

The Puzzle of Boys' Educational Decline

A Review of the Evidence

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EXECUTIVE SUMMARY

The declining standard of boys' school performance in the last decade is a great cause for concern. Although research has attempted to explain this trend, lack of empirical evidence has precluded conclusions to date, and tends to raise more questions than it answers.

The decline is represented in a combination of three notable developments:

1. deteriorating comparative performance of boys in literacy and English;
2. improving performance of girls in maths and the physical sciences; and
3. recent changes in curriculum and assessment that have exacerbated these effects.

A key question is *why* boys' literacy skills and subsequent English performance are inferior and deteriorating. The main factors implicated in the gender gap in English and literacy performance are:

- biological differences

This does not explain why the gender gap is increasing.

- gender biases and expectations

This does not shed any light on the deterioration in boys' English performance, nor does it offer any explanation as to the genesis of these biases.

- teaching and curricula

This does not explain why boys learn differently.

- socio-economic status

It does seem that socio-economic status has the strongest link with boys' school performance. However, lack of empirical evidence prevents a conclusive assessment.

Although income does play a role, the most important elements are parental education and family stability. How specific attributes of broken families—such as father-absence—might affect boys more than girls is yet to be established. Whether teaching methods and school curricula differentially disadvantage boys, and, if so, how, are questions yet to be answered.

Access to information held by Departments of Education would be very valuable in addressing these issues. Without it, research possibilities are limited, and the educational outcomes of boys remain uncertain. ■

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Marked differences between girls and boys in overall school performance have emerged over the past decade. At the same time as girls have extended their schooling and are now 11% more likely than boys to complete Year 12 (ABS 1999), so also their overall performance has improved markedly, seemingly at the expense of boys. Boys are now said to be 'disadvantaged' in relation to girls.

While the evidence for a decline in the school performance of boys is clear, the reasons behind it are certainly not. Explanations of the problem of boys' education raise more questions than they answer. It is a puzzle with too many pieces. (However, to discard any of the pieces at this stage would be premature.)

The declining overall school performance of boys compared to girls seems to be the result of their poorer performance in English, which is dependent on literacy skills (in which boys are also inferior to girls). This raises two questions: why are boys' literacy and English skills inferior to girls', and why is this gender gap increasing?

What is meant by 'literacy' and 'English performance'?

'Literacy', as it is measured on standardised tests in schools, is defined by the Commonwealth Department of Education, Training and Youth Affairs as the ability to 'read, write and spell at an appropriate level' (Masters & Forster 1997: 3). The appropriate level is determined by school year. The *National School English Literacy Survey* (NSELS) in 1996 assessed reading and writing by the following criteria:

- Reading:*
1. Ability to read and interpret a range of fiction and non-fiction texts with a degree of critical awareness.
 2. Ability to understand main themes, ideas and points of view.
 3. Appreciation of the writer's craft.
 4. Awareness of the relationship between the communication medium and the message in written texts.
- Writing:*
1. Quality of thought (eg. Cohesiveness and creativity).
 2. Language control (eg. Spelling and grammar).
 3. Sense of purpose and audience.

'English performance' is understood as students' results in either public- or school-assessed examinations of the high-school subject of English. The curriculum of English is determined by the Boards of Studies in the relevant States, and is generally a study of English literature, ie. novels, plays and poetry.

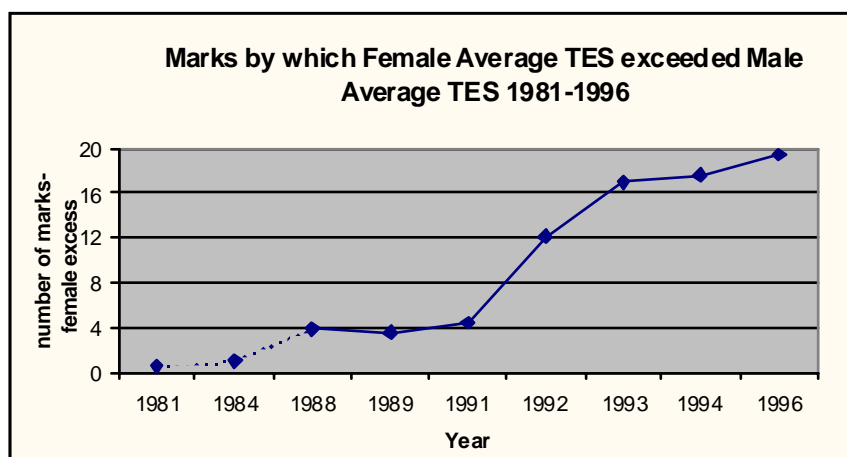
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The falling performance of boys

