

## Take-up and Performance in Junior Certificate Mathematics

### Introduction

In the study of coeducation undertaken by the Economic and Social Research Institute (ESRI) in the mid-1990s, one of the major findings was that: 'Being in a co-ed. school has significant and substantial negative effects on maths performance among girls, a difference of over half a grade from their single-sex counterparts' (Hannan et al. 1996, p. 141). The authors claimed that this appeared to be a 'pure' coeducational effect as 'girls in all types of coeducational schools have lower grades than their single-sex counterparts' (ibid). It was not clear from the study however, to what extent the lower attainment of girls in coeducational schools was a function of the differences in the levels of mathematics (Foundation, Ordinary and Higher) being taken in single-sex compared with coeducational schools.<sup>1</sup> The authors suggested that further research was necessary to explore this issue.

In the light of this, the research team decided to analyse gender differences in attainment between school types<sup>2</sup> in the Junior Certificate examinations over a five-year period. The research focused in particular on the differences in both take-up rates of different levels of mathematics (Higher, Ordinary and Foundation) across schools, and on the differences in attainment rates *within* each level for different types of schools. It was hoped that such an analysis would indicate whether the differences in the performance of girls in coeducational and single-sex schools persisted over time, and whether they were related to the differences between school types in the take-up rates in Higher, Ordinary and Foundation level mathematics. The period chosen for investigation was 1992 to 1996 as the examination data from these years was the most recent available when the study was planned in 1997/8. The analysis of the national examination data took place prior to the case studies in the schools, as it was believed that the findings from the national data would give a good indication as to what were the most significant factors that needed to be explored in the case studies.

### ***The study of Junior Certificate mathematics 1992-1996***

Mathematics is one of three subjects in the Junior Certificate curriculum that may be taken at Foundation, Ordinary and Higher levels (Irish and English are the other two). All other subjects are differentiated into Ordinary and Higher levels. Of all subjects, mathematics has the lowest take-up at the Higher level (36 per cent), followed by Irish at 40 per cent. By contrast, several other subjects attract large numbers of Higher level candidates including Geography (78 per cent), History (74 per cent), Science (69 per cent), Business Studies (68 per cent) and English (61 per cent). Of the three subjects that may be taken at Foundation level, mathematics has the highest take-up (13 per cent) at this level, ahead of Irish (10 per cent) and English (4 per cent) (Junior Certificate Examination Data, 1996).

This chapter is based on an analysis of Junior Certificate mathematics examination data<sup>3</sup> over a five-year period (1992-6). It examines differences in the take-up of, and performance in, mathematics at Foundation, Ordinary and Higher levels, principally by gender and school type.

The chapter is divided into three sections. The first section sets the context for the discussion that follows by examining gender differences in the distribution of students across the different types of schools. Using both school-level and individual-level data, section two presents findings in relation to the take-up of Junior Certificate mathematics and considers differences in the take-up of Foundation, Ordinary and Higher mathematics by school type and gender. Performance in mathematics is discussed in section three; the three levels are considered separately in relation to differences by gender and school type. A discussion of the findings is presented in the conclusion.

### **Student composition by school type and gender**

As the analysis of the gender composition of schools over the five years did not reveal any major differences across school types, we used the most recent data set available at the time of analysis, that for 1996, to indicate the patterns in gender composition in different school types (Table 2.1).

Almost two thirds (63 per cent) of Junior Certificate students attend secondary schools. Within the secondary sector, twice as many students attend single-sex compared with coeducational schools (42 per cent and 21 per cent). Less than one quarter of all students (22 per cent) attend vocational schools or community colleges, while 12 per cent are in community schools and 3 per cent are in comprehensives.

*Table 2.1 Distribution of Junior Certificate students by School Type and Gender: 1996*

	Percentage					
	Scoed	SSS	VCC	COMP	CS	Total
Females	19.1	50.5	17.3	2.4	10.7	100 (33,323)
Males	22.4	34.2	27.0	2.7	13.7	100 (34,094)
Total	20.8	42.2	22.2	2.6	12.2	100 (67,417)

**Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and Community Colleges; COMP: Comprehensive; CS: Community School

As can be seen from Table 2.1, almost 58 per cent of all Junior Certificate students attended coeducational schools in 1996. In gender terms, however, substantially fewer females than males attended coeducational schools (50 per cent and 66 per cent, respectively). Within the coeducational sector, males outnumbered females in all school types. The gender disparity was greatest in vocational schools and community colleges where 61 per cent were male. In community schools 57 per cent were male, in secondary coeducational schools, 55 per cent were male, while 54 per cent of students in comprehensive schools were male.

Schools are not just divided in terms of gender, or whether they are secondary, vocational, community or comprehensive, they are also divided in terms of whether they are designated disadvantaged or not<sup>4</sup>. In addition, within the secondary sector, schools are classified as either fee-paying or free scheme (non-fee). All community, comprehensive and vocational schools and colleges are non fee-paying.

In 1996, 6 per cent of all Junior Certificate students attended fee-paying secondary schools. Two thirds of the fee-paying schools attended were single-sex while one third were coeducational secondary schools. The gender differences in participation in fee-paying education is slight although more boys than girls attend fee-paying schools. (Table A2.2).

Over a quarter (26 per cent) of all second-level schools, which catered for 28 per cent of all students, were classified as disadvantaged at the time of the study. There were slightly more males than females in designated disadvantaged schools (Table A2.3). Vocational schools and community colleges, community schools and comprehensives are over-represented in the designated-disadvantaged category, while the opposite applies to secondary schools. The difference is most striking between vocational schools and community colleges, and coeducational secondary schools: 43 per cent of the students in vocational schools and community colleges are in designated-disadvantaged schools while just 18 per cent of the students in coeducational secondary schools are in disadvantaged schools.

While there are no major gender differences in the overall distribution of students across designated-disadvantaged schools, there are slightly more boys than girls in such schools.

As the base line data on second-level schools does not provide any information on the social class or socio-economic background of students, we asked the ESRI to undertake a re-analysis of the national data they collected on schools in 1994<sup>5</sup> for their study *Coeducation and Gender Equality* (Hannan et al. 1996) on a social class basis. They provided us with a breakdown of the social class profile of Junior Certificate students across different school types, broken down by gender (Table 2.2). Overall, the results confirm that secondary schools are more middle class in composition than vocational, community or comprehensive schools and colleges. Almost half of students in secondary schools come from upper middle and middle-class backgrounds, compared with one in four in vocational schools and community colleges, and one in three in community and comprehensive schools. Conversely, single-sex and coeducational secondary schools have a lower proportion of students from working class backgrounds (31 per cent and 33 per cent respectively) compared with vocational schools and community colleges, where in particular, 55 per cent of whom were from working class backgrounds.

*Table 2.2 Social Class Profile of Junior Certificate Students: School Type and Gender Differences*

**Source:** ESRI, National Survey on Coeducation and Single-sex Schooling, 1994 – Special tabulation

	Percentage by School Type														
	Scoed			SSS			VCC			CS/Comp			Total		
	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All
UMC	17	23	20	19	23	21	5	8	7	11	9	10	15	17	16
MC	26	28	27	28	27	28	18	17	18	25	26	25	25	24	25
LMC	22	19	21	22	18	20	19	21	20	20	22	21	21	20	21
UWC	18	17	18	20	19	19	33	33	33	29	24	26	22	23	23
WC	17	13	15	11	13	12	25	21	22	15	19	18	17	16	17
Total %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n	1501	1141	2642	513	456	969	484	750	1234	384	478	862	2884	2827	5707

**Social Class Key:** UMC: Upper Middle Class; MC: Middle Class; LMC: Lower Middle Class; UWC: Upper Working Class/Skilled Manual; WC: Working Class/Semi-skilled and Unskilled Manual.

**School Type Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and Community Colleges; COMP: Comprehensive; CS: Community School.

In terms of the social class background, there are some differences in the profile of female and male students across school types. In coeducational secondary schools, male students are more likely to come from a middle, or upper middle-class background (51 per cent) than female students (43 per cent), while female students (35 per cent) are somewhat more likely to be working class than male students (30 per cent). Girls in vocational schools and community colleges are also slightly more likely to be working class (58 per cent) than their male peers (54 per cent). Girls and boys in community and comprehensive schools are almost identical in terms of social class background, while those in single-sex schools are also very alike in terms of social class.

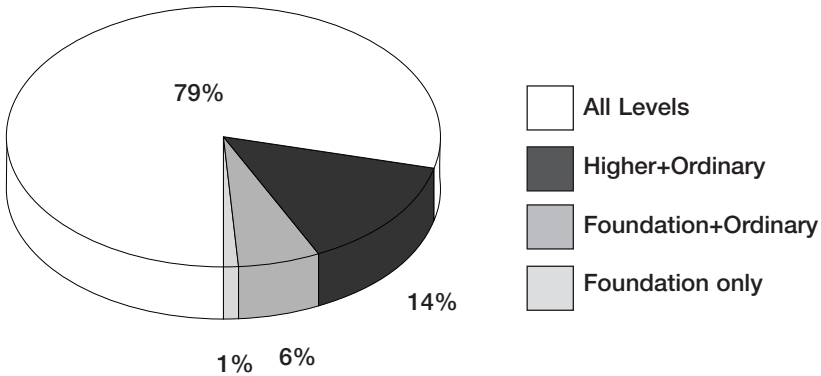
While it is not possible to generalise from the ESRI data set to the present study, it does give a good indication of the social class profile of Junior Cycle students in different school types in the mid-year of the period under investigation, 1994. It indicates particularly that any generalisations about school type must be interpreted in the light of the differences in social class intake across school types, and the known resource advantages and disadvantages attached to class. Secondary schools generally, and single-sex secondary schools in particular, are much more middle-class in intake than other school types, especially more so than vocational schools and community colleges. Both girls and boys in single-sex schools are twice as likely to be middle-class compared with girls and boys in vocational schools and community colleges.

### **Gender differences in the take-up of mathematics at each level**

The first part of the analysis focuses on the overall pattern of take-up of mathematics at the three levels: Foundation, Ordinary and Higher. We also examine the extent to which take-up of mathematics varies between different school types, between fee-paying and non-fee-paying schools, and between designated-disadvantaged and non-disadvantaged schools. As our analysis showed very little change between 1992 and 1996 in the patterns of take-up rates in mathematics, we have used the most recent (1996) school-level data<sup>6</sup> to demonstrate the differences between schools.

