CAMBRIDGE ASSESSMENT

Can trait Emotional Intelligence predict differences in attainment and progress in secondary school?

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EXECUTIVE SUMMARY

Trait Emotional Intelligence (trait EI) is a topic attracting a great deal of interest, particularly in education. It covers a wide range of skills and personality dispositions such as motivation, confidence, optimism, adaptability, peer relations and coping with stress. In the last few years, there has been a growing awareness that social and emotional factors play an important part in students' academic success and it has been claimed that those with high scores on a trait EI measure perform better. Many primary and secondary schools in England are currently involved in a government initiative to develop the emotional, social and behavioural skills of their pupils, through National Curriculum subjects such as PSE/PSHE and Citizenship and through programs such as 'Social and Emotional Aspects of Learning' (SEAL), with the intention of improving academic attainment as well as behaviour.

Aims of the research

The objective of this study was to investigate whether relationships exist between trait EI and progress in different science subjects at school. In particular, the study was designed to investigate the following research questions:

1. Do the entries of different science subjects (*i.e.* the sets of candidates taking the examinations) vary in their Emotional Intelligence?
2. Can this variation be accounted for by variation in prior attainment?
3. Is progress on the different sciences associated with candidates' levels of Emotional Intelligence?

Design and methodology

Trait EI was measured with the Trait Emotional Intelligence Questionnaire. This is a 153 item, likert-type, self-report instrument that measures people's perceptions of their own abilities. It yields a global score as well as scores for 15 subscales organized into four factors. Higher scores indicate higher levels of trait EI.

Data was collected from 2056 students but the final sample comprised 1977 students, grouped in 31 schools, who were taking OCR GCSE science exams. Students completed the questionnaire in school time, supervised by their teachers, prior to the 2007 examination session. Questionnaire scores were matched to participants' Key Stage 3 results and to their GCSE grades.

The following science subjects, available at GCSE, were considered: Applied Science Double Award, Biology, Physics, Chemistry, Twenty First Century Science and Gateway Science. In a second stage of the research, a wider range of GCSE subjects (English, English Literature, Mathematics, Art and Design, Drama and French) was also considered.

Regression models were used to investigate the probability of attaining at least a certain grade at GCSE as a function of trait EI scores when controlling for prior attainment at Key Stage 3.

Key findings

Results showed that some aspects of trait EI significantly predicted attainment in GCSE subjects, supporting the role of emotional factors in students' school performance and progress.

- Key Stage 3 test results and scores on most of the trait EI subscales were significantly higher in the separate sciences (Biology, Physics and Chemistry) than in any of the other science subjects.

- Self-motivation and low impulsivity were significant predictors of attainment in almost all of the science subjects after controlling for Key Stage 3 scores, the exception being Gateway Science. The majority of the trait EI subscales significantly predicted attainment in the Applied Science Double Award after controlling for Key Stage 3 scores. On the other hand, the emotion expression, emotion management and assertiveness subscales were not significant predictors of progress in any of them.
- Global trait EI scores significantly predicted progress from Key Stage 3 in the Applied Science Double Award and in Biology and Chemistry but not in the other three science subjects.
- Key Stage 3 attainment was much lower in the vocational science participants and this suggests that trait EI may have a larger effect where prior attainment is lower and a smaller effect where prior attainment is higher.
- Trait EI was differentially implicated in progress across the remaining subjects considered and influenced attainment in certain subjects more than in others. For example, it had little influence on progress in French or Art and Design but it moderated the effect of Key Stage 3 results on GCSE achievement in English, English Literature, Mathematics and Drama.
- A greater number of the questionnaire subscales were significantly related to progress in English and English Literature than to progress in other subjects. However, the self-motivation and low impulsivity subscales were significant predictors of progress in almost all of the subjects. The exception was GCSE French.
- Some trait EI subscales were negatively associated with academic success. For example, in GCSE Mathematics, high scores on the emotion expression, social awareness and emotion management subscales predicted a lower probability of a given grade after Key Stage 3 attainment was taken into account. It may be that if an individual has high levels of emotion, this might get in the way of their logical thinking.
- Some of the results suggest that trait EI does not seem to have a great influence on performance of high ability students but may aid low ability students by helping them cope with stress or anxiety. High trait EI may confer a selective advantage for students with relatively low ability and for certain subjects. It can be argued that vulnerable or disadvantaged individuals are more likely to experience stress and emotional difficulties than their higher ability peers and are therefore more likely to benefit from an adaptive disposition to deal with these.
- The construct of General Self-Efficacy (GSE) was also measured for the students in the sample and its relationship with school performance investigated. For most of the science subjects GSE had a positive relationship with the probability of obtaining at least a given grade when Key Stage 3 performance was controlled for. The exception was Gateway Science. The effect of the GSE score seemed to be greater in the three separate sciences. GSE also had a positive relationship with performance in English and English Literature. However, trait EI was more strongly associated with attainment at GCSE than GSE.
- The research presented in this report suggests that academic ability is not the only predictor of educational achievement and that Emotional Intelligence has a very important effect on learning. Therefore, attempts to improve the emotional and social skills of British schoolchildren with training programs could be worthwhile. In particular, it may be more effective than concentrating solely on teaching and curriculum initiatives.

1. Introduction

One piece of evidence that is used by awarding bodies when setting pass marks for school examinations in England is the prior attainment of the candidates. It is not unreasonable to expect that examination results will improve if the prior attainment of the candidates improves from that of the previous year. However, prior attainment is not the only determinant of examination performance. This can be illustrated by considering what happened when vocational GCSEs were introduced in England. These examinations were developed to give a more practical alternative to the academic GCSE examinations. When the first results were released concern was expressed that the grades tended to be lower than expected given candidates' attainment at age 11. A thorough analysis revealed that the candidates also made less progress than expected from National Tests at age 14. However, there was no evidence that the pupils' results in vocational GCSEs tended to be any lower than in their other GCSE subjects (that is, they also made less progress than expected in their non-vocational GCSEs). It was thought that a possible reason for this was that the students taking the vocational subjects tended to be less motivated than the ones taking more academic subjects (Vidal Rodeiro and Bell, 2007).

The objective of this study was therefore to investigate whether relationships exist between the affective domain and progress in school. After reviewing the affective literature it was decided that an investigation into Emotional Intelligence might provide an insight into the reasons for differential progress in schools. Emotional Intelligence covers a wide range of skills and personality dispositions such as confidence, optimism, adaptability, motivation, peer relations and coping with stress; factors which could conceivably influence school performance in addition to ability. This study was designed to investigate the following research questions:

- Do the entries of different science subjects (*i.e.* the sets of candidates taking the examinations) vary in their Emotional Intelligence?
- Can this variation be accounted for by variation in prior attainment?
- Is progress on the different sciences associated with candidates' levels of Emotional Intelligence?

If the answers to all of these questions are 'yes' then care would need to be taken when using prior attainment to predict performance in the processes of setting and maintaining examination standards. Also, if attempts to develop the Emotional Intelligence of schoolchildren prove to be successful, then these would be worthwhile provided that the relationship between Emotional Intelligence and examination success is a causal one.

The interest in the social and emotional aspects of learning is not new. There were studies in the 1990s that already examined whether Emotional Intelligence was related to academic performance (*e.g.* Abouserie, 1995; Swart, 1996; Bar-On, 1997; Schutte *et al.*, 1998) but none of these studies reported whether Emotional Intelligence was able to predict success over and above that accounted for by ability or other personality measures.

In the last few years there has been an increase in research in this field, particularly in education, which has resulted in more attention being paid to social and emotional skills. Up to date, considerable research has suggested that motivation, along with abilities and other personality traits, is important in predicting academic school performance, in some cases over and above the contribution made by a measure of prior attainment (*e.g.* Gumora and Arsenio, 2002; Lam and Kirby 2002; Catalano *et al*., 2004; Petrides, Frederickson and Furnham, 2004; Humphrey *et al.*, 2007).

Many primary and secondary schools are currently benefiting from the introduction of a new resource of curriculum materials for actively developing social, emotional and behavioural skills (DfES, 2005, 2007) and they are already developing their students' social, emotional and behavioural skills through National Curriculum subjects such as PSE/PSHE and Citizenship. An example of this is the 'Social and Emotional Aspects of Learning' program (SEAL), which is a comprehensive approach to promoting the social and emotional skills that underpin effective learning, positive behaviour, regular attendance, staff effectiveness and the emotional health and well-being of all who learn and work in schools. It is argued that the

social and emotional aspects of learning, such as self-awareness, managing feelings, motivation, empathy, and social skills, are key areas that can and need to be developed in children so that they can learn effectively.

Goleman (1996) popularised the term 'Emotional Intelligence' and argued that emotional and social abilities can be more influential than conventional intelligence for all kinds of personal, career and school success.

There are a lot of arguments about the definition of Emotional Intelligence, regarding both terminology and operationalizations. The first published attempt towards a definition was made by Salovey and Mayer (1990) who defined Emotional Intelligence as "*the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions*".

Despite this early definition, there has been confusion regarding the exact meaning of this construct. The definitions are so varied, and the field is growing so rapidly, that researchers are constantly amending even their own definitions of the construct (Dulewicz and Higgs, 2000). Up to the present day, there are three main models of Emotional Intelligence (see, for example, Bar-On, 1997; Mayer and Salovey, 1997; Goleman, 1998; Salovey and Grewal, 2005). In this research, the focus is on the Petrides and Furnham (2000) model, who proposed a conceptual distinction between the ability-based model and a trait-based model of Emotional Intelligence.

Trait Emotional Intelligence (or 'trait emotional self-efficacy') refers to

> "*a constellation of behavioral dispositions and self-perceptions concerning one's ability to recognize, process, and utilize emotion-laden information*".

This definition of Emotional Intelligence encompasses behavioral dispositions and self-perceived abilities and is measured by self report, as opposed to the ability-based model which refers to actual abilities as they express themselves in performance-based measures. Trait Emotional Intelligence (trait EI) is regarded as a dimension of personality rather than a form of intelligence: it is related to certain personality traits such as optimism and openness, and is unrelated to nonverbal reasoning ability.

Petrides, Frederickson and Furnham (2004) examined the role of trait EI in academic performance and deviant behaviour in 650 British students at GCSE level and found, among other things, that trait EI moderated the relationship between cognitive ability and academic performance. Since then, there have been intervention programs aimed at adolescent behaviour (*e.g.* SEAL) and therefore there is a renewed interest in the effects of Emotional Intelligence on school achievement. However, the promotion of Emotional Intelligence in schools has proven a controversial pursuit (Weare and Gray, 2003) and there are some key questions that can be considered: what impact would improved Emotional Intelligence have on students' well-being and academic achievements? Can Emotional Intelligence be taught? These are key issues for consideration in developing policy and practice.

The present study explores the relationships between trait Emotional Intelligence and academic performance in a range of GCSE subjects on a sample of British students. In particular, it investigates whether Emotional Intelligence accounts for better performance at GCSE over and above the level attributable to traditional general intelligence, measured in this study by prior attainment at school, that is, Key Stage 3 tests results. In a first step, the relationships between trait EI and progress from Key Stage 3 to GCSE in six different science subjects is studied and in a second step, the relationships between trait EI and progress from Key Stage 3 to GCSE in a wider range of subjects, namely, English, English Literature, Mathematics, Art and Design, Drama and French, is explored. The latter subjects were selected because they were thought to require more consideration of affect-related issues than science subjects and therefore that trait EI could be found to be a better predictor of performance in these.

The construct of General Self-Efficacy was also measured for all the students in the sample and its relationship with trait EI and school performance in the subjects mentioned above investigated.

2. Data and methods

The variables measured in this study and the instruments used to do so are described in this section. Also, a description of the participants is given.

2.1 Trait Emotional Intelligence Questionnaire (TEIQue)

Trait EI was measured with the Trait Emotional Intelligence Questionnaire (TEIQue v. 1.50): a likert-type, self-report instrument devised and developed by Petrides (2001) and Petrides and Furnham (2003). As a self-report instrument, the TEIQue measures people's perceptions of their own abilities.

The version of the questionnaire used in this research has 153 items (see the appendix for an exemplar and Petrides (2009) for a detailed description of the TEIQue and its properties) and yields a global Emotional Intelligence score as well as scores for each of 15 subscales organized into four factors. The questionnaire was initially piloted on a sample of 22 British children ranging in age from 14 to 16 in order to ensure comprehensibility of the items.

Table 1 lists the 15 trait Emotional Intelligence subscales, along with a brief description of each of them.

Table 1: Emotional Intelligence subscales

Subscale	High scorers perceive themselves as…
Adaptability	…flexible and willing to adapt to new conditions.
Assertiveness	…forthright, frank, and willing to stand up for their rights.
Emotion perception	…clear about their own and other people's feelings.
Emotion expression	…capable of communicating their feelings to others.
Emotion management	…capable of influencing other people's feelings.
Emotion regulation	…capable of controlling their emotions.
Impulsiveness (low)	…reflective and less likely to give in to their urges.
Relationships	…capable of having fulfilling personal relationships.
Self-esteem	…successful and self-confident.
Self-motivation	…driven and unlikely to give up in the face of adversity.
Social awareness	…accomplished networkers with excellent social skills.
Stress management	…capable of withstanding pressure and regulating stress.
Empathy	…capable of taking someone else's perspective.
Happiness	…cheerful and satisfied with their lives.
Optimism	…confident and likely to "look on the bright side" of life.

The four factors that the TEIQue provides scores on are:

- Wellbeing: a combined score of optimism, happiness and self-esteem.
- Self-control: a combined score of emotion regulation, impulsiveness and stress management.
- Emotionality: a combined score of empathy, emotion perception, emotion expression and relationships.
- Sociability: a combined score of emotion management, assertiveness and social awareness.

All TEIQue scores (subscales, factors and global) have been rescalated to vary between 1 and 7 with a theoretical average of 3.5. Higher scores on the TEIQue indicate higher levels of Emotional Intelligence. Descriptive statistics providing the mean values and the standard deviations of each of the TEIQue subscales/factors in this sample are given in Table 2.