The relative advantage of girls is apparent at the passing out level/final years. For example, in the 1998 New South Wales Higher School Certificate (HSC), the average mark for girls was higher than that for boys in 64 out of 70 subjects (those subjects which had at least 100 students). The subjects in which the boys' average exceeded girls' were 3-unit Computer studies, 3-unit Economics, 2-unit Japanese, 2-unit Maths in Practice (the lowest maths level), and 3-unit Music. (The amount by which the boys' average exceeded the girls' was no more than 1%. In contrast, for the subjects in which the girls' average was higher, the difference was up to 11%.)

This gender gap in average school performance is illustrated in Figure 1. The figure shows the difference in the average New South Wales Tertiary Entrance Score (TES)—the aggregated final mark out of 500 for Year 12 students—between girls and boys. In 1981, the female average TES exceeded the male average TES by just 0.6 marks. In 1996, the girls beat the boys by 19.4 marks. The most dramatic increase occurred in 1992, when the high scaling of maths and hard sciences was reduced.

Figure 1.



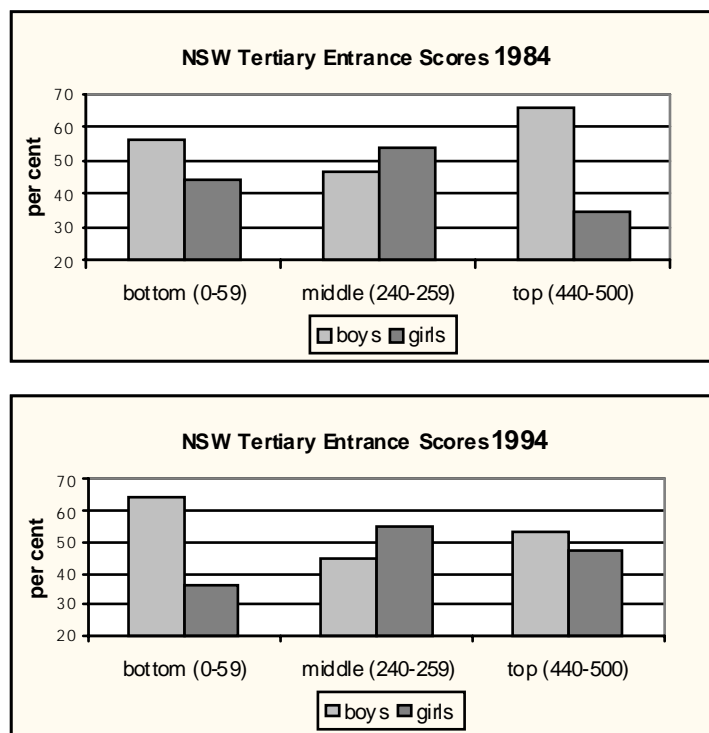
Source: MacCann (1995); ABS (1998)

A breakdown of the results provides a more revealing picture. Boys' overall scores tend to be distributed in a 'saucer-shape'. That is, there are more boys at the top and bottom of the scale than in the middle. Girls, on the other hand, obtain scores that are closer to average—an inverted 'U-shape'—that places the greater proportion of girls around the centre of the scale (Figure 2). These patterns are consistently found in distributions of boys' and girls' performance in all subjects, as well as in IQ tests.

As can be seen in Figure 2, boys make up the majority in both the top and the bottom achievement bands in both years. Nevertheless, between 1984 and 1994 a change occurred. In 1984, the predominance of boys in the top band was greater than that in the bottom band—65% v 55%. A decade later, in 1994, the position was reversed and the size of the majority of boys in the top band was less than that in the bottom—53% v 64%. It is this shift toward the bottom of the scale that seems to have resulted in the divergence in average TES scores shown in Figure 1.

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Figure 2



Source: MacCann (1995), ABS (1997).

Why is boys' school performance deteriorating?

