with high percentages of overclaimers had low performance in mathematics, defined as mathematics performance below the OECD average. A few exceptions include New Zealand and Denmark, which had high percentages of overclaimers, but also higher-than-OECD-average mathematics performance.

Q4: Are there gender gaps in the percentage of overclaimers?

Depending on the education system, there may be a gender gap in the percentage of overclaimers, as shown in Figure 3. In the United States, for example, 11% of girls are overclaimers, as are 12% of boys. The gender gap is not statistically significant in this case. In 31 education systems, however, there are higher percentages of boys than girls who are overclaimers. In 3 education systems, all of which have mathematics performance below the OECD average, higher percentages of girls than boys were identified as overclaimers.

Q5: What is the relationship between students' response patterns and their mathematics performance?

Figure 4 illustrates the average mathematics scores by student group in each education system. The average mathematics scores for overclaimers, which are generally higher than the scores of low claimers and irrational respondents, ranged from 386 in Indonesia to 639 in Shanghai–China. In the United States, students who are identified as overclaimers scored 516 on average, while low claimers and irrational respondents scored 428 and 388, respectively.

Compared with ideal respondents, overclaimers tended to have lower average mathematics scores across the 64 education systems. Except for Macao–China, Albania, and Tunisia, where the gap in the average mathematics scores between overclaimers and ideal respondents is not measurably different, in all other education systems, overclaimers scored, on average, from 26 points (Hong Kong–China) to 100 points (Qatar) lower than ideal respondents.

The score of ideal respondents can be used to provide an adjustment to the score of all students in measuring mathematics performance. The former indicator excludes students who are overclaimers, low claimers, and irrational respondents and, therefore, provides new information about the mathematics performance of an education system. The mathematics score of ideal respondents is 592 points in the United States. It is lowest in Albania (388 points) and highest in Chinese Taipei (672 points).

When ranking the 64 education systems based on mathematics scores of ideal respondents rather than of all students, education systems move up as many as 19 places (from 23rd to 4th in New Zealand) and down as many as 23 places (from 6th to 29th in Macao–China).

Significance

This analysis provides a cross-national picture of students' tendency to overclaim based on the PISA 2012 background questionnaire items. The findings contribute to the existing literature by focusing on students' responses to pseudo concepts, identifying overclaimers, and comparing academic outcomes of student subgroups. The results help us to understand students' response styles across education systems and highlight the importance of accounting for students' different response patterns when interpreting the results, especially in cross-cultural comparisons. Further research could explore ways to improve the validity and reliability of participants' self-reported data on the background questionnaire items, as more valid and reliable background information data can help us better understand how contextual information is related to achievement and allow researchers to have potentially less biased comparisons across education systems.

References

Beaton, Dorcas E., Claire Bombardier, Francis Guillemin, and Marcos Bosi Ferraz. 2000. "Guidelines for the process of cross-cultural adaptation of self-report measures." *SPINE* 3186-3191.

Brown, A, and A Maydeu-Olivares. 2011. "Item response modeling of forced-choice questionnaires." *Educational and Psychological Measurement* 460-502.

Buckley, Jack. 2009. "Cross-national response styles in international educational assessments: Evidence from pisa 2006."

Chen, C., S. Lee, and H. W. Stevenson. 1995. "Response style and cross-cultural comparisons of rating scales among east asian and north american students." *Psychological Science* 170-175.

Cheung, G. W., and R. B. Rensvold. 2000. "Assessing extreme and acquiescence response sets in cross-cultural research using structural equations modeling." *Journal of Cross-Cultural Psychology* 187-212.

Haahr, J. H., T. K. Nielsen, M. E. Hansen, and S. T. Nielsen. 2005. "Explaining student performance: Evidence from the international PISA, TIMSS and PIRLS surveys." Danish Technological Institute.

He, Jia, and Fons Van de Vijver. 2016. "Correcting for scale usage differences among Latin American countries, Portugal, and Spain in PISA." *RELIEVE.*

He, Jia, Janine Buchholz, and Eckhard Klieme. 2017. "Effects of anchoring vignettes on comparability and predictive validity of student self-reports in 64 cultures." *Journal of Cross-Cultural Psychology* 319-334.

