Effects of Unitisation in 2009 GCSE Assessments

Comparison of Candidate Achievement in Modular and Linear Assessments

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Contents

Executive summary

This report examines whether there are any statistically significant differences between the achievement of candidates who follow a modular GCSE assessment route and those who follow a linear one. A modular assessment is divided into smaller modules of study and assessed separately throughout the two years of study, whereas in linear assessment, all assessments are taken at the end of the study.

This report studies candidates' results in selected specifications from GCSE English, English Literature, Geography, Information and Communication Technology (ICT), Mathematics and Religious Education (RE) in summer 2009, drawing on data collected from awarding organisations[1].

Awarding organisations supplied candidate-level data including candidates' average grade in all their GCSEs from summer 2009 (i.e. candidate ability), their centre type and their gender. This research considers whether these factors could affect the outcomes by assessment routes, but inevitably there are other factors that could be driving the differences identified in the research. Therefore, these findings should be viewed with caution as the differences reported could, in part, be due to factors other than the structure of GCSE specifications and not necessarily be a consequence of the assessment pattern.

The study shows that when adjusting for candidates' average GCSE grades, centre types and gender, there are statistically significant differences between candidates' achievement between the assessment routes. For most of the subjects examined, the impact of these differences is small, typically around 0.2 of a grade.

The analysis showed noticeable differences between the subjects, with English Literature, ICT, Mathematics and RE specifications showing a small tendency towards higher grades via linear assessment, while candidates taking English and Geography specifications were more likely to achieve higher grades via modular assessments.

This is illustrated in table i below, which compares candidates' grades[2] by assessment route, in each of the subjects analysed. Candidates' results are presented in terms of an adjusted mean grade score[3], which can be thought of as an

[1] As part of the Awarding Body Data Archive (ABDA) project described in the Introduction.

[2] Candidates' grades are presented in terms of a grade score where A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

[3] The adjusted mean grade score is the derived mean grade score AFTER adjusting for candidates' ability, centre type and gender. This is the marginal mean. Further explanation of these definitions is given in the Introduction.

average grade. The shaded cells highlight the route resulting in higher scores. The analysis showed significant differences (≥99.9% significance level) in all subjects between the performance of candidates using modular and linear assessment routes.

Table i – Adjusted mean grade score for GCSE subjects by assessment route

2009 GCSEs	Assessment route				Difference between modular to linear score
	Modular	Linear	Modular	Linear	
	Adjusted mean score	Adjusted mean score	No. of candidates	No. of candidates	
English	5.11	5.09	35156	484325	0.02
English Literature	5.13	5.33	29340	434459	-0.20
Geography	5.44	5.34	20786	81911	0.10
ICT	4.89	5.36	11382	34709	-0.47
Mathematics	4.75	4.95	127506	254370	-0.20
Religious Education	5.42	5.66	83297	39062	-0.24

Shaded cells represent higher scores.

Table i shows that the difference in adjusted scores between assessment routes varied from 0.1 to -0.47 of a grade. In four of the six subjects, candidates achieved higher grades in linear assessments. ICT showed the greatest difference between modular and linear scores, and English and Geography (specifications where candidates achieved higher grades in modular assessments) showed the smallest differences. Outcomes from the two assessment routes in all other specifications within a subject varied by between 0.1 and 0.2 percentage points, however these differences were still statistically significant.

These differences are in line with the outcomes of the 2009 inter-awarding organisation GCSE screening exercise.[4]

The study also investigated outcomes by candidates' abilities (defined in terms of the average grade achieved in all the candidates' other GCSEs) and again showed variation between subjects:

- In three of the six subjects (English Literature, ICT and RE), all candidates, irrespective of their ability, achieved slightly higher grades via one assessment route than the other. In English, candidates achieving grades D to C on average in their other GCSEs, achieved higher grades in modular assessments, while other candidates achieved higher grades in linear assessments. In Geography, candidates gaining, on average, GCSE grade A or above, achieved higher grades in linear assessment, while those with lower average GCSE grades achieved higher grades in modular assessments. And in Mathematics, the

[4] The inter-awarding organisation screening, carried out in the autumn following summer results, used candidates' concurrent GCSE results to identify any possible severity/leniency in individual specifications.

pattern reversed, so higher-ability candidates gained higher grades in modular assessments, while all other candidates gained higher grades in linear.

- The qualifications examined were chosen to cover the range of different subject areas, not to draw conclusion about GCSEs in general. With this in mind, from the evidence gathered, there is no uniform pattern as to whether modular or linear routes lead to better outcomes.

This report will examine each of the subjects independently, highlighting statistically significant differences in achievement between modular and linear assessments.

1 Introduction

This investigation draws on data collected by awarding organisations as part of the Awarding Body Data Archive project (ABDA). The ABDA project is a longitudinal study which investigates the impact of the new unitised GCSE qualifications by comparing candidate achievement in both the legacy and revised qualifications.

Background

New GCSE criteria introduced in 2007 allowed awarding organisations to offer a greater number of unitised specifications, where content is divided into smaller modules of study and assessed separately throughout the two years of study. This unitised or modular approach to assessment could be offered in place of linear assessments, where candidates sit examinations at the end of two years' study. This approach is more in line with A level qualifications.

This research evaluates the impact of unitised GCSEs and whether modular assessments have led to candidates achieving higher/lower grades compared to those completing linear assessments. The research is based on data collected from the ABDA project, which was set up in 2007 by the Qualifications and Curriculum Agency (QCA, later known as the Qualifications and Curriculum Development Agency, QCDA) to investigate the impact of unitised GCSEs by comparing both the legacy and revised models. Following the closure of QCDA, the project transferred to the Office of Qualifications and Examinations Regulation (Ofqual) in April 2011.

This study also forms part of our investigation into unitisation and re-sits in GCSEs and A levels, in response to the government's white paper, *The Importance of Teaching, the Schools White Paper* (DfE, November 2010).

Purpose of this report

The purpose of this report is to analyse candidates' achievement from these legacy qualifications. It studies modular and linear specifications in GCSE English, English Literature, Geography, ICT, Mathematics and RE in summer 2009. The findings from this report will be compared with the results from summer 2011, the first certifications from the revised models.

This research examines whether there are any statistically significant differences in candidates' achievements between the assessment routes followed across a range of subjects.

Structure of the report

The Executive summary provides an overview of the research, including outcomes and key findings. The Introduction offers the background to the research and identifies the purpose of this report, followed by the research methodology, and

describes key definitions. The remaining chapters of the report examine the specifications within each of the subjects and present the key findings along with data tables to illustrate.

Methodology

Each awarding organisation was asked to select specifications that provided the most appropriate set of comparators. Each awarding organisation supplied candidate-level results, including unit grades and unit marks for the chosen specifications, as well as information on candidates' average GCSE grade in summer 2009, their centre type and gender. Candidates aged 16 who certificated in the selected specifications in summer 2009 were included. The study was based on candidates who took four or more GCSEs in summer 2009 (excluding the subject being analysed).

Table 1.1 presents the modular and linear specifications collected for each subject examined.

Table 1.1 – 2009 specifications collected as part of ABDA and analysed in this report

	Awarding Organisation				
Subject	AQA	CCEA	Edexcel	OCR	WJEC
English	3702	G29	1203	1900	150
English Literature	3712	G30	1213	1901	153
Geography	3031	G36	1312	1988	159
ICT	3521	G58	1185	1994	178
Mathematics	4307	G60	1380	J517	185
Religious Education	3062	G80	2481	1931	206

Shaded cells represent modular specifications.

The investigation was carried out in three stages:

- test whether there were significant differences in grades achieved between the two assessment routes;
- investigate whether individual factors could affect the grades by assessment route; the only factors available from the data supplied by the awarding organisations were the candidates' average grade in all their other GCSEs, their centre type[5] and their gender;
- Control for these factors and establish whether there were still significant differences between assessment routes.

[5] See Appendix for groupings of centre type.

A statistical model was developed using Analysis of Covariance to control for the factors above to see whether there were significant differences across assessment routes.

In order to understand the relationship that the above factors had with assessment routes, a suite of analysis methods was used.

- Analysis of Variance and Bonferroni's post-hoc tests were applied to explore the assessment routes' relationships within candidates' average GCSE grades and centre types.
- The t-test statistical technique was used to:
  - understand the differences between gender and subject grade across modular and linear assessments;
  - test for significant differences between assessment routes in each of the factors investigated.

As part of the interpretation, the outcomes of the 2009 inter-awarding organisation GCSE screening exercise[6] were considered to see how they related to the findings from the research.

It should be noted that a series of other underlying factors could be driving the differences identified in the findings to this research. As this report presents statistical analysis only, without qualitative evidence, the true impact of assessment patterns is unknown. Therefore, caution should be taken, as the differences reported could, in part, be due to factors other than the structure of GCSE specifications, and so not necessarily a consequence of the assessment pattern.

In all data tables presented in this report, significant differences between assessment routes are illustrated by:

- ** when greater than 99%
- * when greater than 95%
- blank cells when less than 95%.

[6] The inter-awarding organisation screening, carried out in the autumn following summer results, used candidates' concurrent GCSE results to identify any possible severity/leniency in individual specifications.

Samples with ten candidates or fewer are identified by #. The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment routes.

Definitions

The analysis in this report was based on the following definitions:

Grade score

Candidates' grades in a particular specification were translated into a grade score as illustrated in Table 1.2. Candidates obtaining grade U sat the assessment and failed to achieve a grade.

Table 1.2 – Grades converted into scores

Grade	Grade score
A*	8
A	7
B	6
C	5
D	4
E	3
F	2
G	1
U	0

Candidate ability

In the absence of a candidate's prior attainment, we used the average grade they achieved in all their other GCSEs as a measure of their ability. The average grade is presented in terms of a mean GCSE score as described below. However caution should be taken as a candidate's grades may vary considerably across their other GCSEs and the mean GCSE score is simply a proxy to measure candidates' abilities.

A candidate with a mean GCSE score of:

- 0–2.99 is regarded as lower ability;
- 3–5.99 is regarded as middle ability; and
- 6 and above is regarded as higher ability.

In the Executive summary, and throughout the findings and conclusions of this report, ability is presented in terms of an average GCSE grade for ease of understanding. In the data tables at the end of each chapter, ability is presented in terms of the mean GCSE score as used in the calculations.

Mean GCSE score (average GCSE grade)

Awarding organisations supplied a mean GCSE score for each candidate as a proxy to measure candidates' abilities. This was calculated by averaging their grade score across four or more other GCSEs[7] taken in summer 2009 (excluding the subject being analysed).

The mean GCSE score does not distinguish which of the other GCSEs were taken as unitised or linear, nor the awarding organisation or the specifications involved in calculating the score. Nor is it known how these factors may affect their overall GCSE mean score as used in the calculations.

Table 1.3 illustrates how a candidate's average GCSE grade has been grouped as an estimation of their ability.