Table 2: Means and standard deviations of the TEIQue subscales/factors

Variable	Mean	Standard Deviation	Minimum	Maximum
Self-esteem	4.47	1.04	1.00	7.00
Emotion expression	4.45	1.04	1.00	7.00
Self-motivation	4.31	0.84	1.20	6.90
Emotion regulation	3.93	0.85	1.08	7.00
Happiness	5.22	1.20	1.00	7.00
Empathy	4.63	0.85	1.33	7.00
Social awareness	4.65	0.83	1.00	7.00
Impulsivity (low)	3.94	0.94	1.00	7.00
Emotion perception	4.57	0.79	1.40	7.00
Stress management	4.16	0.96	1.10	7.00
Emotion management	4.66	0.84	1.00	7.00
Optimism	4.94	1.03	1.00	7.00
Relationships	5.17	0.84	1.44	7.00
Adaptability	4.17	0.75	1.56	6.78
Assertiveness	4.61	0.93	1.00	7.00
Wellbeing	4.88	0.96	1.46	7.00
Self-control	4.01	0.75	1.24	6.56
Emotionality	4.71	0.66	1.66	6.75
Sociability	4.64	0.73	1.04	6.85
trait EI	4.53	0.57	2.29	6.59

Data was collected from 2056 students but the final sample comprised 1977 students, grouped in 31 schools, who were potentially taking OCR[1] GCSE science exams in June 2007. All participants were Year 10 or Year 11 students in British secondary education. Table 3 gives a summary of the gender and school type of the pupils who took part.

Table 3: Characteristics of the pupils in the sample

Variable		Frequency	Percent
Pupil gender	Female	999	50.5
	Male	620	31.4
	Unknown	358	18.1
School type	Comprehensive	1239	62.7
	Grammar	213	10.8
	Independent	317	16.0
	Secondary modern	208	10.5
Boarding status of school	Non-boarding schools	1799	91.0
	Boarding schools	178	9.0
School gender	Boys' schools	256	12.9
	Girls' schools	642	32.5
	Mixed schools	1079	54.6

Students completed the final questionnaire in school time, supervised by their teachers, prior to the 2007 examination session and returned these for scoring. Participants were asked to supply either their name or examination candidate number. This information was used to match students' examination data to their questionnaire responses. The questionnaire took approximately 30 minutes to complete.

[1] Oxford, Cambridge and RSA Examinations

2.2 General Self-Efficacy Scale (GSE)

The construct of General Self-Efficacy was measured using a scale developed by Schwarzer and Jerusalem (1995). The scale was created to assess a general sense of perceived self-efficacy to cope with daily hassles as well as adaptation after experiencing all kinds of stressful life events.

Perceived self-efficacy facilitates goal-setting, effort investment, persistence in the face of barriers and recovery from setbacks. It can be regarded as a positive resistance resource factor. Ten items were designed to tap into this construct. Each item refers to successful coping and implies an internal-stable attribution of success. Students were asked to think about their work at school or their exams when answering the ten GSE questions. These items were completed at the same time as the TEIQue.

The GSE scores in each item vary between 1 and 7. The responses to all ten items were summed up to yield the final composite score with a range from 10 to 70, with a mean of 47.08 and a standard deviation of 9.87.

2.3 Academic performance

GCSE

The examination most commonly taken at the end of Key Stage 4 is the General Certificate of Secondary Education (GCSE). The results are reported on an eight-point scale: A*, A, B, C, D, E, F and G. Students who fail to reach the minimum standard for grade G are recorded as U (unclassified).

In this research the students were assessed in one the following science subjects[2] available at GCSE:

- Applied Science Double Award
- Science: Double Award
- Biology
- Physics
- Chemistry
- Twenty First Century Science
- Gateway Science

The separate sciences (Biology, Chemistry and Physics) were usually taken by the same candidates: only a small number here did not take all three subjects. Nobody taking the vocational science subject took any of the separate science subjects.

The last two specifications are modular and the candidates taking these in this study were all in Year 10. Unfortunately, the response rate for Science Double Award was too low to allow meaningful analysis. This report therefore concentrates on the remaining six subjects.

Examination data on GCSE science subjects was extracted from the OCR results database for June 2007 and matched to the questionnaire data using school and candidate numbers, when available, or names and dates of birth otherwise.

Examination data on other GCSE subjects was extracted from the National Pupil Database (NPD) for 2007 and matched to the questionnaire data using school and candidate numbers. Although in the original questionnaire data was collected from 2056 students, only 874 students had records in the NPD (1050 participants were in Year 10 and therefore they did not have other GCSE results in 2007).

For some of the analyses in this report GCSE grades were converted into points where A*=8, A=7, B=6, and so on.

[2] Students could have been assessed in more than one subject if they sat exams in more than one of the separate sciences (Biology, Chemistry and Physics).

Key Stage 3

In this research Key Stage 3 scores are used as a measure of prior performance. Key Stage 3 is the term for the three years of schooling in maintained schools when pupils are aged between 11 and 14. All pupils in this Key Stage must follow a programme of education in at least 15 areas. At the end of this stage, pupils are tested and are awarded attainment levels (ranging from 1 to 8) depending on what they are able to do. These tests cover English, Mathematics and Science.

Key Stage 3 data for the students completing the questionnaire was obtained from the Quality and Standards division of OCR and it was matched to the questionnaire data using school numbers and students' names and dates of birth. The total of the levels is used as the prior attainment variable in this study.

Around 30% of the students that took part in this research did not take the Key Stage 3 tests (independent schools do not have to follow the National Curriculum and their students are not required to take the Key Stage 3 tests).

2.4. Statistical modelling

In order to find out if trait EI would account for better performance at GCSE over and above the level attributable to traditional general intelligence, measured in this study by prior attainment at school (Key Stage 3 results), proportional odds regression, which models the probability of achieving at least a certain grade at GCSE, is used.

In particular, the grade obtained in each of the GCSE subjects is modelled in separate regression analyses where gender, school, total Key Stage 3 score and each of the EI subscales and factors are the independent variables.

In a very simple proportional odds model (only key Stage 3 scores included as the independent variable) the probability of achieving at least a grade *k* is given by the following equation:

$$\ln\left(\frac{\pi_k}{1-\pi_k}\right) = \alpha_k + \beta x$$

where α_k is a constant for grade *k* and β is the slope for the Key Stage 3 score, *x*.

Proportional odds is one of the commonest models that have been proposed for regression modelling with ordinal dependent variables. It can be used here as there is no significant evidence of non-proportionality in any of the analyses (that is, different slopes for each grade) but, given the distribution of grades and the sample sizes, any difference would have to be large to be detected. For a more detailed description of the proportional odds model see, for example, McCullagh and Nelder (1997). Full details of all the models in this report can be obtained from the authors.

Estimates of the parameters for gender, trait EI and its subscales and factors and total Key Stage 3 score will be given for each subject (each EI subscale or factor was modelled separately). Such estimates represent the logarithm of the odds ratio of achieving at least a particular grade at GCSE.

3. Results

The main aim of this study was to investigate the relationship between trait EI and academic performance in particular OCR science subjects and therefore, the resulting sample was not intended to be representative of the whole population. In particular, the proportion of candidates entered for Biology, Chemistry and Physics attending independent schools was higher in this study than in the whole population.

The schools' participation rate in the survey (small numbers of schools in each group) led to a distribution of school types that severely restricted the analyses that could be done at the school level (see Table 4).

Table 4: Distribution of school types taking part in the study

School Type	Boarding	Boys	Girls	Mixed	Total
Comprehensive	No		4	14	18
Grammar	No	2	1		3
Independent	No		2	1	3
	Yes	1		2	3
Secondary Modern	No		2	2	4
Total		3	9	19	31

The internal consistency of the TEIQue in this study, namely Cronbach's Alpha coefficients for each subscale for the present sample, is shown in Table 5. For a full account of the psychometric properties of the TEIQue see Petrides (2009).

Table 5: Internal consistency of the TEIQue

Subscale	Number of items	Reliability (Cronbach's Alpha)
Self-esteem	11	0.816
Emotion expression	10	0.791
Self-motivation	10	0.658
Emotion regulation	12	0.722
Happiness	8	0.873
Empathy	9	0.676
Social awareness	11	0.744
Impulsivity (low)	9	0.709
Emotion perception	10	0.656
Stress management	10	0.744
Emotion management	9	0.664
Optimism	8	0.772
Relationships	9	0.651
Adaptability	9	0.560
Assertiveness	9	0.695

3.1 Gender differences

Gender differences in trait EI and in each of the subscales and factors that the TEIQue provides were tested via independent samples *t*-tests. These *t*-tests are designed to compare the means of the same variable between two groups. In this case, the mean trait EI scores between the group of female students and the group of male students were compared.

The results of the *t*-tests are presented in Table 6. The tests did not reveal significant mean differences between boys and girls in the emotion expression, impulsivity (low), and emotion perception subscales. In the other subscales there are significant differences in the mean scores, usually with boys scoring higher than girls.

Table 6: Gender differences (means and standard deviations for boys and girls)

Variable	Mean		Std Dev		*t*	*p*
	Girls	Boys	Girls	Boys		
Self-esteem	4.28	4.83	1.02	1.02	-10.04	<.0001
Emotion expression	4.50	4.42	1.06	1.02	1.41	0.1574
Self-motivation	4.25	4.44	0.83	0.85	-4.11	<.0001
Emotion regulation	3.75	4.33	0.78	0.84	-13.47	<.0001
Happiness	5.14	5.39	1.17	1.22	-3.90	0.0001
Empathy	4.73	4.57	0.83	0.85	3.52	0.0004
Social awareness	4.62	4.77	0.77	0.94	-3.12	0.0019
Impulsivity (low)	3.94	4.01	0.90	1.01	-1.34	0.1813
Emotion perception	4.55	4.60	0.76	0.84	-1.16	0.2470
Stress management	4.04	4.46	0.92	0.95	-8.37	<.0001
Emotion management	4.58	4.83	0.83	0.86	-5.40	<.0001
Optimism	4.86	5.14	1.00	1.05	-5.03	<.0001
Relationships	5.25	5.09	0.82	0.84	3.61	0.0003
Adaptability	4.13	4.29	0.73	0.76	-3.97	<.0001
Assertiveness	4.53	4.78	0.94	0.91	-5.03	<.0001
Wellbeing	4.76	5.12	0.92	0.98	-7.07	<.0001
Self-control	3.91	4.27	0.71	0.77	-9.06	<.0001
Emotionality	4.76	4.67	0.65	0.69	2.45	0.0143
Sociability	4.58	4.79	0.71	0.78	-5.30	<.0001
trait EI	4.48	4.66	0.55	0.60	-5.94	<.0001

3.2 Year group differences

As before, year group differences in trait EI and in each of the subscales and factors were tested via independent samples *t*-tests.

The results of these tests are presented in Table 7. They revealed significant mean differences between Year 10 and Year 11 students in global trait EI and in almost all the subscales and factors, the mean being slightly higher for the Year 11 students. The exceptions were the emotion expression and the happiness subscales.

Table 7: Year group differences (means and standard deviations for the Year 10 and Year 11 cohorts)

Variable	Mean		Std Dev		*t*	*p*
	Year 10	Year 11	Year 10	Year 11		
Self-esteem	4.33	4.62	1.03	1.04	-5.84	<.0001
Emotion expression	4.44	4.47	1.05	1.04	-0.71	0.4785
Self-motivation	4.26	4.37	0.85	0.84	-2.84	0.0045
Emotion regulation	3.78	4.11	0.83	0.84	-8.14	<.0001
Happiness	5.18	5.28	1.17	1.22	-1.78	0.0747
Empathy	4.55	4.73	0.86	0.82	-4.58	<.0001
Social awareness	4.58	4.75	0.80	0.84	-4.31	<.0001
Impulsivity (low)	3.82	4.07	0.93	0.93	-5.58	<.0001
Emotion perception	4.52	4.63	0.78	0.79	-2.93	0.0035
Stress management	4.04	4.30	0.92	0.98	-5.68	<.0001
Emotion management	4.59	4.75	0.83	0.85	-3.97	<.0001
Optimism	4.89	5.00	1.02	1.04	-2.22	0.0265
Relationships	5.13	5.23	0.85	0.82	-2.46	0.0139
Adaptability	4.09	4.26	0.74	0.74	-4.74	<.0001
Assertiveness	4.52	4.71	0.93	0.92	-4.27	<.0001
Wellbeing	4.80	4.97	0.93	0.98	-3.66	0.0003
Self-control	3.88	4.16	0.73	0.75	-7.83	<.0001
Emotionality	4.66	4.77	0.67	0.66	-3.39	0.0007
Sociability	4.56	4.74	0.71	0.74	-4.97	<.0001
trait EI	4.45	4.62	0.55	0.59	-6.29	<.0001

3.3 Emotional Intelligence and progress in GCSE science subjects

There was a significant effect of the GCSE science subject attempted on the global trait EI score (F=3.30, p=0.0197). Students taking any of the separate sciences (Biology, Physics or Chemistry) had, on average, significantly higher trait EI scores than students taking any other subject (Table 8).

Table 8: Differences in trait EI by subject (* the mean difference is significant at the 0.05 level)

Science Subject (I)	Science Subject (J)	Mean Difference (I-J)	Standard Error
Applied Science Double Award	Twenty First Century Science	0.01	0.04
	Gateway Science	0.01	0.05
	Biology-Physics-Chemistry	-0.28(*)	0.04
Twenty First Century Science	Applied Science Double Award	-0.01	0.04
	Gateway Science	0.00	0.05
	Biology-Physics-Chemistry	-0.29(*)	0.04
Gateway Science	Applied Science Double Award	-0.01	0.05
	Twenty First Century Science	-0.00	0.05
	Biology-Physics-Chemistry	-0.30(*)	0.05
Biology-Physics-Chemistry	Applied Science Double Award	0.28(*)	0.04
	Twenty First Century Science	0.29(*)	0.04
	Gateway Science	0.30(*)	0.05

Scores on the trait EI subscales were compared for the Applied Science Double Award and the separate sciences entries (Table 9).

It was found that, for all subscales except emotion expression and optimism, the mean scores for the Applied Science entry were significantly lower than those of students taking the separate sciences.

