# IOWME NEWSLETTER

## VOLUME 24, NUMBER 1, March 2010


**Convenor of IOWME:** Olof Bjorg Steinthorsdottir

**Newsletter Editor:** Tamsin Meaney

**Copy Editor:** Ginny Keen

**Technology Co-ordinator:** Christine von Renesse [cvonrenesse@wsc.ma.edu]

http://extra.shu.ac.uk/iowme/


**INTERNATIONAL ORGANISATION OF WOMEN AND MATHEMATICS EDUCATION**

An affiliate of the International Commission on Mathematical Instruction

The scarf on the front page was one of many scarves knitted by a faculty and students at the University of Iceland, School of Education. The activity was organized by Jonina Vala Kristinsdottir and Hafdis Gudjonsdottir.

Olof received the scarf as a gift after presenting at NORSMA (The Nordic Research network on Special Needs Education inMathematics) in Reykjavaik Iceland.

# Welcome to the first IOWME Newsletter of 2010

Life as an academic is very busy. Although we had hoped to produce two or three editions of the IOWME newsletter each year, lack of time of our contributors and myself means that this has not eventuated. We hope that it may be possible to produce a few more editions this year, but we are reliant on contributions so your help is very much appreciated. If you have something to say about women in mathematics education or about gender issues in mathematics education then please send it to me at the email address below.

This edition contains some informative material about a number of issues including gender in mathematics education in Iceland. This continues our series of gender issues in different countries. We also mention two books on gender issues that have come out recently. As well, there are links to the knitting patterns for Mobius Strip Scarves that decorate the front cover of this newsletter.

On an entirely different note, we have received a request for help from Ghanaian Women in Mathematics in setting up an Eastern Regional chapter. If you are interested in reading more about this project you can go to: womeninmaths.wordpress.com

This last week-end, I hosted a group of women who I went to school with 30 years ago. It was fascinating to hear about how their lives had evolved. My background and the recent Australian discussions about national testing meant that it was not surprising that some of our discussion was about our own school mathematics education. Like many of the stories in the research the main memory was about the teachers who made a difference. It was fascinating to find that one woman, who had dropped mathematics as soon as she could, now is involved in an accounting degree and is absolutely loving it. If only she had had the inspiring teacher that some of us had had then maybe her life would have been very different. Not better, just different but it may have given her other choices earlier so she did not have to do her university entrance qualification when she was in her forties. Mathematics education does affect women's lives in a variety of different ways.

Tamsin Meaney (IOWME newsletter editor)

tmeaney@csu.edu.au

# Contents



# Gender and the urban-rural differences in mathematics and reading: An overview of PISA 2003 results in Iceland

Ragnar F. Ólafsson, Almar M. Halldórsson, and Júlíus K. Björnsson.

Previously published in: Mejding, J. & Roe, A. (Eds.) (2006). *Northern Lights on PISA 2003 – a reflection from the Nordic Countries*. Copenhagen, Denmark: Nordic Council of Ministries.
(Reprinted with permission from the authors.)

In this chapter, the performance of Icelandic students in mathematics and reading in PISA 2003 will be examined. The variation in performance between urban and rural regions will be explored and compared to indications from the Icelandic National Examinations for the 10th grade, which show that girls perform better than boys in mathematics. In Iceland, girls generally also do better than boys in the PISA mathematics, reading, science and problem solving assessments. This is an unusual situation as the PISA results for other countries show that boys are generally better at mathematics, and therefore it is important to explore this further.

The literature on educational achievement abounds with results on gender differences in reading and mathematics (e.g. Caplan et al., 1997) and all kinds of social and cognitive explanations for the differences have been put forward. However, it is almost impossible to find any studies where girls do consistently *better* than boys in mathematics, although many researchers have shown that the well-documented gender gap in maths favouring boys appears to be diminishing (e.g. Walkerdine, 1998). A recent summary of international comparative studies indicates that the gender differences in mathematics achievement are generally rather small and in favour of boys (Stephens, 2003) and there are indications that a number of variables in the tests themselves - item format, reading load and text length, to name but a few - influence the results. However, none of the variables identified in the literature are really useful in explaining the reverse gender difference observed in Iceland. It is therefore important to understand this Icelandic phenomenon better.

Why then are girls so much better at mathematics in Iceland than in other countries? A possible interpretation for both the gender and urban-rural differences is the so-called 'Jokkmokk effect'. The Jokkmokk effect is a popular concept suggesting that boys in rural areas have values that prevent them from focusing on academic studies, while the girls in rural areas are perceived to see little hope for the future unless they concentrate on academic achievement, which ultimately enables them to move away and have a future elsewhere (see e.g. Ripley, 2005 for one example of this popular discussion). According to this explanation there should be a close link between urban-rural differences in academic performance and gender differences in performance.

Before attempting to verify the above phenomenon, we evaluated the reliability of the findings by comparing the results with other available data sets for the same population. The outcome of the initial analyses of the PISA data in Iceland led to an exploration of regional and gender differences in the Icelandic National Examinations for the 10th grade for the year 2003 and previous years. This was done to test whether the gender differences in individual regions were consistent. The gender difference in a particular region must be observed consistently for several years at least, before searching for explanations for the difference in the particularities of the region. Potential explanations could be gender-specific unemployment, particularly attractive job opportunities for young men with few educational qualifications etc. In an attempt to explain the gender differences in Iceland, differences between schools were also explored, i.e. whether some schools consistently favoured girls or boys.