Table 1.3 – Average GCSE grade indicating candidate ability

Average GCSE grade	Mean GCSE score	Candidates' range of ability
A*	8+	High
A	7-7.99	
B	6-6.99	
C	5-5.99	Middle
D	4-4.99	
E	3-3.99	
F	2-2.99	Low
G	1-1.99	
U	0-0.99	

Adjusted mean grade score

The adjusted mean grade score is the statistical term "estimated marginal mean". This value is the derived mean grade score AFTER adjusting for the factors in the statistical model (centre type, gender and candidate ability).

Limitations and context of the data

It is always important to understand the difference between a correlation between variables and a causal link (i.e. change in one drives the other). With this analysis it is particularly important to be aware of the factors that might have contributed to the findings.

Where we have found evidence of differences between the modular and linear specifications in this analysis it must be considered that there are several possible

[7] For a reliable mean GCSE score, the research is based only on candidates who took four or more GCSEs in summer 2009. Therefore some candidate data may be omitted from the research if the mean GCSE score was not known.

causes for these differences which would not be a direct result of the modular nature of one side of the comparison.

Examples of such factors follow below.

- In many cases we were comparing a single modular specification with a small number of linear specifications. This raises the possibility that the identified differences may relate only to those particular specifications, so we could not extrapolate the findings to either linear or modular specifications in general.

- Expanding on this point for one possible reason, it may be that the modular specification has other features that cause the variation, not the fact that the specification is modular. These other features could include how the curriculum is grouped or the specific nature of assessment arrangements (within the GCSE criteria).

- While in our analysis we have controlled for gender, centre type and "ability" (as defined by concurrent overall GCSE results), it is likely that this "ability" factor is more complex than our proxy.

In addition, it is important to recognise that our analysis does not exist in isolation, and that there are other processes and procedures in place which are designed to ensure results are consistent between years.

- In particular, there is the inter-awarding organisation "Screening Process" carried out in the autumn following the summer results. This also uses the concurrent GCSE results to identify whether there is evidence of a specification being severe or lenient in result outcomes, in order to correct this in future years.

Ofqual, in its role as the Regulator for qualifications, reviews the distribution of grades prior to the result being published, in order to identify unusual or unexpected patterns and to ask awarding organisations to explain how they have occurred.

Another factor to consider is that awarding organisations can only set grade boundaries to whole marks, which limits their scope for small adjustments. Bramley and Dhawan (2010)[8] examined this issue and concluded that taking the simplest model for a linear GCSE specification and changing each of three component boundaries by ±1 mark could create a difference of around ±6 % in the (cumulative) pass rate at grade C on the foundation paper and ±3% at grade A on the higher tier. The analysis in this paper is less sophisticated than that presented in that work, as

[8] Bramley T. & Dhawan V. (2010) Estimates of Reliability of Qualifications. Part of Ofqual's Reliability Programme. http://www.ofqual.gov.uk/standards/reliability/

our headline value is the average difference in grade for all candidates, not focused on particular boundaries. Put in context, a 1% increase in candidates achieving a grade B instead of a C (with no shift at any other boundary) would be reflected by a 0.01 increase in the average grade score.

Despite the limitations outlined above, the ABDA project has sought to gather the most appropriate comparable results data, to examine the impact of changes made to these qualifications. Ofqual will consider the scale of the statistically significant results in conjunction with evidence from other appropriate sources of information to provide intelligent comment on this topic.

2 English

This chapter presents the analysis of candidate performance in GCSE English specifications in modular and linear assessments from summer 2009.

Key finding

Within the limitations of the data[9], the evidence suggests that in these specifications **candidates achieved higher grades in the modular assessment** compared to linear. This was after adjusting for their ability, centre type and gender and was statistically significant (to 99.9%).

Data

Data for modular specifications were collected from OCR, and included four units (three written exams and one coursework OR two written exams and two coursework); data for linear specifications were collected from AQA, Edexcel, CCEA and WJEC. A total of 519,481 candidates were examined across all these specifications. These candidates had a mean GCSE score based on four or more other GCSEs from summer 2009.

Table 2.1 shows the split of these candidates by awarding organisation and assessment route.

Table 2.1 – Number (and %) of candidates taking GCSE English by awarding organisation and assessment route in the specifications being examined

	Assessment route			
	Modular	Linear	Modular	Linear
Awarding organisation	No. of candidates	No. of candidates	% of Total	% of Total
OCR	35156		100.0%	
Edexcel		12577		2.6%
WJEC		110175		22.7%
CCEA		13231		2.7%
AQA		348342		71.9%
Total	35156	484325	100.0%	100.0%
% of Total	7%	93%		

Analysis

The first stage of the analysis showed that when comparing grade scores in GCSE English across the two assessment routes there was a strong, significant difference between modular and linear assessment. To understand whether the scores were influenced by other factors, the scores were adjusted for candidates' ability, centre

[9] See Limitations and context of data section in chapter 1.

type and gender. The results showed a highly significant difference (≥99.9% significance level) between the assessment routes.

Table 2.2 shows this adjusted mean grade score in both assessment routes compared to the mean grade score.

Table 2.2 – Adjusted mean grade score for GCSE English by assessment route

	Assessment route	
	Modular	Linear
Mean grade score in English	5.54	5.06
Adjusted mean grade score in English	5.11	5.09

Table 2.2 shows there was a small difference (0.02 of a grade) in assessment routes between candidates' mean grade scores and adjusted mean grade scores in English. This difference was statistically significant. This demonstrated that candidates' ability, centre type and gender had made an impact on candidates' scores. Of the three factors, candidates' ability had the strongest impact. This was most noticeable in modular assessments. Having adjusted for these factors, the differences in English scores were still significant.

English: data tables

The following tables and commentary were used to arrive at the analysis and conclusions in this chapter. These tables compare the mean grade scores for candidates taking English across modular and linear assessment routes split by mean GCSE score; centre type; gender; centre type and mean GCSE score; mean GCSE score and gender; and centre type and gender.

A reminder: mean GCSE score is a measure of candidates' abilities and represents the candidates' average GCSE grade in all their other GCSEs, although caution should be taken as grades vary from A*–U across other GCSEs. The mean grade score represents the average grade achieved by the candidates being examined. The scores translate as A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment route.

Table 2.3 shows that candidates of middle ability (mean GCSE scores 3–5.99) achieved higher mean grade scores in modular assessments, and all other ability groups achieved higher scores via a linear route. The middle-ability groups also had the largest number of candidates, representing more than 50% of candidates (57% modular, 64% linear) and thus had the greatest impact on the overall mean presented in Table 2.2.

Table 2.3 – Comparing mean grade scores for English by candidates' mean GCSE scores

		Assessment route				
		Modular	Linear		Modular	Linear
Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	1.66	1.48	**1.67**		82	1759
1-1.99	2.35	2.17	**2.36**	**	560	11863
2-2.99	3.06	2.96	**3.06**	**	1711	35361
3-3.99	3.82	**3.87**	3.81	**	3508	70960
4-4.99	4.62	**4.69**	4.61	**	6325	117460
5-5.99	5.48	**5.53**	5.47	**	8324	123957
6-6.99	6.36	6.34	**6.36**	*	7706	81977
7-7.99	7.21	7.16	**7.22**	**	6160	38870
8+	7.85	7.84	**7.85**		780	2118

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 2.4 shows that English scores were highest in maintained (selective) and independent schools. In the largest groups, maintained (non-selective) and independent schools, there were no significant differences between scores in modular and linear assessments. In maintained (selective) schools, candidates are statistically more likely to achieved higher scores in modular assessments than in linear assessments. In city academies, they achieved higher scores via linear assessments.

Table 2.4 – Comparing mean grade scores for English by centre type

		Assessment route				
		Modular	Linear		Modular	Linear
Centre type	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	4.93	4.91	**4.93**		20429	425411
Maintained Schools (selective)	6.52	**6.67**	6.51	**	1923	22312
Independent	6.48	6.48	**6.49**		12240	20954
Colleges	5.28	4.75	5.28		#	348
Sixth Form	5.13	**6.11**	4.93	**	#	44
Other	4.28	**4.35**	4.28		189	2688
City Academy	4.59	4.16	**4.61**	**	362	12568

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 2.5 shows that both genders achieved higher scores for English via a modular route. This was significant at 99.9%.

Table 2.5 – Comparing mean grade scores for English by gender

		Assessment route				
		Modular	Linear		Modular	Linear
Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Male	4.84	**5.35**	4.80	**	18388	242699
Female	5.34	**5.75**	5.31	**	16759	241626

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 2.6 compares the mean grade scores of candidates[10] with relatively equal ability within the same centre type, across the two assessment routes.

The table shows that in maintained (non-selective) schools, candidates of middle ability (mean GCSE scores of 3–4.99) achieved higher scores in modular assessments, and lower and higher-ability groups achieved higher scores in a linear route than a modular route. In independent schools, candidates of higher ability (mean GCSE scores of 6+) achieved higher scores via linear assessment compared to candidates of equal ability taking modular assessments, however this was not significant at the very top level of ability (mean GCSE score of 8+). In city academies, there were smaller numbers of candidates, however, candidates with a mean GCSE score of less than 5 appeared to achieve higher scores via linear assessments.

[10] Based on samples of more than 100 candidates. This is sufficient enough to draw meaningful conclusions.

Table 2.6 – Comparing mean grade scores for English by centre type and mean GCSE score

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	0-0.99	1.69	1.53	**1.69**		74	1628
	1-1.99	2.35	2.17	**2.36**	**	523	11123
	2-2.99	3.06	2.95	**3.06**	**	1592	33348
	3-3.99	3.81	**3.86**	3.81	**	3224	67331
	4-4.99	4.61	**4.65**	4.61	**	5296	110570
	5-5.99	5.45	5.46	5.45		5441	111079
	6-6.99	6.32	6.23	**6.33**	**	3147	65267
	7-7.99	7.16	6.98	**7.17**	**	1105	24336
	8+	7.81	7.67	7.82		27	729
Maintained Schools (selective)	0-0.99	2.50	.	2.50			#
	1-1.99	2.34	.	2.34			29
	2-2.99	3.44	4.00	3.43		#	70
	3-3.99	4.30	**5.00**	4.29	**	#	203
	4-4.99	5.09	5.25	5.08		51	1190
	5-5.99	5.83	5.85	5.83		347	5148
	6-6.99	6.52	6.53	6.52		709	8389
	7-7.99	7.28	7.18	**7.29**	**	753	6806
	8+	7.86	7.86	7.86		58	471
Independent	0-0.99	1.50	1.00	1.57		#	#
	1-1.99	2.78	3.33	2.68		#	50
	2-2.99	3.43	3.61	3.37		38	129
	3-3.99	4.14	4.27	4.09		162	390
	4-4.99	4.93	4.95	4.91		825	1516
	5-5.99	5.68	5.67	5.69		2435	4208
	6-6.99	6.46	6.40	**6.50**	**	3797	6593
	7-7.99	7.28	7.21	**7.32**	**	4279	7167
	8+	7.87	7.85	7.88		694	894
Colleges	0-0.99		.				#
	1-1.99	4.50	.	4.50			#
	2-2.99	3.00	4.00	2.92		#	13
	3-3.99	3.83	3.00	3.85		#	34
	4-4.99	4.60	.	4.60			89
	5-5.99	5.47	.	5.47			87
	6-6.99	6.04	6.00	6.04		#	75
	7-7.99	6.83	6.00	6.85		#	46
	8+	8.00	.	8.00			#
Sixth Form	0-0.99	.	.	.			
	1-1.99		.	.			
	2-2.99	3.50	.	3.50			#
	3-3.99	5.00	.	5.00			#
	4-4.99	4.79	6.00	4.69		#	13
	5-5.99	4.90	**5.75**	4.69	**	#	16
	6-6.99	5.82	6.33	5.63		#	8
	7-7.99	7.00	7.00	7.00		#	#
	8+	7.00	.	7.00			#
Other	0-0.99	1.39	3.00	1.33		#	30
	1-1.99	2.33	3.00	2.32		#	152
	2-2.99	2.79	2.93	2.79		28	428
	3-3.99	3.53	3.66	3.52		47	540
	4-4.99	4.34	4.04	**4.36**	*	47	663
	5-5.99	5.26	5.45	5.25		31	449
	6-6.99	6.18	5.96	6.20		24	287
	7-7.99	7.11	7.43	7.09		#	133
	8+	7.67	.	7.67			#
City Academy	0-0.99	1.35	0.67	**1.40**	**	#	87
	1-1.99	2.29	1.63	**2.32**	**	24	507
	2-2.99	3.06	2.57	**3.08**	**	51	1371
	3-3.99	3.81	3.57	**3.81**	*	70	2459
	4-4.99	4.56	4.39	**4.57**	*	105	3419
	5-5.99	5.39	5.39	5.39		66	2970
	6-6.99	6.29	6.24	6.29		25	1358
	7-7.99	7.10	7.29	7.09		14	381
	8+	7.76	8.00	7.75		#	16