Table 9: Mean scores for each of the EI subscales and factors for the Applied Science Double Award and Biology-Physics-Chemistry entries

Variable	Applied Science Double Award (mean)	Biology-Physics-Chemistry (mean)	*t*	*p*
Self-esteem	4.50	4.74	-3.27	0.0000
Emotion expression	4.46	4.48	-0.32	0.7500
Self-motivation	4.27	4.50	-3.80	0.0000
Emotion regulation	3.94	4.33	-6.52	0.0000
Happiness	5.07	5.44	-4.21	0.0000
Empathy	4.56	4.89	-5.56	0.0000
Social awareness	4.55	4.89	-5.52	0.0000
Impulsivity (low)	3.94	4.21	-3.97	0.0000
Emotion perception	4.55	4.73	-3.15	0.0000
Stress management	4.08	4.53	-6.39	0.0000
Emotion management	4.45	4.95	-8.16	0.0000
Optimism	4.93	5.05	-1.59	0.1100
Relationships	5.13	5.30	-2.88	0.0000
Adaptability	4.13	4.35	-3.95	0.0000
Assertiveness	4.51	4.89	-5.72	0.0000
Wellbeing	4.83	5.08	-3.45	0.0000
Self-control	3.99	4.36	-6.84	0.0000
Emotionality	4.67	4.85	-3.66	0.0000
Sociability	4.51	4.91	-7.64	0.0000
Trait EI	4.47	4.75	-6.67	0.0000

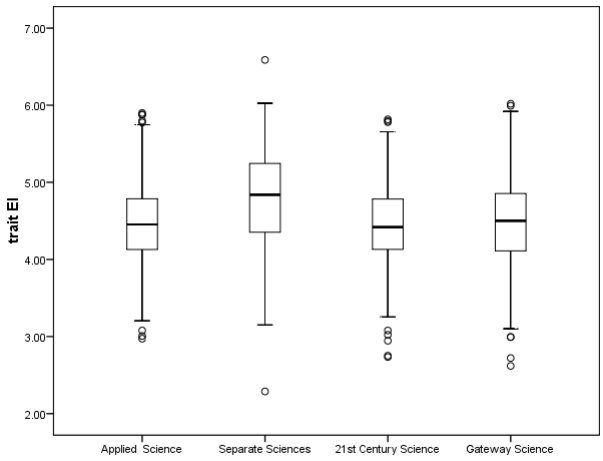
There were significant differences in the total Key Stage 3 score depending on the GCSE science subject attempted (Table 10).

Table 10: Differences in total Key Stage 3 score by subject (* the mean difference is significant at the 0.05 level)

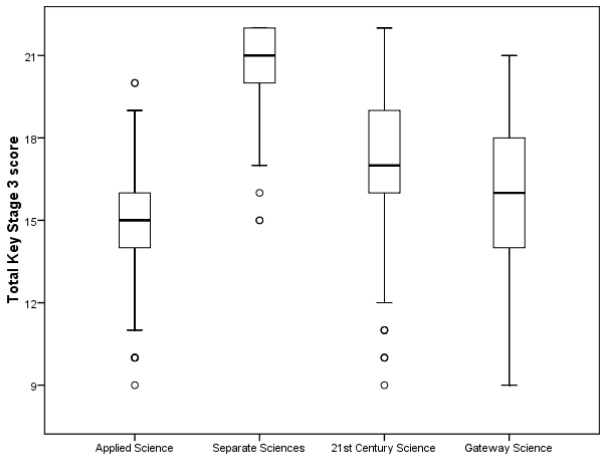
Science Subject (I)	Science Subject (J)	Mean Difference (I-J)	Standard Error
Applied Science Double Award	Biology-Physics-Chemistry	-6.01(*)	0.20
	Twenty First Century Science	-2.23(*)	0.18
	Gateway Science	-0.89(*)	0.25
Biology-Physics-Chemistry	Applied Science Double Award	6.01(*)	0.20
	Twenty First Century Science	3.78(*)	0.20
	Gateway Science	5.12(*)	0.26
Twenty First Century Science	Applied Science Double Award	2.23(*)	0.18
	Biology-Physics-Chemistry	-3.78(*)	0.20
	Gateway Science	1.33(*)	0.24
Gateway Science	Applied Science Double Award	0.89(*)	0.25
	Biology-Physics-Chemistry	-5.12(*)	0.26
	Twenty First Century Science	-1.33(*)	0.24

The Key Stage 3 performance of the students taking a GCSE in Biology, Physics or Chemistry was significantly better than the performance of students taking any other science subject. On the other hand, the students taking the Applied Science Double Award obtained,

on average, lower Key Stage 3 scores than students taking any other science subject (as illustrated in the box plots in Figure 1(b)). This has the implication that the relationships between attainment and the EI subscales for the different science subjects will apply to different parts of the attainment range. If there is any non-linearity in the relationships between attainment and the EI subscales then different results may be expected, for example, between Applied Science Double Award and the separate science subjects.



(a)



(b)

Figure 1: Box plots of trait EI and total Key Stage 3 score by GCSE science entries

3.3.1 Applied Science Double Award

There were 340 students in the survey (119 boys and 221 girls) who sat a Double Award in Applied Science. Only 283 of them had Key Stage 3 tests results. The grades obtained in this subject ranged from AA to GG with CC being the modal grade. This set of students was quite different to the set taking, for example, Physics, Chemistry or Biology and only around 3% of these students obtained at least a grade AA compared with 75% of students in the sample obtaining at least a grade A in Biology. This is to be expected given the difference in prior attainment at Key Stage 3 (Figure 1(b)).

Table 11 presents the proportional odds regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in the Applied Science Double Award. All significant effects are highlighted in bold type.

A positive significant gender effect indicates that, for given values of the EI subscale in the model and a given Key Stage 3 score, the probability of obtaining at least a given grade is higher for girls than for boys. This was the case for the self-motivation, emotion regulation and stress management subscales, and for the self-control factor.

A positive significant EI subscale effect indicates that, for a given Key Stage 3 score, the probability of obtaining at least a given grade significantly increases with increasing scores on that subscale. It can be seen in Table 11 that most of the EI subscales and factors and the global trait EI score had a positive relationship with the probability of obtaining at least a given grade in the Applied Science Double Award when Key Stage 3 performance was controlled for. The exceptions were the emotion expression, emotion management and assertiveness subscales and the sociability factor.

Table 11: Applied Science Double Award: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	0.22	0.12	**0.29**	0.12	**0.49**	0.06
Emotion expression	0.18	0.12	0.06	0.12	**0.47**	0.06
Self-motivation	**0.24**	0.12	**0.59**	0.16	**0.48**	0.06
Emotion regulation	**0.27**	0.12	**0.47**	0.15	**0.47**	0.06
Happiness	0.19	0.12	**0.24**	0.09	**0.46**	0.06
Empathy	0.15	0.12	**0.40**	0.15	**0.46**	0.06
Social awareness	0.20	0.12	**0.30**	0.15	**0.48**	0.06
Impulsivity (low)	0.20	0.12	**0.69**	0.14	**0.51**	0.06
Emotion perception	0.17	0.12	**0.53**	0.16	**0.48**	0.06
Stress management	**0.28**	0.12	**0.43**	0.12	**0.47**	0.06
Emotion management	0.19	0.12	-0.06	0.14	**0.47**	0.06
Optimism	0.22	0.12	**0.30**	0.12	**0.48**	0.06
Relationships	0.12	0.12	**0.50**	0.15	**0.49**	0.06
Adaptability	0.22	0.12	**0.29**	0.12	**0.47**	0.06
Assertiveness	0.19	0.12	0.15	0.14	**0.47**	0.06
Wellbeing	0.22	0.12	**0.35**	0.13	**0.49**	0.06
Self-control	**0.30**	0.12	**0.81**	0.17	**0.48**	0.06
Emotionality	0.14	0.12	**0.65**	0.20	**0.47**	0.06
Sociability	0.19	0.12	0.18	0.18	**0.47**	0.06
trait EI	0.23	0.12	**0.93**	0.23	**0.48**	0.06

Figure 2 shows the probability of achieving a grade CC or above in this subject as a function of both the total Key Stage 3 score and the total trait EI score. For example, a male candidate with a total Key Stage 3 score of 16 and an overall trait EI score of 3 would have a predicted probability of obtaining at least a grade CC of 0.42. If that same candidate's trait EI score was 6 then their predicted probability would be 0.92. A more modest difference in trait EI from 3 to 4 would increase the predicted probability of obtaining a grade CC from 0.42 to 0.63.

The question is, is the relationship between trait EI and achievement causal? If so, changes in an individual's trait EI would change their probability of success in examinations (this is plausible given the fact that one of the subscales is self-motivation), and therefore the performance of school children could be improved substantially by devising strategies for even modest improvements in their Emotional Intelligence.

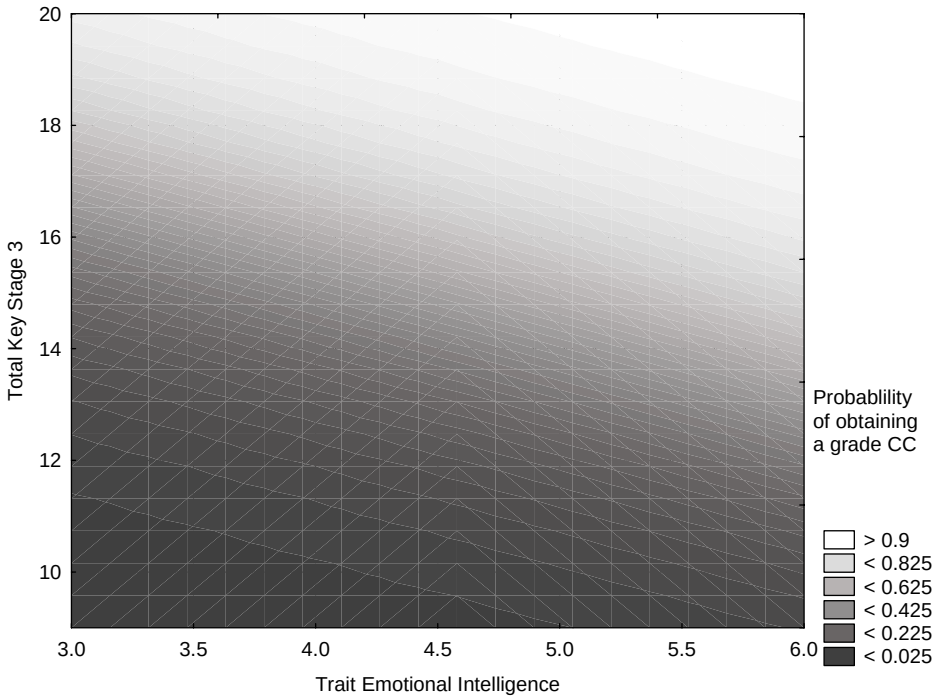


Figure 2: Predicted probability of a male candidate obtaining at least a grade CC in the Applied Science Double Award

3.3.2 GCSE Biology

There were 378 students in the survey (226 boys and 152 girls) who sat a GCSE Biology examination. Among those, 341 also sat a GCSE examination in Physics and Chemistry. Around 75% of the students taking a Biology exam obtained at least a grade A and over 90% of them at least a grade B. Such a small grade range is to be expected since the separate sciences are usually taken by relatively high achievers. The majority of these students attended an independent (29.4%) or a grammar (50.1%) school. 76.7% of these students attended a single-sex school.

In the following analyses 244 students were included since the remaining 134 did not have Key Stage 3 tests results.

In Table 12 the proportional odds regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in Biology are presented.

For most of the EI subscales the gender effect was positive and significant. The exceptions were the emotion expression, empathy, emotion management and relationships subscales.

The self esteem, self motivation, happiness, empathy, low impulsivity, relationships and adaptability subscales, the wellbeing and self-control factors and the global trait EI score were all significant predictors of attainment in Biology when controlling for Key Stage 3 attainment.

Prior attainment was a much more powerful predictor of GCSE performance than was in the case for Applied Science but it should be noted that the two sets of data differ considerably in their prior attainment scores and that the relationships therefore refer to different parts of the attainment range.

Table 12: GCSE Biology: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.50**	0.16	**0.39**	0.13	**0.81**	0.11
Emotion expression	0.25	0.14	-0.10	0.11	**0.83**	0.11
Self-motivation	**0.39**	0.14	**0.61**	0.14	**0.80**	0.11
Emotion regulation	**0.35**	0.15	0.25	0.16	**0.79**	0.11
Happiness	**0.39**	0.15	**0.34**	0.10	**0.84**	0.11
Empathy	0.22	0.14	**0.37**	0.15	**0.81**	0.11
Social awareness	**0.30**	0.14	0.17	0.13	**0.82**	0.11
Impulsivity (low)	**0.30**	0.14	**0.64**	0.13	**0.77**	0.10
Emotion perception	**0.30**	0.14	0.13	0.14	**0.82**	0.11
Stress management	**0.28**	0.14	0.05	0.13	**0.81**	0.11
Emotion management	0.26	0.14	-0.09	0.14	**0.82**	0.11
Optimism	**0.34**	0.15	0.19	0.11	**0.82**	0.11
Relationships	0.23	0.14	**0.54**	0.15	**0.81**	0.11
Adaptability	**0.50**	0.16	**0.39**	0.13	**0.81**	0.11
Assertiveness	**0.28**	0.14	0.06	0.12	**0.82**	0.11
Wellbeing	**0.43**	0.15	**0.38**	0.13	**0.83**	0.11
Self-control	**0.38**	0.15	**0.49**	0.17	**0.77**	0.10
Emotionality	**0.28**	0.14	0.29	0.17	**0.81**	0.11
Sociability	**0.28**	0.14	0.07	0.15	**0.82**	0.11
trait EI	**0.39**	0.15	**0.59**	0.20	**0.80**	0.11

3.3.3 GCSE Chemistry

There were 372 students in the survey (222 boys and 150 girls) who sat a GCSE Chemistry examination. Among those, 341 also sat a GCSE examination in Biology and Physics. Around 74% of the students taking a Chemistry exam obtained at least a grade A and around 90% of them at least a grade B. In this case, the modal grade was A*. The majority of these students attended an independent (29.8%) or a grammar (51.3%) school. 80% of these students attended a single-sex school.