Overall, an examination of the 1996 Junior Certificate examination data showed that most schools (79 per cent) provided mathematics at the three levels (Figure 2.1). In a further 14 per cent of schools, take-up of mathematics was limited to Higher and Ordinary levels. In all, Higher level mathematics was offered in the vast majority (93 per cent) of schools. In the remaining 7 per cent, take-up was mainly restricted to a combination of Foundation and Ordinary levels (6 per cent), while in 1 per cent of schools, students only took Foundation level mathematics for the Junior Certificate.

Figure 2.1 Take-up of Mathematics by Level, 1996 (Base: 745 schools)



**Differences in take-up rates across school types**

When the take-up rates for Higher level mathematics are analysed from 1992 to 1996, they show that about one third of the students took mathematics at the Higher level over the five-year period (Table 2.3). However, there are important differences between school types in the take-up of Higher level mathematics with more than twice the percentage taking Higher level mathematics in secondary schools (either coeducational or single-sex secondary) compared with vocational schools and community colleges. While the proportion of girls taking Higher level mathematics was slightly greater than that of boys in the community, comprehensive and vocational sectors, the reverse was true in the secondary sector where more boys took Higher level mathematics, especially in the single-sex sector.

Table 2.3 Student take-up of Higher Mathematics by School Type and Gender: Average rates for 1992-1996

	Average per cent (1992-1996)					
	Scoed	SSS	VCC	COMP	CS	All
Females	36.5	38.0	19.8	34.6	28.7	33.7
Males	37.2	44.5	15.5	33.9	25.3	32.7
Total	36.9	40.8	17.2	34.3	26.8	33.2

**Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and Community Colleges; COMP: Comprehensive; CS: Community School.

In most Irish schools (64 per cent) less than 40 per cent of the students take Higher level mathematics. There were forty-nine schools (7 per cent) where nobody took the Higher level paper in 1996 (Table 2.4). The patterns for 1992 to 1995 were the same as for 1996. Table 2.4 also shows that a disproportionately high number of vocational schools and community colleges do not offer mathematics at Higher level. One in five of these schools had no student taking Higher level mathematics in 1996, while a further 43 per cent had 20 per cent or fewer of their Junior Certificate students taking Higher level mathematics. These findings should however, be interpreted, in light of the fact that vocational schools have the highest proportion of designated disadvantaged schools of all school types (43 per cent)<sup>7</sup>. One of the criteria for getting such a designation is having a relatively large cohort of students who are socio-economically and educationally disadvantaged.

*Table 2.4: Differences across types of schools in the take-up of Junior Certificate Higher Mathematics 1996*

	Secondary schools			Other second-level schools			
	SSS Girls %	SSS Boys %	Scoed %	VCC %	COMP %	CS %	Total % (n)
Nobody	0	2	1	20	0	0	7 (49)
1 to 20 per cent	12	7	10	43	20	31	21 (161)
21-40 per cent	34	30	50	27	40	56	36 (267)
41-60 per cent	43	40	33	9	40	13	28 (209)
61-80 per cent	10	17	6	1	0	0	7 (52)
81-100 per cent	1	4	0	0	0	0	1 (7)
Total (n)	(166)	(142)	(136)	(225)	(15)	(61)	(745)
%	100	100	100	100	100	100	100

**Key:** SSS Girls: Secondary single-sex girls; SSS Boys: Secondary single-sex boys; Scoed: Secondary Coeducational; VCC: Vocational schools and Community Colleges; COMP: Comprehensive; CS: Community School.

A relatively high proportion of community schools (31 per cent) also had 20 per cent or fewer students taking Higher level mathematics, while just 9 per cent of boys' schools, 12 per cent of girls' and 11 per cent of coeducational secondary schools had 20 per cent or fewer students taking higher level papers.

Single-sex schools were also the most likely to have a clear majority (60 per cent or more) taking Higher level mathematics examinations. However, even in their case, just 11 per cent of girls' schools and 21 per cent of boys' schools had over 60 per cent of students taking Higher level mathematics. Only 1 per cent of vocational schools and none of the

community or comprehensive schools had over 60 per cent of students taking Higher level mathematics examinations.

The disparity between schools is even greater when one compares fee-paying schools with other school types: while over 40 per cent of students took Higher level papers in most (85 per cent) fee-paying schools, less than one third of all other schools (32 per cent) had more than 40 per cent of their students taking Higher level examinations. The difference in Higher level take-up rates between designated disadvantaged schools and others was even greater than that between fee-paying and others: while 44 per cent of schools that were not designated disadvantaged had over 40 per cent of students doing Higher level examinations, only 12 per cent of schools that were designated disadvantaged had this rate of take-up (Table A2.4).

Vocational schools and community colleges had the highest level of take-up of Foundation mathematics: in a quarter of vocational schools and community colleges, more than 40 per cent of Junior Cycle students were taking Foundation level examinations while this was true in 4 per cent or less of all other school types (Table 2.5).

*Table 2.5: Take-up of Junior Certificate Foundation mathematics by school type, 1996 (Base: second-level schools)*

	Secondary schools			Other second-level schools			Total % (n)
	SSS Girls	SSS Boys	Scoed	VCC	COMP	CS	
	%	%	%	%	%	%	
Nobody	18	27	15	7	13	0	14 (107)
1 to 20 per cent	71	65	76	40	74	72	61 (459)
21-40 per cent	8	6	7	28	13	24	15 (110)
41-60 per cent	3	1	1	18	0	2	7 (50)
61-80 per cent	0	1	0	4	0	2	2 (12)
81-100 per cent	0	0	1	3	0	0	1 (7)
Total (n)	166	142	136	225	15	61	745
%	100	100	100	100	100	100	100

**Key:** SSS Girls: Secondary single-sex girls; SSS Boys: Secondary single-sex boys; Scoed: Secondary Coeducational; VCC: Vocational schools and Community Colleges; COMP: Comprehensives; CS: Community Schools.

Given the high concentration of disadvantaged schools in the vocational and community college sector, it is not surprising to find that there was a relatively large number taking Foundation mathematics in disadvantaged schools relative to other school types: in over one fifth (21 per cent) of disadvantaged schools, 40 per cent or more of the students were taking Foundation level examinations while this was true in 5 per cent or less of

other schools. There was no fee-paying school with 40 per cent or more taking Foundation level examinations (Table A2.5).

### ***Concluding comments***

What is most notable from the analysis of take-up rates is the difference across school types in the take-up of Higher, Ordinary and Foundation level mathematics. While there is a disparity in the take-up of different levels of mathematics between vocational schools and colleges and secondary schools generally (with community and comprehensive schools occupying an interim position between the two), the differences are most pronounced between designated disadvantaged schools and other school types. The most socially selective schools, fee-paying secondary schools, have by far the highest take-up rates in Higher level mathematics and the lowest rate of take-up at Foundation level. The reverse is true among those schools that are least socially selective, most especially designated disadvantaged schools, of which a very large number are in the vocational and community college sector.

Given the heavy concentration of coeducation in vocational schools and colleges (51 per cent of all coeducational schools are vocational schools or community colleges, (Department of Education and Science, 2000b)) and the relatively low level of take-up in Higher level mathematics within such schools (63 per cent had 20 per cent or less taking Higher level papers, Table 2.4), it is easy to see how performance in coeducational schools generally would appear to be lower than that in single-sex schools. The results of schools with high concentrations of students taking Higher level courses look favourable when compared to schools with low concentrations of students taking Higher level examinations when results are computed on a single hierarchical scale with Higher level courses being awarded higher points. Whether it is appropriate to compare schools in this way is open to debate. Students in schools in which a Higher level course is not on offer, or where few students are encouraged or allowed to take the Higher level course, cannot be expected to get comparable results to students in schools where Higher level is the norm for a large minority or majority of the students. Why so few students are taking Higher level courses in certain schools, especially in vocational schools and colleges (in 20 per cent of which there were no students taking higher level papers) is a question that needs however to be addressed. While the pattern of low or no take-up in Higher level mathematics is most visible in the vocational sector, with 20 per cent or fewer of the students taking Higher level papers in 63 per cent of these schools, it is not a pattern exclusive to this type of school. In 31 per cent of community schools, 20 per cent of comprehen-

sives and almost 11 per cent of secondary coeducational schools, 20 per cent or fewer of the students were doing Higher level mathematics.

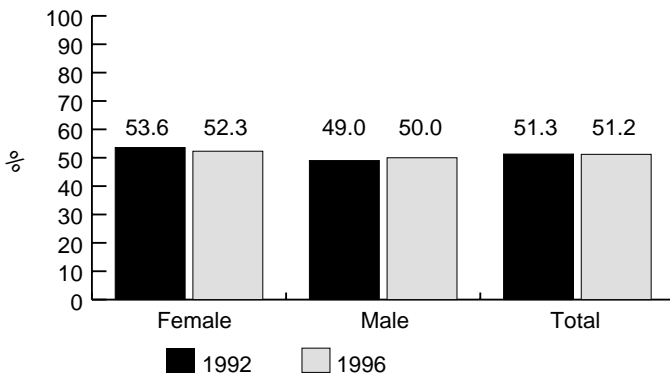
Overall therefore, it would appear that differences in take-up rates of different levels of mathematics between coeducational and single-sex schools, is not so much related to their coeducational status as it is to the social class composition of their school population, and the tradition of the school. The schools with the most disadvantaged students are the ones in which there is the highest take up of Foundation and Ordinary mathematics, and these also tend to be disproportionately vocational schools and community colleges.

### Gender Differences in Take-up Rates

While the discussion so far has concentrated on differences between schools, in this section we analyse the differences in patterns of take-up between the individuals within different types of schools. Given the focus of the study, the analysis centres on differences in the proportion of females and males taking mathematics at Higher and Foundation levels *within* particular school types.

