# Boys and girls achievement: what's really happening?

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This chapter is designed to dispel some contemporary myths regarding the relative performance of boys and girls in schooling 5-19. It reproduces the key findings from a presentation to DfES staff and leading educationalists, given by the author and Sylvia Green, both of Cambridge Assessment.

There is a profound need to dispel simplistic representation of gendered achievement in education and training, and in particular, myths around 'boys underachievement'. Without evidence-driven understanding, there is a grave risk of misunderstanding the real standing of males and females in society as a whole, and of formulating highly defective public policy. Nowhere is this risk more great than in the realm of 'boy friendly learning'.

Media attention on 'underperforming boys' has paid little attention to important subtleties in the nature of the problem, and in the findings from research. In his influential 2001 pamphlet, John Marks failed to highlight that both boys and girls have improved, but boys have improved less (rather than boys' performance getting worse in absolute terms) (Marks J, 2001). It's not all boys at all levels/ages who are underperforming. There is a complex mix of developmental, educational and social phenomena behind the differences in boys' and girls' relative performance. There are no simple explanations for the gender gap; many factors have an influence: learning preferences deriving from developmental distinctions between boys and girls, pupil grouping in schools, assessment techniques, the curriculum, teaching styles, teacher expectations, role models, and the way teachers reward and discipline. Ofsted have evidence of gendered behaviour by teachers – including setting, attention-management, subject choice advice, and decisions about entry to tiered papers….and more…(Ofsted 2003). Not least amongst these factors is gender-stereotypical peer group pressure amongst boys which reinforces low levels of engagement with learning (Warrington M, Younger M. 2005).

**Dispelling myths 1: it's a new problem.**
The 'gender gap' is not a new problem; if raw scores in the 11+ had been used to determine selection, then grammar schools in the 50s and 60s would have been populated almost exclusively by girls. Likewise, the historical figures for O level achievement in the 1960s and 70s show a gap in gender achievement, roughly 5% difference in pass rate, 10% in some subjects (eg languages) (Murphy R. 1980).

**Dispelling myths 2: it's all about education**
Actually it's all about development, including pre-natal development. It all starts much earlier than people think. Babies are actively processing speech *before* birth; they can recognise a story that they have heard while still in the womb. (DeCasper, A. J. and Spence, M. J. 1986). Early experiences affect cognitive development in a profound way; babies in non-inflected language settings lose the acuity to differentiate certain sounds in inflected languages. (Soderstrom, M. 2002. Saffran, JR, A. Senghas, and J.C. Trueswell. 2001; Slobin D.I. ed. 1985). In other words, deep shaping occurs from a very early point in development. Maternal-infant bonding is crucial to engagement with the world; work with infants under a year old shows that the nature of the infant-maternal bond affects learning from birth (Oates, J Stevenson, J. 2005 ). This suggests the power of early influences on the trajectory of the child. Further research suggest the gendered nature of those influences: suggesting that gendered behaviour is an insidious element in care and development of the child (Seavey et al 1975; Condry and Condry 1976).

**Dispelling myths 3: it's only a problem in England**
Not so. In PISA 2003, (the OECD Programme for International Student Assessment), boys performed significantly better than girls on the combined mathematics scale in 27 participating countries. However, the magnitude of these gender differences was generally small. No gender differences were observed in 12 countries and in one country (Iceland) girls performed significantly better than boys. As was the case in PISA 2000, girls performed significantly better than boys on the reading test in all but one country and in all provinces in PISA 2003. However, the gap between girls and boys in reading was much larger than the gap between boys and girls in mathematics. In PISA 2000, no significant gender differences were observed between boys and girls in any country or any province on the science test. In PISA 2003, in 12 countries, boys performed significantly better than girls in science. However, as with mathematics, the gap was small. In the case of problem solving, girls outperformed boys in only six countries (OECD 2006) Finland, the pre-eminent country in PISA 2000 - to which educationalists and policy-makers flocked – also diplays a gender gap. The findings of PISA suggest that as a rule Finland has managed to achieve both high quality and high equality of reading literacy outcomes. In guaranteeing gender equality, however, Finland has been less successful – witness the fact that in PISA the gender gap in reading literacy was widest in Finland, that is, 51 points (the OECD average being 32 points). Moreover, the gender differences found in Finland proved significant on all three subscales.In retrieving information the difference was smallest (44 points), andin reflection and evaluation greatest (63 points). In interpreting texts, the difference was 51 points. Compared to previous international reading literacy assessments, the gender gap, on the whole, seems to have widened not only in Finland but also in the other OECD countries.