**Delimiting regions**

To compare the performance in mathematics and reading in urban vs. rural areas in Iceland, it was decided to divide the country into three regions which reflect the uneven geographical distribution of the population. Over half the population of Iceland lives in Reykjavík and its immediate surrounding area. This area is called the Greater Reykjavík Area, but is generally analysed as two separate areas in social research, namely Reykjavík and the Outer Reykjavík area. It could be argued, however, that these two areas are homogeneous with respect to life style and living conditions. Both units are urban and economically similar. Outside the Greater Reykjavík Area is the much larger sparsely populated area. It consists of small coastal towns and villages, scattered along the coast-line where people's livelihood has traditionally been based on fishing, and rural areas where farming is the main livelihood, and there are a few larger towns (from 4000 to 16 000 inhabitants) which form service and industrial centers for the more sparsely populated surrounding fishing and agricultural areas.

Thus, the division of Iceland into three regions: Reykjavík, the Outer Reykjavík area and the rural area is somewhat arbitrary and does not reflect any uniformity in the way of life or culture within each region. These geographical regions are therefore likely to need revision and more refined analyses that look beyond crude geographical divisions may be needed later. The population size of these three geographical regions is broadly similar. The number of 15-year-old students in Reykjavík in 2003 was 1090, while the Outer Reykjavík area contained 824 students and the rural area contained 1434 students.

**Results: Performance in mathematics**

Iceland is in 12th position compared to the other 41 participating countries, and in 9th position compared to the OECD countries. It should be noted that this ranking of countries is tentative, as the confidence intervals are quite large. Based on confidence intervals, Iceland is in 13th to 18th position among the 41 participating countries and in 8th to 16th position in comparison to the OECD countries. Among the Nordic countries, Iceland's ranking is average, not statistically different from Sweden and Denmark but better than Norway and worse than Finland. Table 1 shows the mean performance in the PISA 2003 mathematics test overall and in each of the tasks for the three regions described above and the country as a whole (Björnsson et al., 2004).

The mean performance of 15-year-old students in Reykjavík in mathematics in PISA 2003 is 522 points, with a standard error of 2.8, which means that with 95% certainty the average performance is between 516 and 527. Within the mathematics tasks, the students' performance is more varied. As the table shows, the performance is best on the *uncertainty* tasks (537 points), based on questions related to statistics and probability. These are also the tasks where the gender difference is smallest.

The table also shows that there is very little difference between Reykjavík and the Outer Reykjavík area in mathematics. The total scores are 522 and 520 respectively. This is not surprising, given the similarity in overall lifestyle in these two adjacent geographical regions. However, the performance in the rural area is markedly lower, with a total score of 507. It is of particular interest to note that girls in rural areas perform no worse than girls in the two urban areas and even have higher average scores in some cases. It is the boys who bring down the average in the rural area, scoring only 496 compared to 520 scored by girls in the rural area and 516 and 518 scored by boys in the two urban areas. Thus it turns out that in PISA 2003 the gender difference in performance is much larger in the rural area, and is not significant in the two urban areas. This requires an explanation.

Table 1. *The performance of Icelandic students in Mathematics in PISA 2003 by geographical area*

| | | Math | SE | Space & Shape | SE | Change & Relation-ships | SE | Un-certainty | SE | Quantity | SE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Reykjavík | Girls | 526 | 3.8 | 512 | 3.9 | 519 | 3.7 | 536 | 4.1 | 532 | 3.8 |
| | Boys | 518 | 4.1 | 505 | 4.2 | 512 | 4.3 | 538 | 3.8 | 509 | 4.3 |
| | Total | 522 | 2.8 | 509 | 2.8 | 515 | 2.7 | 537 | 2.5 | 520 | 2.7 |
| Outer Reykjavík area | Girls | 524 | 4.7 | 513 | 4.9 | 514 | 5.1 | 535 | 5.0 | 531 | 5.7 |
| | Boys | 516 | 4.1 | 505 | 4.6 | 515 | 4.9 | 535 | 4.8 | 508 | 4.8 |
| | Total | 520 | 2.8 | 509 | 3.0 | 514 | 3.0 | 535 | 2.8 | 519 | 3.1 |
| Rural | Girls | 520 | 3.4 | 509 | 3.8 | 511 | 3.8 | 527 | 3.8 | 523 | 3.6 |
| | Boys | 496 | 3.5 | 485 | 3.5 | 494 | 3.7 | 508 | 3.5 | 488 | 3.7 |
| | Total | 507 | 2.6 | 497 | 2.6 | 502 | 2.6 | 517 | 2.6 | 505 | 2.8 |
| Total | Girls | 523 | 2.2 | 511 | 2.3 | 514 | 2.3 | 532 | 2.4 | 528 | 2.3 |
| | Boys | 508 | 2.3 | 496 | 2.4 | 505 | 2.4 | 524 | 2.5 | 500 | 2.5 |
| | Total | 515 | 1.4 | 504 | 1.5 | 510 | 1.4 | 528 | 1.5 | 513 | 1.5 |

**Unusual gender difference in Iceland**

The usual outcome in other countries is that girls always perform better in reading than boys, and boys generally perform better in mathematics than girls. This pattern is not observed in Iceland. The gender difference in reading is larger in Iceland than in any other country in PISA 2003 and Iceland is the only country where girls have a considerable advantage over boys in mathematics. The girls have an overall 15 point advantage over boys. The country most similar to Iceland in this respect is Thailand, where girls have a 4 point advantage over boys, which is not significant. The four countries with the smallest gender difference in favour of boys (albeit non-significant) are not OECD countries: Serbia, Latvia, Indonesia and Hong Kong-China.

In the other Nordic countries the tendency is for boys to perform better in mathematics. This tendency is strongest in Denmark (17 points), but in Sweden, Finland and Norway it is low (7, 7 and 6 points respectively; OECD, 2004). Table 2 shows the gender difference in the mathematics test scores overall and for the individual tasks in the captial Reykjavík, the Outer Reykjavík area and the rural area. The table shows the points advantage for either gender for each of the mathematics tasks.