The increasing discrepancy in boys' and girls' school performance seems to be due to a combination of three related developments:

1. Deteriorating comparative performance of boys in literacy and English

Dr Kemp, Federal Minister for Education, Training and Youth Affairs, has stated that 'the single most important thing a school can provide to any individual is literacy skills' (Kemp 1996). It is therefore remarkable, and alarming, that so many children, male and female, miss out.

Boys' poorer average literacy performance can be seen as early as age 9. Boys under-performed compared to girls in the 1996 *NSW Basic Skills Tests* in both Year 3 and Year 5. There was no significant difference in numeracy (SCRCSSP 1999).

In the 1996 *National School English Literacy Survey* (NSELS), similar findings were obtained. Year 3 and Year 5 students were tested on five modes of literacy: reading, writing, listening, speaking and viewing. Fewer boys than girls achieved the benchmark in every mode, with the largest gender differences in the 'expressive modes'—writing and speaking.

An analysis of data from the *Longitudinal Surveys of Australian Youth* program showed that there has been a small overall decline in literacy in the last two decades. In 1975, 28% of 14 year olds in Year 9 had failed to attain basic literacy skills. In 1995, this figure was 30%. Failure rates were higher for boys than for girls in both years, with the boys' situation worsening considerably: 30% of 14 year old boys were illiterate in 1975, and 35% in 1995. For girls, the relative figures were 26% and 27%, better than boys, but still very unsatisfactory.

In Year 12 English performance, boys' average results are consistently poorer than those of girls. Performance data from Western Australia and Queensland

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show stronger average English results for girls, with more girls than boys in the top achievement band, and more boys than girls in the bottom band. In NSW, in 1992, girls strongly out-performed boys. There were twice as many girls in the highest achievement band, and twice as many boys in the lowest. In 1997, there were more than twice as many girls as boys in the top 25% of English students.

2. Improving performance of girls in maths and physical sciences

Until the early 1990s, the gender gap between boys' and girls' average school performance was relatively small. This balance was maintained by boys' poorer performance in English being offset by stronger performance and stronger weighting for the physical sciences. The slight difference in average score in the 1980s, favouring girls, was probably the result of girls' rising participation and performance in maths and chemistry, which were also scaled highly.

3. Changes in curriculum and assessment

When, in 1992, the scaling changed so that the higher scaling of the physical sciences was reduced, boys lost their advantage. The improved performance of girls across the board, and boys' poor English performance combined to create a divergence in their average scores. This gender gap has continued to grow.

The disadvantage to boys is exacerbated by the fact that English is compulsory. Girls' comparatively poorer participation and performance in physics, for example, is not reflected in the average scores because it is elective. If girls don't study physics, it won't affect their average score.

Why are boys performing badly?

So, if boys' inferior performance in English is a major aspect of their educational disadvantage, what is causing this disparity?

Psychologists, educationists and sociologists have identified a number of factors which may play a part in the decline in boys' capacity to use and understand English. They include:

- (i) biological differences between the sexes affecting capacities and interests;
- (ii) gender biases which define certain activities or skills as 'not masculine', or which underplay the role of masculine models in encouraging certain activities or skills;
- (iii) teaching, curricula and assessment;
- (iv) socio-economic factors, including family income, family structure and parental education.

All of these factors have been written about at some length. What is missing from the current literature is a critical assessment of the strength of each of these factors in explaining both enduring differences in boys' literacy skills and the increasing gender gap in English performance.

Biological differences

It has been claimed that boys' inferiority in literacy is biologically determined. Moir and Jessel (1989) and more recently Steve Biddulph (1997) have cited neurological evidence that boys' brains are different from girls', essentially in the brain's capacity to process linguistic information. The 'gender' of the brain is determined *in utero* by the presence or absence of particular sex hormones.

Research has shown a sex-difference in neural structure, where the left and right hemispheres of the brain have fewer interconnections in male brains

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than in female. This was inferred from the difference in size of the corpus callosum—the bundle of fibres connecting the two hemispheres. However, male brains were found to have more neural connections *within* the right hemisphere. The two hemispheres of the brain perform specialised functions: the left hemisphere is primarily involved in verbal abilities, and processing details and organised information, whereas the right hemisphere is primarily involved in more concrete, object-related thinking and some emotional responses.