Interestingly, differences in PISA in the performance on maths scales of different nations can be explained in part by different cultural behaviours – for example, the way in which Asian countries involve young children in 'high-stakes' number-related family activities such as dividing food (Tymms P 2005).

**Dispelling myths 4: all girls are better than all boys.**
Think about it. Whilst this is the implication of many press stories, this would give rise to a distribution like this:

Table 1 here

This is clearly absurd. OK, so there's some overlap, perhaps like this?

Table 2 here

In fact the difference in real data from examinations is actually like this:

Table 3 here

The overlap is far more substantial than the difference. In other words, we should remain as concerned about girls in the lower attaining parts of the female population as we are about 'underperforming boys'. Males and females are not as different in their outcomes as press comment or public perceptions would have us believe.

**Dispelling myths 5: it's all about learning styles and 'lazy boys'**
Research suggests that learning styles and approaches to learning are crucial, and this is something I will look at in a moment. If we take the data used above, from GCSE maths and draw up a new diagram which shows the degree of difference between boys and girls, you can see that the difference between boys and girls is at its greatest in the middle area of the distribution. This is vital.

Table 4 here

Crucially, boys are more heavily represented at each end of the distribution – both at the highest and lowest ends. This gives rise to a vital effect, not yet significantly documented. If both boys and girls improve over time, this peculiar distribution (which is present in tests in many different settings and with different purposes) then more girls will be included in the top grades, relative to boys. On table 4, if all students (males and females) start scoring 700 where they were previously scoring 800, then many more girls than previously would be in the population scoring 800. In other words, slide the whole distribution up, and you get much greater representation of girls.

This is not the sole explanation for the gender gap at all, but is a mechanism which IS in operation and is part of the picture. As both boys and girls improve, there is a tendency – by virtue of this mechanism – for girls to appear to accelerate in front of boys.

There ARE fundamental issues associated with different approaches to learning. If gender identities are shaped by very early experiences (see earlier sections) then we shouldn't be surprised by this. To form robust policy interventions we need to understand fully the true nature of the differences – ie the underlying causes.

Jean Rudduck and John Gray (Homerton College Cambridge) have undertaken considerable pupil-based research into differential performance, and remain concerned at the personal and social consequences of many boys' failure to develop engagement with learning and to achieve to a reasonable level whilst they are in compulsory education. Madeleine Arnott (Cambs) argued that the most significant issue in explaining difference is the way in which boys and girls regard school (Arnott M, 1997). Amongst boys, it's 'cool' to be seen not to work or comply. Alongside this, boys tend to blame poor performance on externalised factors ('bad teaching', 'wrong test questions'), while girls tend to blame themselves and their competence, and work harder in consequence to improve and to overcome problems. Girls and Boys used gender friendship groupings to cope with transition (Galton et al, 1999) . Jean Rudduck's work on GCSE preparation suggests that boys tend to leave it to the last minute and rely on 'natural talent'; in subjects where you need to build skills and knowledge over time (eg languages, English etc). This adversely affects their performance; leads to the peculiar subject choices post-16. Studies by teachers in schools (eg Beacon School Crowborough, 1993) revealed very different patterns of boys' and girls' homework effort.

These differences are heavily embedded in learning identities and cultural models. It is likely to take a lot to shift them.

