Investigating the patterns of differential attainment of boys and girls

Boys' underachievement - have we got it wrong?

Are boys really not making the grade? Is the frequently reported view of the increasing gender 'gap' in schools an accurate one? This large-scale study examines the results of public examinations in Wales over a six year period, at every level. The study highlights the need for closely detailed analysis of students’ performance. It finds there are few significant differences between the attainment of boys and girls in mathematics and the sciences. In other subjects, although there is little difference at the lowest level of any assessment, the gap in attainment between boys and girls becomes wider with every grade or level.

The authors suggest that the 'problem' is not one of low achieving boys but rather one facing mid to high attaining boys. They conclude that "various policies, strategies and action research programmes have been designed to ameliorate a situation in British education which may not in fact exist" and that now research is needed to identify what is creating the phenomenon.

Keywords:
UK; United Kingdom; Wales; primary schools; secondary schools; science; mathematics; English; GCSE; A Level; boys; girls; gender; achievement; attainment; assessment; student; student; examination results

Contents

Boys' underachievement - have we got it wrong? ................................................................. 1
What is meant by the 'gender gap'? ........................................................................ 2
What were the authors trying to find out? .................................................................. 2
Which data did the authors look at? .......................................................................... 3
What did the researchers discover? ........................................................................... 3
Making sense of it all................................................................................................. 4
What were the detailed findings for mathematics? ................................................... 5
   Key Stage 1 ........................................................................................................... 5
   Key Stage 2 ........................................................................................................... 5
   Key Stage 3 ........................................................................................................... 5
   GCSE .................................................................................................................... 5
   A level .................................................................................................................... 5
What were the findings for science? ....................................................................... 5
   Key Stage 1 ........................................................................................................... 5
   Key Stage 2 ........................................................................................................... 5
   Key Stage 3 ........................................................................................................... 5
   GCSE .................................................................................................................... 5
   A level .................................................................................................................... 6
What were the findings for English? .................................................................... 6
   Key Stage 1 ........................................................................................................... 6
   Key Stage 2 ........................................................................................................... 6
What is meant by the ‘gender gap’?
This paper reports recent research, and the policies that derive from it, as being based on the idea that the performance of girls in school is rising relative to the performance of boys and that the gap in attainment between the genders is rising to an alarming extent.

The authors paint a portrait of current understanding about gender differences in the following terms:

- by the end of 1998 failing boys were being described as the "public burden number one" and "one of the most disturbing problems facing the education system" by the OFSTED Chief Inspector for Schools in England;
- the pattern for boys’ ‘underachievement’ is seen as a uniform one, across subjects, ages and grades; and
- the problems are perceived as being with low levels of achievement which lead to drop out. This in turn is thought to lead to an increasing disparity by age and level of assessment. They thought this to be an added problem, unrelated to standard indicators of poverty and deprivation i.e. free school meals.

The authors suggest that some of the assumptions on which the general perceptions are based are questionable or exaggerated. They go on to say that this is due in part to inadequate data and that researchers are separating the results of one age cohort from any assessment and attempting to generalise from the findings of a single examination board.

The authors argue that datasets used by previous researchers have been limited in detail and, in some cases, hampered by changes to assessment policy during the period of the research. A second problem they suggest has arisen because other research has not taken full account of the gendered patterns of entry for different subjects. The authors also consider it to be important that low achievement by boys is not described as ‘underachievement’. They do not believe underachievement should be used to mean differential attainment by sexes - since there is no independent idea of what they ‘should’ be attaining.

What were the authors trying to find out?
The authors’ intention was to discover the accuracy of the standard perception of the gender gap by undertaking a more detailed analysis than has previously been possible. They used national
statistical data regarding all school children's results from Key Stage 1 to A level, in Wales, over a period of several years.