Javaras, K. N., and B. D. Ripley. 2007. "An "Unfolding" latent variable model for likert attitude data: Drawing inferences adjusted for response style." *Journal of the American Statistical Association* 454-463.

King, G., C. J. L. Murray, J. A. Salomon, and A. Tandon. 2004. "Enhancing the validity and cross-cultural comparability of measurement in survey research." *American Political Science Review* 341-355.

Kyllonen, Patrick C., and Jonas P. Bertling. 2014. "Innovative questionnaire assessment methods to increase cross-country comparability." Edited by Leslie Rutkowski, Matthias von Davier and David Rutkowski. *Handbook of International Large-Scale Assessment: Background, Technical Issues, and Methods of Data Analysis* (CRC Press).

Loveless, Tom. 2017. *The 2017 Brown Center report on American education: How well are American students learning?* The Brookings Institution, Washington D.C.: The Brookings Institution.

Ludeke, S. G., Y. J. Weisberg, and C. G. DeYoung. 2013. "Idiographically desirable responding: Individual differences in perceived trait desirability predict overclaiming." *European Journal of Personality* 580-592.

Ludeke, Steven, and Guido Makransky. 2015. "Does the over-claiming questionnaire measure overclaiming? Absent convergent validity in a large community sample." *Psychological Assessment.*

Marin, G., R. J. Gamba, and B. V. Marin. 1992. "Extreme response style and acquiescence among hispanics: The role of acculturation and education." *Journal of Cross-Cultural Psychology* 498-509.

OECD. 2014. *The PISA 2012 Technical Report.* OECD, Paris: OECD.

Paulhus, D. L. 2002. "Socially desirable responding: The evolution of a construct." Edited by H. I. Braun, D. N. Jackson and D. E. Wiley. *The role of constructs in psychological and educational measurement* 49-69.

Paulhus, D. L., P. D. Harms, M. N. Bruce, and D. C. Lysy. 2003. "The over-claiming technique: Measuring self-enhancement independent of ability." *Journal of Personality and Social Psychology* 890-904.

Rossi, P. E., Z. Gilula, and G. M. Allenby. 2001. "Overcoming scale usage heterogeneity: A Bayesian hierarchical approach." *Journal of the American Statistical Association* 20-31.

Thomson, Sue, Lisa De Bortoli, and Catherine Underwood. 2017. *PISA 2015: Reporting Australia's results.* Australian Council for Educational Research, Camberwell, Victoria: Australian Council for Educational Research.

Watkins, D., and S. Cheung. 1995. "Culture, gender, and response bias: An analysis of responses to the self-description questionnaire." *Journal of Cross-Cultural Psychology* 490.

Zimmerman, J., P.K.Broder, J.J. Shaughnessy, and B.J. Underwood. 1977. "A recognition test of vocabulary using signal-detection measures, and some correlates of word and nonword recognition." *Intelligence* 5-31.

Appendix A. Questionniare items on students' familiarity to mathematical concepts

Thinking about mathematical concepts: how familiar are you with the following terms?						
(Please tick only one box in each row.)						
Real or Pseudo? (Not revealed to the students)	**Concept**	**Never heard of it**	**Heard of it once or twice**	**Heard of it a few times**	**Heard of it often**	**Know it well, understand the concept**
Real	**Exponential Function**	☐1	☐2	☐3	☐4	☐5
Real	**Divisor**	☐1	☐2	☐3	☐4	☐5
Real	**Quadratic Function**	☐1	☐2	☐3	☐4	☐5
Pseudo	**Proper Number**	☐1	☐2	☐3	☐4	☐5
Real	**Linear Equation**	☐1	☐2	☐3	☐4	☐5
Real	**Vectors**	☐1	☐2	☐3	☐4	☐5
Real	**Complex Number**	☐1	☐2	☐3	☐4	☐5
Real	**Rational Number**	☐1	☐2	☐3	☐4	☐5
Real	**Radicals**	☐1	☐2	☐3	☐4	☐5
Pseudo	**Subjunctive Scaling**	☐1	☐2	☐3	☐4	☐5
Real	**Polygon**	☐1	☐2	☐3	☐4	☐5
Pseudo	**Declarative Fraction**	☐1	☐2	☐3	☐4	☐5
Real	**Congruent Figure**	☐1	☐2	☐3	☐4	☐5
Real	**Cosine**	☐1	☐2	☐3	☐4	☐5
Real	**Arithmetic Mean**	☐1	☐2	☐3	☐4	☐5
Real	**Probability**	☐1	☐2	☐3	☐4	☐5