In the following analyses, 241 students were taken into account. The remaining 131 students (35%) did not have Key Stage 3 test results.

Table 13 presents the regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in Chemistry.

For the self-esteem and adaptability subscales, and for the wellbeing factor, there was a gender effect in favour of girls.

The following subscales and factors were related to improved performance in Chemistry when controlling for Key Stage 3 attainment: self-esteem, self motivation, happiness, low impulsivity, optimism, adaptability, wellbeing and self-control. The global trait EI score was also a predictor of attainment in this subject.

As for GCSE Biology, Key Stage 3 results were a strong predictor of performance in this subject.

Table 13: GCSE Chemistry: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.40**	0.16	**0.47**	0.13	**0.99**	0.12
Emotion expression	0.08	0.14	-0.13	0.12	**1.00**	0.12
Self-motivation	0.22	0.14	**0.53**	0.14	**0.97**	0.11
Emotion regulation	0.24	0.15	0.33	0.17	**0.97**	0.12
Happiness	0.22	0.15	**0.27**	0.10	**1.00**	0.12
Empathy	0.11	0.14	0.08	0.15	**0.99**	0.12
Social awareness	0.15	0.14	0.13	0.13	**0.99**	0.12
Impulsivity (low)	0.13	0.14	**0.58**	0.14	**0.95**	0.11
Emotion perception	0.13	0.14	0.04	0.14	**0.99**	0.12
Stress management	0.15	0.15	0.09	0.13	**0.98**	0.12
Emotion management	0.11	0.14	-0.04	0.15	**0.99**	0.12
Optimism	0.21	0.15	**0.22**	0.11	**1.00**	0.12
Relationships	0.11	0.14	0.21	0.15	**0.98**	0.12
Adaptability	**0.40**	0.16	**0.47**	0.13	**0.99**	0.12
Assertiveness	0.15	0.14	0.19	0.12	**0.99**	0.12
Wellbeing	**0.30**	0.15	**0.38**	0.13	**1.00**	0.12
Self-control	0.24	0.15	**0.52**	0.18	**0.95**	0.11
Emotionality	0.12	0.14	0.04	0.18	**0.99**	0.12
Sociability	0.15	0.14	0.15	0.15	**0.99**	0.12
trait EI	0.25	0.15	**0.57**	0.21	**0.98**	0.12

3.3.4 GCSE Physics

There were 354 students in the survey (211 boys and 143 girls) who sat a GCSE Physics examination. Among those, 341 also sat a GCSE examination in Biology and Chemistry. Around 81% of the students taking a Physics exam obtained at least a grade A and over 90% of them at least a grade B. In this case, the modal grade was A*, with 231 students obtaining it. The majority of these students attended an independent (31.1%) or a grammar (53.9%) school. 81.9% of these students attended a single-sex school.

For the following analyses, only 237 students were taken into account. The remaining 117 students (33%) did not have Key Stage 3 test results.

Table 14 presents the regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in Physics.

For all EI subscales the effect of female gender was negative (although not significantly so for the self-esteem, emotion regulation and adaptability subscales), meaning that, for a given value of the EI subscale and a given a total Key Stage 3 score, the probability of obtaining at least a given grade was lower for girls than for boys.

Only two of the EI subscales had a significant relationship with GCSE performance after controlling for attainment at Key Stage 3. These were self-motivation and low impulsivity. Assuming causality, for a candidate with a total Key Stage 3 score of 21 an increase on the self-motivation scale from 4 to 5 would increase their predicted probability of getting an A* grade from 0.5 to 0.58.

Of all the science subjects considered up to this point, performance at Key Stage 3 had the strongest influence on achievement in GCSE Physics.

Table 14: GCSE Physics: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	-0.34	0.18	0.17	0.15	**1.02**	0.12
Emotion expression	**-0.48**	0.16	-0.11	0.14	**1.03**	0.12
Self-motivation	**-0.38**	0.16	**0.32**	0.15	**1.02**	0.12
Emotion regulation	-0.32	0.17	0.33	0.19	**1.01**	0.12
Happiness	**-0.38**	0.16	0.15	0.12	**1.03**	0.12
Empathy	**-0.44**	0.16	-0.11	0.19	**1.03**	0.12
Social awareness	**-0.46**	0.16	-0.07	0.17	**1.03**	0.12
Impulsivity (low)	**-0.42**	0.16	**0.48**	0.17	**1.01**	0.12
Emotion perception	**-0.46**	0.16	-0.05	0.18	**1.03**	0.12
Stress management	**-0.45**	0.16	-0.01	0.16	**1.03**	0.13
Emotion management	**-0.50**	0.16	-0.23	0.18	**1.01**	0.12
Optimism	**-0.43**	0.17	0.03	0.13	**1.03**	0.12
Relationships	**-0.46**	0.16	0.27	0.18	**1.02**	0.12
Adaptability	-0.34	0.18	0.17	0.15	**1.02**	0.12
Assertiveness	**-0.45**	0.16	-0.02	0.15	**1.03**	0.12
Wellbeing	**-0.38**	0.17	0.15	0.15	**1.03**	0.12
Self-control	**-0.35**	0.16	0.38	0.21	**1.00**	0.12
Emotionality	**-0.45**	0.16	-0.02	0.22	**1.03**	0.12
Sociability	**-0.48**	0.16	-0.13	0.19	**1.02**	0.12
trait EI	**-0.38**	0.17	0.24	0.25	**1.02**	0.12

3.3.5 GCSE Twenty First Century Science

There were 367 students in the survey (94 boys and 273 girls) who sat a GCSE in Twenty First Century Science. Around 14% of the students taking this subject obtained at least a grade A and around 44% of them at least a grade B. The majority of these students attended a comprehensive school (90.1%). 47.5% of the students attended a girls' school. There were no boys in boys' schools taking this subject.

For the following analyses, only 237 students were taken into account. The remaining 130 students (35%) did not have Key Stage 3 test results.

Table 15 presents the regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in the Twenty First Century Science.

A negative significant gender effect indicates that, for a given value of the EI subscale and a given total Key Stage 3 score, the probability of obtaining at least a given grade is lower for girls than for boys. This is the case for the following EI subscales and factors: self-esteem, happiness, empathy, emotion perception, emotion management, relationships, assertiveness, emotionality and sociability.

Only three of the EI subscales had a significant relationship with GCSE performance after controlling for Key Stage 3 attainment. These were self-motivation, empathy and low impulsivity. The self-control factor was a predictor of performance in this subject.

Key Stage 3 performance was, in this subject, a strong predictor of performance.

Table 15: GCSE Twenty First Century Science: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**-0.32**	0.16	-0.02	0.11	**1.27**	0.09
Emotion expression	-0.31	0.16	-0.04	0.11	**1.27**	0.09
Self-motivation	-0.31	0.16	**0.39**	0.13	**1.29**	0.09
Emotion regulation	-0.30	0.16	0.11	0.14	**1.27**	0.09
Happiness	**-0.32**	0.16	-0.01	0.10	**1.27**	0.09
Empathy	**-0.38**	0.16	**0.36**	0.14	**1.28**	0.09
Social awareness	-0.31	0.16	0.10	0.14	**1.27**	0.09
Impulsivity (low)	-0.31	0.16	**0.30**	0.12	**1.28**	0.09
Emotion perception	**-0.32**	0.16	0.19	0.16	**1.28**	0.09
Stress management	-0.30	0.16	0.20	0.13	**1.28**	0.09
Emotion management	**-0.32**	0.16	-0.03	0.14	**1.27**	0.09
Optimism	-0.30	0.16	0.14	0.12	**1.28**	0.09
Relationships	**-0.33**	0.16	0.18	0.13	**1.28**	0.09
Adaptability	-0.32	0.16	-0.01	0.16	**1.27**	0.09
Assertiveness	**-0.35**	0.16	-0.14	0.12	**1.27**	0.09
Wellbeing	-0.31	0.16	0.04	0.12	**1.27**	0.09
Self-control	-0.28	0.16	**0.31**	0.15	**1.28**	0.09
Emotionality	**-0.35**	0.16	0.26	0.18	**1.28**	0.09
Sociability	**-0.32**	0.16	-0.05	0.16	**1.27**	0.09
trait EI	-0.30	0.16	0.29	0.22	**1.28**	0.09

3.3.6 GCSE Gateway Science

There were 261 students in the survey (44 boys and 217 girls) who sat a GCSE in Gateway Science. Around 17% of the students taking this subject obtained at least a grade A and around 43% of them at least a grade B. The majority of them attended a comprehensive school (52.9%). Among the remaining ones 28.3% attended an independent school and 18.8% a secondary modern school. 71.3% of the students attended a girls' school. There were no boys in boys' schools taking this subject.

For the following analyses, only 119 students were taken into account. The remaining 142 students (54%) did not have Key Stage 3 test results. Only 1 boy in the dataset had Key Stage 3 test results and we decided to remove him from the analyses. Therefore, data for 118 girls was analysed (the gender effect was not included in the models).

Table 16 presents the regression parameters for the Emotional Intelligence subscales and total Key Stage 3 score for the set of students that obtained a GCSE in the Gateway Science.

Table 16 shows that global trait EI scores did not relate to performance in the Gateway Science GCSE after controlling for Key Stage 3 scores. Also, no significant associations were found between grades in this science subject and any of the EI factors and subscales.

Key Stage 3 performance was, however, a strong predictor of performance in this subject.

Table 16: GCSE Gateway Science: proportional odds regression parameters for the Emotional Intelligence subscales and total Key Stage 3 score

	EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err
Self-esteem	-0.16	0.17	**1.07**	0.12
Emotion expression	-0.27	0.16	**1.09**	0.12
Self-motivation	0.29	0.22	**1.07**	0.12
Emotion regulation	0.22	0.23	**1.08**	0.12
Happiness	-0.20	0.15	**1.08**	0.12
Empathy	0.17	0.20	**1.06**	0.12
Social awareness	-0.17	0.20	**1.07**	0.12
Impulsivity (low)	0.26	0.20	**1.08**	0.12
Emotion perception	-0.05	0.21	**1.07**	0.12
Stress management	0.01	0.19	**1.07**	0.11
Emotion management	-0.17	0.19	**1.07**	0.12
Optimism	-0.09	0.16	**1.07**	0.12
Relationships	0.06	0.24	**1.07**	0.12
Adaptability	0.21	0.24	**1.08**	0.12
Assertiveness	-0.13	0.19	**1.07**	0.12
Wellbeing	-0.19	0.18	**1.07**	0.12
Self-control	0.23	0.25	**1.08**	0.12
Emotionality	-0.12	0.26	**1.07**	0.12
Sociability	-0.20	0.22	**1.07**	0.12
trait EI	-0.11	0.29	**1.07**	0.12

3.3.7 Summary of results for GCSE science subjects

The following table (Table 17) shows a summary of the significance of the global score, factors and subscales of the trait EI measure on progress in each of the science subjects in secondary school.

Although the results provide support for the role of emotional factors in students' school performance and progress, only some of the EI subscales and factors were significantly related to attainment in GCSE sciences over and above the contribution made by prior ability (Key Stage 3 scores).

Global trait EI scores significantly predicted progress from Key Stage 3 in the Applied Science Double Award and in Biology and Chemistry but not in the other three science subjects. The greatest effect was in the Applied Science Double Award where Key Stage 3 attainment was much lower, suggesting that trait EI may have a larger effect where prior attainment is lower and a smaller effect where prior attainment is higher.

Self-motivation and low impulsivity were significant predictors of attainment in almost all of the science subjects after controlling for Key Stage 3 scores, the exception being Gateway Science. The majority of the trait EI subscales significantly predicted attainment in the Applied Science Double Award after controlling for Key Stage 3 scores. On the other hand, the emotion expression, emotion management and assertiveness subscales were not significant predictors of progress in any of them.

Table 17: Emotional Intelligence factors and subscales significantly affecting, positively (+) or negatively (-), students' progress from Key Stage 3 to GCSE in each science subject

	Applied Science Double Award	Biology	Chemistry	Physics	Twenty First Century Science	Gateway Science
Self-esteem	+	+	+			
Emotion expression						
Self-motivation	+	+	+	+	+	
Emotion regulation	+					
Happiness	+	+	+			
Empathy	+	+			+	
Social awareness	+					
Impulsivity (low)	+	+	+	+	+	
Emotion perception	+					
Stress management	+					
Emotion management						
Optimism	+		+			
Relationships	+	+				
Adaptability	+	+	+			
Assertiveness						
Wellbeing	+	+	+			
Self-control	+	+	+		+	
Emotionality	+					
Sociability						
trait EI	+	+	+			

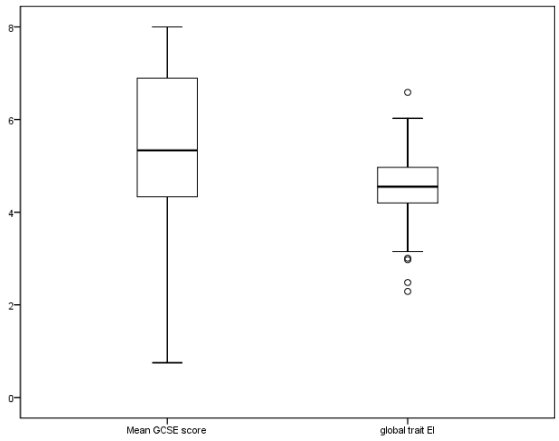
3.4 Emotional Intelligence and progress in other GCSE subjects

This section of the report explores the relationships between trait Emotional Intelligence and progress from Key Stage 3 to GCSE in a wider range of subjects, namely, English, English Literature, Mathematics, Art and Design, Drama and French. These subjects were selected because they appear to require more consideration of affect-related issues and therefore trait EI could be found to be a better predictor of performance in these than in the GCSE science subjects considered in section 3.3.