This research concentrates on subjects and levels of assessment, rather than merely aggregate measures for individual students as is usual when presenting such statistics. The authors wanted to establish more accurately the differences in achievement between boys and girls using an index the authors call the ‘achievement gap’ which takes into account differences in gender entry numbers for the assessments. By examining the pattern of difference between boys and girls by subject, they hoped to generate evidence-based policies to deal with such differences that could be seen as problematic.

Which data did the authors look at?
The report concentrates on the core subjects of mathematics, sciences and English as well as reporting on the overall picture of all subjects, the aggregate scores for individuals, and local variations on the pattern. All data were provided by the Welsh Joint Education Committee (GCSE and A level) and the Welsh Office (KS 1-3 National Tests). The authors suggest that there is no reason to suppose that the situation in England differs greatly to Wales. In England, as in Wales, the gap between boys and girls is declining, with smaller gaps at the lower levels of achievement.

The study also looked at Key Stage 1 results for 1995-97 and Key Stage 2 and 3 results for 1996-97 for all candidates sitting examinations in all schools in Wales.

The GCSE and A level results for all candidates in the relevant age-cohorts sitting these examinations in any centre in Wales 1992-97 were collated, regardless of which examination board was used.

The full breadth of the research covered English, Mathematics, Welsh, Sciences, Humanities, Languages, Design-related and minority subjects.

The relevant age cohorts were defined as those used in the government ‘league’ tables of Key Stage and A level results.

What did the researchers discover?
The authors found that girls in any year are proportionately more likely to achieve any individual benchmark grade. Girls also tend to enter more, and more varied, subjects at GCSE, achieving higher grades. Year on year, in general the data shows little change in the overall achievement gap, but where they do change in individual subjects it is generally toward a decrease in the gap at any level.

Putting the figures together, a remarkably similar picture appears for both Science and Mathematics, and a rather different one for English.

In both Mathematics and Science the figures show little significant difference at Key Stage 1 and none at all at Key Stages 2 and 3. At GCSE, an achievement gap at the higher grades seen in favour of boys at the beginning of the study (1992) has disappeared by the end of the study. Despite a marked entry gap in favour of boys in both subjects at A-level, there is now no achievement gap between the sexes.

Girls significantly outperformed boys at most benchmarked levels in English up to A-level. A small entry gap in favour of girls studying English Language, and a larger one in favour of them studying English literature at GCSE, is complemented by significantly larger gaps in achievement by girls.
gaining a grade D or above in these subjects. At A-level the entry gap in favour of girls rises to 50%, yet their achievement gap disappears, indeed is slightly reversed in favour of boys.

At A level, with greater freedom for the student to choose, entry gaps become larger. The achievement gaps that exist in English and other subject groups at GCSE do not appear to carry over into A-level, the study suggests.

The authors also discuss the importance of using the achievement gap in analysing differences in performance between geographical areas. The study highlights the example of Hackney and Richmond boroughs which both show a gap of 15 percentage points in favour of girls at the five plus grade C GCSEs benchmark. However, the benchmark figure for Hackney is much lower than for Richmond which shows that the achievement gap is more serious in Hackney.

**Making sense of it all**

The authors suggest that before gender achievement gaps are calculated allowance has to be made for what they term the ‘entry gap’ in those cases in which the numbers of boys and girls entered for the assessment are very different. This applies for instance in GCSE English Literature, and in design subjects.

First, the authors calculated the Entry Gap, that is, the difference between the entry for girls and boys relative to the age cohort by Key Stage or subject.

Then, the Entry Gap was used to define the Achievement Gap (if any) between the sexes for each subject at each level of assessment. The ‘Achievement Gap’ was defined as the difference in the numbers of boys and girls achieving a particular grade or level relative to the number of students achieving that grade (rather than as a percentage of the total entry, so distinguishing between the achievement and ‘points’ gap).

The Achievement Gap was calculated for each subject, year, and level or grade to identify consistent trends over time, age and attainment.

A gap of 4% or less in entry or attainment was assumed to have little significance. A larger gap was also assumed to have little significance if it appeared in isolation for one subject-year-grade combination only.