Table 2. *Gender difference in mathematics by geographical area*

| | | Maths totals | Space & shape | Change & relationship | Uncertainty |
|---|---|---|---|---|---|
| Reykjavik | Girls | 8 | 7 | | |
| | Boys | | | | 2 |
| Outer Reykjavik area | Girls | 8 | 8 | | 0 |
| | Boys | | 1 | | |
| Rural | Girls | 25* | 25* | 17* | 18* |
| | Boys | | | | |
| Total | Girls | 15* | 15* | 9* | 7 |
| | Boys | | | | |

*p<=0.05

Significant gender differences are only observed in rural Iceland, with the exception of the *quantity* tasks, where the difference is marked and significant everywhere in the country. Boys are better than girls in only two cases: in Reykjavík they perform better in the *uncertainty* tasks and in the Outer Reykjavík area they perform better in the *change and relationships* tasks. However, these differences are small and non-significant.

Figure 1 shows that there is a considerable difference in proficiency levels between regions and by gender. Interestingly, Reykjavík is similar to the national average with 6% of boys and 2.8% of girls falling into level 0. In the Outer Reykjavík area, the difference between genders is smallest. At the other end of the scale (level 6) far more boys are ranked at level 6 in Reykjavík than in the other two areas. Reykjavík thus seems to contain a large proportion of both low and high achievers. The percentage of poorly performing boys is, however, greatest in the rural area, with 7% of the boys ranked at level 0. The picture of regional differences is therefore similar, whether we look at proficiency levels or at test averages. If the gender differences in proficiency levels by region are examined, it is clear that in both urban areas, there is a greater proportion of boys ranked at level 6 compared to girls. However, in the rural area, there are more girls in level 6 than boys.

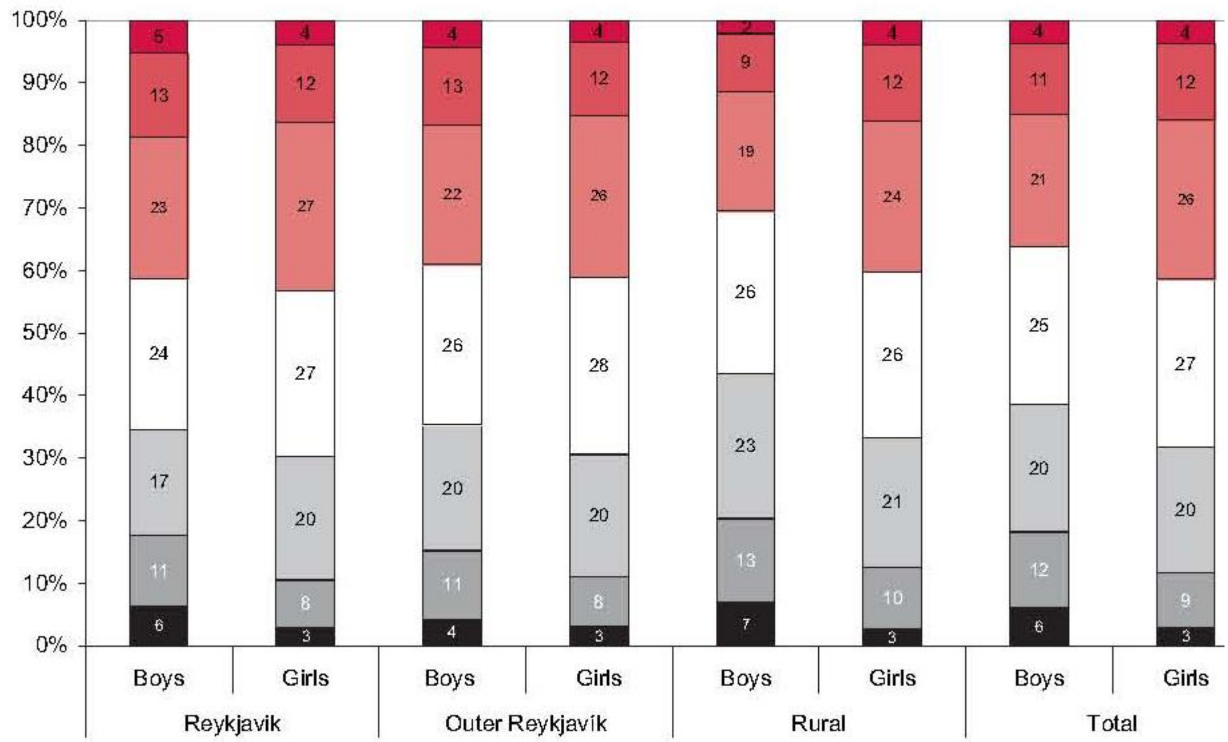



Figure 1. *Percentage of students at each proficiency level by region*

**Other PISA subjects**

There is a similar gender difference in all PISA 2003 subjects in Iceland. Girls score 15 points higher than boys in mathematics. In reading, girls score 58 points higher than boys, which is the largest difference in any of the participating countries. In science, the girls' advantage is 10 points (equal to Tunisia, with no other country showing a higher difference) and in problem solving the difference is 30 points, by far the greatest difference favouring girls in the whole study. The performance of Icelandic students in reading, broken down by region and gender, can be seen in table 3 below. Table 3 shows that there is a very large difference between the genders in favour of girls in all three regions. There is no difference between rural and urban areas. Whatever factors influence performance in rural and/or urban areas seem to be affecting the subjects in different ways.