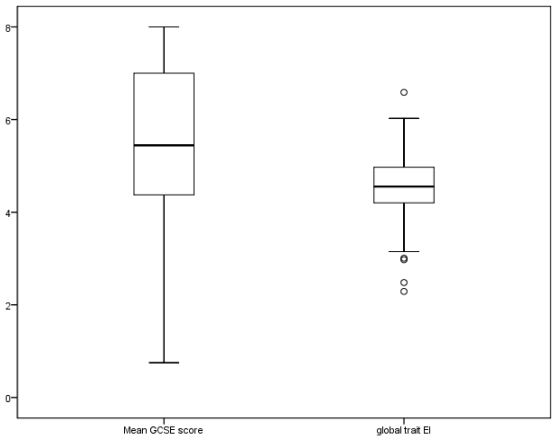
After matching records from the survey and records from the National Pupil Database, GCSE data in the subjects above was available for only 874 students.

Figure 3 presents the trait EI scores and the mean GCSE score of the students taking each of the GCSE subjects considered in this section.

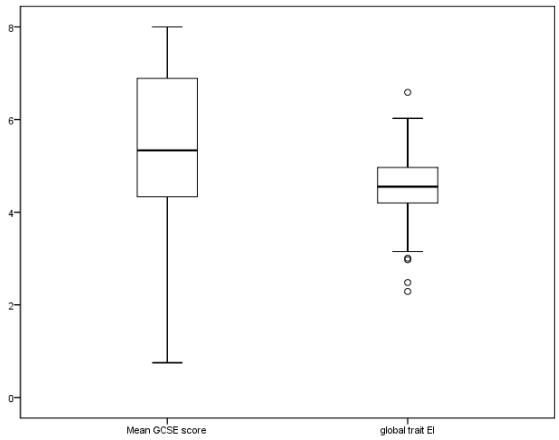
Students taking a GCSE in French had, on average, the highest mean GCSE scores whilst students taking Drama had, on average the lowest, followed by those taking Art and Design. On the other hand, students taking Mathematics, English or English Literature (most students in this study were taking this combination of GCSE subjects) had, on average, the highest trait EI scores. Students taking Art and Design had the lowest trait EI scores.



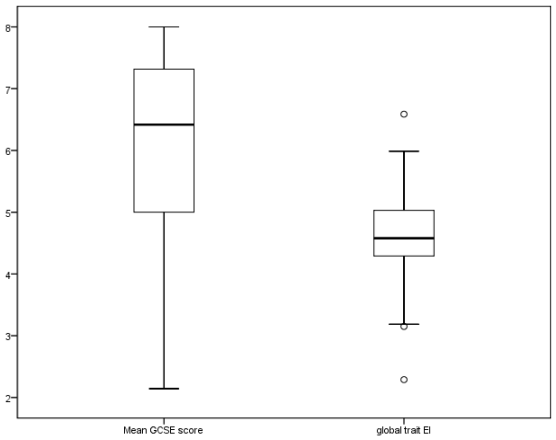
(a) GCSE English



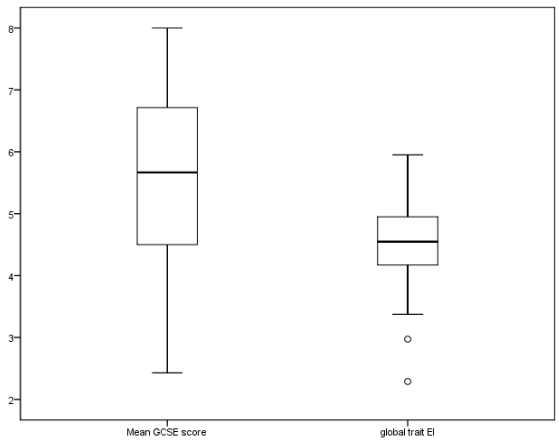
(b) GCSE English Literature



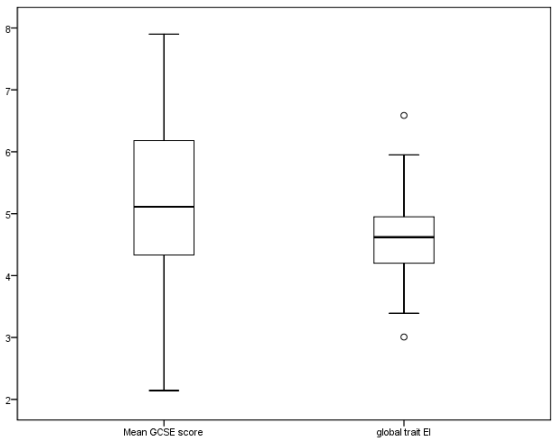
(c) GCSE Mathematics



(d) GCSE French



(e) GCSE Art and Design



(f) GCSE Drama

Figure 3: Box plots of trait EI score and mean GCSE score by GCSE entries

3.4.1 GCSE English

For the following analyses, 552 students were considered (278 girls and 274 boys, covering the whole range of ability in the subject (the modal grade was C)). The remaining students either did not obtain a GCSE in English (*e.g.* students in independent schools that do not follow the National Curriculum and were offered the International GCSE instead) or did not have Key Stage 3 test results.

Table 18 presents the proportional odds regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in English. The effects of individual schools were taken into account and all significant effects are highlighted in bold.

A positive significant Key Stage 3 effect indicates that, for a given score in the Emotional Intelligence subscale, the probability of obtaining at least a given grade significantly increases with increasing scores in the Key Stage 3 tests. From Table 18, it can be seen, as expected, that prior attainment (total Key Stage 3 score) was a significant predictor of performance in GCSE English.

A positive significant gender effect indicates that, given a score in the EI subscale and given a total Key Stage 3 score, the probability of obtaining at least a grade is higher for girls than for boys. This is the case for trait EI and all the EI subscales and factors.

A positive significant EI subscale effect indicates that, for a given Key Stage 3 score, the probability of obtaining at least a given grade significantly increases with increasing scores in that subscale. It can be seen in Table 18 that most of the EI subscales, all the factors and the global trait EI score had a positive relationship with the probability of obtaining a given grade in GCSE English when Key Stage 3 performance was controlled for. The exceptions were the emotion expression, emotion regulation, emotion management, relationships and adaptability subscales.

Table 18: GCSE English: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.54**	0.12	**0.29**	0.08	**0.98**	0.07
Emotion expression	**0.47**	0.11	0.03	0.09	**0.97**	0.07
Self-motivation	**0.54**	0.12	**0.60**	0.11	**0.97**	0.07
Emotion regulation	**0.50**	0.12	0.13	0.11	**0.97**	0.07
Happiness	**0.49**	0.11	**0.16**	0.07	**0.97**	0.07
Empathy	**0.46**	0.11	**0.21**	0.11	**0.97**	0.07
Social awareness	**0.49**	0.11	**0.24**	0.11	**0.98**	0.07
Impulsivity (low)	**0.50**	0.11	**0.46**	0.10	**1.00**	0.07
Emotion perception	**0.47**	0.11	**0.30**	0.11	**0.98**	0.07
Stress management	**0.53**	0.12	**0.21**	0.09	**0.97**	0.07
Emotion management	**0.48**	0.11	0.12	0.11	**0.98**	0.07
Optimism	**0.51**	0.11	**0.18**	0.09	**0.97**	0.07
Relationships	**0.46**	0.11	0.21	0.11	**0.98**	0.07
Adaptability	**0.48**	0.11	0.12	0.11	**0.97**	0.07
Assertiveness	**0.49**	0.11	**0.24**	0.09	**0.97**	0.07
Wellbeing	**0.52**	0.12	**0.26**	0.09	**0.97**	0.07
Self-control	**0.56**	0.12	**0.45**	0.12	**0.97**	0.07
Emotionality	**0.46**	0.11	**0.31**	0.14	**0.98**	0.07
Sociability	**0.50**	0.11	**0.31**	0.12	**0.98**	0.07
trait EI	**0.53**	0.12	**0.64**	0.13	**0.98**	0.07

3.4.2 GCSE English Literature

For the following analyses, 537 students were considered (264 girls and 273 boys, covering the whole range of ability in the subject; the modal grade was grade A, with 21.6% of the students obtaining it).

Table 19 presents the proportional odds regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in English Literature.

From Table 19, it can be seen, as expected, that prior attainment is, as for GCSE English, a significant predictor of performance in GCSE English Literature.

For all of the EI subscales the gender effect was positive and significant.

The following subscales and factors were related to improved performance in English Literature when controlling for Key Stage 3 attainment: self-esteem, self motivation, happiness, empathy, low impulsivity, emotion perception, wellbeing, self-control and emotionality. Also, the global trait EI score was a positive predictor of performance in this subject.

Table 19: GCSE English Literature: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.70**	0.12	**0.23**	0.09	**0.95**	0.07
Emotion expression	**0.65**	0.11	0.07	0.09	**0.94**	0.07
Self-motivation	**0.72**	0.12	**0.53**	0.11	**0.93**	0.07
Emotion regulation	**0.70**	0.12	0.21	0.12	**0.93**	0.07
Happiness	**0.67**	0.11	**0.20**	0.07	**0.94**	0.07
Empathy	**0.62**	0.11	**0.35**	0.11	**0.94**	0.07
Social awareness	**0.67**	0.11	0.21	0.11	**0.95**	0.07
Impulsivity (low)	**0.66**	0.11	**0.33**	0.10	**0.95**	0.07
Emotion perception	**0.65**	0.11	**0.42**	0.11	**0.95**	0.07
Stress management	**0.70**	0.12	0.17	0.09	**0.94**	0.07
Emotion management	**0.66**	0.11	0.16	0.11	**0.95**	0.07
Optimism	**0.67**	0.12	0.10	0.09	**0.94**	0.07
Relationships	**0.64**	0.11	0.20	0.11	**0.94**	0.07
Adaptability	**0.67**	0.11	0.17	0.11	**0.94**	0.07
Assertiveness	**0.67**	0.11	0.13	0.09	**0.94**	0.07
Wellbeing	**0.69**	0.12	**0.23**	0.09	**0.94**	0.07
Self-control	**0.71**	0.12	**0.37**	0.13	**0.94**	0.07
Emotionality	**0.63**	0.11	**0.43**	0.14	**0.95**	0.07
Sociability	**0.67**	0.11	0.23	0.12	**0.95**	0.07
trait EI	**0.70**	0.12	**0.59**	0.16	**0.95**	0.07

3.4.3 GCSE Mathematics

For the following analyses, 554 students were considered (280 girls and 274 boys, covering the whole range of ability in the subject; the modal grade was grade C, with 22.7% of the students obtaining it).

Table 20 shows that, for all EI subscales and factors, the effect of female gender was negative, that is, for a given value of the EI subscale and a given total Key Stage 3 score, the probability of obtaining at least a given grade was lower for girls than for boys. These effects were, however, not significant.

Key Stage 3 performance was a strong predictor of performance in this subject.

With regard to the relationship between EI and progress, Table 20 shows that the self-motivation, emotion regulation and low impulsivity subscales and the self-control factor had a positive relationship with the probability of obtaining a given grade in GCSE Mathematics when Key Stage 3 performance was controlled for. A negative significant EI subscale effect indicates that, for a given Key Stage 3 score, the probability of obtaining at least a given grade significantly decreases with increasing scores in that subscale. This was the case for the emotion expression, social awareness and emotion management subscales and for the sociability factor.

Table 20: GCSE Mathematics: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score.

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	-0.05	0.11	0.12	0.09	**1.21**	0.07
Emotion expression	-0.05	0.11	**-0.26**	0.09	**1.21**	0.08
Self-motivation	-0.04	0.11	**0.37**	0.11	**1.20**	0.08
Emotion regulation	-0.02	0.12	**0.26**	0.12	**1.20**	0.08
Happiness	-0.07	0.11	0.01	0.07	**1.21**	0.08
Empathy	-0.08	0.11	0.10	0.11	**1.20**	0.08
Social awareness	-0.08	0.11	**-0.22**	0.11	**1.20**	0.08
Impulsivity (low)	-0.07	0.11	**0.39**	0.10	**1.23**	0.08
Emotion perception	-0.07	0.11	-0.03	0.11	**1.21**	0.08
Stress management	-0.04	0.11	0.15	0.10	**1.21**	0.08
Emotion management	-0.08	0.11	**-0.38**	0.11	**1.20**	0.08
Optimism	-0.06	0.11	0.10	0.09	**1.21**	0.08
Relationships	-0.10	0.11	0.18	0.11	**1.21**	0.08
Adaptability	-0.07	0.11	0.06	0.12	**1.21**	0.08
Assertiveness	-0.07	0.11	-0.13	0.09	**1.21**	0.08
Wellbeing	-0.06	0.11	1.21	0.08	**1.21**	0.08
Self-control	-0.02	0.11	**0.41**	0.13	**1.21**	0.08
Emotionality	-0.07	0.11	-0.07	0.14	**1.21**	0.08
Sociability	-0.08	0.11	**-0.33**	0.13	**1.20**	0.08
trait EI	-0.07	0.11	0.12	0.16	**1.21**	0.08

3.4.4 GCSE French

For the following analyses, 276 students were considered (130 girls and 146 boys). Around 22% of the students taking GCSE French obtained a grade A* and about 60% of them at least a grade B. This grade distribution is to be expected since modern foreign languages are usually taken by relatively high achievers.

Table 21 presents the proportional odds regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in French.

For all of the EI subscales the gender effect was positive and significant.

Only one of the EI subscales had a significant relationship with GCSE performance in this subject after controlling for Key Stage 3 attainment. This was low impulsivity. Also, the sociability factor was a predictor of performance in this subject but, in this case, had a negative effect.

As usual, Key Stage 3 results were a predictor of performance in this subject.

Table 21: GCSE French: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score.