**Dispelling myths 6: it's all about coursework favouring girls**

This is partly true – but it's not a simple issue. Researchers who have disagreed about the educational merits and social justice of new forms of assessment (Marks J, 2000; Ellwood J, 2000; Murphy P; 1998) agree that coursework and new curriculum content in the national curriculum and in examinations have had a positive effect on girls' performance. However, the notion that '…it's all down to coursework…' is not supported by way in which enhanced girls' performance has not been entirely in synch with changes in assessment approaches:
English moved from being 100% coursework and over the period of introduction of coursework and its reduction, the gender gap continued to increase.

Girls do better in qualifications with coursework for a number of reasons: they do well when they can discursively explore a subject; they attend to all the pieces of work which contribute to the end grade even if they only count for a small %, whereas boys place greater status and emphasis on the 'big bang' of the exam – all the small bits of diligence on the seemingly insignificant pieces of coursework add up to a better overall exam grade for the girls

So what's the choice? Remove coursework because it isn't 'gender neutral' or retain it since it helps to reflect better the learning preferences of girls? It's a not a simple question. We will return to it.

**Dispelling myths 7: there are no tests or qualifications in which boys do better than girls**
This is a key issue. It is certainly the case that girls' performance has improved significantly. From 1980 to 1995, girls moved from being significantly behind boys in science and maths. Over that time, boys' attainment improved significantly, but they improved less quickly than girls, and therefore the gender gap widened. By 1995, Boys' attainment in maths and science at KS2 & 3 still slightly exceeded that of girls. The detail is vital. What was going on? The national curriculum had a significant impact. We know that, compared to boys, female infants and young children tend to manifest higher levels of language-based proficiency. In the past, they have preferentially favoured language-based learning activities, and avoided areas of activity such as 3D representation in maths, something which is cognitively favoured by boys. But the national curriculum cut through these preferences, and forced female children to study such areas. As a result, their performance improved in these areas. In science, in the 60s and 70s it was the case that some girls schools had entirely inadequate science facilities – both reflecting and reproducing social views of the direction which female learning should take. Likewise, prior to the national curriculum, science was poorly represented in teaching training for the primary phase, whilst being dominated by females with little background in science – a circle of negative re-inforcement and reproduction.

Maths remains an area of national testing in which boys are ahead of girls: in maths at key stage 2 Level 4 and above (2006 boys = 77%, girls = 75%) and maths at key stage 2 level 5 and above (2006 boys = 36%, girls = 31%). But there is a much more significant difference in boys and girls attainment embedded in the GCSE and GCE qualifications data, concealed by the way in which the data normally are presented.

Usually, data relating to the numbers attaining a given grade in a qualification are presented as a proportion of the entry. But what if girls are seriously under-represented in the entry? Maybe only the high attaining girls enter certain subjects – the figures will then show a higher proportion of girls getting A grades, even though girls overall are poorly represented in the subject. In other words, there just aren't many girls doing the subject, but if they do, they get a high grade. What's serious about this is that there are far too few girls doing the subject. If it's maths or science, then this affects their life chances, since there is significantly greater personal return to these subjects in employment – along with benefit to society and the ecomomy. In fact this DOES occur. The best way to see issue in sharp relief is to compare grade attainment with the cohort, and not just those from the cohort who enter for each qualification. The following two tables show the contrast. Look at the way in which table 5 is deceptive in terms of girls' lower performance in single science biology, chemistry and physics at GCSE.

Table 5
Table 6

And that's another thing – girls are far less likely to do single sciences at GCSE – which in turn affects their progression onto science-based advanced-level study. This is where the crucial issue of subject choice kicks in.

While girls are now achieving better academic results than boys at age 16, relatively few young women are choosing science or science-related subjects for further study. Boys dominate in maths, science and technology at A level and far more men than women study these subjects in higher education. This has significant implications for men's and women's career choices and future earnings: 60% of working women are clustered in only 10% of occupations; and men are also under-represented in a number of occupations. I will address the question of the impact of this in terms of return to individuals in a moment.