In aggregate terms, girls in any year are more likely to achieve any benchmark grade. Benchmark levels or grades are those chosen by the government in order to measure year on year changes in student performance. They are:

- level 2 - Key stage 1;
- level 4 - Key Stage 2;
- level 5 - Key Stage 3;
- grade C - GCSE; and
- grade E - A level.
Using the official indicators there is a ten point difference in favour of girls’ achievements at GCSE which has remained constant. However, when the total numbers of students reaching each grade or level is considered, the same statistics show that the gender achievement gap decreased in the same period.

**What were the detailed findings for mathematics?**

**Key Stage 1**
- no difference between the sexes at level 1;
- a small achievement gap in favour of girls at level 2; and
- a small achievement gap in favour of boys at level 3.

**Key Stage 2**
- no significant achievement gap at any level; and
- a small achievement gap in favour of boys at level 5

**Key Stage 3**
- no significant achievement gap at any level.

**GCSE**
- until recently, an achievement gap in favour of boys at A and A*; and
- currently no gender gap in either entry or achievement at GCSE.

**A level**
- an entry gap of 30% in favour of boys with an achievement gap almost identical to GCSE.

**What were the findings for science?**

The researchers found the following results at each grade or level:

**Key Stage 1**
- no difference between the sexes at level 1;
- a small achievement gap in favour of girls at level 2; and
- a small achievement gap in favour of boys at level 3.

**Key Stage 2**
- no significant achievement gap at any level.

**Key Stage 3**
- no significant achievement gap at any level.

**GCSE**
- there is effectively little gender gap at lower levels;
- until recently, a small achievement gap in favour of boys at the higher grades; and
- in biology, in other sciences, and in Single Award, an entry gap in favour of boys and an achievement gap in favour of girls.
A level
- at the start of the study boys gained better grades than girls overall, this has now been eliminated and possibly reversed; and
- the entry gap in favour of boys was more marked in 1992, but is becoming gender-neutral now.

What were the findings for English?
The researchers found the following results at each grade or level:

Key Stage 1
- no difference between the sexes at level 1;
- a significant achievement gap in favour of girls at level 2; and
- a large achievement gap in favour of girls at level 3.

Key Stage 2
- no significant difference between the sexes at level 3;
- a significant (6%) achievement gap in favour of girls at level 4; and
- a large (20%) achievement gap in favour of girls at level 5.

Key Stage 3
- an achievement gap in favour of girls of 15% at level 5 and 35% at level 7.

GCSE
- there is effectively little gender gap at lower levels; and,
- a large gap in achievement in favour of girls at grade D and above for both English and English literature.

A level
- the achievement gap disappears, and is slightly reversed in favour of boys.
- entry gap in favour of girls rises to 50%

What were the findings for other subjects?
Statistics were available for GCSE and A level only for other subjects. The figures show:

GCSE
- no achievement gap at low grades but a disproportionate number of girls gain grades A* - B in the humanities, modern languages (including Welsh) and minority subjects like economics.

A level
- in modern languages and minority subjects results show no gender gap at any grade;
- humanities has no significant achievement gaps at any grade until recently, when the gap in favour of girls achieving A grade rose from 2% to 20%; and
- in design-related subjects there are no significant achievement gaps at any grade until recently, when the gap in favour of girls achieving A grade rose from 0% to 20%
What does this mean to you, as a parent, practitioner or governor?
According to this report there is no reason to suppose that the situation in England differs greatly to Wales. In England as in Wales the gap between boys and girls is declining, with smaller gaps at the lower levels of achievement.

The notion of boys' underachievement being worse at low levels of attainment is misjudged. In terms of the entire age cohort the achievement gap only appears at high grades; the proportion of boys and girls failing any examination is similar and constant over time.

The authors point out that low achievement is not synonymous with underachievement, as many commentators imply, and official statistics do not necessarily reflect this either. For example a boy who does not achieve 5 CGSE passes at grade C or above - the official benchmark - may actually have eight GCSE passes of which 4 were at grade C or above. In other words, this is not the stereotypical case of a disaffected youth who is underachieving.