Furthermore, the structures of the hemispheres themselves seem to be different in males and females. It has been asserted, on the basis of observing brain damaged men and women, that brain functions are more ‘diffuse’ in females and more ‘specific’ in males. That is, females use both sides of the brain to process certain information that males process with only one side. It is claimed that the fewer neural connections between the left and right hemispheres, and their higher level of specificity in brain functioning, restrict boys’ language abilities (ie literacy) and enhance their visio-spatial skills (ie maths and science). There is also the observation that boys’ fine motor skills are not as developed as girls at the age when they are learning to read and write, which may have the effect of making this process disagreeable.

Although there have been numerous studies which failed to show differences in brain structure (reviewed by Gilbert & Gilbert 1998), the amassing of evidence for sex differences in brain structure and functioning is, at this stage, very persuasive. However, this does not address boys’ declining English performance.

While biological differences may be implicated in enduring differences in boys’ and girls’ literacy skills, they do not explain why the gender gap is increasing.

Gender biases and expectations

Educationists offer sociological explanations of the problem of boys and literacy. They argue that behavioural differences between boys and girls arise from different gender expectations, and that conventional conceptions of masculinity, and its narrow stereotypes, are restrictive and damaging to both boys and girls, if in different ways.

Although boys are over-represented in remedial reading classes (O’Doherty 1994), research evidence has shown that boys are just as capable of reading as girls (Shaywitz et al 1990; Flynn & Rahbar 1994). But there is much discussion of an apparent aversion of boys to reading, particularly fiction, and their perception of reading as ‘uncool’ (eg. Brown & Fletcher 1995). It is claimed that boys view reading as not masculine. Boys prefer more physical activities, and if they do read, it is more likely to be magazines or manuals. While this may strike a chord of truth for many, the evidence is largely observational and anecdotal.

Part of the problem may arise from the definition and measurement of literacy. Different tests of boys’ literacy skills have been suggested on the grounds that boys are capable of the mechanics of reading, but are disadvantaged by the subjective, introspective nature of literacy as it is presented in schools. The *Boys and Literacy* project (Martino 1995) claimed that the emotional element of English at school is in direct conflict with masculinity, and is therefore unacceptable to most boys.

Angela Phillips (1993) proposes that there is a learned association of reading with femininity due to the predominance of women teachers in primary schools. She argues that this association leads boys to reject reading, and hence literacy. If this were true, the same aversion should occur for maths, which boys also first experience in primary school. This does not seem to be the case.

Gender bias theory may elucidate some of boys' inferiority in literacy, but it does not shed any light on the deterioration in boys' English performance. Nor does it offer any explanation as to the genesis of these biases.

Teaching and curricula

In this area, two factors may be combining to weaken boys' literacy performance. As discussed above, for biological reasons of brain structure, boys may have a slight advantage in dealing with 'structured', or ordered subjects. A major change has occurred in reading instruction which bears upon this difference and which may have affected boys' literacy, and hence their overall school performance.

The method of teaching reading has undergone a transformation since the 1960s, from a structured approach with rules and grammar, to a 'whole word' method, where children are encouraged to recognise whole words. The methodical approach to teaching writing—using copy books, writing on lines, etc.—has also been abandoned.

Children who fail to learn to read in the early stages of their schooling may never catch up (Harrison & Zollner 1993). It is well established that girls mature, both mentally and physically, earlier than boys. By not allowing for boys' developmental delay (Cratty 1987; Vann 1991), boys may be disadvantaged, especially those who do not have support for reading at home. Such a disadvantage in early literacy could, for reasons to be determined, seriously affect boys' subsequent performance in English.

There is some evidence that a more structured approach to literacy teaching has a beneficial effect on boys' performances (Victoria DET 1998; West 1995). Boys perform better in literacy when their instruction and assessment is more highly structured; for example if they are told what is expected and how their work will be marked. Their writing style in general is more economical and less flamboyant. It is not known whether this is due to innate biological gender differences, or is a result of their preference for reading material of the same nature, prescribed by gender expectations.

In sum, methods of teaching and assessment may well affect boys' literacy skills and English performance, but it does not explain why boys learn differently.

Socio-economic status

English and socio-economic status

There is a strong relationship between the socio-economic status of parents and the educational performance of their children. Socio-economic status is determined by household or parental income, family structure, and parental education. The higher the socio-economic status of parents on these measures, the higher is the literacy and English performance of their children, both boys and girls, on average.

