



# **Understanding "soft skills" development at Independent Schools**

## **An Analysis of Mental Toughness at UK Independent Schools**

**January 2017**



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## Executive Summary

This report sets out the key outputs from a study on pupils in Independent Schools and compares the data where possible with equivalent data from State Schools. It is a purely quantitative study and represents a “snap shot in time”. No qualitative work was undertaken.

The study examined to what extent pupils in Independent Schools possessed a flexible mindset (i.e. were likely to possess soft skills). Few schools specifically targeted a specific model or framework for mindset or aspects of mindset in their work with their pupils although most or all sought to develop broader life skills or what are often called soft skills.

The study employed the 4 Cs Mental Toughness Model and framework and the associated valid and reliable psychometric measure MTQ48 (and for some junior schools the JMT-i). See page 9 for more details about the theory underpinning the MTQ48 and JMT-i. Both are normative measures which enables effective comparisons to be made across different samples and populations.

Moreover, the 4 Cs framework (Control, Commitment, Challenge, Confidence) is very well evidenced and it is generally recognised as embracing most of the models which today are used to develop “character and resilience” in young people. The framework serves to standardise what individual schools do and enables useful and meaningful comparisons to be made.

Understanding Mental Toughness is considered important because it is developable and closely correlated with attainment, wellbeing, behaviour and transition change. For example, Mental Toughness, as measured by the MTQ48 accounts for 25% of the variation in performance

As with any such study, the exercise was able to answer most if not all of the initial questions raised. The outputs are interesting and in their turn they raise possibly more questions than they have initially answered. Such is the nature of research.

The key findings were:

### **MTQ48 Measure Overall Analyses.**

- Generally, when looking at overall data, pupils in Independent Schools appear to achieve small but statistically significant higher Mental Toughness scores than their State School counterparts.
  - The difference in Mental Toughness scores varied between each of the 4 Mental Toughness constructs.
  - The greatest differences being on the Commitment and Challenge scales where scores were significantly higher than for State School pupils.
  - Commitment is closely related to conscientiousness and Challenge represents openness to experience and to learning.

- There was a negligible difference when it came to scores for Confidence (and for Emotional Control).
- Redefining the 4 Cs in terms of Resilience and Positivity, the results from the survey suggest the following:
  - Independent School pupils are more resilient than State School pupils – and therefore may be better at dealing with adversity and setbacks (such as getting a poor mark for a piece of work).
  - Independent pupils may be more open to learning
- Schools varied significantly in terms of the Mental Toughness profiles for their pupils - see Table 4. This indicates that individual schools may focus attention on different “soft skills” which are represented by the 4 Cs and their subscales.

### **Analyses by Year Group**

Patterns of Mental Toughness scores varied across year groups. This mirrors what we see in the state sector.

- The data shows a U shaped curve for overall Mental Toughness between scores for years 5/6 and years 12/13 with overall scores returning to years 5/7 levels by year 11. Scores fall away at years 7, 8 and 9. This again is typical of what we see in other studies and might reflect hormonal changes at certain ages and transition to different schools
- There are differences in the scores for each of the 4 Cs. The most significant being the drop in Commitment scores over the years and the corresponding increase in Interpersonal Confidence scores over the same period.

This might suggest that Independent Schools are particularly effective in developing Interpersonal Confidence. During these years, Interpersonal Confidence can be an important factor in examinations. The greater the Interpersonal Confidence, the more likely the individual is to offer fuller answers to exam questions.