Table 3. *Performance in reading and gender difference by region*

| | | Reading | SE | Gender difference –points- |
|---|---|---|---|---|
| Reykjavik | Girls | 529 | 3.7 | |
| | Boys | 469 | 4.2 | |
| | Total | 498 | 2.6 | 60* |
| Outer Reykjavik | Girls | 518 | 4.2 | |
| | Boys | 470 | 5.2 | |
| | Total | 493 | 3.3 | 48* |
| Rural | Girls | 518 | 3.2 | |
| | Boys | 457 | 3.4 | |
| | Total | 486 | 2.5 | 61* |
| Total | Girls | 522 | 2.2 | |
| | Boys | 464 | 2.3 | |
| | Total | 492 | 1.6 | 58* |

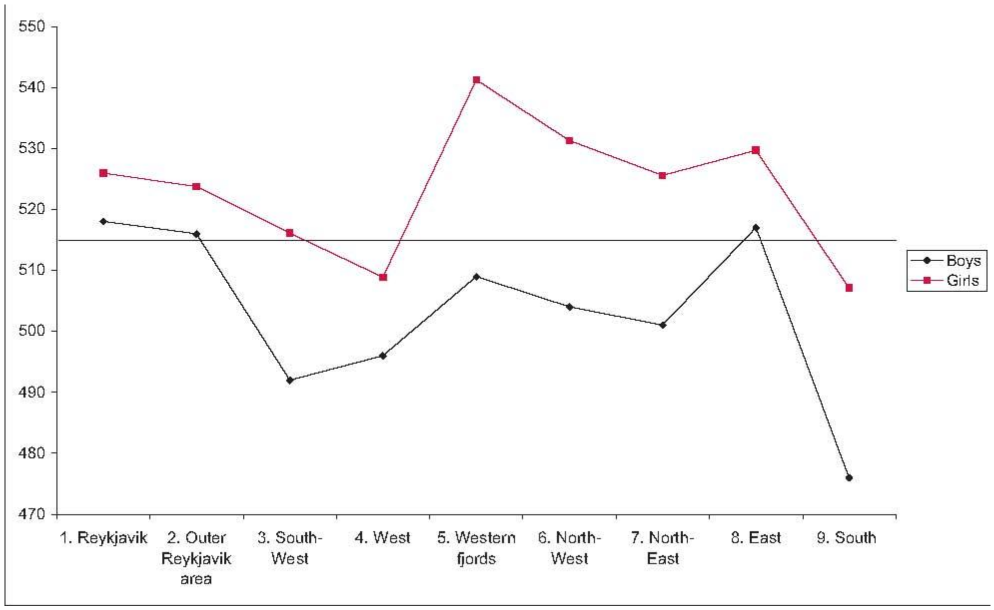
$P<=0.05$

## Are these results reliable?

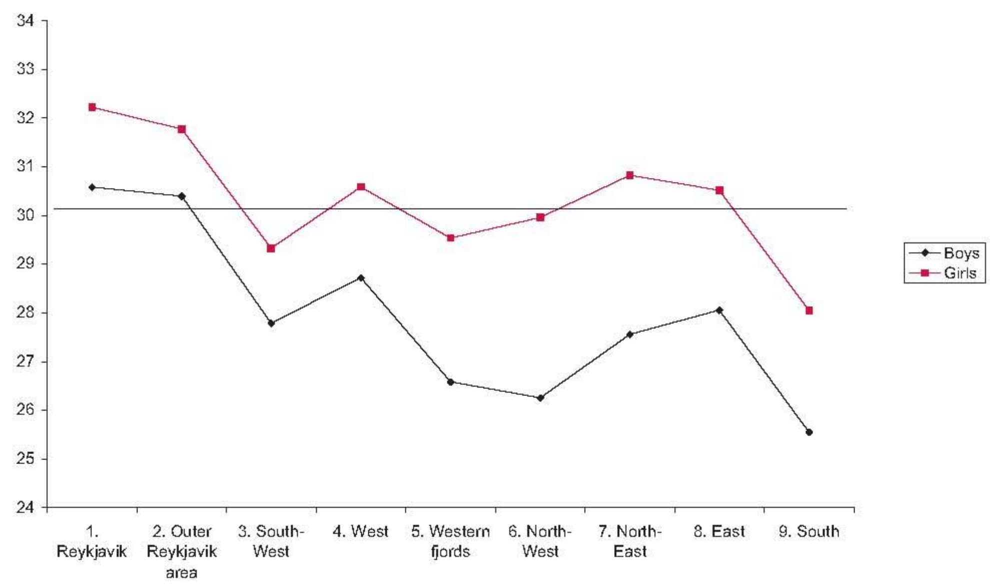
A number of explanations are possible for the gender and regional differences observed and many lines of research can be considered depending on theoretical inclinations. How can we explain the strong and unusual gender difference favouring girls recorded in Iceland in all subject areas tested in PISA 2003? We mentioned earlier the 'Jokkmokk effect', according to which the boys in rural areas are attracted by well paid jobs and away from learning, while the lack of similar opportunities for girls steers them towards pursuing their academic studies. In the light of the findings above this theory deserves closer attention.

But first of all, let us assess the reliability of the above findings. We will focus on mathematics, since it is the main subject area in PISA 2003. Are girls in rural areas systematically outperforming boys year after year? To assess the stability of the regional gender difference over several years we analysed the Icelandic National Examinations (INE) for 15-year-olds as this allows yearly comparisons, whereas there is a 3 year interval between PISA studies.

For this analysis the concordance between the PISA results and the Icelandic National Examinations for 10th grade students was explored, in order to discover whether we were justified in using the Icelandic National Examinations to test the consistency of the gender difference found in PISA. The aim of these two tests is not identical and the rationale behind them is different. However, one would expect that mathematics tests in both PISA and the Icelandic National Examination assess to a large extent the same thing. In figure 2 the results for both tests are compared by geographical region. For the purposes of this comparison, the rural region is broken down into smaller areas for a more detailed analysis. Figure 2 shows the performance of girls and for boys in the two tests by region.