Table 7 here

In the above table, note the position of maths in the boys section and in the girls section. Look also for physics – where is it in the girls section? It doesn't figure. Then look at the position of psychology in the girls' section. This raises key questions about how girls and boys are advised; how self-perception and peer influences shape subject choice; and what the longer term consequences are, in terms of individual progression and in terms of skill supply to the economy.

In examining gender difference, it is relative attainment between boys and girls which is the vital issue in national testing and GCSE; subject choice is the crucial gender issue in post-16 education and training.

**Dispelling myths 8: women carry through into employment the advantage they gain in education**

Not so. While women have made gains and moved towards equal pay and opportunity, the advantage which they hold in education is not carried forward wholesale into society and the economy. The pay gap IS closing, but it continues to exist. The gender pay gap is derived from median hourly earning (excluding overtime) for men and women. The full-time gender pay gap currently stands at 13.0 per cent using the median and 17.1 per cent using the mean, which means that women who work full time are paid on average just 87.0 per cent of men's hourly earnings using the median and 82.9 per cent using the mean. There was a decrease in the full-time gender pay gap of 1.5 percentage points in 2005 using the median and 0.7 percentage points using the mean (ref). Kate Purcell's incisive work suggests that whilst women are increasingly gaining access to previously male-dominated employment, there has been little change in the balance of domestic labour and responsibilities for children (Purcell K 2000). As a result, women face not only the challenge of demanding jobs, but also the full weight of domestic responsibilities. The gap (in pay and progression) between men and childless women has closed. However, for those with children, her work shows that those women with high 'control factors' in work – eg GPs able to specify hours etc – continue to advance in their careers; women with low control factors – eg female bank managers – to have children is to damage their career progression significantly. Career break through child rearing is the dominant factor in inhibiting occupational progression. In addition, where 2-parent m/f families face decisions about whose career should be focussed upon, even a minor differential in pay between the man and woman can influence that decision – which causes a cycle of gendered disadvantage for women.

Occupations remain heavily segregated: "…Amongst first degree graduates entering health professions, there were 3.6 times more females than males. This is attributed partly to the popularity of nursing, and to a lesser extent, medicine, as first degree subjects of choice amongst women. At PhD level, those entering health occupations, albeit at a much smaller number than for first degree and Masters graduates, were more likely to be males (3:2 male: female). Similarly, amongst first degree graduates entering education professions, there were 3.8 times more females than males; for social & welfare professions, 3.7 times; legal professions, two times; scientific research, analysis & development professionals, 1.7 times; and marketing, sales and advertising professionals, 1.6 times. On the other hand, of first degree graduates entering the engineering professions, there were 5.5 times more males than females; for IT professions, 4.6 times, and for other professional, associate professional and technical occupations, 1.4 times…" (Prospects 2006).

A very serious concomitant issue is that of self-perception and labour market positioning. Female graduates more frequently enter employment for which they consider their degree NOT to be a requirement: "…Although female first degree graduates were more likely than their male peers to be in health professions or associate professions, they were less likely to report that their degree was a formal requirement and more likely to say that it has not been required for obtaining their employment. Many of the female graduates employed in these occupations were nurses, of which only around half (54%) reported that a degree was a formal requirement. In contrast, relatively few male graduates went into nursing and of those working in the health professions, a

higher proportion were employed as doctors, for which a medicine degree, unsurprisingly, was formally required.Of first degree graduates entering work as business and financial professionals and associate professionals, 52.6% were females and 47.4% were males. Males working in these types of jobs, however, were more likely than their female counterparts to believe that their degree was a formal requirement, with 41.3% noting that this was the case compared with 32.5% of females. Female graduates were also more likely to report that their qualification was not required: 21% reported that this was the case compared with 17.5% of males.Female graduates were not only less likely than male graduates to be in IT occupations, they were less likely to be in IT jobs for which a degree qualification was a requirement…" (Prospect 2006) .

This suggests a serious, entrenched under-utilisation of skill and learning – the social flipside of personal disadvantage.