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 2.7 shows that when viewing candidates' mean GCSE scores by gender, males and females of lower ability (mean GCSE scores of 1–2.99) achieved higher scores via linear assessment. Females with mean GCSE scores of 6–7.99 also achieved higher scores via linear assessment. Candidates of middle ability (mean GCSE scores of 3–5.99) achieved higher scores via modular assessments; but this was not significant in males with a mean GCSE score of 3–3.99. These groups had the largest number of candidates, representing 52% of modular assessments and 64% of linear assessments, and thus had the greatest impact on the overall findings.

Table 2.7 – Comparing mean grade scores for English by mean GCSE scores and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Mean GCSE score	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	Male	1.50	1.20	**1.52**	*	41	979
	Female	1.86	1.76	1.87		41	780
1-1.99	Male	2.19	2.01	**2.20**	**	320	6802
	Female	2.57	2.39	**2.58**	**	240	5061
2-2.99	Male	2.89	2.75	**2.89**	**	1011	19944
	Female	3.28	3.25	**3.28**		700	15417
3-3.99	Male	3.66	**3.70**	3.66		1979	39457
	Female	4.01	**4.10**	4.00	**	1528	31503
4-4.99	Male	4.49	**4.56**	4.49	**	3490	62980
	Female	4.76	**4.85**	4.76	**	2834	54480
5-5.99	Male	5.36	**5.44**	5.35	**	4436	59556
	Female	5.59	**5.65**	5.59	**	3884	64401
6-6.99	Male	6.23	**6.25**	6.23		3827	36307
	Female	6.46	6.42	**6.46**	**	3876	45670
7-7.99	Male	7.12	7.11	**7.12**		2912	15861
	Female	7.28	7.21	**7.29**	**	3248	23009
8+	Male	7.83	7.81	**7.83**		372	813
	Female	7.87	7.87	7.87		408	1305

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 2.8 shows that both genders in maintained (selective) schools achieved higher scores via modular assessment route.

Table 2.8 – Comparing mean grade scores for English by centre type and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	Male	4.67	**4.68**	4.67		10694	213081
	Female	5.19	5.16	**5.19**		9733	212330
Maintained Schools (selective)	Male	6.35	**6.53**	6.33	**	1124	11255
	Female	6.70	**6.85**	6.69	**	799	11057
Independent	Male	6.30	**6.34**	6.28	**	6275	9947
	Female	6.66	6.62	**6.68**	**	5960	11007
Colleges	Male	4.98	5.00	4.98		#	182
	Female	5.60	4.00	5.61		#	166
Sixth Form	Male	5.13	**6.14**	4.83	**	#	23
	Female	5.13	**6.00**	5.05	**	#	21
Other	Male	4.04	4.15	4.03		119	1629
	Female	4.66	4.66	4.66		68	1059
City Academy	Male	4.38	3.63	**4.40**	**	166	6582
	Female	4.83	4.61	4.83		196	5986

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Earlier, in Table 2.4, independent schools showed no significant differences in scores between assessment routes, but when viewed by gender (Table 2.8) the differences were significant. Males scored higher in modular assessment and females scored higher in linear assessment.

3 English Literature

This chapter presents the analysis of candidate performance in GCSE English Literature specifications in modular and linear assessments from summer 2009.

Key finding

Within the limitations of the data[11], the evidence suggests that in these specifications **candidates achieved higher grades in the linear assessment** compared to modular. This was after adjusting for their ability, centre type and gender and this was statistically significant (to 99.9%).

Data

Data for modular specifications were collected from OCR and included three units (three written exams or two written exams and coursework); data for linear specifications were collected from AQA, Edexcel, CCEA and WJEC. A total of 463,799 candidates were examined across all these specifications. These candidates had a mean GCSE score based on four or more other GCSEs from summer 2009.

Table 3.1 shows the split of these candidates by awarding organisation and assessment route.

Table 3.1 – Number (and %) of candidates taking GCSE English Literature by awarding organisation and assessment route in the specifications being examined

	Assessment route			
	Modular	Linear	Modular	Linear
Awarding organisation	No. of candidates	No. of candidates	% of Total	% of Total
OCR	29340		100.0%	
Edexcel		15107		3.5%
WJEC		96021		22.1%
CCEA		5317		1.2%
AQA		318014		73.2%
Total	29340	434459	100.0%	100.0%
% of Total	6%	94%		

Analysis

The first stage of the analysis showed that when comparing grade scores in GCSE English Literature across the two assessment routes there was a strong, significant difference between modular and linear assessment. To understand whether the scores were influenced by other factors, the scores were adjusted for candidates' ability, centre type and gender. Centre type was not a significant factor and was therefore removed from the statistical model, leaving candidates' ability and gender.

[11] See Limitations and context of data section in chapter 1.

The results showed a highly significant difference (≥99.9% significance level) between the assessment routes.

Table 3.2 shows this adjusted mean grade score in both assessment routes compared to the mean grade score.

Table 3.2 – Adjusted mean grade score for GCSE English Literature by assessment route

	Assessment route	
	Modular	Linear
Mean grade score in English Literature	5.62	5.30
Adjusted mean grade score in English Literature	5.13	5.33

Table 3.2 shows there were differences in both assessment routes between candidates' mean grade scores and adjusted mean grade scores in English Literature. This proved that candidates' ability and gender had made an impact on candidates' scores. Of these two factors, candidates' ability had the strongest impact. This was most noticeable in modular assessments. Having adjusted for these factors, the differences in English Literature scores were still significant. Note that before adjustments were made, modular assessments produced a higher mean grade score, but after adjustments, linear assessments produced higher mean grade scores.

English Literature: data tables

The following tables and commentary were used to arrive at the analysis and conclusions in this chapter. These tables compare the mean grade scores for candidates taking English Literature across modular and linear assessment routes split by mean GCSE score; centre type; gender; centre type and mean GCSE score; mean GCSE score and gender; and centre type and gender.

A reminder: mean GCSE score is a measure of candidates' abilities and represents the candidates' average GCSE grade in all their other GCSEs, although caution should be taken as grades vary from A*–U across other GCSEs. The mean grade score represents the average grade achieved by the candidates being examined. The scores translate as A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment route.

Table 3.3 shows that all candidates (except those with a mean GCSE score of less than 1) achieved higher scores via linear assessment. These ability groups together represent more than 90% of candidates and thus had the greatest impact on the overall mean. At the very top scale of ability (mean GCSE scores 8+) there was no significant difference.

Table 3.3 – Comparing mean grade scores for English Literature by candidates' mean GCSE scores

		Assessment route				
		Modular	Linear		Modular	Linear
Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	1.07	1.12	1.07		25	654
1-1.99	1.94	1.70	**1.94**	**	171	5638
2-2.99	2.82	2.52	**2.83**	**	659	20733
3-3.99	3.76	3.55	**3.76**	**	1983	51159
4-4.99	4.69	4.48	**4.70**	**	4842	103680
5-5.99	5.57	5.34	**5.59**	**	7625	124427
6-6.99	6.39	6.19	**6.41**	**	7481	85052
7-7.99	7.16	7.10	**7.16**	**	5749	40658
8+	7.76	7.75	**7.76**		805	2458

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 3.4 shows that English Literature scores were highest in maintained (selective) and independent schools. In most centres, a linear route was more likely to result in higher scores, except for maintained (selective) and other schools.

Table 3.4 – Comparing mean grade scores for English Literature by centre type

		Assessment route				
		Modular	Linear		Modular	Linear
Centre type	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	5.17	5.01	**5.18**	**	16393	381052
Maintained Schools (selective)	6.49	**6.65**	6.48	**	1876	20616
Independent	6.48	6.39	**6.53**	**	10780	20734
Colleges	5.62	.	5.62			279
Sixth Form	5.78	5.83	5.76		#	21
Other	4.77	**5.25**	4.75	**	68	1448
City Academy	4.85	4.26	**4.86**	**	217	10309

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 3.5 shows that both genders achieved significantly higher scores for English Literature via a modular route.

Table 3.5 – Comparing mean grade scores for English Literature by gender

		Assessment route				
		Modular	Linear		Modular	Linear
Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Male	5.06	**5.43**	5.03	**	14571	207760
Female	5.55	**5.80**	5.54	**	14760	226699

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 3.6 compares the mean grade scores of candidates[12] with relatively equal ability within the same centre type, across the two assessment routes.

The table shows that all candidates in maintained (non-selective) schools, except those with a mean GCSE score of less 1, achieved higher scores via a linear assessment route. These were significant at 99.9% except for candidates at the very top level of ability (mean GCSE score 8+). In maintained (selective) schools, candidates achieving higher scores in other GCSEs (mean GCSE scores of 7+) achieved higher scores via a modular assessment route. This was statistically significant. In independent schools, candidates with a mean GCSE score of 5+ achieved higher scores via linear assessments. These were significant at 99.9%, except for candidates at the very top level of ability (mean GCSE score of 8+).

[12] Based on samples greater than 100 candidates. This is sufficient to draw meaningful conclusions.