Appendix B. Categorization of students in each education system

		REAL_MEAN		
		Bottom quartile	**2nd and the 3rd quartiles**	**Top quartile**
PSEUDO_MEAN	**Top quartile**	**Irrational respondents**		**Over claimers**
	2nd and the 3rd quartiles		**Others**	
	Bottom quartile	**Low claimers**		**Ideal students**

Figure 1. Students' responds to real versus pseudo mathematical concepts

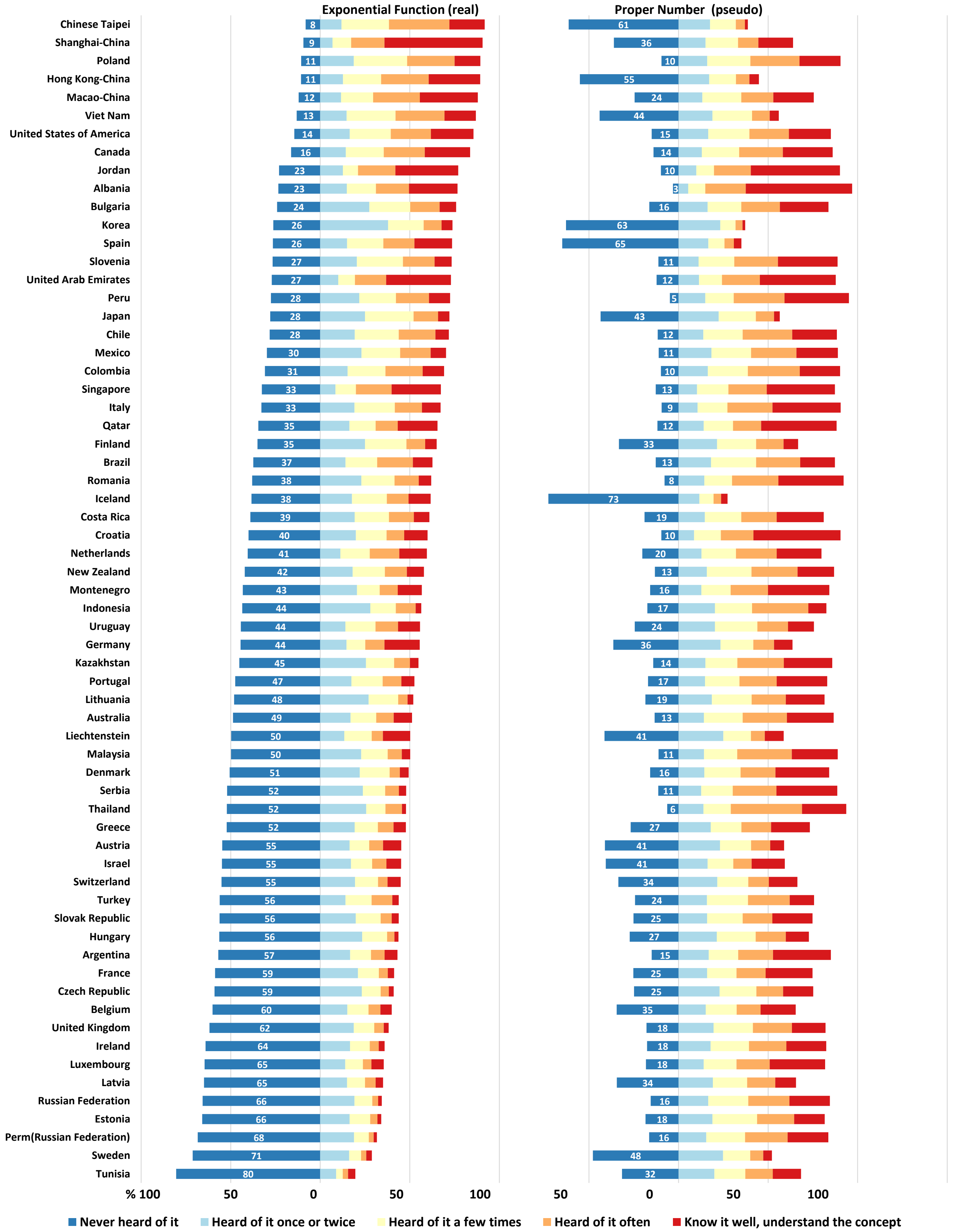

Table 1. Average mathematics scores, familiarity rating to real and pseudo concepts, and within-education correlation between mathematics scores and familiarty ratings											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Education systems	**Mathematics score**	**REAL_MEAN**	**PSEUDO_ME AN**	**ADJUSTED_R EAL_MEAN**	**Within-education-system correlation between (1) and (2)**	**P values of (5)**	**Within-education-system correlation between (1) and (4)**	**P values of (7)**	**Within-education-system correlation between (1) and (3)**	**P values of (9)**	**Gap between (5) and (7)**
Macao-China	538	3.9	2.2	1.7	0.53	0.00	0.26	0.00	0.15	0.00	-0.27
Hong Kong-China	561	3.6	2.0	1.6	0.44	0.00	0.21	0.00	0.14	0.00	-0.23
Singapore	573	3.6	2.4	1.2	0.63	0.00	0.48	0.00	0.13	0.00	-0.16
Shanghai-China	613	4.3	2.0	2.2	0.49	0.00	0.37	0.00	-0.08	0.00	-0.12
Japan	536	3.6	1.7	2.0	0.54	0.00	0.43	0.00	-0.02	0.13	-0.11
Romania	445	3.7	2.9	0.8	0.39	0.00	0.28	0.00	0.05	0.12	-0.10
Viet Nam	511	3.4	1.9	1.6	0.50	0.00	0.40	0.00	0.01	0.81	-0.10
Israel	466	3.4	2.2	1.2	0.48	0.00	0.39	0.00	0.02	0.31	-0.09
Peru	368	3.4	2.9	0.5	0.49	0.00	0.40	0.00	0.11	0.00	-0.08
Malaysia	421	2.8	2.6	0.2	0.36	0.00	0.28	0.00	0.11	0.00	-0.08
Argentina	388	2.8	2.4	0.5	0.38	0.00	0.30	0.00	0.10	0.00	-0.08