*Mean performance of girls and boys on the PISA 2004 Mathematics scale by region*




*Mean performance of girls and boys on the 2004 Icelandic National Mathematics Test by region*

Figure 2. *Comparison between gender difference by region on PISA 2003 and the Icelandic National Examination 2004*

We see that the performance of students overall and the gender difference are similar in each region for both tests in 2003. This figure shows that there is a fair agreement between the PISA and Icelandic National Examinations assessments for 15-year-olds, giving mutual concurrent validity to both tests. Having established that there is a fairly good agreement between the PISA and Icelandic National Examination results in the ranking of performance by region, we can move on to explore the reliability of the gender differences over several years.

Having established that there is a fairly good agreement between the PISA and Icelandic National Examination results in the ranking of performance by region, we can move on to explore the reliability of the gender differences over several years in different regions. Figure 3 shows gender difference by region in the Icelandic National Examinations from 1996 to 2004.

Figure 3 shows that there is very little similarity over the years between the performance of girls and boys in each region. Thus, the findings linking gender differences to particular regional characteristics are not consistent. Even when rural areas are compared to urban areas gender differences are not consistent over time. The years 2000 and 2003 are a good example of this inconsistency. In 2000, there is very little gender difference in the rural areas but a marked difference in the urban areas, while in the year 2003, the situation is reversed.

**The school effect?**

To explore whether some schools could be said to favour one gender over the other separate analyses were conducted on the Icelandic National Examination results for 10th grade students from 1996 to 2003. The gender difference in each school was computed, with the male average in each school being subtracted from the female average in the same school. This produced eight variables, one for every year, showing the degree to which each school favoured girls that particular year. These eight variables were then correlated using Spearman’s correlation. The assumption was that if something about a particular school favoured either gender one year, it would be likely that this would be repeated the following year and in later years, thus yielding a positive correlation between years.

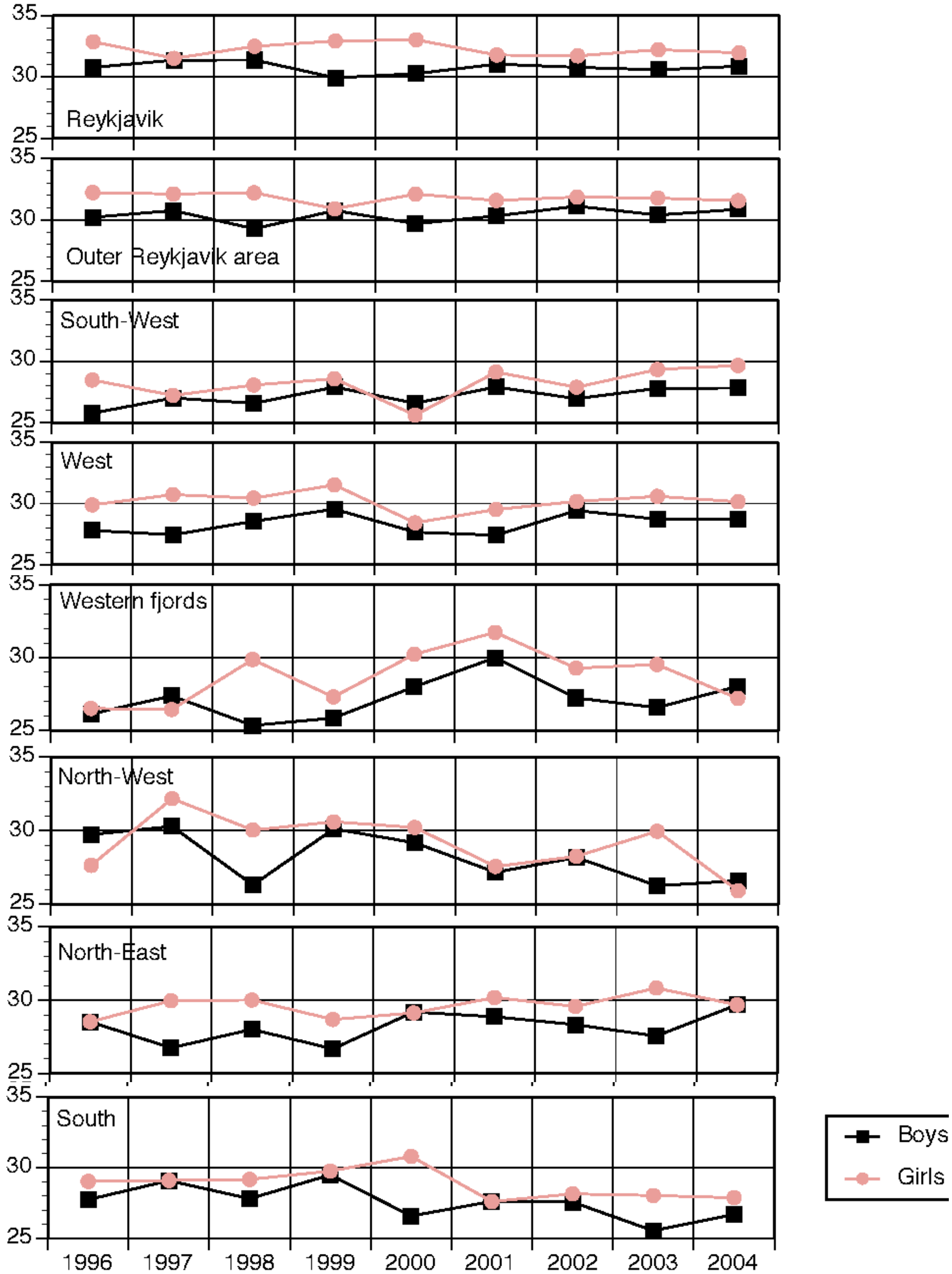



Figure 3. *Gender difference in the Icelandic National Examinations 1996-2004 by region*