Table 3.6 – Comparing mean grade scores for English Literature by centre type and mean GCSE score

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	0-0.99	1.06	1.14	1.05		21	590
	1-1.99	1.94	1.69	**1.95**	**	154	5314
	2-2.99	2.83	2.49	**2.84**	**	616	19680
	3-3.99	3.75	3.53	**3.76**	**	1850	48845
	4-4.99	4.69	4.44	**4.70**	**	4194	98210
	5-5.99	5.56	5.30	**5.58**	**	5206	112622
	6-6.99	6.38	6.14	**6.40**	**	3218	68780
	7-7.99	7.13	6.92	**7.14**	**	1108	26150
	8+	7.74	7.69	**7.74**		26	861
Maintained Schools (selective)	0-0.99	.67	.	.67			#
	1-1.99	2.07	.	2.07			15
	2-2.99	2.57	4.00	2.54		#	46
	3-3.99	3.96	.	3.96			180
	4-4.99	5.05	5.02	5.05		42	934
	5-5.99	5.78	5.72	**5.78**		309	4474
	6-6.99	6.45	6.42	**6.45**		713	7828
	7-7.99	7.20	**7.26**	7.19	*	756	6626
	8+	7.77	**7.91**	7.75	**	55	510
Independent	0-0.99	1.00	.	1.00			#
	1-1.99	2.25	.	2.25			24
	2-2.99	3.03	3.87	2.86	**	15	73
	3-3.99	4.01	4.03	4.01		74	272
	4-4.99	4.82	4.74	**4.85**	*	542	1281
	5-5.99	5.63	5.41	**5.74**	**	2043	4007
	6-6.99	6.41	6.19	**6.52**	**	3515	6710
	7-7.99	7.19	7.12	**7.23**	**	3868	7305
	8+	7.76	7.74	**7.78**		723	1059
Colleges	0-0.99	.	.	.			
	1-1.99	.	.	.			
	2-2.99	3.75	.	3.75			#
	3-3.99	4.00	.	4.00			21
	4-4.99	4.56	.	4.56			68
	5-5.99	5.51	.	5.51			75
	6-6.99	6.32	.	6.32			69
	7-7.99	7.37	.	7.37			41
	8+	8.00	.	8.00			#
Sixth Form	0-0.99	.	.	.			
	1-1.99	.	.	.			
	2-2.99	5.00	.	5.00			#
	3-3.99	5.00	.	5.00			#
	4-4.99	5.17	.	5.17			#
	5-5.99	5.57	5.00	5.80		#	#
	6-6.99	6.11	6.00	6.17		#	#
	7-7.99	7.00	7.00	7.00		#	#
	8+	.	.	.			
Other	0-0.99	.86	.	.86			#
	1-1.99	2.00	2.00	2.00		#	43
	2-2.99	2.52	**2.67**	2.52		#	155
	3-3.99	3.49	**4.27**	3.45	**	11	221
	4-4.99	4.41	**4.60**	4.40		10	329
	5-5.99	5.50	5.21	**5.52**		19	316
	6-6.99	6.19	6.18	**6.20**		17	235
	7-7.99	6.88	**7.14**	6.87		#	129
	8+	7.31	.	7.31			13
City Academy	0-0.99	1.25	1.00	1.27		#	51
	1-1.99	1.84	1.75	1.85		16	242
	2-2.99	2.82	2.38	**2.83**	*	24	774
	3-3.99	3.75	3.65	3.75		48	1619
	4-4.99	4.64	4.69	4.64		54	2852
	5-5.99	5.49	5.17	5.50		46	2928
	6-6.99	6.34	6.40	6.34		15	1424
	7-7.99	7.11	7.22	7.10		#	405
	8+	7.93	8.00	7.93		#	14

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 3.7 shows that males and females with mean GCSE scores of 2+ achieved significantly higher scores via linear assessment, except at the very top level of ability (mean GCSE score of 8+). Females of lower ability (mean GCSE score of 1–1.99) also achieved higher scores via linear assessments.

Table 3.7 – Comparing mean grade scores for English Literature by mean GCSE scores and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Mean GCSE score	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	Male	.91	1.00	.91		#	358
	Female	1.26	1.20	1.26		15	296
1-1.99	Male	1.73	1.55	1.73		87	3069
	Female	2.18	1.85	**2.20**	**	84	2569
2-2.99	Male	2.59	2.37	**2.59**	**	363	11108
	Female	3.10	2.71	**3.11**	**	296	9625
3-3.99	Male	3.54	3.39	**3.54**	**	1029	26830
	Female	4.00	3.73	**4.01**	**	953	24329
4-4.99	Male	4.52	4.35	**4.52**	**	2523	53093
	Female	4.87	4.63	**4.88**	**	2318	50587
5-5.99	Male	5.42	5.22	**5.43**	**	3995	58459
	Female	5.71	5.49	**5.72**	**	3626	65968
6-6.99	Male	6.24	6.06	**6.26**	**	3644	37280
	Female	6.51	6.32	**6.52**	**	3834	47772
7-7.99	Male	7.06	7.01	**7.07**	**	2562	16631
	Female	7.22	7.16	**7.23**	**	3187	24027
8+	Male	7.74	7.74	7.74		358	932
	Female	7.77	7.76	**7.77**		447	1526

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 3.8 shows that both genders in maintained (non-selective) schools, independent schools and city academies achieved higher scores via a linear assessment, while maintained (selective) schools and other schools produced higher scores via a modular route.

Table 3.8 – Comparing mean grade scores for English Literature by centre type and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	Male	4.90	4.81	**4.90**	**	8085	181735
	Female	5.42	5.21	**5.43**	**	8306	199317
Maintained Schools (selective)	Male	6.33	**6.45**	6.32	**	1084	10034
	Female	6.65	**6.94**	6.62	**	792	10582
Independent	Male	6.30	6.22	**6.34**	**	5251	9983
	Female	6.65	6.55	**6.70**	**	5524	10751
Colleges	Male	5.49	.	5.49			142
	Female	5.76	.	5.76			137
Sixth Form	Male	5.80	5.75	5.82		#	11
	Female	5.75	6.00	5.70		#	#
Other	Male	4.53	**5.11**	4.50	*	38	789
	Female	5.06	5.43	5.04		28	659
City Academy	Male	4.63	3.72	**4.65**	**	109	5066
	Female	5.07	4.80	**5.07**		108	5243

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

4 Geography

This chapter presents the analysis of candidate performance in GCSE Geography specifications in modular and linear assessments from summer 2009.

Key finding

Within the limitations of the data[13], the evidence suggests that in these specifications **candidates achieved higher grades in the modular assessment** compared to linear. This was after adjusting for their ability, centre type and gender and this was statistically significant (to 99.9%).

Data

Data for modular specifications were collected from OCR and included three units; data for linear specifications were collected from AQA, Edexcel, CCEA and WJEC. A total of 102,697 candidates were examined across all these specifications. These candidates had a mean GCSE score based on four or more other GCSEs from summer 2009.

Table 4.1 shows the split of these candidates by awarding organisation and assessment route.

Table 4.1 – Number (and %) of candidates taking GCSE Geography by awarding organisation and assessment route in the specifications being examined

	Assessment route			
	Modular	Linear	Modular	Linear
Awarding organisation	No. of candidates	No. of candidates	% of Total	% of Total
OCR	20786	0	100.0%	.0%
Edexcel	0	11170	.0%	13.6%
WJEC	0	7870	.0%	9.6%
CCEA	0	3670	.0%	4.5%
AQA	0	59201	.0%	72.3%
Total	20786	81911	100.0%	100.0%
% of Total	20%	80%		

Analysis

The first stage of the analysis showed that when comparing grade scores in GCSE Geography across the two assessment routes there was a strong, significant difference between modular and linear assessment. To understand whether the scores were influenced by other factors, the scores were adjusted for candidates' ability, centre type and gender. The results showed a highly significant difference (≥99.9% significance level) between the assessment routes.

[13] See Limitations and context of data section in chapter 1.

Table 4.2 shows this adjusted mean grade score in both assessment routes compared to the mean grade score.

Table 4.2 – Adjusted mean grade score for GCSE Geography by assessment route

	Assessment route	
	Modular	Linear
Mean grade score in Geography	5.28	5.38
Adjusted mean grade score in Geography	5.44	5.34

Table 4.2 shows that there were differences in both assessment routes between candidates' mean grade scores and adjusted mean grade scores in Geography. This proved that candidates' ability, centre type and gender had made an impact on candidates' scores. Of the three factors, candidates' ability had the strongest impact. This was most noticeable in modular assessments. Having adjusted for these factors, the differences in Geography scores were still significant. Note that before adjusting, linear assessments produced a higher mean grade score, but after adjustments were made, modular assessments produced higher mean grade scores.

Geography: data tables

The following tables and commentary were used to arrive at the analysis and conclusions in this chapter. These tables compare the mean grade scores for candidates taking Geography across modular and linear assessment routes split by mean GCSE score; centre type; gender; centre type and mean GCSE score; mean GCSE score and gender, and centre type and gender.

A reminder: mean GCSE score is a measure of candidates' abilities and represents the candidates' average GCSE grade in all their other GCSEs, although caution should be taken as grades vary from A*–U across other GCSEs. The mean grade score represents the average grade achieved by the candidates being examined. The scores translate as A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment route.

Table 4.3 shows that candidates with mean GCSE scores of 4–6.99 achieved higher scores for Geography via modular assessment. These ability groups also had the largest number of candidates, representing more than 70% of candidates (74% modular, 72% linear) and thus had the greatest impact on the overall mean presented in Table 4.2. For higher performing candidates (mean GCSE score of 7+), scores were higher via linear assessment.

Table 4.3 – Comparing mean grade scores for Geography by candidates' mean GCSE scores

		Assessment route				
		Modular	Linear		Modular	Linear
Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	.40	.27	.44		11	36
1-1.99	.94	**1.00**	.92		133	425
2-2.99	1.76	**1.77**	1.76		686	2080
3-3.99	2.80	2.77	**2.81**		1821	6229
4-4.99	4.02	**4.10**	3.99	**	4208	15061
5-5.99	5.18	**5.36**	5.13	**	6122	23135
6-6.99	6.43	**6.49**	6.41	**	5040	20862
7-7.99	7.49	7.42	**7.51**	**	2604	13118
8+	7.93	7.87	**7.95**	*	161	965

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 4.4 shows that Geography scores were highest in maintained (selective) and independent schools. In most centres a modular route was more likely to result in higher scores, except for maintained (selective) and other schools. Candidates from maintained (non-selective) and independent schools together represent a large proportion of the study sample (94% modular, 88% linear) and thus had the greatest impact on the overall mean.

Table 4.4 – Comparing mean grade scores for Geography by centre type

		Assessment route				
		Modular	Linear		Modular	Linear
Centre type	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	4.99	**5.10**	4.96	**	18024	59132
Maintained Schools (selective)	6.48	6.42	**6.49**		1051	8852
Independent	6.65	**6.73**	6.64	*	1555	12749
Colleges	4.42		4.42		0	12
Sixth Form	4.79	6.00	4.69		#	13
Other	4.55	4.00	**4.61**		21	221
City Academy	4.32	**4.41**	4.31		134	932

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 4.5 shows that both genders achieved significantly higher scores for Geography via a linear route.

Table 4.5 – Comparing mean grade scores for Geography by gender

		Assessment route				
		Modular	Linear		Modular	Linear
Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Male	5.23	5.14	**5.25**	**	11301	45751
Female	5.51	5.44	**5.53**	**	9484	36160

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 4.6 compares the mean grade scores of candidates[14] with relatively equal ability within the same centre type, across the two assessment routes.