**Dispelling myths 9: gender differences are the most crucial in our system.**
It is essential to ensure that gender is placed in the right point on the scale of political and social concerns. Differences in attainment according to gender may be important, but these differences are dwarfed by those differences which are associated with social background. It's not that gender is unimportant – it's just vital to keep it in perspective when forming public policy priorities. Whilst gender is a valuable category for analysis and causes can be attributed to gendered aspects of educational practice and to gendered attitudes and approaches to learning by pupils themselves, social class and ethnicity are still more determining of achievement than gender. (Claessen M 2006). Child poverty, irrespective of gender, remains a pressing social policy issue (Robinson P, 2001).

**Dispelling myths 10: The gender gap points to a failure at the heart of our education system**
Actually it could be construed as a very real success. Both boys and girls have improved significantly over the past two decades. Children go into school with heavily gendered views of occupations (the result of early experience); these moderate whilst they are at school (impact of positive stereotyping, deliberate equal opportunity policy etc); and then kick back in again with subject choice (impact of social values and the labour market) (Knipe et al 2002; Jackson C &Warin J 2000). School is thus delivering some key social goods. This is not a picture of the education system failing, but moderating extremely powerful social forces.

**Dispelling myths 11: What we need is a 'boy friendly' pedagogy**
This is an oft-quoted position which holds considerable danger. Boaler cuts to the heart of the matter: '….gender patterns are shifting, not because of a climate of boy disadvantage, but because of a climate that is moving closer to equality of opportunity, in which girls are being allowed to achieve. I would therefore like to turn a popular media perspective on its head and propose a history of male overachievement, gained at the expense of the oppression of girls, that is now being replaced by a more equitable system of opportunity in which the group that works hardest and longest is allowed to achieve the greatest rewards…' (Boaler J undated). What Boaler goes on to recommend is NOT a return to methods which advantaged boys, but to methods which advantage both sexes. Her approach is entirely endorsed by the DfES-funded study by Younger, Warrington et al, a neglected study which provides a comprehensive, evidence-based set of recommendations for pedagogy (Younger M, Warrington M et al 2005). They outlined four classes of intervention strategies:

Pedagogic – eg space and time to talk and reflect about reading
Individual – eg realistic and challenging target-setting
Organisational – eg selective use of single-sex teaching groups
Socio-cultural – eg paired reading schemes between yr3 and yr5 pupils

Like Boaler, their research '…does not support the view that there is a case for boy-friendly pedagogies. Pedagogies which appeal to and engage boys are equally girl-friendly. They

characterise quality teaching, and as such are just as suitable and desirable for girls as for boys…'

**Conclusions**

By considering the full trajectory of children – from before birth to participation in employment – we can see that the gender gap has results from complex processes. My analysis of trajectories through life suggest that this is not a picture of the education system being solely responsible in some way for the gender gap; it is more that social and other stereotypes and pressures impact on education. Where problems ARE manifest in schools, they require careful remedy – and I hope that the analysis in this chapter gives some base for the formulation of robust public policy.