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.51**	0.18	0.18	0.12	**0.75**	0.10
Emotion expression	**0.47**	0.18	-0.17	0.12	**0.73**	0.10
Self-motivation	**0.48**	0.18	0.20	0.14	**0.73**	0.10
Emotion regulation	**0.48**	0.18	0.01	0.16	**0.75**	0.10
Happiness	**0.48**	0.18	0.01	0.10	**0.75**	0.10
Empathy	**0.48**	0.18	-0.06	0.15	**0.75**	0.10
Social awareness	**0.47**	0.18	-0.17	0.14	**0.74**	0.10
Impulsivity (low)	**0.50**	0.18	**0.39**	0.13	**0.78**	0.10
Emotion perception	**0.47**	0.18	0.02	0.15	**0.75**	0.10
Stress management	**0.45**	0.18	-0.09	0.14	**0.74**	0.10
Emotion management	**0.50**	0.18	-0.30	0.16	**0.71**	0.10
Optimism	**0.47**	0.18	-0.02	0.12	**0.74**	0.10
Relationships	**0.47**	0.18	0.08	0.16	**0.75**	0.10
Adaptability	**0.47**	0.18	-0.23	0.16	**0.74**	0.10
Assertiveness	**0.49**	0.18	-0.24	0.13	**0.73**	0.10
Wellbeing	**0.48**	0.18	0.07	0.13	**0.75**	0.10
Self-control	**0.51**	0.18	0.19	0.18	**0.75**	0.10
Emotionality	**0.48**	0.18	-0.10	0.19	**0.74**	0.10
Sociability	**0.49**	0.18	**-0.34**	0.17	**0.72**	0.10
trait EI	**0.47**	0.18	-0.05	0.22	**0.74**	0.10

3.4.5 GCSE Art and Design

For the following analyses, 170 students were considered (105 girls and 65 boys). The grades obtained by the students in this subject ranged from A* to D with A being the modal grade, followed very closely by B.

Table 22 presents the proportional odds regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that obtained a GCSE in Art and Design.

For all EI subscales the effect of female gender was positive and significant.

Only two of the EI subscales had a significant relationship with GCSE performance after controlling for Key Stage 3 attainment. These were self-motivation and low impulsivity.

Key Stage 3 performance was a predictor of achievement in GCSE Art and Design although, among all the subjects considered until this point in the report, it had the weakest effect.

Table 22: GCSE Art and Design: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score.

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.88**	0.22	0.09	0.17	**0.34**	0.09
Emotion expression	**0.84**	0.22	0.16	0.15	**0.34**	0.09
Self-motivation	**0.87**	0.22	**0.45**	0.20	**0.33**	0.09
Emotion regulation	**0.93**	0.23	0.33	0.23	**0.32**	0.09
Happiness	**0.87**	0.22	0.08	0.14	**0.34**	0.09
Empathy	**0.86**	0.22	0.23	0.19	**0.33**	0.09
Social awareness	**0.86**	0.22	-0.03	0.19	**0.33**	0.09
Impulsivity (low)	**0.85**	0.22	**0.46**	0.19	**0.32**	0.09
Emotion perception	**0.85**	0.22	0.19	0.19	**0.33**	0.09
Stress management	**0.86**	0.22	-0.03	0.18	**0.34**	0.09
Emotion management	**0.87**	0.22	-0.15	0.20	**0.33**	0.09
Optimism	**0.88**	0.22	0.10	0.18	**0.34**	0.09
Relationships	**0.84**	0.22	0.23	0.20	**0.34**	0.09
Adaptability	**0.87**	0.22	-0.12	0.22	**0.34**	0.09
Assertiveness	**0.89**	0.22	0.22	0.18	**0.34**	0.09
Wellbeing	**0.88**	0.22	0.12	0.19	**0.34**	0.09
Self-control	**0.90**	0.23	0.39	0.25	**0.32**	0.09
Emotionality	**0.83**	0.22	0.35	0.24	**0.34**	0.09
Sociability	**0.87**	0.22	0.04	0.23	**0.34**	0.09
trait EI	**0.88**	0.22	0.40	0.31	**0.34**	0.09

3.4.6 GCSE Drama

For the following analyses, 113 students were considered (62 girls and 51 boys). The grades obtained by the students in this subject ranged from A* to F with B being the modal grade. The mean GCSE of the students taking Drama was, on average, the lowest in this study (Figure 3).

Table 23 presents the regression parameters for the independent variables for the set of students that obtained a GCSE in Drama.

For all EI subscales and factors, there was no significant difference between girls and boys in the probability of obtaining at least a given grade in Drama, for given values of the EI subscale and the total Key Stage 3 score (*i.e.* the gender effect was not significant).

Key Stage 3 performance was a predictor of performance in this subject, although the effect in GCSE Drama was relatively small compared to the effect in subjects such as GCSE Mathematics, English or English Literature.

With regard to the relationship between EI and progress, Table 23 shows that the self-esteem, self-motivation, low impulsivity, emotion perception, emotion management and adaptability subscales and the self-control and sociability factors had a positive relationship with the probability of obtaining a given grade in GCSE Drama when Key Stage 3 performance was controlled for. Also, the global trait EI score was a strong predictor of performance in this subject. Furthermore, global trait EI was a much more powerful predictor of performance in GCSE Drama than it was in any other subject in this study, with the exception of the Applied Science Double Award.

Table 23: GCSE Drama: proportional odds regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score.

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	0.29	0.24	**0.47**	0.22	**0.26**	0.12
Emotion expression	0.19	0.24	-0.08	0.20	0.21	0.12
Self-motivation	0.41	0.24	**0.89**	0.25	**0.32**	0.13
Emotion regulation	0.21	0.24	0.16	0.25	0.21	0.12
Happiness	0.19	0.23	0.09	0.16	0.21	0.12
Empathy	0.15	0.23	0.19	0.24	0.21	0.12
Social awareness	0.21	0.23	0.43	0.26	0.24	0.12
Impulsivity (low)	0.29	0.24	**0.75**	0.22	**0.32**	0.13
Emotion perception	0.16	0.23	**0.56**	0.27	0.22	0.12
Stress management	0.25	0.24	0.21	0.21	0.21	0.12
Emotion management	0.14	0.23	**0.58**	0.26	0.23	0.12
Optimism	0.19	0.23	0.12	0.19	0.21	0.12
Relationships	0.16	0.23	0.24	0.28	0.20	0.12
Adaptability	0.21	0.23	**0.58**	0.25	**0.26**	0.12
Assertiveness	0.19	0.23	0.45	0.24	**0.27**	0.12
Wellbeing	0.22	0.24	0.25	0.21	0.22	0.12
Self-control	0.32	0.24	**0.60**	0.28	**0.25**	0.12
Emotionality	0.14	0.24	0.34	0.33	0.21	0.12
Sociability	0.19	0.23	**0.71**	0.31	**0.26**	0.12
trait EI	0.25	0.23	**0.90**	0.37	**0.26**	0.12

3.4.7 Overall GCSE attainment

For the following analyses, 561 students were considered (282 girls and 279 boys).

For grades at GCSE, 8 points were assigned to each A*, 7 to each A, 6 to each B, etc. The points were then accumulated to form a total GCSE score for each student. The 'mean GCSE' indicator was calculated by dividing the total score by the number of subjects attempted.

In this section, a proportional odds regression model was not used. Instead, since the mean GCSE is a continuous variable, a two-level multilevel model, in which students (level 1) are nested in schools (level 2), was used. The explanatory variables (gender, the total Key Stage 3 score and each of the EI subscales and factors) were entered into the fixed part of the model. The outcome measure was overall GCSE attainment, measured by the mean GCSE score. The models were fitted using the programme MLwiN (Rasbash *et al*., 2005).

Table 24 presents the regression parameters for the Emotional Intelligence subscales, total Key Stage 3 score and gender for the set of students that had an overall measure of attainment at GCSE.

As expected, prior attainment (total Key Stage 3 score) was a significant predictor of overall performance at GCSE.

For all EI subscales and factors the effect of female gender was positive and significant.

Most of the EI subscales and factors were predictors of overall GCSE attainment when Key Stage 3 performance was controlled for. The exceptions were the emotion expression, social awareness, emotion management, adaptability and assertiveness subscales and the sociability factor. The global trait EI score was a predictor of overall performance at GCSE.

Table 24: Mean GCSE: regression parameters for gender, Emotional Intelligence subscales and total Key Stage 3 score.

	Gender		EI subscale		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Self-esteem	**0.35**	0.07	**0.10**	0.03	**0.35**	0.02
Emotion expression	**0.31**	0.07	-0.01	0.03	**0.35**	0.02
Self-motivation	**0.34**	0.06	**0.21**	0.03	**0.34**	0.02
Emotion regulation	**0.35**	0.07	**0.11**	0.03	**0.35**	0.02
Happiness	**0.31**	0.07	**0.07**	0.02	**0.35**	0.02
Empathy	**0.28**	0.07	**0.11**	0.03	**0.35**	0.02
Social awareness	**0.31**	0.07	0.03	0.03	**0.35**	0.02
Impulsivity (low)	**0.31**	0.06	**0.22**	0.03	**0.35**	0.02
Emotion perception	**0.30**	0.07	**0.12**	0.03	**0.35**	0.02
Stress management	**0.35**	0.07	**0.09**	0.03	**0.35**	0.02
Emotion management	**0.31**	0.07	-0.02	0.03	**0.35**	0.02
Optimism	**0.33**	0.07	**0.07**	0.03	**0.35**	0.02
Relationships	**0.29**	0.07	**0.09**	0.03	**0.35**	0.02
Adaptability	**0.31**	0.07	0.05	0.03	**0.35**	0.02
Assertiveness	**0.31**	0.07	0.03	0.03	**0.35**	0.02
Wellbeing	**0.33**	0.07	**0.10**	0.03	**0.35**	0.02
Self-control	**0.37**	0.07	**0.22**	0.04	**0.35**	0.02
Emotionality	**0.29**	0.07	**0.11**	0.04	**0.35**	0.02
Sociability	**0.31**	0.07	0.02	0.04	**0.35**	0.02
trait EI	**0.33**	0.07	**0.22**	0.05	**0.35**	0.02

3.4.8 Summary of results for other GCSE subjects

Table 25 shows a summary of the significance of the global score, factors and subscales of the trait EI measure on progress from Key Stage 3 in several GCSE subjects.

The results presented in section 3.4 of the report show that trait EI was differentially implicated in progress across the various subjects considered and influenced school attainment in certain subjects more than in others. For example, it had little influence on progress in French or Art and Design but it moderated the effect of Key Stage 3 results on GCSE achievement in English, English Literature, Mathematics and Drama. Clearly, trait EI and its subscales relate differently to different subjects.

A greater number of the questionnaire subscales were significantly related to progress in English and English Literature than in the other subjects.

As with the science subjects, self-motivation and low impulsivity were significant positive predictors of progress from Key Stage 3 to GCSE in almost all the other subjects, the exception being French. The relationships subscale was not a significant predictor in any of these.

Some trait EI subscales were negatively associated with academic success. For example, in GCSE Mathematics, high scores on the emotion expression, social awareness and emotion management subscales predicted lower grades after Key Stage 3 attainment was taken into account. It may be that if an individual has high levels of emotion, this might get in the way of their logical thinking.

Table 25: Emotional Intelligence factors and subscales significantly affecting, positively (+) or negatively (-), students' progress from Key Stage 3 to GCSE

	English	English Literature	Mathematics	Art and Design	Drama	French
Self-esteem	+	+			+	
Emotion expression			-			
Self-motivation	+	+	+	+	+	
Emotion regulation			+			
Happiness	+	+				
Empathy	+	+				
Social awareness	+		-			
Impulsivity (low)	+	+	+	+	+	+
Emotion perception	+	+			+	
Stress management	+					
Emotion management			-		+	
Optimism	+					
Relationships						
Adaptability					+	
Assertiveness	+					
Wellbeing	+	+				
Self-control	+	+	+		+	
Emotionality	+	+				
Sociability	+		-		+	-
trait EI	+	+			+	

3.5 General self-efficacy and progress

In this section, the effect of perceived self-efficacy (GSE) is studied. The specific aim is to see if GSE is related to greater success at school and whether it can explain differences in the progress made between pupils from Key Stage 3 to GCSE.

In section 2.2, it was mentioned that the GSE scores in each of 10 items vary between 1 and 7. The responses to all ten items were summed up to yield the final composite score with a range from 10 to 70, with a mean of 47.08 and a standard deviation of 9.87. Table 26 shows the mean and standard deviation of the GSE scale for each of the GCSE subjects considered in this study.

Table 26: Means and standard deviations of the total GSE score

Subject	Mean	Standard Deviation
Biology	51.35	9.49
Chemistry	51.42	9.49
Physics	51.30	9.48
Applied Science Double Award	45.48	9.10
Twenty First Century Science	45.66	9.20
Gateway Science	44.83	10.65
English	47.98	10.03
English Literature	48.48	9.98
Mathematics	47.94	10.02
French	49.40	10.08
Art and Design	47.22	9.15
Drama	47.07	9.89

The students taking Biology, Chemistry and Physics have higher GSE scores, on average, than the students taking any of the other subjects. They are followed by the students taking French. The students with the lowest scores are those taking the Applied Science Double Award.

Gender and year group differences in GSE were tested via independent samples t-tests. These tests did not reveal significant mean differences between boys and girls in GSE. Likewise, there were no significant differences in GSE between Year 10 and Year 11 students.

Table 27 shows the correlations between the total GSE score and each of the trait EI subscales and factors. The table shows that all the correlations are positive and statistically significant and suggest that some of the EI subscales and factors (*e.g.* self-esteem, social awareness, wellbeing and sociability) and the global trait EI score are strongly associated with the total GSE score. Note that almost all correlations exceed the so-called 0.3 barrier (McCrae and Costa, 1989). The exceptions are the correlations between GSE and the low impulsivity and relationships subscales.

Table 27: Correlations between total GSE score and the trait EI subscales and factors
(** correlation is significant at the 0.01 level)

Trait EI \ GSE	Correlation
Self-esteem	0.534**
Emotion expression	0.311**
Self-motivation	0.484**
Emotion regulation	0.409**
Happiness	0.458**
Empathy	0.303**
Social awareness	0.556**
Impulsivity (low)	0.247**
Emotion perception	0.400**
Stress management	0.452**
Emotion management	0.386**
Optimism	0.473**
Relationships	0.287**
Adaptability	0.426**
Assertiveness	0.456**
Wellbeing	0.555**
Self-control	0.449**
Emotionality	0.430**
Sociability	0.552**
trait EI	0.659**

Figure 4 shows the relationship between global trait EI and GSE in a scatter plot.

In order to find out if GSE is a predictor of progress from Key Stage 3 to GCSE, proportional odds regression, which models the probability of achieving at least a certain grade at GCSE, was used. In particular, the grade obtained in each of the GCSE subjects was modelled in separate regression analyses where gender, school, total Key Stage 3 score and the total GSE score were the independent variables.