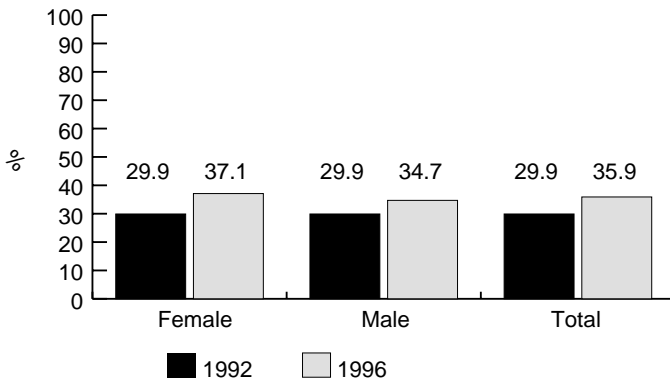
The findings in Figures 2.2 to 2.4 show gender differences in the take-up of Junior Certificate mathematics for the two years, 1992 and 1996<sup>8</sup>. Half of all students took Ordinary level mathematics in 1992 and 1996, although slightly more females than males took Ordinary level papers in both years. While the percentage of females taking Ordinary mathematics declined slightly over the five years, the proportion of males increased slightly.

Figure 2.2 Take-up of Ordinary mathematics by gender, 1992 and 1996



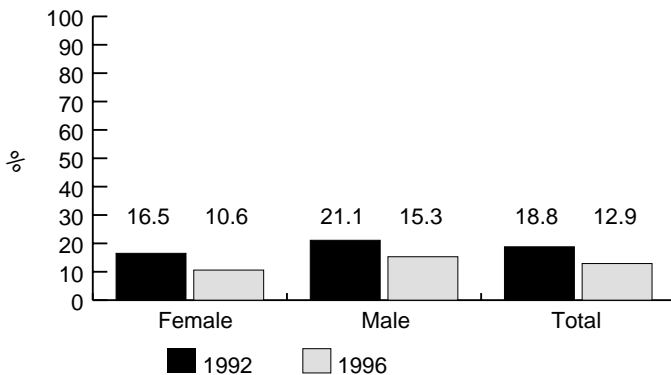
Over the five-year period, a steady increase occurred in the proportion of students taking Higher level mathematics, from 30 per cent in 1992 to 36 per cent in 1996 (Figure 2.3). While an equal proportion of girls and boys took Higher level examinations in 1992 (30 per cent), the proportion of girls taking Higher level mathematics (37 per cent) exceeded that of boys (35 per cent) in 1996. The relatively higher participation rate of girls in Higher mathematics continued to the end of the millenium. In 1999, 51 per cent of those taking Higher level mathematics examinations at the Junior Certificate level were girls (Department of Education and Science, 2000b).

Figure 2.3 Take-up of Higher Mathematics by Gender, 1992 and 1996



Foundation level mathematics is the least chosen option of the three levels in mathematics, with just 13 per cent of students taking this level in 1996 (Figure 2.4). This represents a decrease from the 1992 take-up rate of

Figure 2.4 Take-up of Foundation Mathematics by Gender, 1992 and 1996

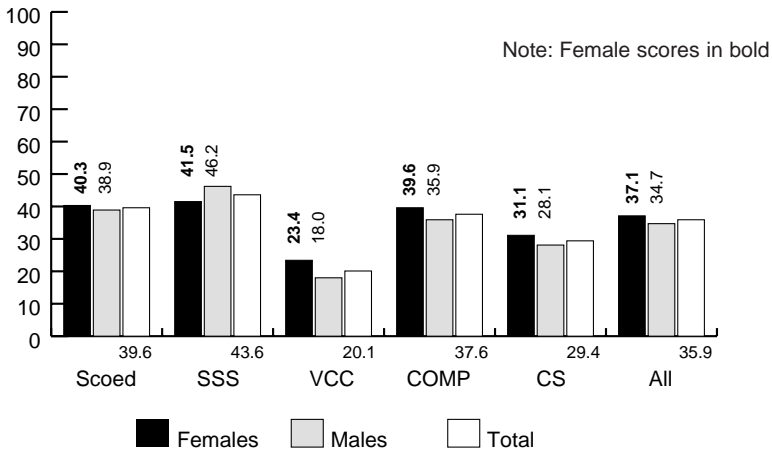


19 per cent (the 1999 data shows that the take-up rate was still at 13 per cent, *ibid*). A gender analysis of the 1992 and 1996 figures revealed a higher representation of boys taking foundation level mathematics. In 1996, for example, 15 per cent of males took foundation compared with 11 per cent of females. This gender pattern has persisted since 1996 (*ibid*).

The next part of the analysis involves an examination of how the take-up of Higher and Foundation level mathematics varies by school type and gender. As the gender patterns across school types did not vary across the five years, the analysis here is based on the 1996 figures, the most recent examination data available for this study (Figure 2.5).

Overall, the take-up of Higher mathematics is substantially higher than the average (36 per cent) in single-sex secondary schools (44 per cent), and marginally higher than average in coeducational secondary schools (40 per cent) and comprehensives (38 per cent). By contrast, take-up of Higher level mathematics in vocational schools and community colleges is approximately half the average rate (20 per cent). Community schools also rank somewhat below the average, with a take-up rate of 29 per cent (Figure 2.5).

*Figure 2.5. Take-up of Higher Mathematics by School Type and Gender: 1996*



Although there are no major gender differences in the take-up of higher mathematics, there are very significant differences across school types. Boys in single-sex secondary schools are the most likely to take Higher level mathematics, either compared with girls in this sector, or compared with either gender in the other school types. The differences between males and females within the secondary sector are moderate (46 per cent and 39 per cent for males in single-sex and coeducational schools

respectively, compared with 42 per cent and 40 per cent for females in single-sex and coeducational schools respectively). However, if the rates for males in single-sex schools are compared with those for either males or females in vocational schools and community colleges, the differences are considerable (ibid). Boys in single-sex schools are 2.5 times more likely than boys in vocational schools and community colleges to do Higher level mathematics and almost twice as likely as girls in these schools.

Girls in the single-sex sector are less likely than boys in this sector to take Higher level mathematics. In other school types, girls are *more* likely than boys to take mathematics at Higher level although the differences are relatively small in all cases (Figure 2.5).

Girls in single-sex schools, secondary coeducational and comprehensive schools are twice as likely to do Higher mathematics as boys in vocational schools and community colleges, and more than 1.5 times more likely to do them than girls in vocational schools and community colleges (ibid).

The analysis of the take-up rates for Foundation level mathematics is presented in Table A2.6. Overall, the take-up of Foundation level mathematics is substantially higher in vocational schools and community colleges compared with all other school types. The take-up in this sector is almost double the average rate (25 per cent compared with 13 per cent). Otherwise, what is most notable is the substantially lower take-up in the secondary sectors compared with the non-secondary sectors.

With the exception of single-sex secondary schools, girls are less likely than boys to take up Foundation level mathematics in all school types. The gender gap is quite substantial in secondary coeducational schools, vocational school and community colleges, and in community schools.

Overall therefore, the greatest gender differences in the take-up rates of different levels of mathematics is between boys in single-sex schools and boys in vocational schools and community colleges, followed by that between girls in single-sex schools and boys (and to a somewhat lesser degree, girls) in vocational and community colleges. Both girls and boys in coeducational secondary schools, and those in comprehensive schools, also, have twice as high a rate of participation in Higher level mathematics than boys in vocational schools and community colleges, and a much higher rate than that of girls in such schools and colleges. Girls and boys in community schools also have a 50 per cent higher rate of take-up in Higher level mathematics than girls and boys in vocational schools and community colleges.

Girls have a 30 per cent lower take-up rate in Foundation level mathematics than boys nationally, although girls in single-sex schools are

slightly more likely than boys in single-sex schools to take Foundation mathematics. The reverse is true in all the coeducational schools.

It would appear therefore that, while the gender composition of the school does impact on the take-up of different levels of mathematics, the most notable differences are between schools with the large concentrations of students from disadvantaged working class background, 43 per cent of which are vocational schools and community colleges. In the majority of vocational schools and community colleges generally (63 per cent), and of designated disadvantaged schools (58 per cent), one fifth or fewer of the students are taking Higher level mathematics (Tables 2.4 and A2.4).

Differences between school types must be interpreted with caution however, as there is evidence from the Hannan et al. study (1996) that there are differences in attainment between students attending different school types, with secondary schools having a disproportionately higher number of students who achieved highly on tests of verbal reasoning and numerical skill<sup>9</sup>. The rank order of average attainment levels from the highest to the lowest in their study was as follows: boys' secondary schools, coeducational secondary schools, girls' secondary schools, community and comprehensive schools, and vocational schools and community colleges. A measure of the proportion of lower attaining students within each school was computed<sup>10</sup>, and it was found that 18 per cent of students overall fell into this category. Almost one third of students in vocational schools and community colleges, and 27 per cent of those in community and comprehensive schools had low attainment scores compared with 10 per cent of boys and 14 per cent of girls in single-sex schools (ibid, pp. 84-87). What the data suggest therefore is that what can appear to be a school effect may be an intake effect. It is very likely that higher proportions of students in secondary schools are taking Higher level papers because these schools have a higher intake of the high attaining students in the first instance.

However, as Hannan et al.'s study did not have a test of students' attainment *prior to* second-level entry, even the test of so-called ability (in reality a test of attainment) used in that study (it was based on the entire Junior Cycle cohort in the study) does not tell us what the differences were between students *prior to* entering second-level schools. As there is no national test of attainment prior to second-level entry, there is no definitive evidence on the attainment differences between entrants to different second-level schools. In the light of this, we can only make informed estimates as to the precise differences between students in different types of schools: the available evidence does suggest that there are very significant differences and that these are to the advantage of secondary schools in particular. Whatever the extent of the differences in

attainment between students across school types at entry or at Junior Certificate level, the findings raise serious questions as to how disparities in attainment arise, and why they are so evidently related to social class background.

### **Performance in Junior Certificate mathematics: school type and gender differences**

Table 2.6 shows that the average grade obtained by students in all levels in mathematics approximated to Grade C<sup>11</sup> over the five years from 1992 to 1996. The average grade obtained in foundation is slightly lower than that obtained in the other levels. There are no notable gender differences in the average scores in relation to Foundation, Ordinary or Higher level mathematics, although girls' scores are marginally higher than boys' scores.