### **Analyses by Gender**

- The data shows a significant difference between overall Mental Toughness scores for males and females with male scores being significantly higher.
- There are differences in the scores for each of the 4 Cs. Male pupils score significantly higher than female pupils on the Control and Confidence scales. On the Commitment scale there is only a slight difference in favour of male pupils.
- The patterns of scores mirror what we see in State Schools.
- Comparison with State school data shows very similar patterns of differences for both male and female pupils. Where comparative data exists, the data indicates that:

- Males at Independent schools exhibit higher levels of mental toughness than males at state schools
  - Females at Independent schools exhibit higher levels of mental toughness than females at state schools
  - The greatest differences are on the Commitment and Challenge scales which relate to conscientiousness and openness to learning.
- In terms of the U-shaped curve observed, the dip in years 8 and 9 is much more pronounced with female pupils than with male pupils. The dip is most pronounced with the Challenge and Life Control scales. Again this is consistent with studies and research observed elsewhere.

### **Analysis of Mental Toughness scores for staff**

- Albeit a small sample, there is evidence that staff in Independent Schools may be more mentally tough than staff in State Schools.
- Studies indicate that staff Mental Toughness is a factor in pupils' Mental Toughness. Mental Toughness is an important life skill that is learned through experimentation and observation of the behaviour and emotions of the people closest to them.
- It has also been shown that teachers may have a causal effect on other factors such as student absences and grade progression.
- The higher MT scores for staff at Independent Schools is likely to be a factor contributing to the higher scores for pupils at Independent Schools

### **JMT-i measure**

Note: As indicated within the report, some of this data may need to be treated with caution. The sample is much smaller than the MTQ48 sample and there is some indication of over-assessing pupils in some of the data. Nevertheless, there is evidence to suggest that:

- Pupils in years 1 – 6 are more mentally tough than the norm for their population and more mentally tough than that their counterparts in State Schools.
- There is evidence of a reduction in Mental Toughness scores in year 6 (and in year 3)

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## The Brief

The Independent Schools Council (ISC) has identified the importance of demonstrating the value that Independent Schools add for their pupils. The academic value that Independent Schools add can easily be demonstrated through exam results but the softer values (the so-called “soft skills”) that they add such as Confidence, Commitment etc. may not always be easily demonstrated.

The hypothesis is that Independent Schools develop pupils in such a way that they have a long-lasting significant advantage over pupils developed in the state system.

A number of studies already exist that support this hypothesis:

- The Institute of Education produced a report (Green, Parsons, Sullivan, & Wiggins, 2015) that looked at soft skill development at UK Independent Schools. It includes findings such as higher “locus of control” and “aspirations” in independent school pupils having effects on later life achievement. It does not however discuss the link between the effects of soft skills on academic achievement (in contrast to the theory underpinning the MTQ48) so we suspect this reports underestimates the importance of soft skills.
- Oxford University produced a report (Jerrim, Parker, Chmielewski, & Anders, 2015) which explored why independent school pupils do better than their state school counterparts. It stripped out background and academic achievement and concluded a significant proportion of “residual” factors which we might conclude to be “soft” skills.
- The Institute for Fiscal Studies produced a report (Brimstone, n.d.) which says that private school graduates significantly out earn their state school counterparts. Graduates of equal ability are compared suggesting the difference is related to non-academic (soft) skills.
- A Social Mobility paper (Ashley, Duberley, Sommerlad, & Scholarios, 2015) showed that pupils from low income groups tend to lack the soft skills needed to succeed in the workplace.
- Bristol University produced a paper (Macmillan, Tyler, & Vignoles, n.d.) which shows that children from Independent Schools are six percentage points more likely to work in a top NS-SEC occupation than those with the same academic achievement who went to State Schools.
- The recent CEM Durham report (Ndaji, Little, & Coe, 2016) concluded that independent school pupils achieve higher academic success even after prior ability and socio-economic factors are controlled for. Again this points to non-academic (soft) skills accounting for the difference.
- A Sutton Trust report (Kirby, 2015) also discusses soft skills and how these are often more accessible to independent school pupils.

The aim of this study was to provide a more definitive answer to this question as to whether Independent Schools in the UK do in fact develop pupils' soft skills in a way that they have a long-lasting significant advantage over pupils developed in the state system.