**Table 1**
**Putative Relationship between ♀ ♂**

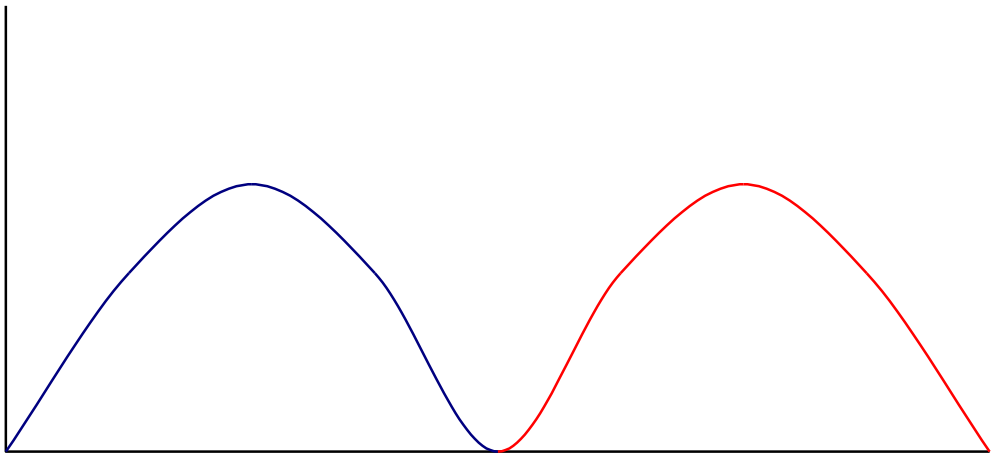


**Table 2**
**Putative Relationship between ♀ ♂**

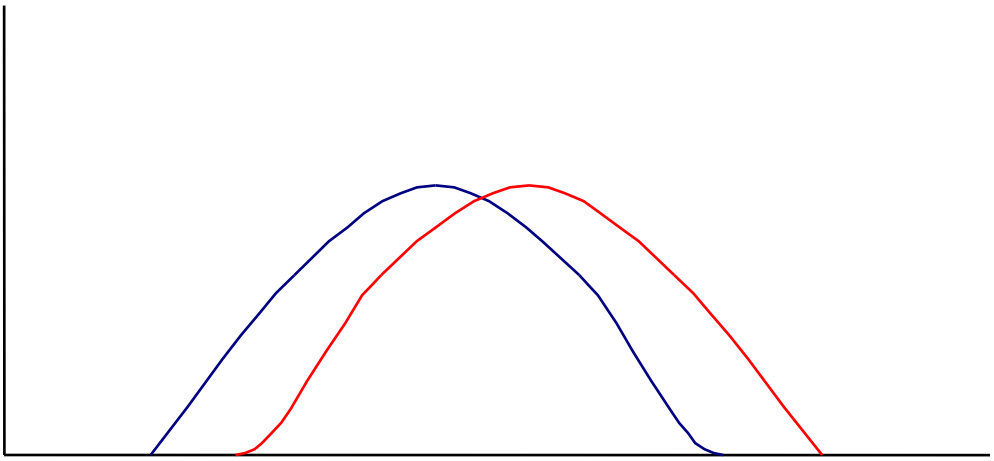


