

Table 17.1 Variance components model: outcome – exam score

Number of pupils 1,154
 Number of schools 18

Fixed Part	Estimate	Standard error
Male	0.000	0.000
Female	0.386	0.283
Family's socio-economic group	0.540 ¹	0.110
Second year reading score	0.138 ¹	0.011
UK/Eire	0.000	0.000
South Asian	2.252 ¹	0.548
Mixed or other	1.187 ¹	0.428
Grand mean	-7.828	

1 Significant at the 99 per cent level of confidence or above.

Table 17.2 Variance components model: outcome – exam score
Examples of scores predicted by the fixed part

	<i>Predicted exam scores</i>		
	Second year reading score		
	40	75	110
Male, UK/Eire			
Neither parent has worked	-1.76	3.08	7.92
Unskilled manual	-1.22	3.62	8.46
Semi-skilled manual	-0.68	4.16	9.00
Skilled manual	-0.14	4.70	9.54
White collar	0.40	5.24	10.08
Professional or managerial	0.94	5.78	10.62
Male, skilled manual family			
UK/Eire	-0.14	4.70	9.54
South Asian	2.11	6.95	11.79
Mixed or other	1.05	5.89	10.72

Table 17.3 Variance components model: outcome – exam score
Examples of scores predicted by the random part, by second-year reading score
within school

Male from skilled manual family originating from UK/Eire in school	Second year reading score		
	40	75	110
12	-2.35	0.78	3.91
14	-2.20	1.07	4.34
15	-1.63	2.05	5.72
21	0.40	5.76	11.11
22	-0.83	3.48	7.79
23	0.91	6.49	12.08
24	1.52	7.74	13.96
25	1.54	7.70	13.87
31	0.80	6.61	11.62
32	1.05	6.82	12.58
33	4.63	13.16	21.68
34	0.11	5.22	10.33
35	-1.43	2.38	6.18
41	-0.66	3.79	7.48
42	-1.52	2.26	6.03
43	-1.30	2.58	6.46
44	-0.93	3.30	7.54
45	-0.62	3.82	8.26

These estimates, and those in Tables 3.4, 3.5 and 3.6, are derived from the best fit model, which has the grand mean, the second year reading score and country of origin in the random part. The reduction in deviance achieved by including variables in the random part is illustrated below.

	Deviance
Initial deviance (fixed part model)	6911.3
With grand mean in the random part	6907.1
With grand mean, second year reading score and country of origin in the random part	6847.4

The reduction in deviance achieved by the random model as compared with the fixed model is significant at a very high level of confidence (better than 99.9 per cent).

Table 17.4 Variance components model: outcome – exam score
Examples of scores predicted by the fixed part, by country of origin within school

Predicted exam scores

Male from skilled manual family with second year reading score of 75 in school	Country of origin UK/Eire	S.Asian	Mixed/other
12	0.78	NA	1.92
14	1.07	NA	2.32
15	2.05	4.44	NA
22	3.48	4.92	4.76
24	7.74	11.48	NA
31	6.21	5.31	NA
34	5.22	9.28	NA
35	2.38	3.93	NA
41	3.79	6.56	NA
42	2.26	4.29	NA

NA Not available: the estimate would be very unreliable because the number of observations is small.

Estimates are shown for selected schools only. In the remaining schools the number of observations is very small for both ethnic minority groups.

Table 17.5 Variance components model: outcome – exam score with Easter leavers excluded

Number of pupils 1,086
 Number of schools 18

Fixed Part	Estimate	Standard error
Male	0.000	0.000
Female	0.383	0.292
Family's socio-economic group	0.580 ¹	0.115
Second year reading score	0.142	0.012
UK/Eire	0.000	0.000
South Asian	2.343 ¹	0.534
Mixed or other	1.274 ¹	0.447
Grand mean	-8.137	

1 Significant at the 99 per cent level of confidence or above.

Table 17.6 Variance components model: outcome – exam score
Comparison between scores predicted by the fixed part of the models for all
pupils registered and for all excluding Easter leavers