However, as table 4 shows, there is only a significant correlation between 2 pairs of years and one of these correlations is negative. Such correlations are likely to be obtained by chance. Overall, the results indicate that there is no consistency in the degree to which a school favours either gender

Table 4. *Correlation of gender difference between schools in 1996 – 2003*

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| 1996 | -0.002 | -0.126 | -0.79 | -0.166 | -0.06 | -0.052 | -0.061 |
| 1997 | | 0.042 | -0.118 | -0.029 | 0.193* | -0.112 | 0.050 |
| 1998 | | | 0.077 | 0.088 | 0.145 | 0.179 | -0.007 |
| 1999 | | | | -0.039 | -0.052 | 0.009 | 0.118 |
| 2000 | | | | | 0.021 | -0.049 | -0.026 |
| 2001 | | | | | | 0.058 | -0.055 |
| 2002 | | | | | | | -0.207* |

*Correlation is significant at the 0.05 level (2-tailed).

**The relationship between reading and mathematics**

When viewing the overall PISA 2003 and PISA 2000 results it is clear (OECD, 2003) that a very strong correlation between performance in reading and mathematics exists. The correlation in PISA 2003 is around 0.6 for most countries and slightly higher for Iceland. This means that students who are better at reading are also generally better in mathematics. Results show that when the maths performance of boys and girls is compared, if the effect of reading ability is controlled for, then, unexpectedly, the Icelandic boys are a little better at mathematics than the girls. In other words, given equal proficiency in reading, boys can be expected to be slightly better at mathematics than girls. This relationship between reading and mathematics is therefore an important factor, suggesting that looking at the maths gender differences in isolation from performance in other subjects is perhaps pointless. As Iceland has the largest gender gap in reading in PISA 2003, the above correlation would therefore predict that girls should perform strongly in mathematics compared to boys. This appears to hold true for most of the participating countries in PISA generally; when the gap favouring girls in reading is smaller the boys generally perform better in mathematics. In Iceland where the gender gap in reading favouring the girls is large, we should therefore also see the smallest gender difference in maths favouring boys or indeed a gender difference in favour of girls, as was the case in PISA 2003. This simple relationship between reading and mathematics is of course not isolated from or uninfluenced by all the background variables that have been implicated in gender differences. The relationship is also not completely linear but it appears clear that it is very strong and perhaps stronger than any other relationship used to explain the gender differences in educational achievement. For further discussion of this issue, see the chapter by Roe and Taube (this volume). This relationship can therefore also be used to explore the regional differences examined earlier, as the reading gap is generally also bigger in rural than in urban areas. But this needs further research and is outside the scope of this chapter.

## Gender differences at the international level

Our attempts to analyze gender differences favouring girls in the PISA 2003 mathematics test results in Iceland at the national level or in terms of regional or school differences have not yielded conclusive results. However, further avenues for research can be pursued at the international level. The results of a number of international studies can be correlated with the gender differences observed in PISA across countries. Our initial analyses of these studies have found that gender differences in favour of girls are associated with positive measures of women's empowerment: a high level of women's empowerment correlates with a better performance by girls in comparison to boys within each country. Similarly, gender differences can be correlated with international measures of corruption, democratic development, economic situation etc. There is much research to be done in these areas in order to understand the unusual Icelandic gender gap, and the results of this research will be reported in a separate publication.

## Conclusion and discussion

Overall, the results of these analyses can be summarized as follows. We find that the regional difference and gender difference in PISA 2003 results are replicated within the same year in the Icelandic National Examinations for the 10$^{th}$ grade. This finding *per se* is evidence for the validity of both tests. In addition, this similarity justifies our use of National Examination results for other year groups in our search for an explanation of the PISA results.

However, we find that gender differences in each region in the Icelandic National Examination are inconsistent from one year to the next, which makes it difficult to associate gender differences with particular regional characteristics. Also, we find that there is no consistency within schools as to whether they favour boys or girls. A school which shows girls to be better one year may show the opposite the next year.

Our attempts to explain why boys perform worse in rural Iceland than girls and than boys in the rest of the country have thus far not proved fruitful. There is great variability in gender differences within rural and urban areas and between years and schools. Unless gender and regional differences are found to be consistent across subjects and over time, there is little point in looking for established regional characteristics to explain the differences observed in one year. With the addition of the PISA 2006 results for *Link items* which will be published in 2007, results from 2000, 2003 and 2006 for mathematics, reading and science can be combined on a 3-point timeline and trends in gender differences using the PISA results can be studied more reliably and compared to the results presented in this chapter for the Icelandic National Examinations.

We believe that a combination of approaches, local and international, is necessary to throw further light on these gender and regional differences. The inconsistency in the differences in performance analysed by gender and region does indicate that gender differences in Iceland cannot be explained by the simple 'Jokkmokk effect' and that there are considerably more complex relationships at work. Over the past few decades, migration between certain parts of the country has increased considerably, mostly characterized by movement from rural to urban areas. This has surely had an effect but it is very difficult to relate this effect directly to the gender differences observed in the PISA results. During the last 10 years there have also been considerable socio-economic changes in Iceland, with the population generally doing better economically. These changes have not yet been related to outcomes of educational measurements, but we would expect to see a correlation between these variables.

## References

Björnsson, J.K., Halldórsson, A.M. & Ólafsson, R.F. (2004). *Stærðfræði við lok grunnskóla: Stutt samantekt helstu niqurstaqna úr PISA 2003 rannsókninni.* Reykjavík: Námsmatsstofnun. (Icelandic PISA 2003 Report, Educational Testing Institute).