*Table 2.6: Gender Differences in Attainment in Junior Certificate Mathematics: Foundation, Ordinary and Higher Examinations*

	Average Mean Scores (1992-1996)		
	Females	Males	Overall Average
Foundation	3.94	3.86	3.90
Ordinary	4.16	4.07	4.12
Higher	4.16	4.15	4.15

We also examined performance in mathematics by school type (Table 2.7). Within a given level of mathematics, students in single-sex schools score higher than those in vocational schools and community colleges in particular. The greatest difference is between the performance of girls in single-sex school and those in vocational schools and community colleges at both Ordinary and Higher levels, where the differences reached almost half a grade. On average, girls in single-sex schools achieved over 10 per cent higher grades in both Higher and Ordinary level mathematics from 1992 to 1996.

Gender differences *within* school type are minor at all levels, although girls in single-sex schools have slightly higher scores than boys for each level within the single-sex sector. Boys in community schools have slightly higher scores than girls over the five-year period.

Differences in mean scores between the fee-paying and non fee-paying sectors follows a slightly different pattern. (Figures A2.1 to A2.3). Irrespective of level, students in the fee-paying sector consistently achieved higher mean scores in mathematics than those in the non-fee

paying sector. The size of the differences that apply can be seen by comparing the overall lowest and highest mean scores. In Foundation level mathematics, there is a difference of a grade between the scores of girls in the coeducational free scheme, vocational, community and comprehensive schools, and those of girls in fee-paying coeducational schools to the advantage of the latter. In both Higher and Ordinary mathematics, there is a difference of approximately half a grade between the lowest and highest mean scores. Vocational schools and community colleges achieved the lowest scores at both levels, and single-sex secondary schools the highest scores (Figures A2.2 and A2.3).

*Table 2.7 Gender Differences in Mathematics Attainment across School Types. Average mean scores for 1992-1996: Foundation, Ordinary and Higher*

	School Type					
	Scoed	SSS	VCC	COMP	CS	Total
Foundation						
Females	3.73	3.96	3.69	3.80	3.52	3.79
Males	3.78	3.83	3.66	3.56	3.70	3.71
<i>Total</i>	<i>3.76</i>	<i>3.91</i>	<i>3.67</i>	<i>3.65</i>	<i>3.64</i>	<i>3.74</i>
Ordinary						
Females	4.28	4.40	3.95	3.98	3.93	4.23
Males	4.23	4.24	3.98	4.04	4.04	4.13
<i>Total</i>	<i>4.25</i>	<i>4.33</i>	<i>3.97</i>	<i>4.01</i>	<i>3.99</i>	<i>4.18</i>
Higher						
Females	3.92	4.14	3.75	3.91	3.86	4.03
Males	3.96	4.11	3.74	4.07	3.89	4.01
<i>Total</i>	<i>3.94</i>	<i>4.13</i>	<i>3.74</i>	<i>3.99</i>	<i>3.88</i>	<i>4.02</i>

**Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and Community Colleges; COMP: Comprehensives; CS: Community schools.

An examination of gender differences *within* these school sectors showed that female and male scores were very similar. This applied to Foundation, Ordinary and Higher mathematics. Girls in single-sex fee-paying and in free scheme secondary schools did slightly better than boys in similar schools, at both Higher and Ordinary levels. The reverse was true for both levels of the examination in all other school types, with the exception of Ordinary level mathematics in free scheme coeducational secondary schools where girls had slightly higher grades than boys. All the gender differences within sectors are small, especially in the Higher level courses, and especially when compared with the differences across

designated disadvantaged and other schools, or between fee-paying and other schools.

We also examined differences in the mean scores in Foundation, Ordinary and Higher level mathematics for designated-disadvantaged and other schools (Figures A2.4 to A2.6). The overall findings for each of the three levels show that mean scores in the non-disadvantaged schools are consistently higher than scores in disadvantaged schools. For Foundation and Ordinary level mathematics, the lowest scores are found in designated-disadvantaged comprehensive schools and the highest scores in non designated-disadvantaged single-sex secondary schools. The lowest scores for Higher level mathematics are found in designated-disadvantaged vocational schools and community colleges, and the highest scores in non designated-disadvantaged single-sex secondary schools. Differences between the lowest and highest scores are quite substantial: they amount to over a half-grade for all three levels.

There were some differences however, between different types of designated disadvantaged schools in Ordinary level grades, with girls in disadvantaged secondary coeducational and single-sex schools scoring half a grade above girls in disadvantaged comprehensive and community schools in particular (Figure A2.5).

### **Excelling and performing poorly in mathematics**

To examine the differences between types of schools, it was decided to examine the patterns of achievement at both grade A, and grade E or lower levels. The third measure was a measure of reasonable achievement, grade C or above<sup>12</sup>.

A profile of those who excelled (grade A) in the Junior Certificate examination in Foundation, Ordinary and Higher level mathematics over the 1992 to 1996 period is presented in Figures A2.7 to A2.9. It is clear that the overall proportion achieving this grade fluctuated quite substantially from year to year<sup>13</sup>. The proportion awarded grade A at Higher level in 1996 (8 per cent) was only half of that of 1994 (16 per cent). At Ordinary level, while 13 per cent got a grade A in 1996, only 7 per cent got this grade in 1994.

Over the five years, boys were slightly more likely to excel than girls in both Higher and Foundation level mathematics (except for 1996). In Ordinary level mathematics, girls either performed marginally better or on a par with boys (since 1993). We can conclude, therefore, that although boys consistently achieved a slightly higher proportion of A grades in Higher and Foundation level mathematics from 1992 to 1996, girls and boys received approximately an equal number of A grades at Ordinary level.

The proportion of students awarded grade A varies considerably across school types and by level of subject. Students in single-sex schools received the highest proportion of A grades at both Higher (10 per cent) and Ordinary level (15 per cent). Comprehensive schools were those closest to single-sex schools in terms of A grades awarded at Higher level (9 per cent), while students in secondary coeducational schools were closest to them at Ordinary level (13 per cent). At Foundation level, there were no differences across school types, in terms of the A grades awarded, although comprehensive schools got slightly more (4 per cent) than other school types (3 per cent) (Table 2.8).

*Table 2.8 School Type and Gender Differences in Percentage Grade A awarded in Mathematics at Foundation, Ordinary and Higher level (1996)\**

	Percentage					
	Scoed	SSS	VCC	COMP	CS	Total
Foundation						
Females	3	4	3	5	1	3
Males	3	3	3	3	5	3
Total	3	3	3	4	3	3
Ordinary						
Females	14	16	8	11	9	13
Males	13	13	10	10	11	12
Total	13	15	9	10	10	13
Higher						
Females	5	8	4	7	6	7
Males	7	11	5	11	7	9
Total	6	10	4	9	6	8

**Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and community colleges; COMP: Comprehensive; CS: Community School

\*Data for 1992-1995 showed the same trends

There were also gender differences in the proportion of A grades awarded: more males were awarded A grades in Higher level mathematics across all school types, with males in single-sex and comprehensive schools getting the highest proportion of A grades (11 per cent). The comparable figures for girls in single-sex and comprehensive schools were 8 per cent and 7 per cent respectively. The greatest disparity in A grades awarded was between boys in single-sex schools and girls in vocational schools: while 11 per cent of boys in the single-sex schools got Higher level A grades, only 4 per cent of girls in vocational schools and community colleges got A grades. As pointed out above (Table 2.2 and on

page 28), the gender findings need to be interpreted in the light of the social class profile of the schools and their general attainment scores: boys in single-sex schools are the second most likely to be middle-class (boys in coeducational secondary schools are slightly more middle-class) while girls in vocational schools and community colleges are the most likely to be working class. Single-sex boys' schools also had the lowest proportion of students with low general attainment scores in the Junior Certificate classes while vocational schools had the highest proportion.

Gender differences between schools are not confined to secondary and vocational schools. There was also a considerable disparity between girls and boys *within* comprehensive schools: 7 per cent of girls got A grades on Higher examinations compared with 11 per cent of boys. Equally, within the single-sex sector, considerably more boys (11 per cent) than girls (8 per cent) got A grades. Gender disparities are reversed at Ordinary level with girls in single-sex schools getting most (16 per cent), followed by girls in coeducational secondary schools (14 per cent). Girls in both single-sex and comprehensive schools got more A grades at this level than boys in these school types.

There is also a considerable disparity between fee-paying and all other schools in the proportion of A grades awarded at both Higher and Ordinary levels (Table A2.7). At Higher level, the greatest disparity is between boys in single-sex fee-paying schools (14 per cent of whom got A grades) and girls in vocational, community and comprehensive schools and community colleges (5 per cent of whom got A grades). At Ordinary level it is girls in single-sex fee-paying schools who got most A grades and girls in vocational, community and comprehensive schools and community colleges who got least. What is interesting to note is that slightly more boys (14 per cent) in fee-paying schools got A grades at Higher level than girls in such schools (10 per cent).

We must enter a caveat here about these differences in performance across school types. There is a widespread use of grinds by students undertaking public examinations. As grinds are relatively expensive, it is highly probable that students from more economically advantaged backgrounds are disproportionately more likely to have taken them, thereby boosting their grades. There is some research evidence to support the contention that it is the more economically advantaged students that have the highest take-up rates for grinds (Lynch and O'Riordan, 1998; Lynch and Lodge, 2002).

When designated disadvantaged schools are compared with other schools, the greatest disparity in the proportion of A grades awarded is between boys in non-disadvantaged single-sex schools and girls in designated disadvantaged vocational schools and community colleges

(Table A2.8). While 12 per cent of boys in the former schools got A grades at Higher level, only 1 per cent of girls got A grades at higher level in the vocational schools and community colleges (and 3 per cent of boys). At Ordinary level, the gender disparities in the proportion of A grades awarded are not as great between designated disadvantaged and non-disadvantaged schools. In this case, it is girls who get most A grades across most school types, but not in vocational schools and community colleges or in designated disadvantaged community schools (Table A2.8).

The proportion of students performing very poorly (Grade E or less) in the Junior Certificate mathematics examination are presented for the years 1992 to 1996 in Figures A2.10 to A2.12. Although there is some variation over the five-year period, between 2 per cent and 12 per cent of students are awarded grade E or less in the Junior Certificate mathematics examination each year. Although gender differences within each level and year are slight, it is notable that males consistently perform more poorly than females.

The proportion of students performing poorly is shown to differ quite substantially between secondary and other schools (Tables A2.9 to A2.11). Most notably, the proportion of students performing poorly is considerably higher in vocational schools and community colleges as it is in single-sex secondary schools (Table A2.9).