The table shows that candidates with a mean GCSE score of 4–6.99 in maintained (non-selective) schools achieved higher scores in modular assessments. Candidates from the same centre type with a mean GCSE score of 7+ achieved higher scores in linear assessments but there was no significant difference. All candidates in maintained (selective) schools achieved higher scores via a linear assessment route, and for those with a mean GCSE score of 6–7.99 this was significant at 99.9%. Independent schools showed no clear pattern of trends between assessment routes.

[14] Based on samples greater than 100 candidates. This is sufficient to draw meaningful conclusions.

Table 4.6 – Comparing mean grade scores for Geography by centre type and mean GCSE score

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	0-0.99	.36	.30	.38		#	34
	1-1.99	.94	**1.01**	.92		130	407
	2-2.99	1.77	**1.79**	1.76		667	1991
	3-3.99	2.80	2.76	**2.81**		1777	5933
	4-4.99	4.01	**4.09**	3.99	**	4084	13766
	5-5.99	5.15	**5.35**	5.08	**	5615	18473
	6-6.99	6.37	**6.49**	6.33	**	4075	12909
	7-7.99	7.44	7.42	**7.44**		1610	5439
	8+	7.89	7.84	7.91		56	180
Maintained Schools (selective)	0-0.99	.	.	.		0	0
	1-1.99	.33	.	.33		0	#
	2-2.99	1.67	.	1.67		0	#
	3-3.99	2.63	.	2.63		0	32
	4-4.99	3.99	3.88	4.00		16	306
	5-5.99	5.26	5.23	5.26		194	1905
	6-6.99	6.43	6.28	**6.45**	**	454	3425
	7-7.99	7.50	7.27	**7.52**	**	368	2982
	8+	7.96	7.79	7.97		19	193
Independent	0-0.99	.	.	.		0	0
	1-1.99	1.50	.	1.50		0	#
	2-2.99	2.03	1.14	2.26	**	#	27
	3-3.99	3.15	3.53	3.08		19	109
	4-4.99	4.27	4.46	4.24		81	647
	5-5.99	5.41	**5.71**	5.38	**	261	2392
	6-6.99	6.63	**6.65**	6.62		488	4342
	7-7.99	7.57	7.51	**7.58**	**	614	4640
	8+	7.94	7.91	7.95		85	590
Colleges	0-0.99	.	.	.		0	0
	1-1.99	.	.	.		0	0
	2-2.99	.	.	.		0	0
	3-3.99	.	.	.		0	0
	4-4.99	3.83	.	3.83		0	#
	5-5.99	3.67	.	3.67		0	#
	6-6.99	5.50	.	5.50		0	#
	7-7.99	8.00	.	8.00		0	#
	8+	.	.	.		0	0
Sixth Form	0-0.99	.	.	.		0	0
	1-1.99	.	.	.		0	0
	2-2.99	.	.	.		0	0
	3-3.99	.	.	.		0	0
	4-4.99	.00	.	.00		0	#
	5-5.99	4.86	.	4.86		0	#
	6-6.99	5.40	6.00	5.25		#	#
	7-7.99	6.00	.	6.00		0	#
	8+	.	.	.		0	0
Other	0-0.99	.	.	.		0	0
	1-1.99	.67	.	.67		0	#
	2-2.99	1.15	.50	1.27		#	11
	3-3.99	2.14	1.50	2.25		#	24
	4-4.99	3.65	4.00	3.62		#	47
	5-5.99	4.97	5.00	4.97		#	64
	6-6.99	6.00	5.67	6.02		#	47
	7-7.99	7.04	7.00	7.04		#	24
	8+	8.00	.	8.00		0	#
City Academy	0-0.99	1.00	.00	1.50		#	#
	1-1.99	1.08	.67	1.20		#	#
	2-2.99	1.45	1.00	1.56		#	45
	3-3.99	2.71	2.71	2.71		21	131
	4-4.99	3.75	3.87	3.74		23	288
	5-5.99	4.90	5.07	4.87		46	291
	6-6.99	6.36	6.21	6.38		19	133
	7-7.99	7.32	7.40	7.29		#	31
	8+	8.00	8.00	8.00		#	#

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 4.7 shows that of those candidates with mean GCSE scores of 4–4.99, males achieved higher scores in modular assessments and females achieved higher scores in linear assessments. All candidates achieving mean GCSE scores of 5–6.99 achieved higher scores via modular assessment. Males and females with higher mean GCSE scores (mean GCSE score of 7+) gained higher scores in linear assessments but there was no significant difference between assessment routes in males of top ability (mean GCSE score of 8+).

Table 4.7 – Comparing mean grade scores for Geography by mean GCSE scores and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Mean GCSE score	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	Male	.40	.17	.46		#	24
	Female	.41	.40	.42		#	12
1-1.99	Male	.92	.87	**.93**		86	274
	Female	.98	**1.23**	.91		47	151
2-2.99	Male	1.83	**1.89**	1.81		437	1383
	Female	1.64	1.57	**1.67**		249	697
3-3.99	Male	2.88	2.83	**2.90**		1152	4034
	Female	2.66	2.66	2.66		669	2195
4-4.99	Male	4.07	**4.14**	4.04	**	2543	9394
	Female	3.94	4.03	**3.91**	**	1665	5667
5-5.99	Male	5.22	**5.38**	5.17	**	3304	13144
	Female	5.12	**5.34**	5.06	**	2818	9991
6-6.99	Male	6.44	**6.49**	6.43	**	2536	10786
	Female	6.41	**6.48**	6.40	**	2503	10076
7-7.99	Male	7.47	7.41	**7.48**	**	1165	6247
	Female	7.51	7.43	**7.53**	**	1439	6871
8+	Male	7.94	7.93	**7.95**		72	465
	Female	7.93	7.82	**7.94**	*	89	500

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 4.8 shows that both genders in maintained (non-selective) schools achieved higher scores via a modular assessment, while maintained (selective) schools produced higher scores via a linear route. In independent schools, scores were higher for males via a modular assessment and for females, via a linear route, although this was not significant.

Table 4.8 – Comparing mean grade scores for Geography by centre type and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	Male	4.86	**4.97**	4.82	**	9893	32957
	Female	5.15	**5.25**	5.12	**	8131	26175
Maintained Schools (selective)	Male	6.35	6.26	**6.36**		458	5153
	Female	6.65	6.55	**6.67**	*	593	3699
Independent	Male	6.56	**6.76**	6.54	**	852	6991
	Female	6.75	6.68	**6.76**		702	5758
Colleges	Male	3.90	.	3.90		0	#
	Female	7.00	.	7.00		0	#
Sixth Form	Male	5.11	6.00	5.00		#	#
	Female	4.20	.	4.20		0	#
Other	Male	4.29	4.29	4.28		17	130
	Female	4.97	2.75	5.07		#	91
City Academy	Male	4.14	3.64	**4.22**	*	80	502
	Female	4.54	**5.56**	4.41	**	54	430

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

5 Information and communication technology (ICT)

This chapter presents the analysis of candidate performance in GCSE ICT specifications in modular and linear assessments from summer 2009.

Key finding

Within the limitations of the data[15], the evidence suggests that in these specifications **candidates achieved higher grades in the linear assessment** compared to modular. This was after adjusting for their ability, centre type and gender and this was statistically significant (to 99.9%).

Data

Data for modular specifications were collected from OCR and included four units (two written exams and two coursework); data for linear specifications were collected from AQA, Edexcel, CCEA and WJEC. A total of 46,091 candidates were examined across all these specifications. These candidates had a mean GCSE score based on four or more other GCSEs from summer 2009.

Table 5.1 shows the split of these candidates by awarding organisation and assessment route.

Table 5.1 – Number (and %) of candidates taking GCSE ICT by awarding organisation and assessment route in the specifications being examined

	Assessment route			
	Modular	Linear	Modular	Linear
Awarding organisation	No. of candidates	No. of candidates	% of Total	% of Total
OCR	11382	0	100.0%	.0%
Edexcel	0	6915	.0%	19.9%
WJEC	0	10484	.0%	30.2%
CCEA	0	5444	.0%	15.7%
AQA	0	11866	.0%	34.2%
Total	11382	34709	100.0%	100.0%
% of Total	25%	75%		

Analysis

The first stage of the analysis showed that when comparing grade scores in GCSE ICT across the two assessment routes there was a strong, significant difference between modular and linear assessment. To understand whether the scores were influenced by other factors the scores were adjusted for candidates' ability, centre

[15] See Limitations and context of data section in chapter 1.

type and gender. The results showed a highly significant difference (≥99.9% significance level) between the assessment routes.

Table 5.2 shows this adjusted mean grade score in both assessment routes compared to the mean grade score.

Table 5.2 – Adjusted mean grade score for GCSE ICT by assessment route

	Assessment route	
	Modular	Linear
Mean grade score in ICT	5.00	5.32
Adjusted mean grade score in ICT	4.89	5.36

Table 5.2 shows there were differences in both assessment routes between candidates' mean grade scores and adjusted mean grade scores in ICT. This proved that candidates' ability, centre type and gender had made an impact on candidates' scores. Of the three factors, candidates' ability had the strongest impact. This was most noticeable in modular assessments. Having adjusted for these factors, the differences in ICT scores were still significant.

ICT: data tables

The following tables and commentary were used to arrive at the analysis and conclusions in this chapter. These tables compare the mean grade scores for candidates taking ICT across modular and linear assessment routes split by mean GCSE score; centre type; gender; centre type and mean GCSE score; mean GCSE score and gender; and centre type and gender.

A reminder: mean GCSE score is a measure of candidates' abilities and represents the candidates' average GCSE grade in all their other GCSEs, although caution should be taken as grades vary from A*–U across other GCSEs. The mean grade score represents the average grade achieved by the candidates being examined. The scores translate as A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment route.

Table 5.3 shows that candidates of all abilities achieved higher scores for ICT via a linear assessment route. This was significant at 99.9% for candidates with a mean GCSE score of 2+.

Table 5.3 – Comparing mean grade scores for ICT by candidates' mean GCSE scores

		Assessment route				
		Modular	Linear		Modular	Linear
Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	1.03	.67	1.06		#	31
1-1.99	1.64	1.46	1.69		63	249
2-2.99	2.51	2.00	**2.62**	**	278	1263
3-3.99	3.40	2.96	**3.52**	**	908	3466
4-4.99	4.38	4.05	**4.48**	**	2528	8194
5-5.99	5.37	5.03	**5.49**	**	3521	10459
6-6.99	6.33	5.95	**6.47**	**	2756	7504
7-7.99	7.23	6.97	**7.33**	**	1261	3411
8+	7.83	7.69	**7.89**	**	64	132

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 5.4 shows that ICT scores were highest in maintained (selective) and independent schools. Candidates in maintained schools (selective and non-selective) achieved higher scores via linear assessments, as did candidates in other schools. There was no significant difference between scores in independent schools.