Mexico	413	3.2	2.6	0.6	0.40	0.00	0.32	0.00	0.11	0.00	-0.08
Costa Rica	407	3.0	2.3	0.7	0.45	0.00	0.37	0.00	0.07	0.01	-0.07
Jordan	386	3.9	3.2	0.6	0.39	0.00	0.31	0.00	0.08	0.00	-0.07
Chile	423	3.3	2.5	0.9	0.53	0.00	0.46	0.00	0.02	0.32	-0.07
Denmark	500	3.2	2.3	0.8	0.41	0.00	0.34	0.00	0.07	0.00	-0.07
Poland	518	3.6	2.6	1.0	0.46	0.00	0.39	0.00	-0.02	0.25	-0.06
Tunisia	388	3.1	2.5	0.7	0.31	0.00	0.24	0.00	0.00	0.97	-0.06
New Zealand	500	2.8	2.2	0.5	0.54	0.00	0.49	0.00	0.17	0.00	-0.06
United Kingdom	494	2.9	2.2	0.8	0.53	0.00	0.47	0.00	0.11	0.00	-0.06
Netherlands	523	2.8	2.2	0.6	0.60	0.00	0.54	0.00	0.01	0.59	-0.05
Slovak Republic	482	3.2	2.1	1.1	0.54	0.00	0.49	0.00	-0.06	0.02	-0.05
Qatar	376	3.2	2.9	0.2	0.48	0.00	0.43	0.00	0.11	0.00	-0.05
Australia	504	3.0	2.3	0.8	0.58	0.00	0.54	0.00	0.13	0.00	-0.05
Greece	453	3.7	2.2	1.5	0.42	0.00	0.38	0.00	-0.06	0.01	-0.04
Latvia	491	3.8	2.1	1.6	0.45	0.00	0.41	0.00	-0.15	0.00	-0.04
Belgium	515	3.4	2.2	1.3	0.60	0.00	0.56	0.00	-0.13	0.00	-0.04
Brazil	389	3.0	2.5	0.5	0.50	0.00	0.47	0.00	0.07	0.00	-0.04
Czech Republic	499	3.5	2.0	1.5	0.49	0.00	0.45	0.00	-0.05	0.03	-0.04
Thailand	427	3.4	3.0	0.4	0.42	0.00	0.39	0.00	0.02	0.46	-0.04
Ireland	501	2.8	2.0	0.7	0.49	0.00	0.46	0.00	0.10	0.00	-0.04
Korea	554	3.8	1.4	2.4	0.64	0.00	0.60	0.00	-0.16	0.00	-0.04
Canada	518	3.5	2.4	1.1	0.48	0.00	0.45	0.00	-0.01	0.32	-0.04
Uruguay	409	3.1	2.1	1.0	0.52	0.00	0.49	0.00	0.00	0.87	-0.03
United Arab Emirates	434	3.8	2.8	1.0	0.45	0.00	0.42	0.00	0.00	0.86	-0.03
Colombia	376	3.3	2.6	0.7	0.45	0.00	0.41	0.00	0.02	0.51	-0.03
Chinese Taipei	560	3.8	1.7	2.0	0.60	0.00	0.57	0.00	-0.15	0.00	-0.03
United States of America	481	3.5	2.4	1.2	0.53	0.00	0.51	0.00	-0.03	0.10	-0.02
Estonia	521	3.7	2.1	1.6	0.38	0.00	0.36	0.00	-0.07	0.01	-0.02