## Discussion

Although mathematics is a core subject for the Junior Certificate examination, there is considerable variation in the take-up of the subject at different levels. While take-up rates in all subjects vary at Higher and Ordinary level, the take up rate in Higher level mathematics is much lower than in most other major subjects. In 1996, just 36 per cent took Higher level mathematics (an increase from 30 per cent in 1992) compared with 61 per cent taking Higher level English and 69 per cent taking Higher level science. The take-up rate for Higher level mathematics was still 36 per cent in 1999 (Department of Education and Science, 2000b).

Over the five year period of the study (1992 to 1996), mathematics had the lowest take-up at the Higher level and the highest take-up at Foundation level of the three subjects which are divided into three levels. While the majority of schools (79 per cent) were shown to have examined mathematics at all three levels in 1996, in 20 per cent of schools only Ordinary and Foundation level mathematics were taken for the Junior Certificate examination, while in 1 per cent of schools only Foundation level mathematics was examined at Junior Certificate level.

Although boys and girls were equally likely to take Higher level

mathematics in 1992, girls were slightly more likely to take the Higher level course in 1996, a pattern that has continued into the new millennium (Department of Education and Science, 2000b).

The low take-up of Higher level mathematics was shown to be a feature of vocational schools and community colleges, and designated disadvantaged schools especially, with a heavy overlap between the two. On the other hand, schools where a high percentage of students were studying Higher level mathematics were typically single-sex secondary schools, with boys' schools in the fee-paying sector being the most likely to offer the Higher level course.

Boys in single-sex secondary schools were shown to be more likely to take Higher level mathematics, either compared with girls in this sector, or students of either gender in the other school types. While differences between males and females within the secondary sector were moderate, those between males in single-sex schools, and males and females in vocational schools and community colleges were considerable. The take-up of Foundation level mathematics was especially high in vocational schools and community colleges.

In terms of performance, an examination of mean scores showed that students in vocational schools and community colleges achieved the lowest mean scores, while students in single-sex secondary school achieved the highest scores at Foundation, Ordinary and Higher levels. The differences were noticeable and consistent: students in secondary schools were awarded just over a quarter of a grade higher scores in the Foundation examination, and a little over one third of a grade higher scores in both the Higher and Ordinary level papers than those in other school types.

Differentiating schools by fee-paying and non-fee-paying, and designated-disadvantaged and non-designated disadvantaged, revealed some notable differences. Schools in the fee-paying and non designated-disadvantaged sectors consistently achieved higher mean scores in mathematics than those in the non fee-paying sector (with differences of over a half to one whole grade differentiating between those at the top and bottom across school types). An examination of gender differences *within* these school sectors showed that female and male grades were very similar.

An examination of gender differences between designated-disadvantaged and non-designated disadvantaged schools showed that female and male scores were very similar within each level, although girls in single-sex schools performed slightly better than boys in both designated-disadvantaged and non-designated disadvantaged single-sex schools. Girls in designated-disadvantaged (coeducational) community and compre-

hensive schools performed relatively poorly compared with other schools, especially compared with designated-disadvantaged single-sex girls' schools in Ordinary mathematics. In Higher mathematics, girls in designated-disadvantaged single-sex schools achieved a half a grade higher score than girls in designated-disadvantaged vocational schools and community colleges. Girls in designated-disadvantaged coeducational secondary schools also had higher scores than girls in vocational schools and colleges, and than girls in designated-disadvantaged comprehensive and community schools, although the differences were not as pronounced.

An examination of the proportion achieving an A grade or grade E or less reveals a similar pattern. Irrespective of level, schools in the single-sex secondary sector achieve the greatest share of the highest grade while the opposite applies to vocational schools and community colleges. Once again, however, one needs to remember that these grade differences across school types may well be boosted by the level of uptake in mathematics grinds for the Junior Certificate.

In gender terms, although boys consistently achieve a slightly higher proportion of A grades in Higher level mathematics, girls and boys are performing fairly equally at the upper end of the academic spectrum. The opposite applies in relation to poor performance. Here boys consistently perform more poorly than girls, although the differences are slight. An examination of the achievement of a grade C or above by gender shows that girls consistently do better than their male peers; again, however, the differences are small.

In general, the fact that one in five vocational and community schools do not have students taking Higher level mathematics has important implications for students' choices further on in their education. Specifically, the option of taking Higher level mathematics at senior cycle is usually contingent on having studied the subject at this level at junior cycle. The choice of Foundation mathematics at junior cycle, in particular, is likely to limit options both in terms of further educational and vocational choices. On a broader level, because attainment in mathematics is used to allocate students to classes within their year group, placement in a Foundation or Ordinary level class for this subject is likely to have implications for the student's placement in other subjects as well.

While the gender differences in performance are relatively minor within given levels of Junior Certificate mathematics, there are still some differences in performance. Although girls are now slightly more likely to take Higher level mathematics examinations at Junior Certificate level, boys are still more likely to get A grades at higher levels. This is especially true of boys in single-sex secondary schools and of boys in comprehensive schools. Girls are more likely to get A grades at Ordinary level and there is no difference at Foundation level.

In terms of overall performance in Junior Certificate mathematics, girls in single-sex schools achieved the highest scores across all three levels of mathematics between 1992 and 1996. Girls and boys in vocational schools and community colleges got the lowest scores in the Higher level examinations, while girls in community schools got the lowest scores in both Ordinary and Foundation level examinations. The gender differences 'within' each school type are generally very small however.

Differences in performance therefore are much more notable across school types than across gender groups, with more middle class schools having the higher rates of attainment, and more working class schools having lower rates. Such findings raise questions as to how such differences are generated and perpetuated in the first instance. This is a major subject of our case studies.

## APPENDIX TO CHAPTER 2

*Table A2.1: Allocation of points to mathematics*

Grade	Level		
	Foundation	Ordinary	Higher
A	6	6	6
B	5	5	5
C	4	4	4
D	3	3	3
E	2	2	2
F	1	1	1
No Grade	0	0	0

*Table A2.2: Distribution of Junior Certificate students across free scheme and fee-paying, single-sex and coeducational secondary schools: 1996 data*

	School Type					
	Scoed Fee	Scoed Free	SSS Fee	SSS Free	Other	Total
Females	1.7	17.5	3.4	47.1	30.4	100.0
Males	2.8	19.6	3.8	30.4	43.4	100.0
Total	2.2	18.6	3.6	38.6	37.0	100.0

**Key:** Scoed FEE: Secondary Coeducational fee-paying; Scoed FREE: Secondary Coeducational free-scheme; SSS FEE: Secondary single-sex fee-paying; SSS FREE: Secondary single-sex free-scheme.

*Table A2.3: The proportion of students across school types that are in designated disadvantaged schools: 1996 data*

	School Type					
	Scoed	SSS	VCC	COMP	CS	Total
Females	16.0	23.5	40.2	38.5	41.5	27.2
Males	19.9	18.9	44.8	33.3	38.3	29.2
Total	18.2	21.6	43.0	35.7	39.7	28.2

**Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and Community Colleges; COMP: Comprehensive; CS: Community Schools.

*Table A2.4: Take-up of Junior Certificate Higher mathematics non-fee vs. fee-paying and designated-disadvantaged (DD) vs. non-designated disadvantaged (NDD), 1996 (Base: all second level schools)*

	Non-fee vs. Fee-paying Schools		DD vs. NDD Schools		Total Schools % (n)
	Non-fee %	Fee-paying %	DD %	NDD %	
Nobody	7	0	12	5	7 (49)
1-20 per cent	23	2	46	13	21 (161)
21-40 per cent	37	13	30	38	36 (267)
41-60 per cent	27	39	11	34	28 (209)
61-80 per cent	5	38	1	9	7 (52)
81-100 per cent	0	8	0	1	1 (7)
Total (n)	693	52	196	549	(745)
%	100	100	100	100	100

*Table A2.5: Take-up of Junior Certificate Foundation mathematics non-fee vs. fee-paying and designated-disadvantaged (DD) vs. non-designated disadvantaged (NDD), 1996 (Base: all second level schools)*

	Non-fee vs. Fee-paying Schools		DD vs. NDD Schools		Total Schools % (n)
	Non-fee %	Fee-paying %	DD %	NDD %	
Nobody	12	44	4	18	14
1-20 per cent	62	52	49	66	61
21-40 per cent	16	4	26	11	15
41-60 per cent	7	0	14	4	7
61-80 per cent	2	0	4	1	2
81-100 per cent	1	0	3	0	1
Total (n)	693	52	196	549	745
%	100	100	100	100	100

*Table A2.6 Take-up of Foundation mathematics by school type and gender: 1996*

	Percentage					
	Scoed	SSS	VCC	COMP	CS	All
Females	6.5	8.6	19.8	8.3	12.9	10.6
Males	11.0	7.1	28.6	11.5	19.3	15.3
Total	8.8	7.9	25.2	10.0	16.5	13.0

**Key:** Scoed: Secondary Coeducational; SSS: Secondary single-sex; VCC: Vocational schools and community colleges; COMP: Comprehensive; CS: Community Schools.

*Table A2.7 Percentage obtaining grade A in mathematics by fee-paying vs. free-scheme, and school type and gender: 1996 Data*

	School Type (fee-paying vs. free-scheme)				
	Scoed FEE	Scoed FREE	SSS FEE	SSS FREE	VCC/CS/ COMP FREE
Foundation					
Females	23	2	0	4	2
Males	8	3	11	2	3
Total	14	2	5	3	3
Ordinary					
Females	15	13	24	16	9
Males	19	12	15	13	10
Total	17	13	20	15	10
Higher					
Females	6	5	10	8	5
Males	7	8	14	11	6
Total	7	6	12	9	6

**Key:** Scoed FEE: Secondary Coeducational fee-paying; Scoed FREE: Secondary Coeducational free-scheme; SSS FEE: Secondary single-sex fee-paying; SSS FREE: Secondary single-sex free-scheme; VCC/CS/COMP FREE: Vocational schools and community colleges, community schools and comprehensive free-scheme.