Predicted exam scores

	40		Second year reading score 75		110	
	(a)	(b)	(a)	(b)	(a)	(b)
Male, UK/Eire						
Neither parent has worked	-1.76	-1.87	3.08	3.11	7.92	8.08
Unskilled manual	-1.22	-1.29	3.62	3.69	8.46	8.66
Semi-skilled manual						
Skilled manual	-0.68	-0.71	4.16	4.27	9.00	9.24
White collar	-0.14	-0.13	4.70	4.85	9.54	9.82
Professional or managerial	0.40	0.45	5.24	5.43	10.08	10.40
	0.94	1.03	5.78	6.01	10.62	10.99
Male, skilled manual family						
UK/Eire	-0.14	-0.13	4.70	4.84	9.54	9.82
South Asian	2.11	2.21	6.95	7.19	11.79	12.17
Mixed or other	1.23	1.15	5.89	6.12	10.72	11.10

- a) Model based on all pupils registered.
 b) Model based on all excluding Easter leavers.

Table 17.7 Variance components model: outcome – exam score
Comparison between scores predicted by the random part of the models for all pupils registered and for all excluding Easter leavers

Predicted exam scores

Male from skilled manual family originating from UK/Eire in school	Second year reading score					
	40		75		110	
	(a)	(b)	(a)	(b)	(a)	(b)
12	-2.35	-2.38	0.78	0.81	3.91	4.00
14	-2.20	-2.35	1.07	0.96	4.34	4.26
15	-1.63	-1.72	2.05	1.98	5.72	5.69
21	0.40	0.40	5.76	5.91	11.11	11.41
22	-0.83	-0.96	3.48	3.39	7.79	7.73
23	0.91	0.83	6.49	6.46	12.08	12.10
24	1.52	1.34	7.74	7.59	13.96	13.84
25	1.54	1.32	7.70	7.50	13.87	13.69
31	0.80	0.94	6.21	6.62	11.62	12.30
32	1.05	1.85	6.82	8.33	12.58	14.81
33	4.63	5.08	13.16	14.09	21.68	23.08
34	0.11	0.04	5.22	5.22	10.33	10.40
35	-1.43	-1.24	2.38	2.82	6.18	6.88
41	-0.66	-0.73	3.79	3.79	7.48	8.31
42	-1.52	-1.47	2.26	2.51	6.03	6.49
43	-1.30	-1.50	2.58	2.35	6.46	6.20
44	-0.93	-1.20	3.30	3.27	7.54	7.57
45	-0.62	-0.75	3.82	3.67	8.26	8.10

Table 17.8 Variance components model: outcome – English exam score

Number of pupils 1,155
Number of schools 18

Fixed Part	Estimate	Standard error
Male	0.000	0.000
Female	0.198 ¹	0.051
Family's socio-economic group	0.076 ¹	0.020
Second year reading score	0.022 ¹	0.002
UK/Eire	0.000	0.000
South Asian	0.296 ¹	0.091
Mixed or other	0.222 ¹	0.084
Grand mean	-1.176	

1 Significant at the 99 per cent level of confidence or higher.

Table 17.9 Variance components model: outcome – English exam score: examples of scores predicted by the fixed part

Predicted English exam scores

	Second year reading score		
	40	75	110
Male, UK/Eire			
Neither parent has worked	-0.22	0.56	1.33
Unskilled manual	-0.14	0.63	1.41
Semi-skilled manual	-0.06	0.71	1.48
Skilled manual	0.01	0.79	1.56
White collar	0.09	0.86	1.63
Professional or managerial	0.16	0.94	1.71
Male, skilled manual family			
UK/Eire	0.01	0.79	1.56
South Asian	0.31	1.08	1.85
Mixed or other	0.23	1.01	1.78
Skilled manual family from UK/Eire			
Male	0.01	0.79	1.56
Female	0.21	0.98	1.76

Table 17.10 Variance components model: outcome – English exam score: examples of English exam scores predicted by the random part, by second year reading score within school

Predicted English exam scores

	Second year reading score		
	40	75	110
Male from skilled manual family originating from UK/Eire in school			
12	-0.19	0.31	0.81
14	-0.21	0.34	0.89
15	-0.05	0.54	1.12
21	-0.06	0.69	1.39
22	-0.34	0.28	0.91
23	-0.13	0.65	1.43
24	0.37	1.53	2.70
25	0.71	1.92	3.13
31	0.15	1.10	2.05
32	-0.08	0.83	1.51
33	0.25	1.22	2.20
34	0.20	1.00	1.80
35	-0.09	0.54	1.17
41	-0.27	0.35	0.97
42	-0.17	0.51	1.20
43	0.34	1.22	2.10
44	0.04	0.83	1.61
45	-0.19	0.44	1.07

These estimates, and those in Tables 3.11 and 3.12, are derived from the best fit model, which has the grand mean, the second year reading score and country of origin in the random part. The reduction in deviance achieved by including variables in the random part is illustrated below.

