

Chapter 4

Country by Country Profiles of

Achievement in Mathematics. This chapter describes in which mathematics country is relatively strong or weak. Regardless of overall standing, the profiles of achievement within countries in many countries performed relatively better or worse in some cognitive domains than they did overall.

Differences in relative performance may be due to more of a number of factors, such as emphases in instruction or the types of items contained in TIMSS 2003 textbooks, differences in instructional implementation, and differences in the match between

Profiles of Achievement

For each country, Exhibit 4.1 displays the difference between average performance in each content area and the country's average performance overall. The first three pages of Exhibit 4.1 show the results for eighth grade and the next two pages show the results for the

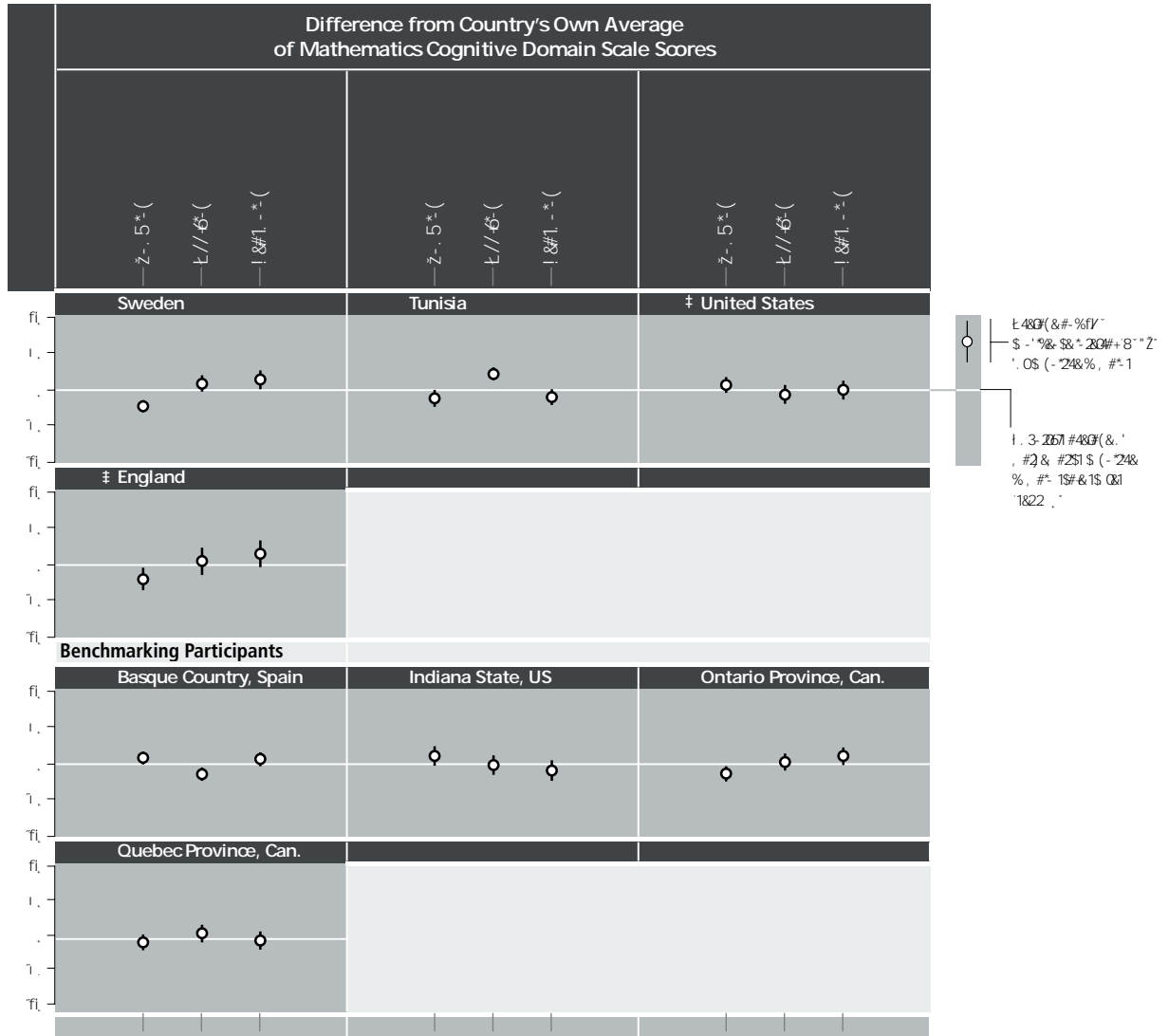
fourth grade. For each country, the average of the cognitive domain scores has been set to zero, so that above average or below average performance can be highlighted for each of the three domains. Relatively better achievement in a cognitive domain is shown when the circle and the lines indicating its confidence interval are completely above and not touching zero on the scale, and relatively worse achievement by a circle and its confidence interval lines completely below “0.”