The performance indicators showing a gender gap described earlier (Figure 1) must be seen in the context of socio-economic status. The gap between boys and girls varies with socio-economic circumstances. High socio-economic status boys outperform low socio-economic status girls. However, the gender gap between boys' and girls' performance persists within each socio-economic level.

Extensive research by Richard Teese et al (1995) has demonstrated the influence of this factor. In an analysis of Victorian Year 12 exam results (VCE), he found that school performance varied with socio-economic status for both boys and girls, with girls out-performing boys in each socio-economic cohort.

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Socio-economic status appears to mediate English performance specifically, and hence school performance generally, by either enlarging or reducing the gender gap.

Alloway and Gilbert (1997) found comparable results in Year 3 students in NSW: when comparing girls and boys with the same socio-economic ranking, girls still did better. At the bottom of the socio-economic scale, both boys and girls exhibited the worst results for their gender, with boys performing worst of all. The 1996 NSELS also found that boys and girls in higher socio-economic groups obtained better literacy results. The performance gap between socio-economic groups widened from Year 3 to Year 5 (Table 1). Thus, socio-economic status influences the school performance in English of both girls and boys.

However, of particular interest is the fact that higher socio-economic status has an ameliorating effect on boys' performance relative to girls. Results fall faster for boys than for girls with progression down the socio-economic scale. (Teese et al 1995). Socio-economic status appears to mediate English performance specifically, and hence school performance generally, by either enlarging or reducing the gender gap.

Table 1—Per cent of students *not* meeting standards in reading and writing, 1996,
by Year of schooling, gender and socio-economic status (SES)

	READING	WRITING
	<i>% not meeting standard</i>	<i>% not meeting standard</i>
YEAR 3		
Boys	34	35
Girls	23	19
High SES	12	10
Medium SES	28	27
Low SES	38	30
YEAR 5		
Boys	35	41
Girls	24	26
High SES	13	19
Medium SES	29	33
Low SES	53	43

Source: Masters and Forster (1997).

Maths and socio-economic status

Year 12 results show that maths participation and performance also differ with socio-economic status. But the gender divide between participation and performance in maths is not comparable to that for English. Boys are about twice as likely to enrol in advanced maths courses and are over-represented in the top performance bands, but they are also more likely to fail (MacCann 1995; Teese 1995). Consequently, girls' average in maths now exceeds or equals boys' (NSW Board of Studies 1999; Ludowyke & Scanlon 1997). Maths is traditionally a male course of study, and until this decade, boys dominated in participation and performance. This is less the case now, and Teese (1995) suggests that there is increased participation and performance by girls from the

higher socio-economic groups and decreased participation and performance by boys from the lower socio-economic groups.

So, there has been a shift whereby girls in the higher socio-economic groups are overcoming the traditional gender barriers, and are exceeding the performance of boys in the lower socio-economic groups. This has created the illusion that all girls have made significant improvements in their educational outcomes, whereas in fact a subset of socio-economically advantaged girls has improved and a subset of socio-economically disadvantaged boys has deteriorated. The discrepancies in performance in these key aspects of education have been highlighted and intensified by the recent changes in assessment described earlier.

It is now widely accepted, based on conclusive empirical evidence, that the family environment has a strong influence on school attainment. For example, an Australian study found that the family's socio-economic status was positively related to cognitive scores, and that family factors accounted for variations in children's educational performance even after controlling for intellectual ability (Marjoribanks 1987).

Why socio-economic status affects English performance, school performance generally and the gender gap specifically, is less clear. Two aspects of socio-economic status are primarily implicated in research findings.

Family income

Economic disadvantage is the over-riding feature of low socio-economic status. Some research has suggested that the lack of financial resources in low socio-economic families accounts for the lower school performance. The Western Australian Child Health Survey (Zubrick et al 1997) showed a relationship between household income and school performance. It found that as income declined, overall academic competence declined. However, these results do not take account of other variables associated with differences in economic circumstances, such as family structure and parental education. Further, financial disadvantage would presumably affect both boys and girls equally, and this does seem to be the case. If socio-economic status is relevant to the growing gender gap, there is presumably an aspect of low socio-economic status families, other than low income, which affects boys more than girls.