*Table A2.8 Percentage obtaining Grade A in mathematics: differences by gender and designated-disadvantaged status: 1996 Data*

	School Type (Designated Disadvantaged Status vs. Non-Designated Disadvantaged Status)									
	Scoed		SSS		VCC		COMP		CS	
	DD	NDD	DD	NDD	DD	NDD	DD	NDD	DD	NDD
Foundation										
Females	1	4	3	4	2	5	4	5	0	1
Males	4	3	2	3	2	3	2	3	4	5
Total	3	3	2	4	2	4	3	4	3	4
Ordinary										
Females	12	14	13	17	6	9	5	15	5	13
Males	11	13	10	14	8	11	4	12	7	13
Total	12	14	12	16	7	11	5	14	6	13
Higher										
Females	4	5	5	9	1	5	2	9	5	6
Males	5	8	9	12	3	5	11	11	6	7
Total	5	6	7	10	2	5	6	10	6	7

**Key:** ScoedDD: Secondary Coeducational designated-disadvantaged; ScoedNDD: Secondary Coeducational non designated-disadvantaged; SSSDD: Secondary single-sex designated-disadvantaged; SSSNDD: Secondary single-sex non designated-disadvantaged; VCCDD: Vocational schools and community colleges designated-disadvantaged; VCCNDD: Vocational schools and community colleges non designated-disadvantaged; CompDD: Comprehensive designated-disadvantaged; CompNDD: Comprehensive non designated-disadvantaged; CSDD: Community school designated-disadvantaged; CSNDD: Community school non designated-disadvantaged

*Table A2.9 Percentage performing poorly (grade E or lower) in mathematics by school type and gender: 1996 Data*

	School Type					
	Scoed	SSS	VCC	COMP	CS	Total
Foundation						
Females	10	6	10	9	14	9
Males	6	9	12	13	12	11
Total	8	7	11	12	13	10
Ordinary						
Females	7	5	10	11	12	7
Males	8	8	11	11	11	9
Total	7	6	11	11	12	8
Higher						
Females	7	4	11	10	9	6
Males	9	8	11	7	9	9
Total	8	6	11	9	9	7

**Key:** Scoed: Secondary Coeducational; SSS: Secondary Single-sex; VCC: Vocational schools and community colleges; COMP: Comprehensive; CS: Community Schools.

*Table A2.10 Percentage performing poorly (grade E or lower) in mathematics by fee-paying vs. free-scheme school type and gender: 1996 Data*

	School Type (fee-paying vs. free-scheme)				
	Scoed FEE	Scoed FREE	SSS FEE	SSS FREE	VCC/CS/ COMP FREE
Foundation					
Females	4	11	6	6	11
Males	3	7	7	9	12
Total	3	8	7	7	12
Ordinary					
Females	3	7	1	5	11
Males	3	8	5	8	11
Total	3	8	3	6	11
Higher					
Females	6	7	3	4	10
Males	6	9	5	8	10
Total	6	8	4	6	10

**Key:** Scoed FEE: Secondary Coeducational fee-paying; Scoed FREE: Secondary Coeducational free-scheme; SSS FEE: Secondary single-sex fee-paying; SSS FREE: Secondary single-sex free-scheme; VCC/CS/COMP FREE: Vocational schools and community colleges, community school and comprehensive free-scheme.

*Table A2.11: Percentage performing poorly (grade E or lower) in mathematics by designated-disadvantage status compared to all other schools and gender: 1996 Data*

	School Type (Designated Disadvantaged Status vs. Non-Designated Disadvantaged Status)									
	Scoed		SSS		VCC		COMP		CS	
	DD	NDD	DD	NDD	DD	NDD	DD	NDD	DD	NDD
Foundation										
Females	11	10	8	4	10	9	11	8	17	10
Males	8	6	7	9	13	11	17	10	16	9
Total	9	7	8	6	12	10	14	10	16	9
Ordinary										
Females	9	6	6	4	14	8	14	8	17	8
Males	11	7	10	7	14	9	22	5	17	8
Total	10	7	8	5	14	9	18	7	17	8
Higher										
Females	9	6	5	4	16	9	21	5	14	6
Males	14	8	12	7	13	11	12	6	16	6
Total	11	7	8	6	14	10	17	5	15	6

**Key:** ScoedDD: Secondary Coeducational designated-disadvantaged; ScoedNDD: Secondary Coeducational non designated-disadvantaged; SSSDD: Secondary single-sex designated-disadvantaged; SSSNDD: Secondary single-sex non designated-disadvantaged; VCCDD: Vocational schools and community colleges designated-disadvantaged; VCCNDD: Vocational schools and community colleges non designated-disadvantaged; CompDD: Comprehensive designated-disadvantaged; CompNDD: Comprehensive non designated-disadvantaged; CSDD: Community school designated-disadvantaged; CSNDD: Community school non designated-disadvantaged

*Table A2.12 Percentage obtaining grade C and above in mathematics by school type and gender: 1996 Data*

	School Type					
	Scoed	SSS	VCC	COMP	CS	Total
Foundation						
Females	60	69	57	62	49	62
Males	61	64	56	51	56	58
Total	60	67	56	55	54	59
Ordinary						
Females	76	79	65	64	64	72
Males	74	74	66	68	69	71
Total	75	77	65	66	67	72
Higher						
Females	65	74	59	66	63	69
Males	66	70	58	68	62	67
Total	66	72	58	67	63	68

**Key:** Scoed: Secondary Coeducational; SSS: Secondary Single-sex; VCC: Vocational schools and community colleges; COMP: Comprehensive; CS: Community Schools.

*Table A2.13 Percentage obtaining grade C and above by fee-paying vs. free-scheme school type and gender: 1996 Data*

	School Type (fee-paying vs. free-scheme)				
	Scoed FEE	Scoed FREE	SSS FEE	SSS FREE	VCC/CS/COMP FREE
Foundation					
Females	93	57	71	69	55
Males	87	59	75	64	56
Total	89	58	73	67	56
Ordinary					
Females	86	75	91	78	65
Males	84	73	81	74	67
Total	85	74	87	77	66
Higher					
Females	65	65	81	73	61
Males	70	65	77	69	61
Total	68	65	79	71	61

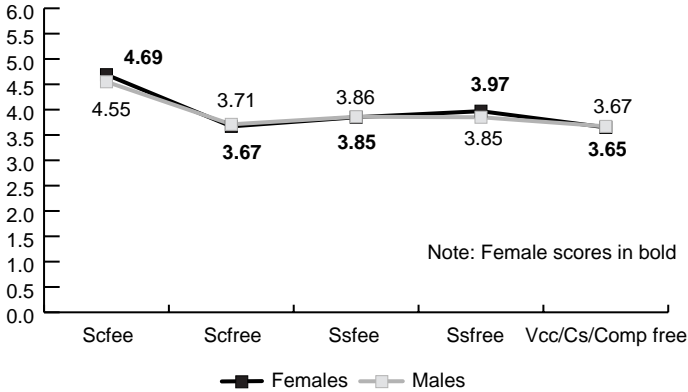
**Key:** Scoed FEE: Secondary Coeducational fee-paying; Scoed FREE: Secondary Coeducational free-scheme; SSS FEE: Secondary single-sex fee-paying; SSS FREE: Secondary single-sex free-scheme; VCC/CS/COMP FREE: Vocational schools and community colleges, community school and comprehensive free-scheme.

*Table A2.14 Percentage obtaining grade C and above in mathematics by designated-disadvantage compared to other school types and gender: 1996 Data*

	Designated Disadvantaged compared to other school types									
	Scoed		SSS		VCC		COMP		CS	
	DD	NDD	DD	NDD	DD	NDD	DD	NDD	DD	NDD
Foundation										
Females	60	60	65	73	53	62	61	62	46	54
Males	53	64	67	62	55	57	36	64	51	61
Total	55	62	65	68	55	58	45	63	49	59
Ordinary										
Females	69	77	75	80	59	69	55	70	55	71
Males	68	76	68	76	62	69	54	75	60	74
Total	69	76	72	79	60	69	55	73	58	73
Higher										
Females	62	66	71	74	52	61	61	68	52	68
Males	57	67	65	71	52	60	62	70	54	66
Total	60	66	68	73	52	61	61	69	53	67

**Key:** ScoedDD: Secondary Coeducational designated-disadvantaged; ScoedNDD: Secondary Coeducational non designated-disadvantaged; SSSDD: Secondary single-sex designated-disadvantaged; SSSNDD: Secondary single-sex non designated-disadvantaged; VCCDD: Vocational schools and community colleges designated-disadvantaged; VCCNDD: Vocational schools and community colleges non designated-disadvantaged; CompDD: Comprehensive designated-disadvantaged; CompNDD: Comprehensive non designated-disadvantaged; CSDD: Community school designated-disadvantaged; CSNDD: Community school non designated-disadvantaged.

Figure A2.1: Mean scores for Foundation level mathematics by school type and gender, 1996.



**Key – Figures A2.1 to A2.3:** *Scfee*: Secondary Coeducational fee-paying; *Scfree*: Secondary coed free-scheme; *Ssfee*: Secondary single-sex fee-paying; *Ssfree*: Secondary single-sex free-scheme; *Vcc/cs/comp free*: Vocational schools and community colleges, community schools and comprehensives.