	Deviance
Initial deviance (fixed part model)	2899.3
With grand mean in the random part	2865.3
With grand mean, second year reading score and country of origin in the random part	2819.4

The reduction in deviance achieved by the random model as compared with the fixed model is significant at a very high level of confidence (better than 99.9 per cent).

Table 17.11 Variance components model: outcome – English exam score: examples of scores predicted by the random part, by country of origin within school

Predicted English exam scores

Male from skilled manual family with second year reading score of 75 in school	Country of origin		
	UK/Eire	S.Asian	Mixed/other
12	0.31	NA	0.57
14	0.34	NA	0.59
15	0.54	1.05	NA
22	0.28	0.24	0.41
24	1.53	1.86	1.61
31	1.10	0.97	NA
34	1.00	1.63	NA
35	0.54	0.73	NA
41	0.35	0.51	NA
42	0.51	0.77	NA

NA Not available: the estimate would be very unreliable because the number of observations is small.

Estimates are shown for selected schools only. In the remaining schools the number of observations is very small for both ethnic minority groups.

Table 17.12 Variance components model: outcome – maths exam score

Number of pupils 1,155
Number of schools 18

Fixed Part	Estimate	Standard error
Male	0.000	0.000
Female	-0.108 ¹	0.049
Family's socio-economic group	0.077 ²	0.019
Second year maths score	0.055 ²	0.005
UK/Eire	0.000	0.000
South Asian	0.246 ²	0.059
Mixed or other	0.160 ¹	0.070
Grand mean	-1.461	

1 Significant at the 95 per cent level of confidence.

2 Significant at the 99 per cent level of confidence or above.

Table 17.13 Variance components model: outcome – maths exam score: examples of scores predicted by the fixed part

		<i>Predicted maths exam scores</i>		
		Second year maths score		
		15	30	45
Male/UK/Eire				
Neither parent has worked	-0.56		0.26	1.08
Unskilled manual	-0.49		0.33	1.15
Semi-skilled manual	-0.41		0.41	1.23
Skilled manual	-0.33		0.49	1.31
White collar	-0.25		0.57	1.39
Professional or managerial	-0.18		0.64	1.46
Male, skilled manual family				
UK/Eire	-0.33		0.49	1.31
South Asian	-0.09		0.73	1.55
Mixed or other	-0.17		0.64	1.47
Skilled manual family from UK/Eire				
Male	-0.33		0.49	1.31
Female	-0.44		0.38	1.20

Table 17.14 Variance components model: outcome – maths exam score
Examples of scores predicted by the random part, by second-year score within school

Male from skilled manual family originating from UK/Eire in school	Second year maths score		
	15	30	45
12	-0.39	0.24	0.87
14	-0.44	0.27	0.98
15	-0.62	-0.12	0.38
21	-0.10	0.87	1.84
22	-0.19	0.77	1.73
23	0.03	1.11	2.19
24	-0.22	0.74	1.69
25	-0.03	1.01	2.06
31	-0.09	0.95	1.91
32	-0.25	0.63	1.51
33	-0.21	0.88	1.96
34	-0.16	0.81	1.77
35	-0.34	0.50	1.34
41	0.12	1.26	2.41
42	-0.85	-0.39	0.07
43	-0.97	-0.54	-0.11
44	-0.60	0.00	0.60
45	-0.74	-0.19	0.36

These estimates are derived from the best fit model, which has the grand mean and the second year maths score in the random part. The reduction in deviance achieved by including variables in the random part is illustrated below.

	Deviance
Initial deviance (fixed part model)	2,760.7
With grand mean in the random part	2,749.9
With grand mean and second year maths score in the random part	2,719.1

The reduction in deviance achieved by the random model as compared with the fixed model is significant at a very high level of confidence (better than 99.9 per cent).