Caplan, P.J., Crawford, M., Hyde, J.S & Richardson, J.T.E. (Eds). (1997). *Gender Differences in Human Cognition*. New York: Oxford University Press.

OECD (2003). *Learning for Tomorrows World*. First results from PISA 2003. OECD Paris.
Ripley, A. (2005). Who says women can't be Einstein. *Time Magazine* March 7, 2005.
Roe, A. & Taube, K. (2006). How can reading abilities explain differences in maths performances? J. Mejding, & A. Roe, (Eds.) *Northern Lights on PISA 2003 – a reflection from the Nordic Countries*. Copenhagen, Denmark: Nordic Council of Ministries.
Stephens, M. Gender Differences in Achievement. In J.H. Moskowitz & M. Stephens. (2003). *Comparing Learning Outcomes*. *International Assessment and Educational Policy*. London: Routledge Falmer.
Walkerdine, V. (1998). Counting Girls out: Girls and Mathematics. London: Falmer Press.

## Mathematical Relationships in Education: seminar and book launch

In the UK, as in many other countries, results in mathematics examinations are getting better and better and yet more and more people are choosing to reject mathematics as soon as they get the chance. To make sense of this situation, we set out in 2005 along with Margaret Brown and Melissa Rodd to organise a series of seminars that focused on the relationships that learners form with mathematics. Central to these relationships is the learner's developing sense of self and their understanding of the part played by mathematics in it. The seminars were funded by the Economic and Social Research Council and the British Educational Research Association. They took us on a journey through the recurring issues of assessment, pedagogy, curriculum, choice and teacher development, as we explored each from a sociocultural, discursive and psychoanalytic perspective.

There is a record of these seminars including videos of many of the talks at http://www.lancs.ac.uk/fass/events/mathematicalrelationships/.

This journey reached a climax on Tuesday 22nd September when we held an event at London South Bank University to celebrate the publication of the book *Mathematical Relationships in Education* by Routledge. This book grew from contributions and discussions in the original seminar series. Like the series, it brings together researchers from inside and outside of mathematics education, including many who, like the three of us, prefer to identify as both inside and outside of mathematics education. It runs through the same familiar issues, in each case taking sociocultural, discursive and psychoanalytic perspectives on identity. At the book launch on the 22nd, we took a similar approach: we each looked at the same two interviews with two young women in post-compulsory education, using different theoretical tools to analyse and re-tell their stories – the result was an illustration of the differences (and similarities) that can arise when data are analysed differently. As well as the three of us, Jim Ridgway, Durham University, introduced the research which generated the interviews, and Stephen Lerman, London South Bank University, responded to the different stories.

Laura Black, Heather Mendick and Yvette Solomon

## Mobius Strip Knitting Patterns

Olly Steinthorsdottir provided the photo on the front cover of the knitted mobius strip scarf. Trude Fosse from Norway provided the links for the patterns for these scarves:

http://www.toroidalsnark.net/mkmb.html

http://www.geom.uiuc.edu/docs/doyle/mpls/handouts/node15.html

# Conference Reports

## Psychology of Mathematics Education 33, Thessaloniki, July 2009

AT PME 33, there were a number of papers that had a gender focus. With permission of the authors, we have reproduced the following abstracts from the proceedings: M. Tzekaki, M. Kaldrimidou, & H. Sakonidis (Eds.) (2009). *Proceedings of the 33rd Conference of the International Group for the Psychology of Mathematics Education*. PME: Thessaloniki.

### AFFECTIVE, COGNITIVE, AND SOCIAL FACTORS IN REDUCING GENDER DIFFERENCES IN MEASUREMENT AND ALGEBRA ACHIEVEMENTS

Mei-Shiu Chiu, National Chengchi University, Taiwan

*The results of the TIMSS 2003 study indicated that boys had higher measurement achievements than girls and girls had higher algebra achievements than boys. It was predicted in this present study that affective, cognitive, and social factors could reduce these gender differences. The results of a series of regression analyses showed that gender differences in measurement achievements could be reduced by the sub-factors of inductive affect, social backgrounds, and cognitively closed learning experiences, while those in algebra achievements by the sub-factors of deductive affect, cognitively open learning experiences, and social resources, in a descending sequence.*

### HIGH ACHIEVING FEMALES IN MATHEMATICS: HERE TODAY AND GONE TOMORROW?

Gilah C Leder, La Trobe University, Australia

*The continuing lower representation of mathematically capable females among those entering careers in mathematics and related areas is continuing to attract research attention. In this paper I draw on data gathered, some years after their school success, from the highest achievers in the annually conducted Australian Mathematics Competition. Using purposeful sampling, insight is gained into the lives - after they have left school - of these high achieving mathematics students, and in particular on their attitudes to mathematics, their motivations, self descriptions of aspects of their lives, their career choices and factors influencing those choices. Although inevitably a small group, in this paper particular emphasis is placed on the female medallists.*

**GENDER EFFECTS IN ORIENTATION ON PRIMARY STUDENTS' PERFORMANCE ON ITEMS RICH IN GRAPHICS**

Tom Lowrie[1], Carmel Diezmann[2], Tracy Logan[1]
[1]Charles Sturt University and [2]Queensland University of Technology

*This study investigated the longitudinal performance of 378 students who completed mathematics items rich in graphics. Specifically, this study explored student performance across axis (e.g., numbers lines), opposed-position (e.g., line and column graphs) and circular (e.g., pie charts) items over a three-year period (ages 9-11 years). The results of the study revealed significant performance differences in the favour of boys on graphics items that were represented in horizontal and vertical displays. There were no gender differences on items that were represented in a circular manner.*

## 11th International Conference of The Mathematics Education into the 21st Century Project

Turning Dreams into Reality: Transformations and Paradigm Shifts in Mathematics Education

**September 10 (arrival) – 16, 2011**

**Rhodes University, Grahamstown, South Africa**

**Preliminary Announcement and Call for Papers**

Paper proposals are now invited on all innovative aspects of mathematics, statistics, science and computer education. Our conferences are renowned for their friendly and productive working atmosphere. They are attended by innovative teachers and mathematics educators from all over the world, 44 countries were represented at our last conference for example.