Table 5.4 – Comparing mean grade scores for ICT by centre type

		Assessment route				
		Modular	Linear		Modular	Linear
Centre type	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	4.99	4.76	**5.07**	**	9231	27458
Maintained Schools (selective)	6.60	6.33	**6.66**	**	984	3885
Independent	6.07	6.05	**6.08**		1050	2696
Colleges	5.00	.	5.00		0	13
Sixth Form	4.86	.	4.86		0	110
Other	5.46	4.06	**5.53**	**	18	344
City Academy	3.89	**3.99**	3.85		99	203

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 5.5 shows that both genders achieved significantly higher scores for ICT via a linear route.

Table 5.5 – Comparing mean grade scores for ICT by gender

		Assessment route				
		Modular	Linear		Modular	Linear
Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Male	5.07	4.76	**5.16**	**	6366	19453
Female	5.47	5.31	**5.52**	**	5012	15256

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 5.6 compares the mean grade scores of candidates[16] with relatively equal ability within the same centre type, across the two assessment routes.

The table shows the significant differences between assessment routes for candidates with mean GCSE scores of 2+ in maintained (non-selective) schools, and for candidates with mean GCSE scores of 4–7.99 in maintained (selective) schools. These candidates achieved higher scores via linear assessments compared to modular. In independent schools, candidates with mean GCSE scores of 5+ also achieved higher scores via linear assessments.

[16] Based on samples greater than 100 candidates. This is sufficient to draw meaningful conclusions.

Table 5.6 – Comparing mean grade scores for ICT by centre type and mean GCSE score

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	0-0.99	1.06	.50	1.10		#	30
	1-1.99	1.70	1.52	1.75		58	234
	2-2.99	2.49	1.97	**2.61**	**	268	1214
	3-3.99	3.40	2.96	**3.51**	**	871	3333
	4-4.99	4.35	4.03	**4.46**	**	2388	7379
	5-5.99	5.29	5.01	**5.39**	**	3041	8235
	6-6.99	6.23	5.87	**6.36**	**	1960	5090
	7-7.99	7.14	6.75	**7.26**	**	627	1894
	8+	7.74	7.31	**7.88**	**	16	49
Maintained Schools (selective)	0-0.99	.00	.	.00		0	#
	1-1.99	.29	.	.29		0	#
	2-2.99	3.00	.	3.00		0	#
	3-3.99	3.98	1.00	4.04		#	47
	4-4.99	5.38	4.05	**5.46**	**	19	324
	5-5.99	6.13	5.15	**6.27**	**	179	1208
	6-6.99	6.71	6.12	**6.90**	**	416	1379
	7-7.99	7.40	7.23	**7.47**	**	349	864
	8+	7.89	7.95	7.87		20	45
Independent	0-0.99	.	.	.		0	0
	1-1.99	.50	.00	.67		#	#
	2-2.99	3.25	4.50	2.83		#	#
	3-3.99	3.43	3.87	3.22		15	32
	4-4.99	4.37	4.56	4.31		93	276
	5-5.99	5.35	5.19	**5.40**	**	270	820
	6-6.99	6.39	6.22	**6.46**	**	363	926
	7-7.99	7.29	7.15	**7.36**	**	278	595
	8+	7.85	7.71	**7.95**	**	28	38
Colleges	0-0.99	.	.	.		0	0
	1-1.99	.	.	.		0	0
	2-2.99	.00	.	.00		0	
	3-3.99	.	.	.		0	0
	4-4.99	4.00	.	4.00		0	#
	5-5.99	6.00	.	6.00		0	#
	6-6.99	6.50	.	6.50		0	#
	7-7.99	6.67	.	6.67		0	#
	8+	.	.	.		0	0
Sixth Form	0-0.99	.	.	.		0	0
	1-1.99	.	.	.		0	0
	2-2.99	.	.	.		0	0
	3-3.99	2.50	.	2.50		0	#
	4-4.99	4.06	.	4.06		0	18
	5-5.99	4.40	.	4.40		0	45
	6-6.99	5.21	.	5.21		0	28
	7-7.99	6.65	.	6.65		0	17
	8+	.	.	.		0	0
Other	0-0.99	.	.	.		0	0
	1-1.99	2.00	.	2.00		0	#
	2-2.99	3.50	2.50	3.70		#	20
	3-3.99	4.27	4.00	4.29		#	35
	4-4.99	5.00	3.43	**5.10**	**	#	107
	5-5.99	5.83	5.33	5.84		#	89
	6-6.99	6.64	7.50	6.61		#	62
	7-7.99	7.19	.	7.19		0	27
	8+	.	.	.		0	0
City Academy	0-0.99	1.00	1.00	.		#	0
	1-1.99	.80	1.00	.00		#	#
	2-2.99	1.75	2.25	1.58		#	12
	3-3.99	2.42	2.32	2.53		19	17
	4-4.99	3.27	3.71	3.16		21	85
	5-5.99	4.67	4.86	4.58		28	60
	6-6.99	5.59	5.33	5.82		15	17
	7-7.99	6.61	6.14	6.91	*	#	11
	8+	.	.	.		0	0

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 5.7 shows that candidates achieved higher scores via linear assessments, particularly male and female candidates with a mean GCSE score between 2 and 7.99. Males at the top scale of ability (mean GCSE score of 8+) were also statistically significant.

Table 5.7 – Comparing mean grade scores for ICT by mean GCSE scores and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Mean GCSE score	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	Male	1.19	.67	1.28		#	18
	Female	.77	.	.77		0	13
1-1.99	Male	1.72	1.30	**1.84**	*	44	146
	Female	1.53	1.84	1.48		19	103
2-2.99	Male	2.42	1.87	**2.56**	**	183	746
	Female	2.63	2.25	**2.70**	**	95	517
3-3.99	Male	3.32	2.88	**3.44**	**	581	2111
	Female	3.53	3.12	**3.63**	**	327	1355
4-4.99	Male	4.31	3.98	**4.42**	**	1539	4922
	Female	4.49	4.15	**4.59**	**	989	3272
5-5.99	Male	5.27	4.93	**5.38**	**	2035	5805
	Female	5.51	5.17	**5.62**	**	1485	4654
6-6.99	Male	6.23	5.81	**6.38**	**	1423	3938
	Female	6.44	6.10	**6.57**	**	1330	3566
7-7.99	Male	7.16	6.81	**7.28**	**	535	1701
	Female	7.29	7.09	**7.38**	**	726	1710
8+	Male	7.80	7.48	**7.91**	**	23	66
	Female	7.85	7.80	7.88		41	66

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 5.8 shows that males from all centre types achieved significantly higher scores via linear assessments. Females in maintained (non-selective) and other schools also achieved higher scores via linear assessments. However there was no significant difference in scores for female candidates from maintained (selective) and independent schools.

Table 5.8 – Comparing mean grade scores for ICT by centre type and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	Male	4.83	4.60	**4.91**	**	5337	15372
	Female	5.20	4.97	**5.27**	**	3894	12086
Maintained Schools (selective)	Male	6.41	5.69	**6.54**	**	416	2249
	Female	6.82	6.79	**6.83**		568	1636
Independent	Male	5.87	5.76	**5.91**	*	528	1465
	Female	6.31	6.36	6.29		518	1231
Colleges	Male	5.00	.	5.00		0	#
	Female	5.00	.	5.00		0	#
Sixth Form	Male	4.56	.	4.56		0	39
	Female	5.03	.	5.03		0	71
Other	Male	5.31	4.00	**5.40**	**	15	205
	Female	5.68	4.33	**5.71**	**	#	139
City Academy	Male	3.49	3.81	3.29		70	114
	Female	4.53	4.41	4.56		29	89

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

6 Mathematics

This chapter presents the analysis of candidate performance in GCSE Mathematics specifications in modular and linear assessments from summer 2009.

Key finding

Within the limitations of the data[17], the evidence suggests that in these specifications **candidates achieved higher grades in the linear assessment** compared to modular. This was after adjusting for their ability, centre type and gender and this was statistically significant (to 99.9%).

Data

Data for modular specifications were collected from AQA and CCEA (both included three units); data for linear specifications were collected from OCR, Edexcel and WJEC. A total of 381,876 candidates were examined across all these specifications. These candidates had a mean GCSE score based on four or more other GCSEs from summer 2009.

Table 6.1 shows the split of these candidates by awarding organisation and assessment route.

Table 6.1 – Number (and %) of candidates taking GCSE Mathematics by awarding organisation and assessment route in the specifications being examined

	Assessment route			
	Modular	Linear	Modular	Linear
Awarding organisation	No. of candidates	No. of candidates	% of Total	% of Total
OCR		29459		11.6%
Edexcel		199840		78.6%
WJEC		25071		9.9%
CCEA	309		0.2%	
AQA	127197		99.8%	
Total	127506	254370	100.0%	100.0%
% of Total	33%	67%		

Analysis

The first stage of the analysis showed that when comparing grade scores in GCSE Mathematics across the two assessment routes there was a strong, significant difference between modular and linear assessment. To understand whether the scores were influenced by other factors the scores were adjusted for candidates' ability, centre type and gender. The results showed a highly significant difference (≥99.9% significance level) between the assessment routes.

[17] See Limitations and context of data section in chapter 1.

Table 6.2 shows this adjusted mean grade score in both assessment routes compared to the mean grade score.

Table 6.2 – Adjusted mean grade score for GCSE Mathematics by assessment route

	Assessment route	
	Modular	Linear
Mean grade score in Mathematics	4.69	4.99
Adjusted mean grade score in Mathematics	4.75	4.95

Table 6.2 shows that there were differences in both assessment routes between candidates' mean grade scores and adjusted mean grade scores in Mathematics. This proved that candidates' ability, centre type and gender had made an impact on candidates' scores. Of the three factors, candidates' ability had the strongest impact. This was most noticeable in modular assessments. Having adjusted for these factors, the differences in Mathematics scores were still significant.

Mathematics: data tables

The following tables and commentary were used to arrive at the analysis and conclusions in this chapter. These tables compare the mean grade scores for candidates taking Mathematics across modular and linear assessment routes split by mean GCSE score; centre type; gender; centre type and mean GCSE score; mean GCSE score and gender; and centre type and gender.

A reminder: mean GCSE score is a measure of candidates' abilities and represents the candidates' average GCSE grade in all their other GCSEs, although caution should be taken as grades vary from A*–U across other GCSEs. The mean grade score represents the average grade achieved by the candidates being examined. The scores translate as A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment route.

Table 6.3 shows that for all candidates with a mean GCSE score less than 7, a linear route was more likely to result in a higher Mathematics score. Those candidates with a mean GCSE score of 7+ were statistically more likely to achieve higher scores by a modular route.

Table 6.3 – Comparing mean grade scores for Mathematics by candidates' mean GCSE scores

		Assessment route				
		Modular	Linear		Modular	Linear
Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	1.36	1.09	**1.48**	**	368	861
1-1.99	1.81	1.58	**1.91**	**	2655	5685
2-2.99	2.52	2.32	**2.62**	**	8842	17504
3-3.99	3.41	3.26	**3.50**	**	18981	36329
4-4.99	4.42	4.30	**4.48**	**	33225	61016
5-5.99	5.36	5.20	**5.44**	**	35367	64719
6-6.99	6.35	6.23	**6.41**	**	20353	45572
7-7.99	7.32	**7.35**	7.30	**	7468	21662
8+	7.90	**7.96**	7.88	**	247	1021

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 6.4 shows that Mathematics scores were higher in maintained (selective) and independent schools. In all centres, except for colleges, a linear route was more likely to result in a higher score.