**Table 3**
**Examples of a Mark Distribution for an OCR mathematics GCSE**

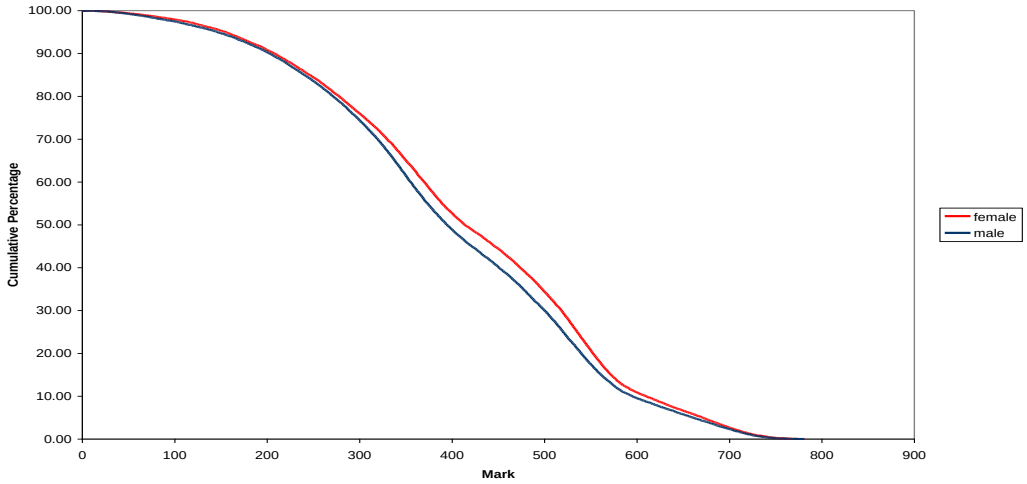
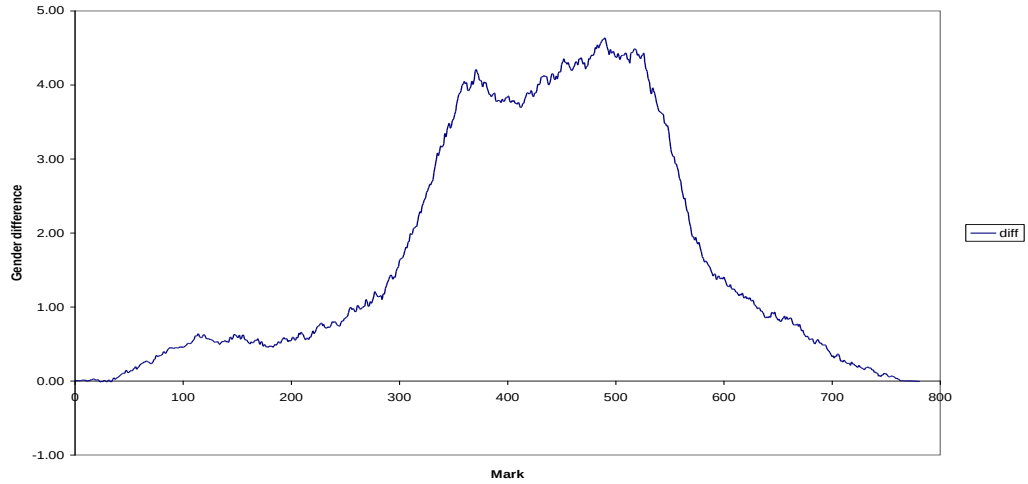
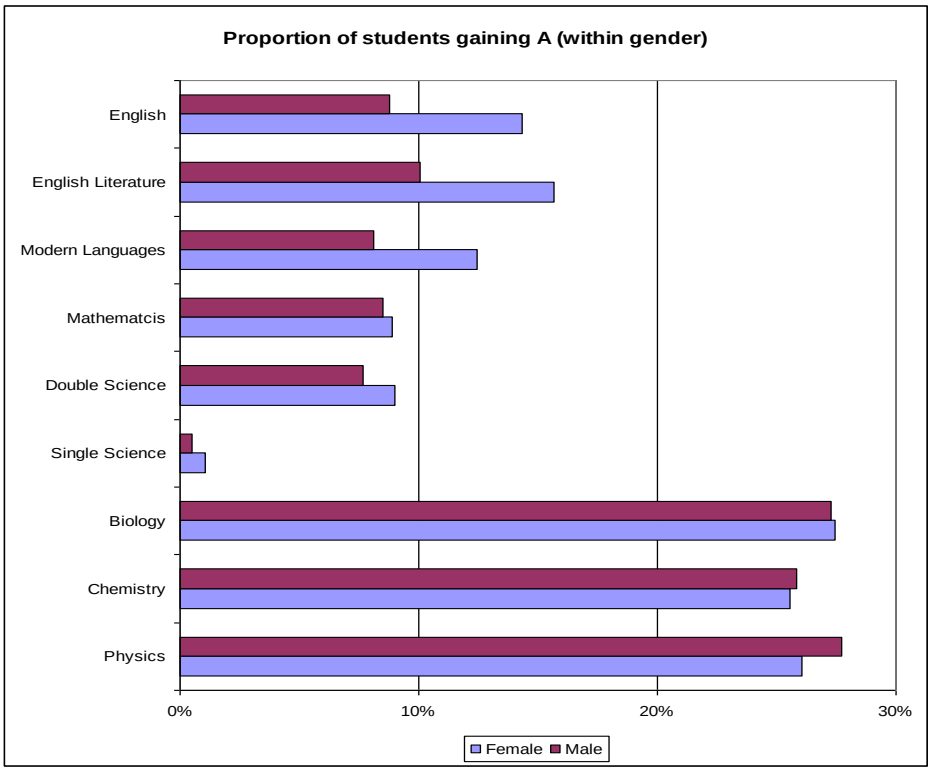