Figure A2.2: Mean scores for Higher level mathematics by school type and gender, 1996

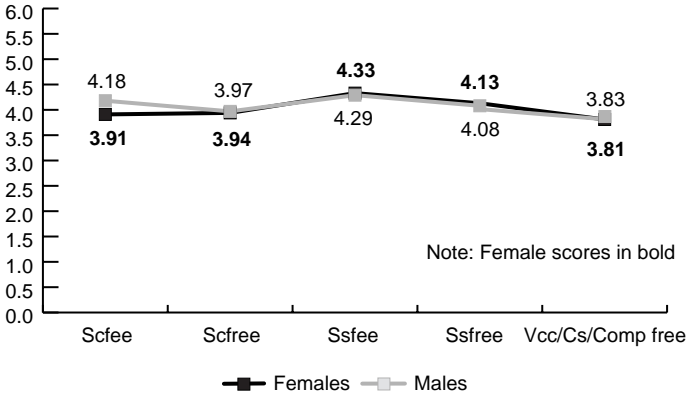


Figure A2.3: Mean scores for Ordinary level mathematics by school type and gender, 1996

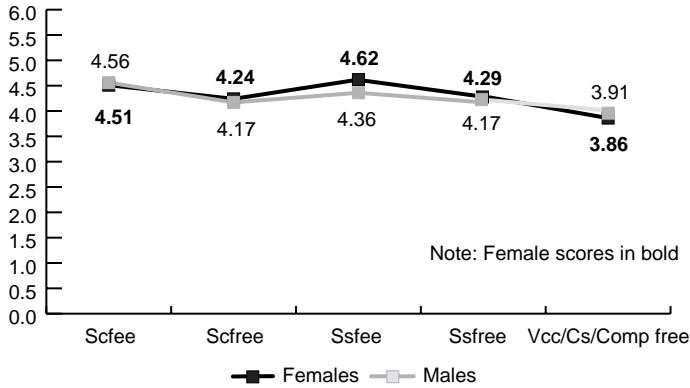
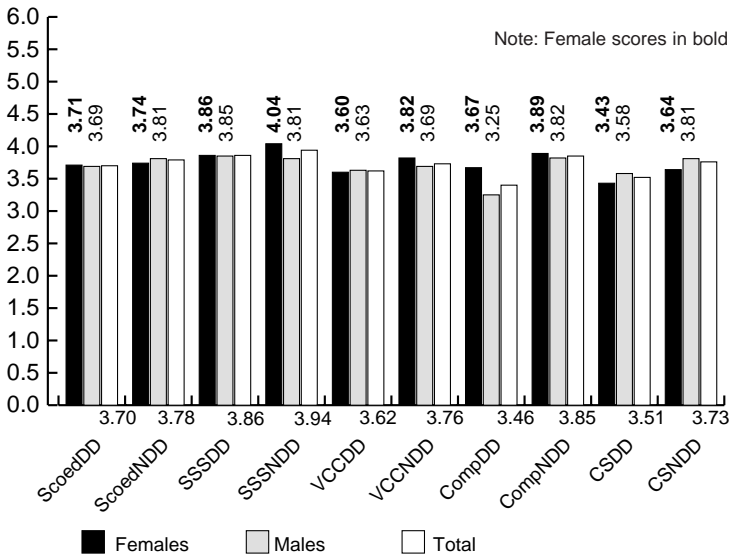


Figure A2.4: Foundation level mathematics mean scores by designated disadvantaged compared with other school types, 1996 Data



**Key – Figures A2.4 to A2.6:** ScoedDD: Secondary Coeducational designated-disadvantaged; ScoedNDD: Secondary Coeducational non designated-disadvantaged; SSSDD: Secondary single-sex designated-disadvantaged; SSSNDD: Secondary single-sex non designated-disadvantaged; VCCDD: Vocational schools and community colleges designated-disadvantaged; VCCNDD: Vocational schools and community colleges non designated-disadvantaged; CompDD: Comprehensive designated-disadvantaged; CompNDD: Comprehensive non designated-disadvantaged; CSDD: Community school designated-disadvantaged; CSNDD: Community school non designated-disadvantaged.

Figure A2.5: Ordinary level mathematics mean scores by designated disadvantaged compared with other school types, 1996 Data

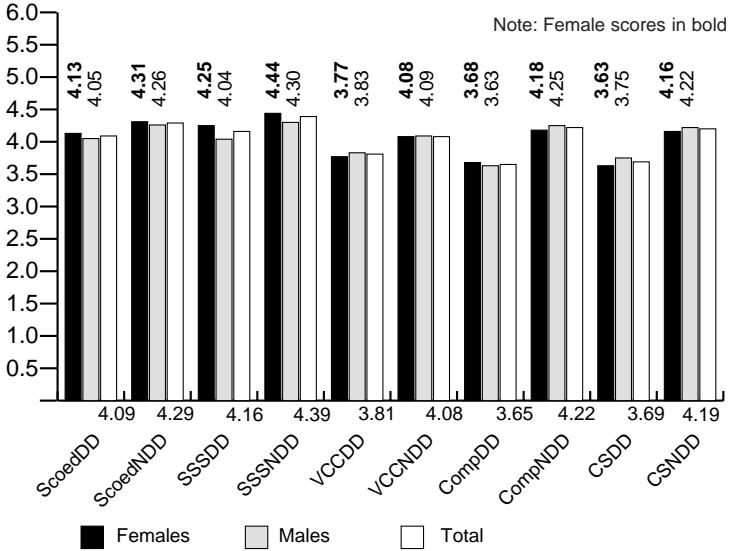


Figure A2.6: Higher level mathematics mean scores by designated disadvantaged compared with other school types, 1996 Data

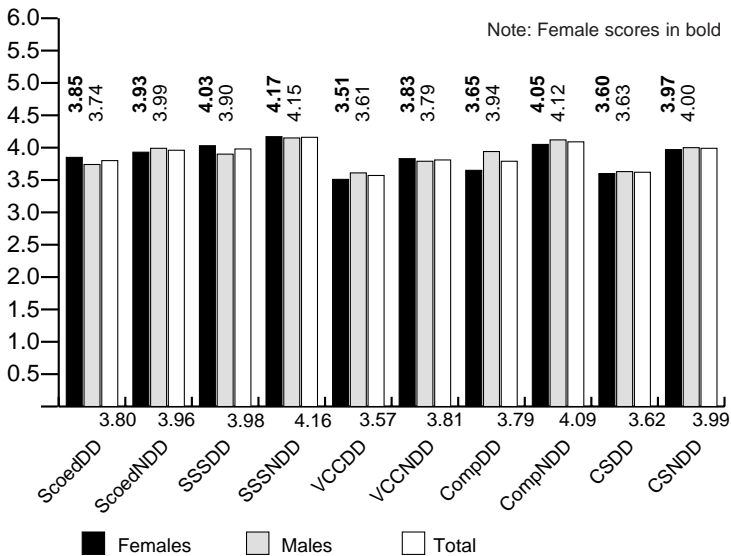


Figure A2.7: Percentage achieving grade A in Foundation mathematics, 1992 to 1996.

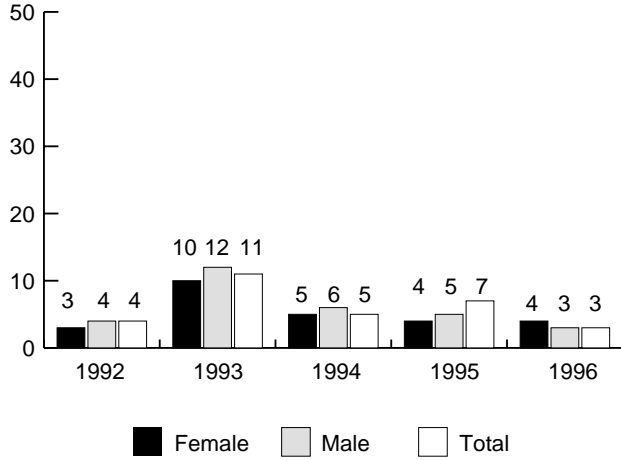


Figure A2.8: Percentage achieving grade A in Higher mathematics, 1992 to 1996.

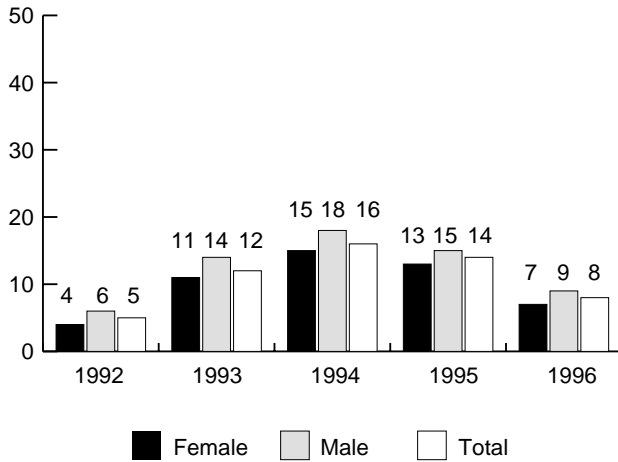


Figure A2.9: Percentage achieving grade A in Ordinary mathematics, 1992 to 1996.

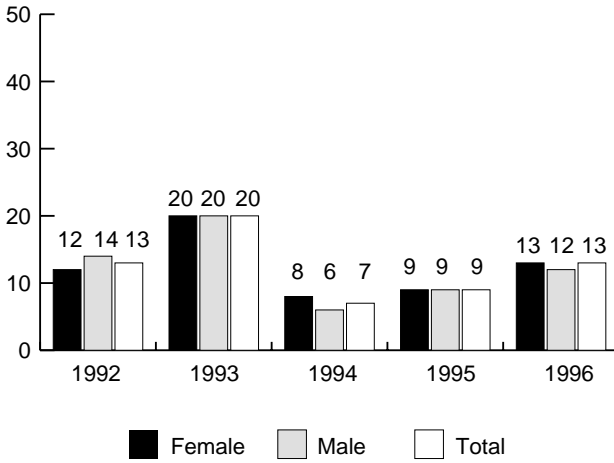


Figure A2.10: Percentage performing poorly in Foundation level mathematics by gender, 1992–6.

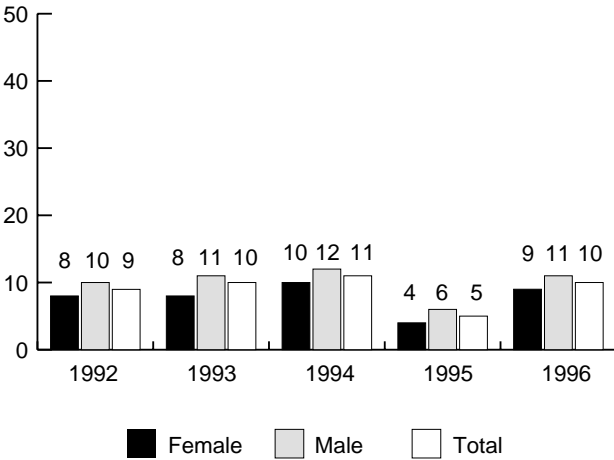


Figure A2.11: Percentage performing poorly in Higher level mathematics by gender, 1992–6.