Table 6.4 – Comparing mean grade scores for Mathematics by centre type

		Assessment route				
		Modular	Linear		Modular	Linear
Centre type	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	4.74	4.64	**4.80**	**	119044	218554
Maintained Schools (selective)	6.78	6.14	**6.89**	**	2194	13163
Independent	6.23	5.79	**6.33**	**	3319	15074
Colleges	4.63	**5.75**	4.53	**	28	339
Sixth Form	5.31	5.29	5.31		#	52
Other	3.95	3.57	**4.00**	**	216	1468
City Academy	4.38	4.36	**4.39**		2698	5720

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 6.5 shows that both genders achieved significantly higher scores for Mathematics via a linear route.

Table 6.5 – Comparing mean grade scores for Mathematics by gender

		Assessment route				
		Modular	Linear		Modular	Linear
Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Male	4.91	4.72	**5.00**	**	63222	125390
Female	4.87	4.66	**4.97**	**	64284	128977

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 6.6 compares the mean grade scores of candidates[18] with relatively equal ability within the same centre type, across the two assessment routes.

The table shows that in maintained (non-selective) schools, candidates with mean GCSE scores below 7 achieved higher scores in linear assessments, and those gaining mean GCSE scores of 7+ achieved higher scores via modular assessments. These results were significant at 99.9%. In maintained (selective) and independent schools, candidates with a mean GCSE score of 3–6.99 achieved higher scores in linear. However higher achieving candidates in independent schools (mean GCSE score of 8+) achieved higher scores via a modular route. And in city academies, candidates with mean GCSE scores of less than 4 or 5–5.99 achieved higher scores in linear assessments.

[18] Based on samples of more than 100 candidates. This is sufficient to draw meaningful conclusions.

Table 6.6 – Comparing mean grade scores for Mathematics by centre type and mean GCSE score

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	0-0.99	1.34	1.10	**1.44**	**	350	794
	1-1.99	1.79	1.58	**1.89**	**	2525	5321
	2-2.99	2.51	2.32	**2.61**	**	8493	16516
	3-3.99	3.41	3.25	**3.49**	**	18272	34512
	4-4.99	4.41	4.29	**4.47**	**	31788	57209
	5-5.99	5.33	5.20	**5.40**	**	32970	56876
	6-6.99	6.30	6.22	**6.34**	**	18222	34489
	7-7.99	7.26	**7.34**	7.22	**	6265	12489
	8+	7.89	**7.96**	7.85	**	159	347
Maintained Schools (selective)	0-0.99	1.33	1.33	.		#	
	1-1.99	1.83	1.71	2.14		17	#
	2-2.99	3.05	2.79	3.50		24	14
	3-3.99	4.35	3.85	**4.79**	**	48	53
	4-4.99	5.27	4.89	**5.46**	**	189	391
	5-5.99	5.98	5.57	**6.08**	**	633	2449
	6-6.99	6.74	6.39	**6.79**	**	768	5157
	7-7.99	7.50	7.43	**7.50**	*	474	4777
	8+	7.92	7.92	7.92		38	315
Independent	0-0.99	4.75	.	4.75			#
	1-1.99	2.24	1.40	2.42		#	24
	2-2.99	2.98	2.54	3.11		28	94
	3-3.99	3.86	3.54	**4.00**	**	124	290
	4-4.99	4.70	4.49	**4.78**	**	472	1280
	5-5.99	5.55	5.25	**5.64**	**	1006	3666
	6-6.99	6.44	6.25	**6.48**	**	1006	5172
	7-7.99	7.35	7.33	**7.35**		631	4190
	8+	7.89	**7.96**	7.88	*	47	354
Colleges	0-0.99	2.50	.	2.50			#
	1-1.99	1.87	.	1.87			15
	2-2.99	2.58	2.50	2.58		#	38
	3-3.99	3.42	**5.00**	3.25	**	#	53
	4-4.99	4.60	5.00	4.58		#	97
	5-5.99	5.58	6.00	5.55		#	78
	6-6.99	6.56	7.00	6.51		#	51
	7-7.99	7.17	7.67	6.67		#	#
	8+	.	.	.			
Sixth Form	0-0.99	.	.	.			
	1-1.99	.	.	.			
	2-2.99	4.33	.	4.33			#
	3-3.99	4.00	.	4.00			#
	4-4.99	4.87	5.50	4.64		#	11
	5-5.99	5.25	5.00	5.27		#	22
	6-6.99	6.18	5.00	6.30		#	#
	7-7.99	7.00	.	7.00			#
	8+	.	.	.			
Other	0-0.99	1.80	1.50	1.85		#	13
	1-1.99	2.18	1.13	**2.36**	**	15	87
	2-2.99	2.61	2.65	2.60		37	232
	3-3.99	3.31	3.14	3.34		57	327
	4-4.99	4.04	4.00	4.05		62	386
	5-5.99	5.10	4.90	5.13		31	248
	6-6.99	6.18	5.90	6.20		10	137
	7-7.99	7.08	**8.00**	7.03	**	#	37
	8+	8.00	.	8.00			#
City Academy	0-0.99	1.41	.77	**1.59**	**	13	46
	1-1.99	1.97	1.56	**2.14**	**	93	231
	2-2.99	2.53	2.24	**2.65**	**	258	607
	3-3.99	3.37	3.19	**3.44**	**	474	1091
	4-4.99	4.34	4.30	**4.36**		705	1642
	5-5.99	5.25	5.17	**5.30**	**	719	1380
	6-6.99	6.20	6.16	**6.23**		340	556
	7-7.99	7.20	7.15	7.23		93	163
	8+	8.00	8.00	8.00		#	#

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 6.7 shows that males and females with a mean GCSE score of less than 7 achieved higher scores in a linear route. Candidates obtaining a mean GCSE score of 7 achieved higher scores via a modular route. At the very highest level of ability (candidates with a mean GCSE score of 8+) females were more likely to achieve higher scores via modular assessments. However there was no significant difference between Mathematics scores for the male candidates.

Table 6.7 – Comparing mean grade scores for Mathematics by mean GCSE scores and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Mean GCSE score	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	Male	1.44	1.22	**1.54**	**	252	568
	Female	1.20	.82	**1.34**	**	116	293
1-1.99	Male	1.98	1.77	**2.07**	**	1714	3574
	Female	1.51	1.23	**1.63**	**	941	2111
2-2.99	Male	2.73	2.56	**2.81**	**	5368	10561
	Female	2.20	1.94	**2.32**	**	3474	6943
3-3.99	Male	3.65	3.54	**3.71**	**	10963	20497
	Female	3.10	2.87	**3.21**	**	8018	15832
4-4.99	Male	4.64	4.54	**4.69**	**	17752	32011
	Female	4.17	4.02	**4.25**	**	15473	29005
5-5.99	Male	5.58	5.43	**5.66**	**	16519	30361
	Female	5.16	5.01	**5.24**	**	18848	34355
6-6.99	Male	6.58	6.49	**6.62**	**	8053	19354
	Female	6.18	6.05	**6.24**	**	12300	26218
7-7.99	Male	7.48	**7.52**	7.46	**	2537	8159
	Female	7.22	**7.26**	7.21	**	4931	13503
8+	Male	7.92	7.95	7.91		64	305
	Female	7.89	**7.96**	7.87	**	183	716

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

Table 6.8 shows that males and females in maintained (selective and non-selective) schools, independent schools and other schools achieved higher scores via a linear route. This was significant at 99.9%. However in colleges, both genders achieved higher scores via a modular route.

Table 6.8 – Comparing mean grade scores for Mathematics by centre type and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	Male	4.78	4.69	**4.83**	**	59424	108217
	Female	4.71	4.59	**4.77**	**	59620	110337
Maintained Schools (selective)	Male	6.81	5.89	**6.95**	**	1037	6782
	Female	6.76	6.36	**6.83**	**	1157	6381
Independent	Male	6.17	5.69	**6.26**	**	1200	6437
	Female	6.27	5.84	**6.38**	**	2119	8634
Colleges	Male	4.63	**5.71**	4.54	**	14	165
	Female	4.62	**5.79**	4.53	*	14	174
Sixth Form	Male	5.45	5.00	5.47		#	32
	Female	5.12	5.33	5.05		#	20
Other	Male	3.96	3.62	**4.03**	**	156	830
	Female	3.93	3.45	**3.97**	*	60	638
City Academy	Male	4.38	4.37	4.39		1390	2927
	Female	4.37	4.36	4.38		1308	2793

*** Denotes 99% significance*

** Denotes 95% significance*

Blank cells denote less than 95% significance

 # Denotes 10 candidates or less

7 Religious Education (RE)

This chapter presents the analysis of candidate performance in GCSE RE specifications in modular and linear assessments from summer 2009.

Key finding

Within the limitations of the data[19], the evidence suggests that in these specifications **candidates achieved higher grades in the linear assessment** compared to modular. This was after adjusting for their ability, centre type and gender and this was statistically significant (to 99.9%).

Data

Data for modular specifications were collected from AQA and Edexcel (both included two units); data for linear specifications were collected from OCR, CCEA and WJEC. A total of 122,359 candidates were examined across all these specifications. These candidates had a mean GCSE score based on four or more other GCSEs from summer 2009.

Table 7.1 shows the split of these candidates by awarding organisation and assessment route.

Table 7.1 – Number (and %) of candidates taking GCSE RE by awarding organisation and assessment route in the specifications being examined

	Assessment route			
	Modular	Linear	Modular	Linear
Awarding organisation	No. of candidates	No. of candidates	% of Total	% of Total
OCR		30745		78.7%
Edexcel	58877		70.7%	
WJEC		5944		15.2%
CCEA		2373		6.1%
AQA	24420		29.3%	
Total	83297	39062	100.0%	100.0%
% of Total	68%	32%		

Analysis

The first stage of the analysis showed that when comparing grade scores in GCSE RE across the two assessment routes there was a strong, significant difference between modular and linear assessment. To understand whether the scores were influenced by other factors the scores were adjusted for candidate's ability, centre type and gender. The results showed a highly significant difference (≥99.9% significance level) between the assessment routes.

[19] See Limitations and context of data section in chapter 1.

Table 7.2 shows this adjusted mean grade score in both assessment routes compared to the mean grade score.

Table 7.2 – Adjusted mean grade score for GCSE RE by assessment route

	Assessment route	
	Modular	Linear
Mean grade score in RE	5.39	5.71
Adjusted mean grade score in RE	5.42	5.66

Table 7.2 shows that there were differences in both assessment routes between candidates' mean grade scores and adjusted mean grade scores in RE. This proved that candidates' ability, centre type and gender had made an impact on candidates' scores. Of the three factors, candidates' ability had the strongest impact. This was most noticeable in modular assessments. Having adjusted for these factors, the differences in RE scores were still significant.