Estimates of the parameters for gender, total GSE and total Key Stage 3 score are given for each subject in Table 28. All significant effects are highlighted in bold type.

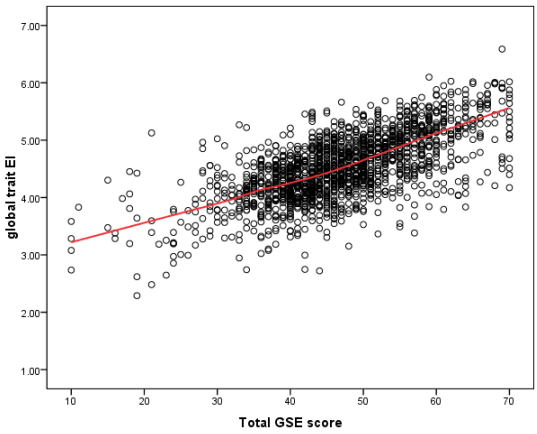


Figure 4: Trait EI and GSE

A negative significant gender effect indicates that, for given values of the GSE and total Key Stage 3 scores, the probability of obtaining at least a given grade is lower for girls than for boys. This was the case for GCSE Physics. On the contrary, in English, English Literature, French and Art and Design there was a positive significant gender effect, indicating that, for given values of the GSE and total Key Stage 3 scores, the probability of obtaining at least a given grade is higher for girls than for boys. For the remaining subjects the effect of gender was not significant.

A positive significant GSE score effect indicates that, for a given Key Stage 3 score, the probability of obtaining at least a given grade significantly increases with increasing scores in GSE. It can be seen in Table 28 that for most of the science subjects GSE had a positive relationship with the probability of obtaining at least a given grade when Key Stage 3 performance was controlled for. The exception was Gateway Science. The effect of the GSE score seemed to be greater in the three separate sciences. GSE also had a positive relationship with performance in English and English Literature.

Table 28: Proportional odds regression parameters for gender, total GSE score and total Key Stage 3 score in each GCSE subject

Subject	Gender		GSE score		Total KS3 score	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Biology	0.25	0.26	**0.05**	0.01	**1.03**	0.14
Chemistry	0.11	0.26	**0.04**	0.01	**1.15**	0.15
Physics	**-0.59**	0.30	**0.04**	0.02	**1.32**	0.17
Applied Science Double Award	0.16	0.13	**0.02**	0.01	**0.64**	0.07
Twenty First Century Science	-0.25	0.17	**0.03**	0.01	**1.23**	0.09
Gateway Science	-	-	0.01	0.02	**0.97**	0.11
English	**0.48**	0.11	**0.02**	0.01	**0.95**	0.07
English Literature	**0.69**	0.11	**0.03**	0.01	**0.89**	0.07
Mathematics	-0.09	0.11	0.02	0.01	**1.20**	0.07
French	**0.43**	0.18	-0.01	0.01	**0.71**	0.10
Art and Design	**0.83**	0.22	0.02	0.02	**0.34**	0.09
Drama	0.30	0.23	0.04	0.06	**0.26**	0.12

In some of the subjects, both trait EI (or some of the subscales/factors) and GSE are significant predictors of performance. For example, global trait EI and GSE are predictors of performance in the Applied Science Double Award, Biology, Chemistry, English and English Literature. But which one has the higher predictive power (*i.e.* is more strongly associated with attainment): trait EI or GSE?

In order to answer the previous question, the statistical models fitted in sections 3.3, 3.4 and 3.5 were compared. If the model that included the trait EI subscale had a better fit than the model that included the GSE score, then that trait EI subscale would be more strongly associated with attainment than was GSE.

Since the models to be compared are not nested models, a general fit index to compare the fit of statistical models was used: the Akaike's Information Criterion *AIC* (Akaike, 1987). This index assumes that the models compared are fit to the same data set and use the same estimation method. When the index goes down, it indicates a better fit.

For the motivation and low impulsivity subscales (significant predictors in almost all subjects), as well as for the global trait EI score, the *AIC* index was lower than for the GSE in all subjects considered in this report (when both measures were significant predictors of performance). Therefore, it is possible to conclude that global trait EI, motivation and low impulsivity are more strongly associated with attainment at GCSE than is the general self-efficacy construct.

4. Conclusions and discussion

Emotional Intelligence is currently a topic attracting a great deal of interest, both in academia and within the general public. In the last few years, there has been a growing awareness that social and emotional factors play an important part in students' academic success and it has been claimed that those with high scores on a trait EI measure perform better (*e.g.* Lam and Kirby, 2002; Petrides, Frederickson and Furnham, 2004; Zins *et al.*, 2004). The present study provides support for the role of trait EI in students' performance and progress at secondary school.

Factors such as ability are not the only predictors of educational attainment. According to this study, and also according to previous research (Cassidy and Lynn, 1991; Vidal Rodeiro and Bell, 2007), it is the combination of ability, individual characteristics, home background, type of school attended and social, behavioural and emotional aspects that is important.

From a review of the literature in this field, ability-based measures might be expected to be correlated to some degree with academic success but this has not always been the case. On the other hand, trait EI measures have appeared, in the literature, to be more reliable in being able to predict success, although some subscales more so than others. However, one consistent theme is that personality factors such as motivation and self-esteem are positively related to academic success. There is some evidence to suggest that this may be more relevant in students with relatively low ability and at times of relatively high stress, such as at the transition from high school to university.

The results of this research show that some aspects of trait Emotional Intelligence were significantly related to attainment in GCSE subjects over and above the contribution made by prior ability (Key Stage 3 tests results).

Among the science subjects, trait EI had the greatest effect on progress in the Applied Science Double Award and the least effect on progress in Physics (there are large differences in the prior attainment of the students taking these examinations, with the vocational entry having poorer performance at Key Stage 3). Self-motivation and low impulsivity were significant positive predictors of progress from Key Stage 3 in almost all science subjects considered in this report, the exception being GCSE Gateway Science. On the other hand, the emotion expression, emotion management and assertiveness subscales, and the sociability factor, were not significant predictors of progress in any of them. These findings corroborate those of Petrides Frederickson and Furnham (2004), who found that EI moderated the relationship between cognitive ability and performance, in particular in those students with lower ability. It seems that trait EI does not have a great influence on the performance of students of higher ability but may aid lower ability ones by helping them cope with stress and anxiety. In other words, high trait EI may confer a selective advantage for

students with lower ability and for certain subjects. It can be argued that vulnerable or disadvantaged individuals are more likely to experience stress and emotional difficulties than their higher ability peers and are therefore more likely to benefit from an adaptive disposition to deal with these. Gumora and Arsenio (2002) also found that some aspects of EI contributed to performance at school over and above the contribution made by cognition-related abilities. In contrast, the findings of this research are opposite to those of Barchard (2003) who found that measures of EI were unable to add significantly to the prediction of academic performance over and above the contribution made by the cognitive variables.

Although the main aim of this research was to study the relationships between trait EI and performance in different science subjects at GCSE, a secondary aim was to explore the relationships between trait EI and progress from Key Stage 3 to GCSE in a wider range of subjects. English, English Literature, Mathematics, Art and Design, Drama and French were selected because they appear to require more consideration of affect-related issues and therefore trait EI could have been found to be a better predictor of performance in these than in the GCSE science subjects. In fact, Petrides, Frederickson and Furnham (2004) found a differential influence of trait EI on mathematics, English and science attainment. In particular, those researchers found that trait EI was not related to attainment in Mathematics but correlated with performance in English and overall GCSE attainment. In this report, the results show that trait EI was differentially implicated in progress across the various subjects considered and influenced school attainment in certain subjects more than in others. For example, it had little influence on progress in French or Art and Design but it moderated the effect of Key Stage 3 results on GCSE achievement in English, English Literature, Mathematics and Drama. As with the sciences, self-motivation and low impulsivity were significant positive predictors of progress from Key Stage 3 in almost all subjects, the exception being French. The relationships subscale was not a significant predictor in any of them. There were large differences in the prior attainment of the entries for these examinations (students taking a GCSE in French had, on average, the highest concurrent attainment (mean GCSE) whilst students taking Drama had, on average, the lowest, followed by those taking Art and Design) and this suggests a possible non-linear relationship between trait EI and progress over the range of attainment. That is, trait EI may have a larger effect where prior attainment is lower and a smaller effect where prior attainment is higher.

Humphrey *et al.* (2007) identified 3 attributes of EI that might be required to adapt effectively to new situations such as starting school. These were 'personal', 'social' and 'emotional' attributes. The four most powerful predictors of academic success found in this study fall within the 'personal' dimension and the weakest predictors fall within the 'emotional' dimension of Humphrey's classifications. The 'personal' attributes of self-motivation, self-esteem, adaptability and low impulsivity can also be viewed as aspects of personality.

There were gender differences in trait EI scores in this sample and in particular in some subscales, with boys usually scoring higher than girls. This finding is contradictory to findings of other researchers (Mavroveli *et al.*, 2007; Petrides, Furnham and Martin, 2004) although most of the previous findings were on adult samples and there could be differences between the adolescent and adult sampling domains of the construct (Petrides *et al.*, 2006). However, some of these findings are in accordance with other studies (Leondari, Syngollitou and Kiosseoglou, 1998; Farrier, 1985) which show, for example, that adolescent males tend to have higher levels of self-esteem than adolescent females do.

Schools and students were self-selected for this study and this might be a limitation since it is possible that the more able and/or confident students would have been more likely to complete the questionnaire. Furthermore, schools that were more involved in the promotion of EI ideas might have been more likely to take part in the survey. The present study was also limited by being restricted to students taking OCR GCSE science subjects.

There are also some limitations in this study due to the use of self-report scales, which make it impossible to determine whether the reported scores reflect the true traits or whether they are 'just questionnaire responses'. It may also be the case that self-perceived abilities are not an accurate reflection of actual abilities. Also, it would be interesting to develop a measure that is specifically designed to measure trait EI in children and adolescents. At present, the few measures that exist are adaptations of various inventories. This was also the case with the measure used in this study. Further research on the long-term effects of trait EI may be of

interest since students might be likely to have different levels of Emotional Intelligence at the end of their school years when compared to their levels at the start.

Emotional Intelligence is a relatively new way of considering the affective domain. The latter term was developed by Bloom in his *Taxonomy of Educational Objectives* (Bloom *et al.*, 1956). The top level of this classification had three categories: cognitive, affective and psychomotor. Loosely, the first is the thinking skills used in learning and the third describes the ability to physically manipulate a tool or instrument, for example, you cannot teach a child to write if they have not developed the skills to control a pencil. It is the second domain in which this research is focussed. This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations and attitudes.

The importance of the affective domain in education has long been recognised. For example, Thomas Arnold, the famous headmaster of Rugby school, believed that, while learning was important, the great aim of education was the formation of character. His ideal was to train boys to become not merely scholars but Christian gentlemen. After allowing for the mores and language of the era it is clear that features of Emotional Intelligence, such as adaptability, emotion management, low impulsiveness, self-motivation and social awareness, were meant to be developed. Today Rugby school's website states: 'Many fundamental qualities are not examinable: curiosity, shrewdness, initiative, an awareness of beauty, a sense of humour, a sense of responsibility and a gift for friendship. These qualities need to be developed in an institution that regards itself as educational….'

The components measured in trait Emotional Intelligence have existed previously as part of other questionnaires and similar factors have long been measured in the affective domain, although there may be differences in the precise wording. For example, emotional regulation is a very similar concept to emotional resilience and is not unrelated to the nineteenth century concept of 'stiff upper lip'. There is thus a considerable body of research evidence relevant to establishing a causal relationship between Emotional Intelligence and educational attainment. For example, by gathering evidence from sixty one research experts, ninety one formal review papers and one hundred and seventy nine handbook chapters, Wang *et al.* (1993) found that the 'affective-motivational attitudinal disposition of students' was more important than peer group, school culture and the quantity and quality of classroom instruction in influencing learning outcomes. Focussing solely on curriculum and teaching initiatives might therefore not be the most effective way of improving examination performance. It is also worth noting that it is not unreasonable to expect the quality of instruction to be positively related to the levels of Emotional Intelligence of the students.

More recent research findings have supported the argument that features of the affective domain have a particular and separate impact on achievement. Some of the most useful research in this area is the review of positive youth development programs in the United States by Richard Catalano and his colleagues (Catalano *et al.*, 2004). They obtained a consensus that positive youth development programs sought to achieve one or more of the following objectives: promotes bonding, fosters resilience, promotes social competence, promotes emotional competence, promotes behavioural competence, fosters self determination, fosters spirituality, fosters self-efficacy, fosters clear and positive identity, fosters belief in the future, provides recognition of positive behaviours, fosters opportunities for pro-social involvement and fosters pro-social norms. Again the words may be different but many of the ideas are the same as those used in Emotional Intelligence.

Using very rigorous criteria for identifying effective programs, Catalano *et al.* (2004) identified thirty studies that could be used to draw sound conclusions about the effects on youth's behavioural and educational outcomes. Twenty five of these programs were successful. Nineteen of the programs showed significant improvements in a range of factors including interpersonal skills, quality of relationships, self control and academic achievement. They concluded that it was schemes involving methods that, in effect, improved Emotional Intelligence that produced these benefits. They also concluded that a structured programme is more likely to be a success and that it needs to be clear and well planned. They noted that structured programs that included opportunities to practice skills and gave feedback and positive reinforcement were more likely to be successful.

Another example of this type of work that has been evaluated is the Australian 'You can do it!' Programme (Bernard, 2006). This research found that, in another variant terminology, academic confidence, work persistence, work organisation, getting along and emotional resilience can be taught. Not only can these be taught but, following the training, academic performance is increased. The aim of this program is to create beneficial habits of mind, defined as an automatic tendency of a person to think in a certain way.

In conclusion, the research presented in this report suggests that academic ability is not the only predictor of educational achievement and that Emotional Intelligence has a very important effect on learning. Therefore, attempts to improve the emotional and social skills of British schoolchildren with training programs could be worthwhile. In particular, it may be more effective than concentrating solely on teaching and curriculum initiatives.