There will be an additional full social programme for accompanying persons. For ALL further conference details please email Alan Rogerson, Chairman of the International Programme Committee, at alan@rogerson.pol.pl .

# PROMOTING EQUITY IN MATHS ACHIEVEMENT. THE CURRENT DISCUSSION.

Information about this book comes from Maria Chionidou at the University of Aegean and includes selected papers from PREMA's Consortium.

The book is:
Chionidou Moskofoglou M., Blunk A., Siemprinska R., Solomon Y., & Tanzberger R. (2007). *Promoting Equity in Maths Achievement. The Current Discussion.* University of Barcelona: Future Learning.

## Table of Contents

6. Sciences Entering The 'Body' Of Education: Women's Experiences In Masculine Domains Of Knowledge
   *Anna Chronaki*
7. Teachers' Perceptions about Gender Differences in Greek Primary School Mathematics Classrooms
   *M. Chionidou-Moskofoglou & K. Chatzivasiliadou-Lekka*
8. Mathematics, Boys And Girls In Estonia
   Mare Leino *Marika Veisson, Viive-Riina Ruus, Loone Ots*

**III. Classroom Processes and Gender-Sensitive Pedagogy: Methods, applications and tools to support gender-sensitive maths teaching.**

9. Research On Mathematics And Gender: Implications For Teaching
   *Andrea Blunck*
10. Calendar Of Female Mathematicians as a Secondary School Classroom Diary
    *Jalón Ranchal, Mª del Carmen*
11. New Issues and Perspectives in Mathematics Teaching Approaches for Gender Sensitive Pedagogy
    *Maria Chionidou-Moskofoglou*
12. Multiple Representations In Mathematical Problem Solving: Exploring Differences Between Boys And Girls In Primary School
    *Iliada Elia*
13. Gender Sensitivity of Online mathematics teaching materials in Austria
    *Kathrin Helling, M.A. & Mag. Christian Petter*

**IV. Outside the Classroom: Policymaking, career choice and social context in gender differences in mathematics education**

14. Distribution of Men and Women at the university of Cyprus
    *Athanasios Gagatsis*
15. Sex Differences in Teenagers' Leisure Activities as One of the Determinants of Interests in Math and Science
    *Dominika Walczak, Anna Domaradzka*

16. Gendered Educational Paths of Polish Youth. Causes and Consequences.
    *Renata Siemieńska*

# National Coordinators

| | | |
|---|---|---|
| Australia | Leigh Wood | leigh.wood@mq.edu.au |
| Austria | Helga Jungwirth | hejun@t-online.de |
| Botswana | Topayame D. Mogotsi | tmogotsi@bocodol.ac.bw |
| Brasil | Gelsa Knijnik | gelsak@unisinos.br |
| Cameroon | Babila-Njingum Ghogomu Emilia | yayor_babila@yahoo.co.uk |
| Canada | Tasoula Berggren | tasoula_berggren@sfu.ca |
| Cyprus | Rita Panaoura | edrita@ucy.ac.cy |
| Czech Republic | Barbora Batikova | babatikova@yahoo.com |
| Finland | Riitta Soro | riitta.soro@loimaa.fi |
| Germany | Laura Martignon | martignon@ph-ludwigsburg.de |
| Greece | Maria Chionidou-Moskofoglou | mchionidou@rhodes.aegean.gr |
| Hungary | Susan Berényi | bermatsz@freemail.c3.hu |
| Iceland | Gudbjord Palsdottir | gudbjord@khi.is |
| India | Surja Kumari | surja_45@yahoo.com |
| Israel | Miriam Amit | amit@mail.bgu.ac.il |
| Italy | Litizia Jengo | enrico.stefanini@next.it |
| Japan | Hanako Senuma | hanako@nier.go.jp |
| Jordan | Liliana Atanassova Al- Zboun | lilian_zboun@yahoo.com |
| Malaysia | Munirah Ghazali | munirah_ghazali@yahoo.com |
| The Netherlands | Jenneke Krüger | j.kruger@slo.nl |
| New Zealand | Margaret Walshaw | M.A.Walshaw@massey.ac.nz |
| Northern Ireland | Sally McClean | si.mclean@ulster.ac.uk |
| Norway | Bjorg Kristin Selvik | bks@hib.no |
| Pakistan | Nusrat Fatima Rizvi | nusrat.fatimarizvi@aku.edu |
| Papua New Guinea | Neela Sukthankar | sukthankar@yahoo.com |
| Russia | Emanuila G. Gelfman | gelfman@mpi.tomsk.ru |
| Spain | Maria Jesus Luelmo | mluelmo@roble.pntic.mec.es |
| South Africa | Renuka Vithal | vithalr@ukzn.ac.za |
| Sweden | Barbro Grevholm | barbro.grevholm@mna.hkr.se |

| | | |
|---|---|---|
| Switzerland | Nicoletta Sala | nsala@arch.unisi.ch |
| Trinidad & Tobago | Margaret Bernard | mbernard@fsa.uwi.tt |
| UAE | Hanan Ayoub Innabi | hinnabi@uaeu.ac.ae |
| USA | Olly Steinthorsdottir | steintho@email.unc.edu |
| Zimbabwe | Chipo Tsvigu | ctsvigu@yahoo.com |