RE: data tables

The following tables and commentary were used to arrive at the analysis and conclusions in this chapter. These tables compare the mean grade scores for candidates taking RE across modular and linear assessment routes split by mean GCSE score; centre type; gender; centre type and mean GCSE score; mean GCSE score and gender; and centre type and gender.

A reminder: mean GCSE score is a measure of candidates' abilities and represents the candidates' average GCSE grade in all their other GCSEs, although caution should be taken as grades vary from A*–U across other GCSEs. The mean grade score represents the average grade achieved by the candidates being examined. The scores translate as A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0.

The figures in bold highlight the assessment route achieving the highest score where there are more than 100 candidates in both the modular and linear assessment route.

Table 7.3 shows that candidates of all abilities achieved higher scores for RE via a linear assessment route. This was significant at 99.9% or above across all groups where there were more than 100 candidates.

Table 7.3 – Comparing mean grade scores for RE by candidates' mean GCSE scores

		Assessment route				
		Modular	Linear		Modular	Linear
Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	.77	.73	.87		73	30
1-1.99	1.42	1.31	**1.62**	**	710	359
2-2.99	2.30	2.19	**2.53**	**	2845	1314
3-3.99	3.38	3.30	**3.59**	**	8162	3598
4-4.99	4.53	4.45	**4.69**	**	18421	8366
5-5.99	5.68	5.59	**5.87**	**	25188	11448
6-6.99	6.69	6.61	**6.86**	**	18618	8874
7-7.99	7.51	7.45	**7.62**	**	8862	4790
8+	7.94	7.92	**7.97**	**	417	283

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 7.4 shows that RE scores were the highest in independent schools. There were strong differences between linear and modular assessment routes for all centre types. The table shows that candidates in maintained (non-selective) and independent schools achieved higher scores in linear assessments, and those in maintained (selective) and city academies achieved higher scores via a modular route.

Table 7.4 – Comparing mean grade scores for RE by centre type

		Assessment route				
		Modular	Linear		Modular	Linear
Centre type	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	5.31	5.22	**5.51**	**	72848	32111
Maintained Schools (selective)	6.75	**6.82**	6.65	**	4477	3325
Independent	7.01	6.84	**7.28**	**	4520	2809
Colleges	6.08	6.50	6.00		#	11
Sixth Form	6.25	6.00	6.33		#	#
Other	4.69	**4.95**	4.50		64	90
City Academy	4.80	**5.04**	4.34	**	1385	713

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 7.5 shows that both genders achieved significantly higher scores for RE via a linear route.

Table 7.5 – Comparing mean grade scores for RE by gender

		Assessment route				
		Modular	Linear		Modular	Linear
Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Male	5.17	5.08	**5.37**	**	38116	17360
Female	5.77	5.66	**5.98**	**	45181	21701

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 7.6 compares the mean grade scores of candidates[20] with relatively equal ability within the same centre type, across the two assessment routes.

The table shows that in maintained (selective) schools candidates with mean GCSE scores of 4–5.99 achieved higher scores in modular assessments. In independent schools, candidates gaining mean GCSE scores of 5-5.99 achieved higher scores via linear assessments. Candidates in city academies with mean GCSE scores of 6-6.99 also gained higher scores via linear assessments.

[20] Based on samples greater than 100 candidates. This is sufficient to draw meaningful conclusions.

Table 7.6 – Comparing mean grade score for RE by centre type and mean GCSE score

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Mean GCSE score	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	0-0.99	.72	.71	.76		72	21
	1-1.99	1.39	1.28	**1.65**	**	685	306
	2-2.99	2.28	2.16	**2.55**	**	2747	1232
	3-3.99	3.38	3.28	**3.60**	**	7863	3415
	4-4.99	4.52	4.44	**4.69**	**	17629	7886
	5-5.99	5.65	5.56	**5.86**	**	22828	9945
	6-6.99	6.64	6.56	**6.83**	**	15033	6575
	7-7.99	7.44	7.38	**7.57**	**	5830	2649
	8+	7.92	7.89	**7.96**	*	160	82
Maintained Schools (selective)	0-0.99		.				#
	1-1.99	.	.	.			
	2-2.99	2.50	2.50	2.50		#	#
	3-3.99	3.92	4.25	3.62		12	13
	4-4.99	4.77	**4.96**	4.59	*	113	123
	5-5.99	5.84	**5.97**	5.69	**	901	783
	6-6.99	6.73	6.75	6.70		1868	1309
	7-7.99	7.54	7.53	7.55		1501	1040
	8+	7.92	7.91	7.93		80	54
Independent	0-0.99	.	.	.			
	1-1.99	3.33	3.33	.		#	
	2-2.99	3.92	**4.00**	2.50	**	36	#
	3-3.99	4.63	**4.71**	4.24		101	21
	4-4.99	5.22	5.20	5.24		339	147
	5-5.99	6.25	6.09	**6.55**	**	980	525
	6-6.99	7.14	7.02	**7.34**	**	1437	889
	7-7.99	7.74	7.67	**7.84**	**	1445	1079
	8+	7.96	7.94	7.99	*	173	146
Colleges	0-0.99	.	.	.			
	1-1.99	.	.	.			
	2-2.99	.	.	.			
	3-3.99	6.00	.	6.00			#
	4-4.99	4.00	.	4.00			#
	5-5.99	6.00	.	6.00			#
	6-6.99	6.50	6.00	6.67		#	#
	7-7.99	7.50	7.00	8.00		#	#
	8+	.	.	.			
Sixth Form	0-0.99	.	.	.			
	1-1.99	.	.	.			
	2-2.99	.	.	.			
	3-3.99	.	.	.			
	4-4.99	3.00	.	3.00			#
	5-5.99	6.00	6.00	.		#	
	6-6.99	8.00	.	8.00			#
	7-7.99	.	.	.			
	8+	8.00	.	8.00			#
Other	0-0.99	2.00	2.00	.		#	
	1-1.99	1.50	1.00	2.00		#	#
	2-2.99	2.00	2.17	1.90		6	10
	3-3.99	3.23	3.69	2.77		13	13
	4-4.99	4.53	**5.05**	4.18	**	19	28
	5-5.99	5.68	5.75	5.64		12	22
	6-6.99	6.95	7.30	6.64		10	11
	7-7.99	7.00	7.50	6.80		#	#
	8+	.	.	.			
City Academy	0-0.99	1.25	.	1.25			#
	1-1.99	1.49	1.73	1.42		15	52
	2-2.99	2.38	2.52	2.26		54	68
	3-3.99	3.21	**3.27**	3.13		173	135
	4-4.99	4.30	4.22	**4.45**		321	179
	5-5.99	5.39	5.36	**5.44**		466	169
	6-6.99	6.59	6.50	**6.86**	**	269	86
	7-7.99	7.43	7.39	**7.69**	*	83	16
	8+	8.00	8.00	.		#	

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 7.7 shows that in all groups, candidates achieved higher scores via linear assessments. In particular, there were significant differences between male and female candidates with a mean GCSE score from 2 to 7.99. There was also a significant difference between male candidates at the top scale of ability (mean GCSE score of 8+).

Table 7.7 – Comparing mean grade score for RE by mean GCSE scores and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Mean GCSE score	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
0-0.99	Male	.74	.64	.91		39	22
	Female	.81	.82	.75		34	#
1-1.99	Male	1.31	1.19	**1.53**	**	394	202
	Female	1.55	1.46	**1.73**		316	157
2-2.99	Male	2.11	2.02	**2.34**	**	1563	687
	Female	2.52	2.41	**2.74**	**	1282	627
3-3.99	Male	3.18	3.11	**3.34**	**	4231	1799
	Female	3.60	3.50	**3.83**	**	3931	1799
4-4.99	Male	4.31	4.26	**4.43**	**	9071	3982
	Female	4.73	4.64	**4.93**	**	9350	4384
5-5.99	Male	5.45	5.39	**5.60**	**	11400	4947
	Female	5.86	5.76	**6.08**	**	13788	6501
6-6.99	Male	6.50	6.42	**6.66**	**	7843	3692
	Female	6.83	6.75	**7.01**	**	10775	5181
7-7.99	Male	7.40	7.33	**7.51**	**	3420	1917
	Female	7.59	7.53	**7.70**	**	5442	2873
8+	Male	7.92	7.88	**7.97**	**	154	112
	Female	7.95	7.94	**7.97**		263	171

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Table 7.8 shows that both genders in maintained (non-selective) and independent schools achieved higher scores via linear assessment, and maintained (selective) schools and city academies produced higher scores via a modular route.

Table 7.8 – Comparing mean grade score for RE by centre type and gender

			Assessment route				
			Modular	Linear		Modular	Linear
Centre type	Gender	Mean grade score	Mean grade score	Mean grade score		No. of candidates	No. of candidates
Maintained Schools (non-selective)	Male	4.95	4.88	**5.11**	**	33155	14024
	Female	5.61	5.51	**5.81**	**	39693	18087
Maintained Schools (selective)	Male	6.57	**6.64**	6.47	**	2089	1565
	Female	6.91	**6.98**	6.81	**	2388	1760
Independent	Male	6.85	6.66	**7.15**	**	2194	1370
	Female	7.16	7.01	**7.41**	**	2326	1438
Colleges	Male	6.50	.	6.50			#
	Female	6.00	6.50	5.89		#	#
Sixth Form	Male	8.00	.	8.00			#
	Female	5.67	6.00	5.50		#	#
Other	Male	4.42	**4.77**	4.17		35	48
	Female	5.00	**5.17**	4.88		29	42
City Academy	Male	4.42	**4.78**	3.77	**	643	350
	Female	5.13	**5.26**	4.88	**	742	363

*** Denotes 99% significance*
** Denotes 95% significance*
Blank cells denote less than 95% significance
 # Denotes 10 candidates or less

Appendix

The centre types used in this report are mapped to the centre types used by the Joint Council for Qualifications as follows:

Centre types used in this analysis	Centre types used by the Joint Council for Qualifications
Maintained (non-selective)	Secondary Comprehensive or Middle Community, Voluntary Aided/Controlled (State)
Maintained (non-selective)	Secondary Modern Foundation
Maintained (non-selective)	Secondary Modern Community, Voluntary Aided/Controlled (State)
Maintained (non-selective)	Secondary Comprehensive or Middle Foundation
Maintained (selective)	Secondary Selective Foundation
Maintained (selective)	Secondary Selective Community, Voluntary Aided/Controlled (State)
Independent	Independent
Colleges	Further Education Establishment
Sixth Form	Sixth Form College
Colleges	Tertiary College
Other	Other (including private candidates)
City Academy	City Academy

The data items supplied by the awarding organisations were:

Variables	Description
Subname	Subject name
abc	Awarding body code
N1	Replacement ID number
N2	Replacement ID number
sg	Subject grade
sm	Subject mark
op	Option
tier	Tier
gender	Gender
CT	Centre type
mgcse	Mean GCSE score
ngcse	Number of GCSE results
category	Mean GCSE category
dob	Date of birth
Grade_X_Y	Unit grade obtained in unit X at series/examination period Y
UM_X_Y	Unit uniform mark obtained in unit X at series/examination period Y
bu_X	Best uniform mark obtained in unit X

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