**Table 4**



## Table 5




## Table 6

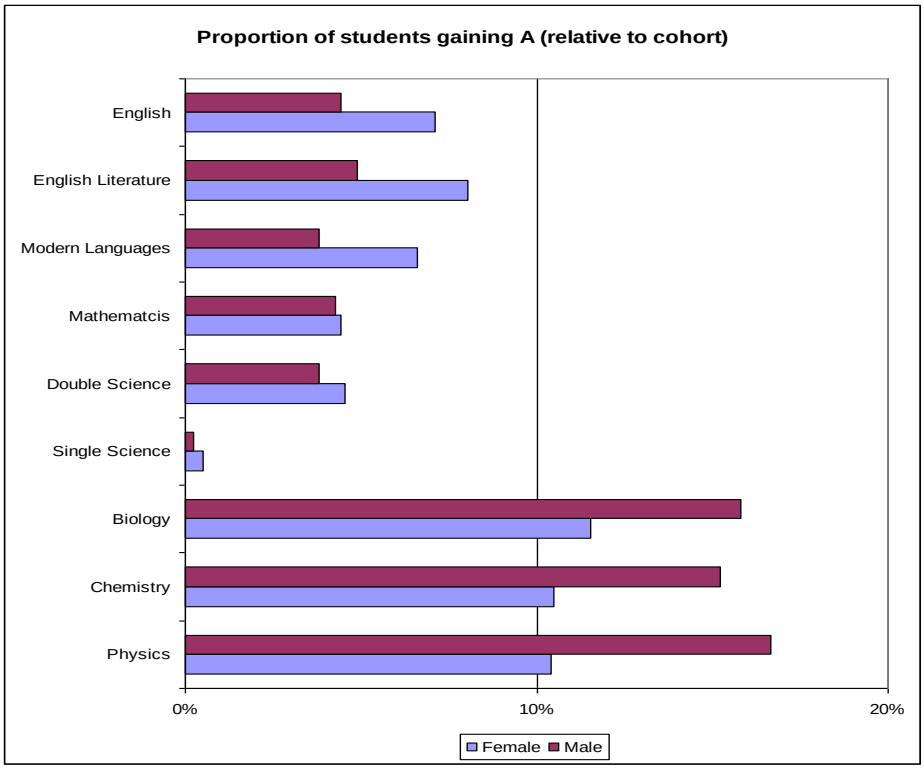


**Table 7**
**Top A Levels**

| FEMALE | | | | | | MALE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | | 2003 | | 2005 | | 2001 | | 2003 | | 2005 | |
| GS | 11.62% | GS | 9.66% | GS | 9.62% | GS | 11.88% | GS | 9.98% | GS | 10.12% |
| EngLit | 7.79 | EngLit | 7.36 | EngLit | 7.62 | Math | 10.29 | Math | 7.86 | Math | 7.61 |
| Bio | 6.24 | Psy | 6.24 | Psy | 7.35 | Phy | 6.08 | Phy | 5.58 | History | 5.34 |
| Math | 6.22 | Bio | 5.94 | Bio | 6.05 | Geo | 4.90 | BS | 5.05 | Phy | 5.34 |
| Psy | 5.04 | Math | 4.85 | History | 4.73 | BS | 4.78 | History | 4.79 | Bio | 4.99 |
| History | 4.33 | History | 4.42 | Soc | 4.41 | Chem | 4.61 | Geo | 4.59 | BS | 4.74 |
| Chem | 4.01 | Soc | 4.20 | Chem | 3.94 | Bio | 4.44 | Bio | 4.42 | Chem | 4.73 |
| Soc | 3.85 | Chem | 3.80 | Math | 3.93 | History | 4.28 | Chem | 4.20 | Geo | 4.38 |
| Geo | 3.69 | Geo | 3.39 | Geo | 3.12 | EngLit | 3.61 | EngLit | 3.42 | EngLit | 3.30 |
| BS | 3.44 | BS | 3.07 | Media | 2.98 | PE | 2.88 | ICT | 3.24 | PE | 3.18 |

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