Table 17.15 Comparison between predicted total exam score, English exam score and maths exam score

School	Total exam		English exam		Maths exam	
	Score	Rank	Score	Rank	Score	Rank
12	0.78	18	0.31	17	0.24	13
14	1.07	17	0.34	16	0.27	12
15	2.05	16	0.54	11=	-0.12	15
21	5.76	7	0.69	9	0.87	6
22	3.48	11	0.28	18	0.77	8
23	6.49	5	0.65	10	1.11	2
24	7.74	2	1.53	2	0.74	9
25	7.70	3	1.92	1	1.01	3
31	6.21	6	1.10	5	0.95	4
32	6.82	4	0.83	7=	0.63	10
33	13.16	1	1.22	3=	0.88	5
34	5.22	8	1.00	6	0.81	7
35	2.38	14	0.54	11=	0.50	11
41	3.79	10	0.35	15	1.26	1
42	2.26	15	0.51	13	-0.39	17
43	2.58	13	1.22	3=	-0.54	18
44	3.30	12	0.83	7=	0.00	14
45	3.82	9	0.44	14	-0.19	16

Table 17.16 Total exam scores, by school: actual results compared with results predicted by the model

School	Actual exam score ¹		Predicted score ²	
	Mean	Rank order	Value	Rank order
12	3.8	11=	0.78	18
14	3.4	15	1.07	17
15	5.1	8	2.05	16
21	5.8	5=	5.76	7
22	4.8	10	3.48	11
23	5.8	5=	6.49	5
24	6.8	4	7.74	2
25	7.8	2	7.70	3
31	7.3	3	6.21	6
32	5.3	7	6.82	4
33	8.0	1	13.16	1
34	3.8	11=	5.22	8
35	3.2	16	2.38	14
41	5.0	9	3.79	10
42	2.4	17	2.26	15
43	3.5	13=	2.58	13
44	2.1	18	3.30	12
45	3.5	13=	3.82	9

1 The actual exam score is the mean across all fifth year pupils.

2 The predicted score is the value predicted by the random effects model for a boy with a second year reading score of 75 coming from a skilled manual family originating from the UK.

Table 17.17 English exam results, by school: actual results compared with scores predicted by the model

School	Actual results ¹		Predicted results ²	
	Per cent obtaining higher grade	Rank order	Score	Rank order
12	18	13	0.31	17
14	19	11=	0.34	16
15	27	4	0.54	11=
21	21	8=	0.69	9
22	20	10	0.28	18
23	21	8=	0.65	10
24	26	6	1.53	2
25	50	1	1.92	1
31	29	3	1.10	5
32	19	11=	0.83	7=
33	31	2	1.22	3=
34	23	7	1.00	6
35	27	5	0.54	11=
41	15	15	0.35	15
42	9	17	0.51	13
43	16	14	1.22	3=
44	10	16	0.83	7=
45	8	18	0.44	14

1 The actual results shown are the percentage of all pupils who obtained a higher grade in English.

2 The predicted results are the English scores predicted by the model for a boy with a second year reading score of 75 coming from a skilled manual family originating from the UK.

Table 17.18 Maths exam results, by school: actual results compared with scores predicted by the model

School	Actual results ¹		Predicted results ²	
	Per cent obtaining higher grade	Rank order	Score	Rank order
12	14	11=	0.24	13
14	21	6	0.27	12
15	12	13	-0.12	15
21	22	4=	0.87	6
22	17	8=	0.77	8
23	19	7	1.11	2
24	22	4=	0.74	9
25	27	2	1.01	3
31	36	1	0.95	4
32	15	10	0.63	10
33	26	3	0.88	5
34	14	11=	0.81	7
35	10	14	0.50	11
41	17	8=	1.26	1
42	1	17=	-0.39	17
43	1	17=	-0.54	18
44	2	16	0.00	14
45	6	15	-0.19	16

1. The actual results shown are the percentage of all pupils who obtained a higher grade in maths.
2. The predicted results are the maths scores predicted by the model for a boy with a second year maths score of 30 coming from a skilled manual family originating from the UK.

Table 17.19 Pupil turnover, by school

	Number of study children registered in the first year (1981/82)	Percentage of these still registered in the fifth year (1985/86)
12	181	58
14	132	54
15	134	63
21	169	82
22	188	81
23	207	64
24	199	73
25	208	64
31	249	76
32	100	88
33	147	80
34	79	80
35	84	64
41	144	69
42	90	64
43	129	82
44	98	27
45	194	85