Serbia	449	3.8	2.8	1.0	0.43	0.00	0.41	0.00	-0.06	0.00	-0.02
Bulgaria	439	3.6	2.6	1.0	0.47	0.00	0.45	0.00	-0.07	0.00	-0.02
Spain	484	3.5	1.6	1.8	0.55	0.00	0.53	0.00	-0.14	0.00	-0.02
Italy	485	3.6	2.4	1.2	0.50	0.00	0.49	0.00	-0.06	0.00	-0.01
Lithuania	479	3.2	2.2	1.1	0.46	0.00	0.45	0.00	-0.08	0.00	-0.01
Finland	519	2.9	1.7	1.1	0.48	0.00	0.47	0.00	0.01	0.43	-0.01
Croatia	471	3.6	2.5	1.1	0.47	0.00	0.47	0.00	-0.08	0.00	0.00
Montenegro	410	3.5	2.8	0.7	0.39	0.00	0.39	0.00	-0.03	0.16	0.00
Perm(Russian Federatio	484	3.7	2.5	1.2	0.37	0.00	0.38	0.00	-0.13	0.00	0.00
Luxembourg	490	3.0	2.5	0.5	0.46	0.00	0.47	0.00	-0.01	0.65	0.01
Portugal	487	3.4	2.4	1.0	0.53	0.00	0.55	0.00	-0.12	0.00	0.01
Kazakhstan	432	3.7	3.0	0.7	0.29	0.00	0.30	0.00	-0.04	0.11	0.01
Austria	506	3.1	2.0	1.1	0.55	0.00	0.56	0.00	-0.15	0.00	0.01
Albania	394	3.9	3.4	0.5	-0.01	0.67	0.01	0.67	-0.02	0.42	0.02
Slovenia	501	3.6	2.5	1.2	0.46	0.00	0.49	0.00	-0.10	0.00	0.03
Germany	514	3.2	2.0	1.2	0.56	0.00	0.59	0.00	-0.16	0.00	0.03
Hungary	477	3.6	2.1	1.5	0.55	0.00	0.59	0.00	-0.22	0.00	0.04
Turkey	448	3.7	2.4	1.3	0.42	0.00	0.47	0.00	-0.18	0.00	0.05
Indonesia	375	3.1	2.9	0.2	0.31	0.00	0.37	0.00	0.00	0.88	0.05
France	495	3.4	2.1	1.3	0.51	0.00	0.57	0.00	-0.20	0.00	0.06
Switzerland	531	2.9	2.1	0.9	0.50	0.00	0.57	0.00	-0.15	0.00	0.07
Russian Federation	482	3.8	2.6	1.2	0.30	0.00	0.38	0.00	-0.18	0.00	0.08
Liechtenstein	535	3.1	2.1	1.1	0.59	0.00	0.69	0.00	-0.24	0.00	0.10
Iceland	493	2.6	1.7	0.9	0.24	0.00	0.40	0.00	-0.09	0.00	0.16
Sweden	478	1.9	1.6	0.3	0.10	0.00	0.36	0.00	-0.12	0.00	0.26
MEAN	474	3.4	2.3	1.0	0.46		0.43		-0.03		-0.03
Min	368	1.9	1.4	0.2	-0.01		0.01		-0.24		-0.27
Max	613	4.3	3.4	2.4	0.64		0.69		0.17		0.26