Family structure

It has been found that divorce leads to a fall in socio-economic status, and that this adversely affects children's educational outcomes (Demo & Acock 1988; National Health Strategy 1992). The Western Australian Child Health Survey provides evidence for a relationship between family structure and school attainment—the proportion of children with low academic competence was almost twice as high for sole-parent families as for couple families (30% and 17% respectively) (Zubrick et al 1997).

After controlling for income, children whose parents are divorced or separated have lower levels of educational attainment than children from intact families (Guidubaldi et al 1983). Likewise, if economic hardship were the main predictor of school performance, it would be expected that there would be no difference between children in step-families and children in intact families, where both received similar incomes. A research review shows that this is not necessarily the case, and that children in stepfamilies generally still perform less well (Amato & Keith 1991).

There appears to be differential effects of a custodial parent's remarriage on boys and girls. The presence of a step-father has been associated with the greater well-being of boys who have a custodial mother, but not girls (Amato

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& Keith 1991; Hetherington et al 1985). Amato and Keith (1991) found that for a variety of outcomes, there is an interaction between the gender of the child and the gender of the custodial parent. Boys seem to be better off with their fathers, and girls better off with their mothers. These findings provide more support for a parental absence or socialisation theory of child well-being, including educational outcomes.

One of the strongest predictors of low socio-economic status is sole parenthood, so sole parenthood in turn is a predictor of lower average school performance. Nearly 90 per cent of sole-parent families are mother-headed, and since the majority of these mothers have poorer educational attainments than mothers in general (ABS 1991), and insofar as parental education is a significant factor in children's educational performance, sole parent families, on average, are clearly a less propitious educational environment for children. Boys in sole parent families will frequently lack a male role model and the discipline exercised by most fathers. However, although there is some suspicion that this may be disadvantageous for boys, we lack sufficient supporting evidence to draw such a conclusion with regard to school performance.

The importance of the family environment

When we look more closely at the correlation between socio-economic status and school performance, family income *per se* declines in importance, and family structure, parental competence and parental influence come to the fore. Whether parental education, general competence, and family stability, are causes of low parental income, or vice versa, it is the former that count most in the educational performance of children, whilst allowing that low income brings its own stresses that affect the relations between parents and children, with consequences for children's education.

Conclusions

- Against a background of poor standards of literacy in both boys and girls, the general school achievement levels of boys are declining in comparison with girls.
- The notable features of this significant and increasing discrepancy are boys' more serious literacy problems and subsequent poor performance in English.
- Biological differences, possibly involving hormonal and brain structure differences, may play a part by influencing capacities, interests and motivations, yielding advantages for boys in certain subjects, and girls in others. The research evidence is so far inconclusive. But if significant innate gender differences do exist, any recent changes in curricula, instruction and assessment that are comparatively less congruent with boys' capabilities and interests, could be a factor in boys' declining performance.
- The socio-economic backgrounds of children are strong predictors of their literacy skills and school performance. For boys' English performance, the relationship is particularly cogent in that the gender gap increases with decreasing socio-economic status. What matters most is not parental income, but parental education, general competence, and family stability. More broken families entail high levels of father-absence from children's home life. A vital question is whether this disadvantages boys' education more than girls'.

What is needed?

A variety of evidence shows that declining educational achievement of boys is associated not only with subsequent unemployment, and an impoverished

intellectual and social life, but also with the genesis of delinquency and crime (Kercher 1988; Gottfredson & Hirschi 1990).

The research evidence so far does not allow us to identify causes of the gender gap in performance with any confidence; but it does highlight areas, as suggested above, where further research is indicated and urgently needed. Is increasing father-absence more salient for boys than for girls? Are gender-specific role models important? Are there 'gender biases' in curricula, instruction and assessment, and, if so, how do they work and should they be reformed?

Inconclusive empirical evidence and an abundance of speculative opinion are hampering the search for a solution to the puzzle of boys' educational decline. Ready access to data collected by Departments of Education about performance of students and schools is vital to the further research which is needed. Departments have been reluctant to release such information, presumably to protect poorly performing schools and teachers, and inappropriate teaching methods, from critical scrutiny. But this data, in combination with demographic data from other sources, could make an important contribution to the understanding of boys' declining achievement.

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