Given the established link between socio-economic conditions and examination success, this makes it unlikely that the gender gap is primarily caused by disaffected boys from economically deprived families.

How to calculate Entry and Achievement Gaps

The Entry Gap

The Entry Gap is the difference between the entry for boys and girls relative to the total for the relevant age cohort, expressed as a percentage. This is calculated as follows:

\[
Entry \text{ Gap} = \frac{(GE - BE)}{(GE + BE)} \times 100
\]

where GE is the number of girls entered (or in the age cohort) and BE is the number of boys entered.

The result is the difference between the percentage of entry for any assessment who are girls and the percentage for any assessment who are boys.

For example if 75% of the English A level entry were girls and 25% boys, then the entry gap would be 50%. This shows the proportion of girls entered was 50% over and above what would have been expected if there were no gap. A positive number would indicate that more girls were entered compared to boys; a negative number would mean that the entry was in favour of boys.

The Achievement Gap

The Achievement Gap measures the relative attainment of each gender for any grade or level. For any one subject it is calculated as the difference between the performance of boys and girls relative to the performance of all entries, minus the entry gap.

The calculation to produce the Achievement Gap is:

\[
Achievement \text{ Gap} = \frac{(GP - BP)}{(GP + BP)} \times 100 - \frac{(GE - BE)}{(GE + BE)} \times 100
\]

where GP is the number of girls achieving that grade or better, and BP the number of boys.

The percentage achievement gap for equal entries shows how much better or worse one gender does than the other.
For example, if girls are half of the entry, then we might expect half of any grade score to be girls. But, if 55% of those achieving any grade are girls, then the actual achievement is 10% more than expected, so the gap is 10%.

Although the authors realise that the significance of any gap is dependent upon the numbers of entries, they assume that differences of 4% or less are statistically insignificant.

Implications

In completing this digest its authors began to ask the following questions about implications for practitioners:

- if teachers have high expectations of students, this tends to promote success and vice versa – what strategies have you found useful to avoid rooting judgments of student potential based in gender patterns?
- the study found that girls did better than boys at higher levels of achievement in English up to GCSE and at the highest grades in humanities - are specific strategies needed for specific groups of students in different subjects to ensure they realise their potential?

In completing this digest its authors began to ask the following questions about implications for school leaders:

- the study noted that underachievement occurs when a student is not fulfilling his/her potential, and may be masked by reasonable examination results, when they could be achieving higher results – to what extent do monitoring systems effectively identify underachieving students in each subject?
- the study noted the difference between low achievement and underachievement – to what extent is there a clear understanding of the differences between underachievement and low achievement at your school?

Where can I find out more?

Original article

Other sources


School of Education (1998) *Report on Combating Underachievement, especially in boys: an action research project* (Cardiff School of Education, Cardiff University)

You can search for other research summaries on the subject of gender using the ‘Themes’ or ‘Keywords’ search boxes on the website. Other TRIPS summaries on the issue of gender include:

Warrington M, & M Younger, 'We decided to give it a twirl': single-sex teaching in English comprehensive schools available at

Williams M., Burden R., and Lanvers U., 'French is the language of love and stuff': student perceptions of issues related to motivation in learning a foreign language.

Myhill, Debra. Bad boys and good girls? Patterns of interaction and response in whole class teaching.

A GTC Research of the Month summary based on Sukhnandan, L., Lee, B. and Kelleher, S. (2000) *An Investigation into Gender Differences in Achievement, Phase 2: School and Classroom Strategies*

National Foundation for Educational Research can be found at: [https://www.nfer.ac.uk/publications/91059/91059.pdf](https://www.nfer.ac.uk/publications/91059/91059.pdf)

An EPPI systematic review of ‘Classroom strategies for reducing stereotypical gender constructions among girls and boys in mixed-sex UK primary schools’ can be found at: [https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=235](https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=235)