Figure 2. Percentage distribution of students based on response style

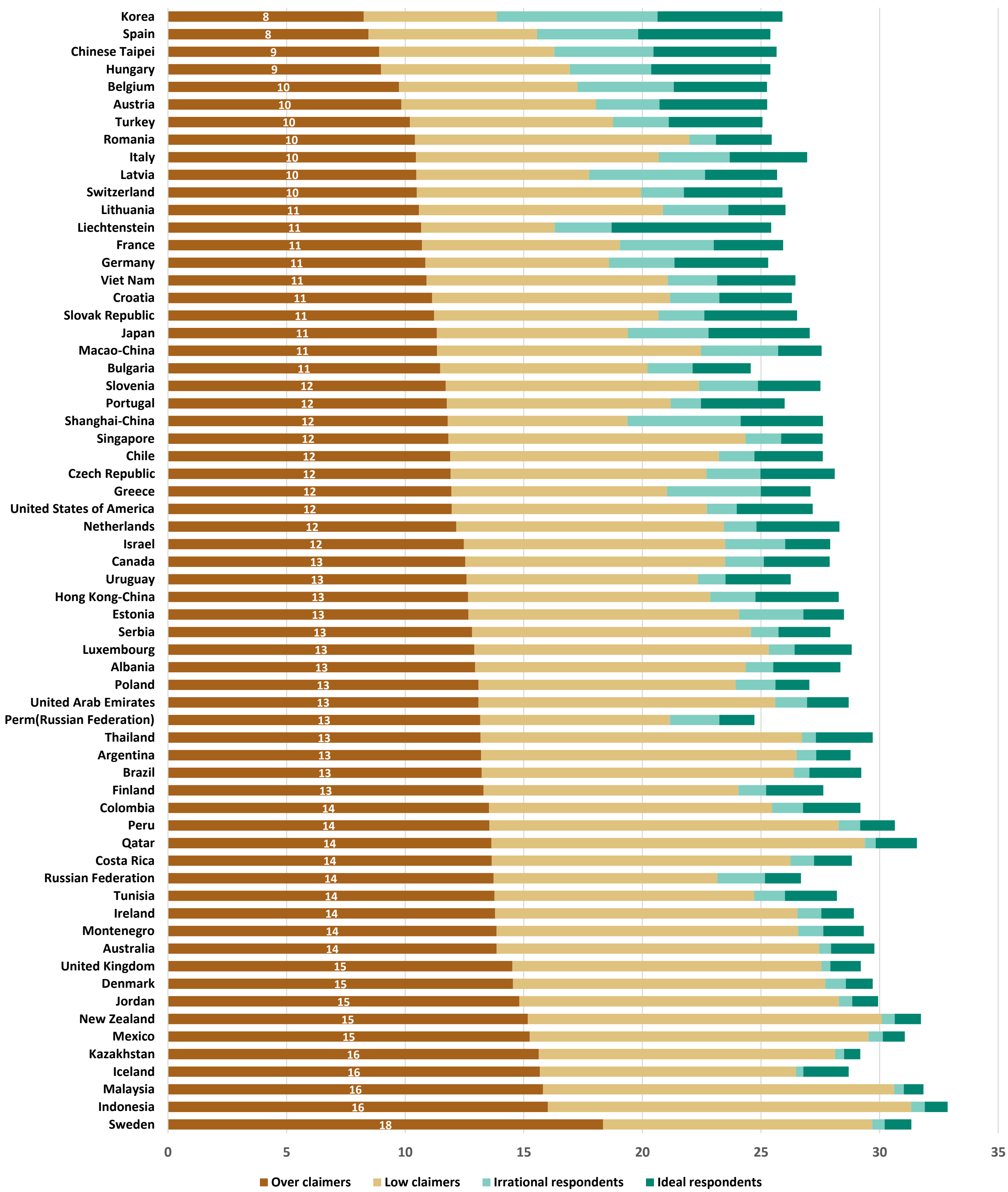