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Appendix: Emotional Intelligence questionnaire

3388606756

Student questionnaire

First name | Initial(s)

Surname

Candidate number | Date of Birth (dd – mm – yy) | Home postcode

Please read the instructions below and answer all questions

- Please answer the questions by putting a circle around the number that best reflects your degree of agreement or disagreement with that statement. There are no right or wrong answers.
- If for any reason you feel uncomfortable with answering some questions, simply leave them blank. However, we would appreciate it if you answer all questions.
- Work quickly, and don't think too long about the exact meaning of the statements.
- Try to answer as accurately as possible.

Thank you very much for your time and interest

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		DISAGREE COMPLETELY						AGREE COMPLETELY
1	I'm usually able to control other people	1	2	3	4	5	6	7
2	Generally, I don't take notice of other people's emotions	1	2	3	4	5	6	7
3	When I receive wonderful news, I find it difficult to calm down quickly	1	2	3	4	5	6	7
4	I tend to see difficulties in everything	1	2	3	4	5	6	7
5	On the whole, I have a gloomy point of view on most things	1	2	3	4	5	6	7
6	I don't have a lot of happy memories	1	2	3	4	5	6	7
7	Understanding the needs and desires of others is not difficult for me	1	2	3	4	5	6	7
8	I generally believe that things will work out fine in my life	1	2	3	4	5	6	7
9	I often find it difficult to recognise what emotion I'm feeling	1	2	3	4	5	6	7
10	I'm not socially skilled	1	2	3	4	5	6	7
11	I find it difficult to tell others that I love them even when I want to	1	2	3	4	5	6	7
12	Others admire me for being relaxed	1	2	3	4	5	6	7
13	I rarely think about old friends from the past	1	2	3	4	5	6	7
14	Generally, I find it easy to tell others how much they really mean to me	1	2	3	4	5	6	7
15	Generally, I need to be under pressure to really work hard	1	2	3	4	5	6	7
16	I tend to get involved in things I later wish I could get out of	1	2	3	4	5	6	7
17	I'm able to 'read' most people's feelings like an open book	1	2	3	4	5	6	7
18	I'm usually able to influence the way other people feel	1	2	3	4	5	6	7
19	I normally find it difficult to calm angry people down	1	2	3	4	5	6	7
20	I find it difficult to take control of situations at home	1	2	3	4	5	6	7
21	I generally hope for the best	1	2	3	4	5	6	7
22	Others tell me that they admire me for my honesty	1	2	3	4	5	6	7
23	I really don't like listening to my friends' problems	1	2	3	4	5	6	7
24	I'm normally able to 'get into someone else's shoes' and experience their emotions	1	2	3	4	5	6	7
25	I believe I'm full of weaknesses	1	2	3	4	5	6	7
26	I find it difficult to give up things I know and like	1	2	3	4	5	6	7
27	I always find ways to show my affection to others when I want to	1	2	3	4	5	6	7
28	I feel that I have a number of good qualities	1	2	3	4	5	6	7
29	I tend to rush into things without much planning	1	2	3	4	5	6	7
30	I find it difficult to speak about my intimate feelings even to my closest friends	1	2	3	4	5	6	7
31	I'm not able to do things as well as most people	1	2	3	4	5	6	7
32	I'm never really sure what I'm feeling	1	2	3	4	5	6	7
33	I'm usually able to show my emotions when I want to	1	2	3	4	5	6	7
34	When I disagree with someone, I usually find it easy to say so	1	2	3	4	5	6	7

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		DISAGREE COMPLETELY						AGREE COMPLETELY
35	I normally find it difficult to keep myself motivated	1	2	3	4	5	6	7
36	I know how to get rid of my negative moods	1	2	3	4	5	6	7
37	On the whole, I find it difficult to describe my feelings	1	2	3	4	5	6	7
38	I find it difficult not to feel sad when someone tells me about something bad that happened to them	1	2	3	4	5	6	7
39	When something surprises me, I find it difficult to get it out of my mind	1	2	3	4	5	6	7
40	I often pause and think about my feelings	1	2	3	4	5	6	7
41	I tend to see the glass as half-empty rather than as half-full	1	2	3	4	5	6	7
42	I often find it difficult to see things from another person's point of view	1	2	3	4	5	6	7
43	I'm a follower, not a leader	1	2	3	4	5	6	7
44	Those close to me often complain that I don't treat them right	1	2	3	4	5	6	7
45	Many times, I find it difficult to know what emotion I am feeling	1	2	3	4	5	6	7
46	I couldn't affect other people's feelings even if I wanted to	1	2	3	4	5	6	7
47	If I'm jealous of someone, I find it difficult not to behave badly towards them	1	2	3	4	5	6	7
48	I get stressed by situations that others find comfortable	1	2	3	4	5	6	7
49	I find it difficult to sympathise with other people's problems	1	2	3	4	5	6	7
50	In the past, I have taken credit for someone else's ideas	1	2	3	4	5	6	7
51	On the whole, I cope well with change	1	2	3	4	5	6	7
52	I am unable to change the way other people feel	1	2	3	4	5	6	7
53	I have many reasons for not giving up easily	1	2	3	4	5	6	7
54	I like putting effort even into things that are not really important	1	2	3	4	5	6	7
55	I always take responsibility when I do something wrong	1	2	3	4	5	6	7
56	I tend to change my mind frequently	1	2	3	4	5	6	7
57	When I argue with someone, I can only see my point of view	1	2	3	4	5	6	7
58	Things tend to turn out right in the end	1	2	3	4	5	6	7
59	When I disagree with someone, I generally prefer to remain silent rather than make a scene	1	2	3	4	5	6	7
60	If I wanted to, it would be easy for me to make someone feel bad	1	2	3	4	5	6	7
61	I would describe myself as a calm person	1	2	3	4	5	6	7
62	I often find it difficult to show my affection to those close to me	1	2	3	4	5	6	7
63	There are many reasons to expect the worst in life	1	2	3	4	5	6	7
64	I usually find it difficult to express myself clearly	1	2	3	4	5	6	7
65	I don't mind frequently changing my daily routine	1	2	3	4	5	6	7
66	Most people are better liked than I am	1	2	3	4	5	6	7
67	Those close to me rarely complain about how I behave towards them	1	2	3	4	5	6	7

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		DISAGREE COMPLETELY						AGREE COMPLETELY
68	I usually find it difficult to show my emotions the way I would like to	1	2	3	4	5	6	7
69	Generally, I'm able to adapt to new situations	1	2	3	4	5	6	7
70	I often find it difficult to adjust my life according to what is happening	1	2	3	4	5	6	7
71	I would describe myself as a good negotiator	1	2	3	4	5	6	7
72	I can deal well with people	1	2	3	4	5	6	7
73	On the whole, I'm a highly motivated person	1	2	3	4	5	6	7
74	I have stolen things in the past	1	2	3	4	5	6	7
75	On the whole, I'm pleased with my life	1	2	3	4	5	6	7
76	I find it difficult to control myself when I'm extremely happy	1	2	3	4	5	6	7
77	Sometimes, it feels like I'm producing a lot of good work effortlessly	1	2	3	4	5	6	7
78	When I take a decision, I'm always sure it is the right one	1	2	3	4	5	6	7
79	If I went on a blind date, the other person would be disappointed with my looks	1	2	3	4	5	6	7
80	I normally find it difficult to adjust my behaviour according to the people I'm with	1	2	3	4	5	6	7
81	On the whole, I'm able to identify myself with others	1	2	3	4	5	6	7
82	I try to control my stress levels	1	2	3	4	5	6	7
83	I don't think I'm a useless person	1	2	3	4	5	6	7
84	I usually find it difficult to balance my emotions	1	2	3	4	5	6	7
85	I can handle most difficulties in my life in a cool and calm manner	1	2	3	4	5	6	7
86	If I wanted to, it would be easy for me to make someone angry	1	2	3	4	5	6	7
87	On the whole, I like myself	1	2	3	4	5	6	7
88	I believe I'm full of personal strengths	1	2	3	4	5	6	7
89	I generally don't find life enjoyable	1	2	3	4	5	6	7
90	I'm usually able to calm down quickly after I've got mad at someone	1	2	3	4	5	6	7
91	I can remain calm even when I'm extremely happy	1	2	3	4	5	6	7
92	Generally, I'm not good at comforting others when they feel bad	1	2	3	4	5	6	7
93	I'm usually able to settle arguments	1	2	3	4	5	6	7
94	I never put pleasure before work	1	2	3	4	5	6	7
95	Imagining myself in someone else's position is not difficult for me	1	2	3	4	5	6	7
96	I need a lot of self-control to keep myself out of trouble	1	2	3	4	5	6	7
97	It is easy for me to find the right words to describe my feelings	1	2	3	4	5	6	7
98	I expect that most of my life will be enjoyable	1	2	3	4	5	6	7
99	I am an ordinary person	1	2	3	4	5	6	7
100	I tend to get 'carried away' easily	1	2	3	4	5	6	7

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		DISAGREE COMPLETELY						AGREE COMPLETELY
101	I usually try to avoid negative thoughts and think of positive alternatives	1	2	3	4	5	6	7
102	I don't like planning ahead	1	2	3	4	5	6	7
103	Just by looking at somebody, I can understand what he or she feels	1	2	3	4	5	6	7
104	Life is beautiful	1	2	3	4	5	6	7
105	I normally find it easy to calm down after I have been scared	1	2	3	4	5	6	7
106	I want to be in charge of things	1	2	3	4	5	6	7
107	I usually find it difficult to change other people's opinions	1	2	3	4	5	6	7
108	I'm generally good at social chit-chat	1	2	3	4	5	6	7
109	Controlling myself is not very difficult for me	1	2	3	4	5	6	7
110	I really don't like my physical appearance	1	2	3	4	5	6	7
111	I tend to speak well and clearly	1	2	3	4	5	6	7
112	On the whole, I'm not satisfied with how I cope with stress	1	2	3	4	5	6	7
113	Most of the time, I know exactly why I feel the way I do	1	2	3	4	5	6	7
114	I find it difficult to calm down after I have been strongly surprised	1	2	3	4	5	6	7
115	On the whole, I would describe myself as assertive	1	2	3	4	5	6	7
116	On the whole, I'm not a happy person	1	2	3	4	5	6	7
117	When someone offends me, I'm usually able to remain calm	1	2	3	4	5	6	7
118	Most of the things I manage to do well seem to require a lot of effort	1	2	3	4	5	6	7
119	I have never lied to save someone from feeling hurt	1	2	3	4	5	6	7
120	I find it difficult to connect well even with those close to me	1	2	3	4	5	6	7
121	I consider all the advantages and disadvantages before making up my mind	1	2	3	4	5	6	7
122	I don't know how to make others feel better when they need it	1	2	3	4	5	6	7
123	I usually find it difficult to change my attitudes and views	1	2	3	4	5	6	7
124	Others tell me that I rarely speak about how I feel	1	2	3	4	5	6	7
125	On the whole, I'm satisfied with my close relationships	1	2	3	4	5	6	7
126	I can identify an emotion from the moment it starts to develop in me	1	2	3	4	5	6	7
127	On the whole, I like to put other people's interests above mine	1	2	3	4	5	6	7
128	Most days, I feel great to be alive	1	2	3	4	5	6	7
129	I tend to get a lot of pleasure just from doing something well	1	2	3	4	5	6	7
130	It is very important to me to get along with all my close friends and family	1	2	3	4	5	6	7
131	I frequently have happy thoughts	1	2	3	4	5	6	7
132	I have many strong arguments with those close to me	1	2	3	4	5	6	7
133	Showing my emotions with words is not difficult for me	1	2	3	4	5	6	7

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		DISAGREE COMPLETELY						AGREE COMPLETELY
134	I find it difficult to take pleasure in life	1	2	3	4	5	6	7
135	I'm usually able to influence other people	1	2	3	4	5	6	7
136	When I'm under pressure, I tend to lose my calmness	1	2	3	4	5	6	7
137	I usually find it difficult to change my behaviour	1	2	3	4	5	6	7
138	Others look up to me	1	2	3	4	5	6	7
139	Others tell me that I get stressed very easily	1	2	3	4	5	6	7
140	I'm usually able to find ways to control my emotions when I want to	1	2	3	4	5	6	7
141	I believe that I would make a good salesman	1	2	3	4	5	6	7
142	I lost interest in what I do quite easily	1	2	3	4	5	6	7
143	I have many routines	1	2	3	4	5	6	7
144	I would normally defend my opinions even if it meant arguing with important people	1	2	3	4	5	6	7
145	I would describe myself as a flexible person	1	2	3	4	5	6	7
146	Generally, I need a lot of encouragement in order to do my best	1	2	3	4	5	6	7
147	Even when I'm arguing with someone, I'm usually able to take their point of view	1	2	3	4	5	6	7
148	On the whole, I'm able to deal with stress	1	2	3	4	5	6	7
149	I try to avoid people who may stress me out	1	2	3	4	5	6	7
150	I often do things without considering all the consequences	1	2	3	4	5	6	7
151	I tend to 'back down' even if I know I'm right	1	2	3	4	5	6	7
152	I find it difficult to take control of situations at school	1	2	3	4	5	6	7
153	Some of my responses on this questionnaire are not 100% honest	1	2	3	4	5	6	7

When answering the following questions think about **your school work or your exams** and put a circle around the number that best reflects your degree of agreement or disagreement with that statement.

		DISAGREE COMPLETELY						AGREE COMPLETELY
1	I can always manage to solve difficult problems if I try hard enough	1	2	3	4	5	6	7
2	If someone opposes me, I can find the means and ways to get what I want	1	2	3	4	5	6	7
3	It is easy for me to stick to my aims and achieve my goals	1	2	3	4	5	6	7
4	I am confident that I could deal well with unexpected events	1	2	3	4	5	6	7
5	Thanks to my resourcefulness, I know how to handle unexpected situations	1	2	3	4	5	6	7
6	I can solve most problems if I invest the necessary effort	1	2	3	4	5	6	7
7	I can remain calm when facing difficulties because I can rely on my abilities	1	2	3	4	5	6	7
8	When I am confronted with a problem, I can usually find several solutions	1	2	3	4	5	6	7
9	If I am in trouble, I can usually think of a solution	1	2	3	4	5	6	7
10	I can usually handle whatever comes my way	1	2	3	4	5	6	7