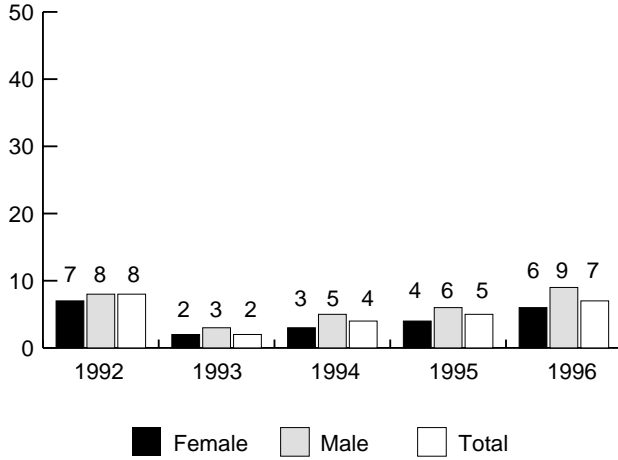
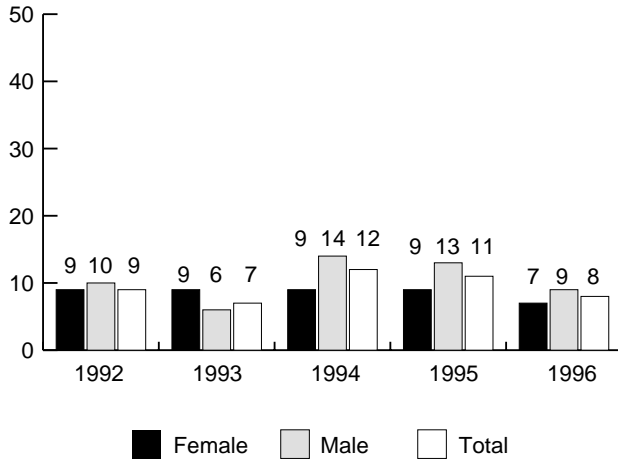
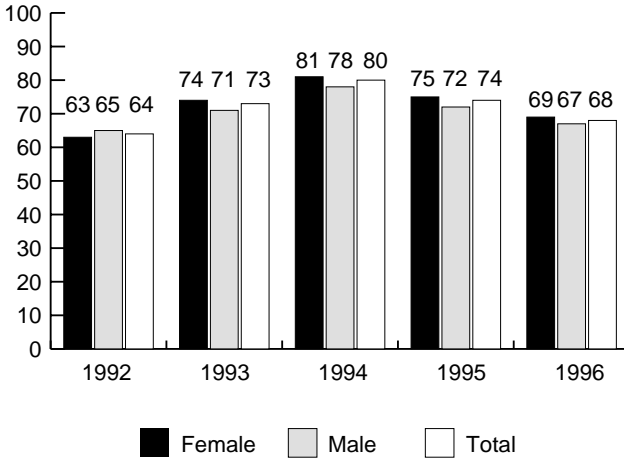


Figure A2.12: Percentage performing poorly in Ordinary level mathematics by gender, 1992–6.



*Figure A2.13: Percentage achieving a grade C or above in Higher level mathematics by gender, 1992–6.*



*Figure A2.14: Percentage achieving a grade C or above in Foundation level mathematics by gender, 1992–6.*

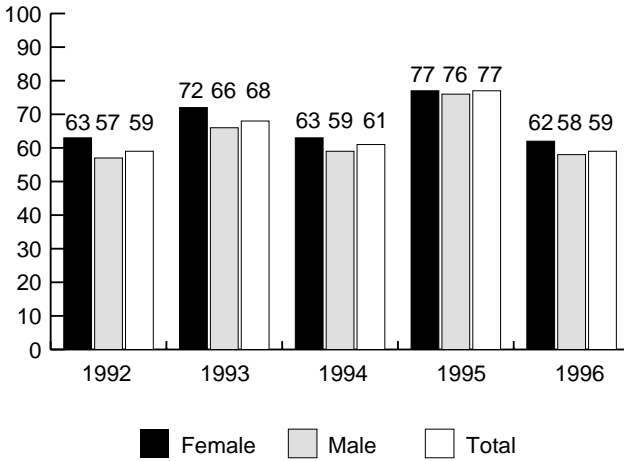
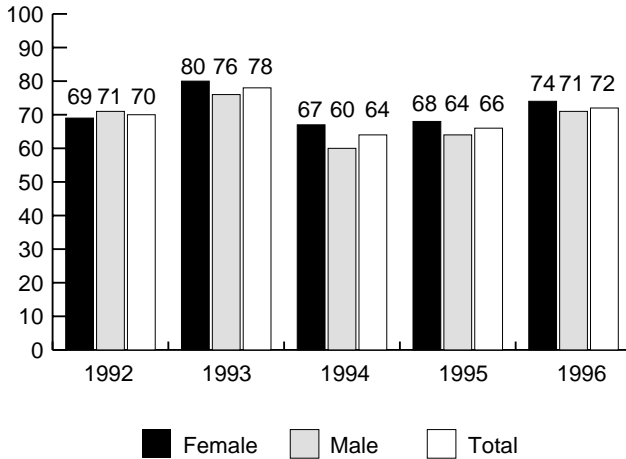


Figure A2.15: Percentage achieving a grade C or above in Ordinary level mathematics by gender, 1992–6.



### Notes

<sup>1</sup>In the ESRI study, a single scale based on all three grades of mathematics was computed for each school. Higher level papers got the top score ranging from 12 points for an A grade to 7 points for a D grade. An A grade in Ordinary level was awarded 7 points also, while a D in Ordinary level was worth 4 points. The Foundation course was graded from 4 points for an A grade to 1 point for a D (Hannan et al. 1996, p. 262). The inevitable effect of this scaling system was that schools where most students took Higher examinations were bound to have a higher score than those in which most took Ordinary or Foundation level examinations. Given the bias built into the ESRI scale against schools that did not offer Higher level courses, we devised an alternative scale for each level, in which an A grade was given 6 and an F grade was given 1 for each of the three levels in mathematics. An NG grade was given 0. Performance across schools was compared for each level separately (see Table A2.1).

<sup>2</sup> There is a range of different school types at second level. Secondary schools comprise 58 per cent of all schools; these schools were set up by a variety of religious and a few non-religious bodies and organisations. They are traditionally the most academic schools, and also traditionally the most selective in terms of both academic and social intake. Although no schools can select on the basis of entrance tests since the mid-1990's, in practice there is still selection albeit using more discrete criteria (Lynch and Lodge, 2002). Vocational schools and community colleges are under the jurisdiction of vocational education committees. These schools were established under the Vocational Education Act of 1930 and were originally designed to be engaged only in vocational education and training. They were known originally as vocational schools or technical schools but many changed their name, and their management structure, to become community colleges in the 1990's. Vocational schools were not allowed to prepare students for the Leaving Certificate examination until the early

1970's. Not surprisingly therefore, they did not attract the more academically ambitious students in the past, although this changed when they were able to offer the full complement of Leaving Certificate courses some thirty years ago. The vocational schools and community colleges are generally coeducational, unlike secondary schools, of which two thirds are single sex. Vocational schools have traditionally been more working class in intake than all other school types. Comprehensive schools were established from the 1960's onwards and were inspired by similar initiatives in the UK. They have a management structure that comprises representatives of the Department of Education and Science, the vocational education committee and the religious bodies engaged in the schools. They are either Catholic or Protestant in ethos. Community schools were established in the 1970's under Deeds of Trust. They are similar to comprehensives in management structure although the religious bodies involved in running them are generally Roman Catholic while the Department of Education and Science is not as directly involved. Both the community and comprehensive schools can offer the full complement of second-level subjects. They are generally coeducational schools. While most of the early community and comprehensive schools were built on green field sites, in the 1990's a growing number of community schools have resulted from amalgamations of secondary and vocational schools or of other school combinations. Even some of the recently created community colleges have resulted from the amalgamation of secondary and vocational schools. In terms of intake, both the community and comprehensive schools occupy an interim position between vocational/community colleges and secondary schools.

<sup>3</sup> The Junior Certificate examination data comprises a record of results (grade achieved within each subject level) for each candidate. In addition, each record contains a code identifying the school attended by each student. The following school-level information was identified and entered into the data base for all candidates:

- (1) school type: secondary, vocational schools and community colleges, community schools and comprehensive schools;
- (2) gender composition: single-sex or coeducational;
- (3) fee-paying or free-scheme;
- (4) designated-disadvantaged or non designated-disadvantaged.

<sup>4</sup> Over one quarter (26 per cent) of all schools are designated disadvantaged. This designation is based on an assessment of the proportion of socially, economically and educationally disadvantaged students in the school. The criteria for assessing each form of disadvantage are laid down by the Department of Education and Science: they include levels of educational attainment in the schools, proportion of families on low incomes, numbers who are welfare dependent, have medical cards, etc.

<sup>5</sup> As 1994 was the mid-year of our five year study (1992 to 1996), it provided a useful benchmark for estimating the social class profile of the students in different school types.

<sup>6</sup> The individual-level Junior Certificate examination data were aggregated by the school variable, to produce school-level data.

<sup>7</sup> The corresponding figures for the proportion of other school types having designated disadvantaged status are as follows: Community Schools (40 per cent), Comprehensives (36 per cent), Secondary single-sex (22 per cent) and Secondary Coed (18 per cent).

<sup>8</sup> We do not report the findings for the intervening three years, as the patterns do not vary to any significant degree from those in 1992 and 1996.

<sup>9</sup> In order to obtain a measure of ability, the Department of Education and Science's Psychological Service administered Differential Aptitude Tests (DATS) to almost 5,000 of the Junior Cert students surveyed. These tests comprised assessments of competence in verbal reasoning and numerical skill. The summed score of both tests was used as an indicator of general academic ability (VRNA) in the ESRI study (Hannan et al., 1996).

<sup>10</sup> Defined as the proportion of students within each school type falling more than one standard deviation below the aggregate mean VRNA (Verbal Reasoning/Numerical skill) score.

<sup>11</sup> Grades 'A' to 'NG' are marked 6 to 0 within each level (Table A2.1). This means that a difference of 1 between scores equals a whole grade difference. Other differences are *pro rata*.

<sup>12</sup> While the results of the patterns for the C or higher grades are not discussed in the text, tables reporting the results of this analysis are included in the Appendix (Figures A2.13 to A2.15 and Tables A2.12 to A2.14).

<sup>13</sup> There are a number of reasons why this could have happened, including changes in marking schemes from year to year and changes in tasks the students were required to undertake in the examinations.