The profiles of relative performance reveal interesting differences among countries. Most countries show the profile of performing



SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2003

Exhibit 4.1: Profiles of Within-Country Relative Performance in Mathematics Cognitive Domains



SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2003

v @V&dk eSf[eUW Yg[WVf V&X&deS_bWbSdflUbsfja' dSV&e'a' k SXVtdW/SUJ_Wf eLZaa'ei W/W
[UgWw/eWw] Z[[f 5zsfz
S 6[V' af eSf[eUW Yg[WVf V&X&deS_bWbSdflUbsfja' dSV&e/aWw] Z[[f 5zsfz

fourth grade, countries with a relative strength in the knowing domain were Belgium (Flemish), Italy, Singapore, the United States, and the US state of Indiana. Comparatively more countries at the fourth grade had a relative weakness in the knowing domain, including Cyprus, Latvia, Lithuania, the Netherlands, Norway, the Russian Federation, and Slovenia.

Relative Strengths and Weaknesses in the Applying Domain

At the eighth grade, there were fewer countries with differences between overall mathematics achievement and achievement in the applying domain than there were with such differences in the knowing domain. Countries with a relative strength in the applying domain at the eighth grade included Ghana, Singapore, and Tunisia. Those with a relative weakness in the applying domain included Bahrain, Macedonia, and Serbia.

At the fourth grade, Armenia, Latvia, Lithuania, and the Russian Federation had applying as a particular strength. Compared to performance in overall mathematics, applying was a relative weakness in Australia, New Zealand, Norway, the United States, the US state of Indiana, and the two Canadian provinces (a group including three English-speaking countries).

Relative Strengths and Weaknesses in the Reasoning Domain

Countries with the reasoning domain as a particular strength at the eighth grade included Bahrain, Chile, Ghana, Japan, Norway, the Palestinian National Authority, Saudi Arabia, Scotland, South Africa, and Sweden. Countries that performed less well in the reasoning domain than they did in overall mathematics included Armenia, Botswana, Cyprus, Hong Kong, Israel, Lebanon, Lithuania, the Philippines, Romania, the Russian Federation, Serbia, and Singapore.

At the fourth grade, the participants with a relative strength in reasont

the two Canadian provinces. Only two countries, Belgium (Flemish) and Singapore, did relatively less well in reasoning as compared to their overall mathematics performance.

International Achievement Across the Cognitive Domains

At the eighth grade across the TIMSS 2003 participants, the knowing domain had the most differences, with many countries showing either a relative strength or weakness in this area. Fifteen countries performed better in the knowing domain than they did in mathematics overall, and 12 countries and the Canadian province of Ontario performed worse. The applying domain was the cognitive area least likely to feature either relatively strong or relatively weak performance. Only three countries performed better in the applying domain than they did in mathematics overall (Ghana, Singapore, and Tunisia) and only three countries performed worse (Bahrain, Macedonia, and Serbia).

In the reasoning domain at the eighth grade, 10 countries performed relatively better than they did in mathematics overall and 12 countries did less well. The countries making up each of the two groups included those from very different parts of the world geographically and with disparate cultures and mathematics traditions. For example, the countries with a relative strength in the reasoning domain were Bahrain, Chile, Ghana, Japan, Norway, the Palestinian National Authority, Saudi Arabia, Scotland, South Africa, and Sweden.

At the fourth grade, looking across the participating countries, about the same number of differences (strengths or weaknesses) occurred in each of the cognitive domains. However, several more countries showed a relative weakness in the knowing cognitive domain (seven) than had this domain as a relative strength (five). Similarly, more countries had a relative weakness in the applying domain (seven) than had this domain as a relative strength (four). In comparison, more countries showed a relative strength in the reasoning domain (seven) than showed this domain as a relative weakness (two).