Figure 3. Gender gap in the percentage of over claimers

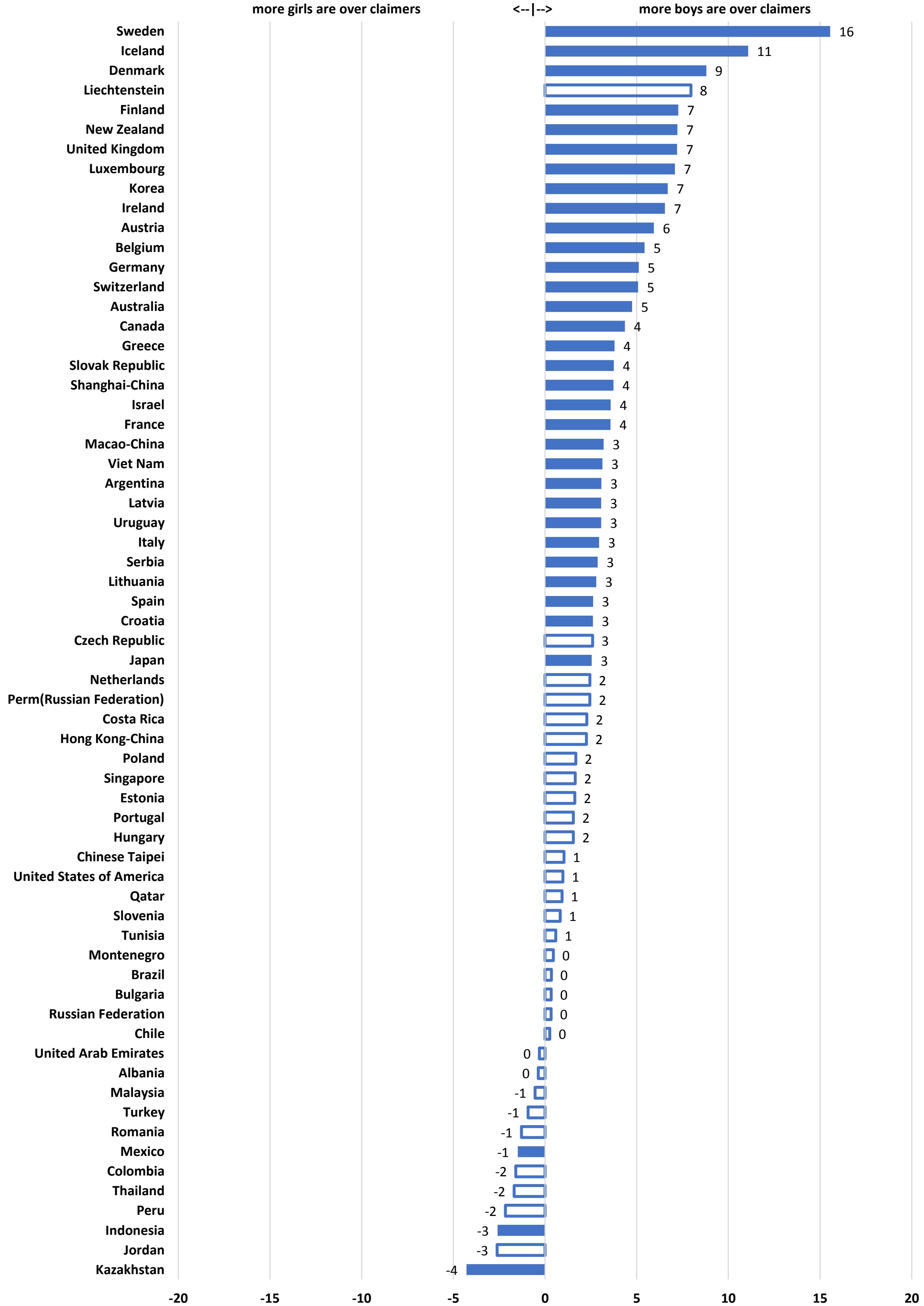

Figure 4. PISA Mathematics scores by student group