The MTQ48 was chosen because of its more integrated approach, providing a measure that embraces multiple types of soft skills and character traits.



## Mental Toughness: Overview of theory

This section provides a brief overview of the theory underpinning Mental Toughness. The work is based on 20+ years of research and as such it is not possible to give a thorough account here. Readers are invited to review the wider literature available on the AQR website and beyond.

Mental Toughness has been defined as, ***“A personality trait which determines in large part how individuals deal effectively with challenge, opportunity, stressors and pressure...irrespective of circumstances”*** (Clough & Strycharczyk, 2015).

Mental Toughness describes the mindset that every person adopts in everything they do. It defines how we think and shouldn't be confused with behavioural traits (such as extraversion and introversion) which can be more situational.

It is closely related to qualities such as Mindset (Dweck), character, resilience, grit (Duckworth), Learned Optimism (Seligman) etc. All of these qualities have been identified in studies as important in the education and development of young people. The ability to deal with the demands of schools is at the core of Mental Toughness (Clough, Earle & Sewell, 2002). The Mental Toughness model and framework is widely recognised as embracing all of these elements in one integrated model.

Studies using monozygotic and dizygotic twins separated at birth show that Mental Toughness may have a hereditary component and that its basis lies within biology (Veselka, Schermer, Petrides & Vernon, 2009). Genes may have a large bearing on educational achievement. An Early Development Study on twins concluded that at GCSE level results seem to be determined by 58% genes and 36% school (Oliver & Plomin, 2007).

However, research also shows that both genetic and environmental factors contribute to the individual differences in Mental Toughness (Horsburgh, Schermer, Veselka & Vernon, 2009). Mental Toughness has been shown to be a narrow plastic (i.e. capable of change) Personality Trait.

Research shows that an individual's Mental Toughness is closely correlated with

- Attainment/Performance – Studies in the UK and the Netherlands indicate that Mental Toughness (as assessed through the MTQ48) accounts for 25% of the variation in attainment.
- Wellbeing
- Behaviour
- Transition/Change

The Mental Toughness model and framework is summarised below:

<b>Mental Toughness Scale</b>	<b>What this means ... what does MTQ48 assess</b>
<b>CONTROL</b>	<i>Life Control</i> – I really believe I can do it. I believe that I am in control of much of what determines my ability to do things.
	<i>Emotional Control</i> – I can manage my emotions and the emotions of others
<b>COMMITMENT</b>	<i>Goal Setting</i> – I promise to do it – I like working to goals and will set goals for myself
	<i>Achieving</i> – I'll do what it takes to keep my promises and achieve my goals
<b>CHALLENGE</b>	<i>Risk Taking</i> – I will stretch myself and welcome new situations – I am not frightened of new things
	<i>Learning from Experience</i> – even setbacks are opportunities for learning and I will try again if I have not succeeded the first time
<b>CONFIDENCE</b>	<i>In Abilities</i> – I believe I have the ability to do it – or can acquire the ability. I have less need for validation from others.
	<i>Interpersonal Confidence</i> – I can influence and engage with others – I can stand my ground if needed – I will ask questions of others

Mental Toughness (as measured by the MTQ48 Young Person's Questionnaire and the Junior Mental Toughness Indicator, JMT-i) has emerged as a significant factor in the development of young people.

Over the past several years, research and case studies have emerged which show that Mental Toughness is strongly correlated with performance, wellbeing, positive behaviours, aspirations and employability.

Research shows that individuals who are mentally tough find it easier to deal with the demands of school (St Clair-Thompson, Bugler, Robinson, Clough, McGeown & Perry, 2014). Mental Toughness has been linked to a number of key factors within education such as, academic engagement, valuing schoolwork, coping effectively and thriving on pressure (Crust, 2008; St Clair-Thompson et al, 2014).

Links have also been made between Mental Toughness and educational outcomes (Clough, submitted 2016). A significant relationship has been found between Mental Toughness and student's attainment and attendance. The performance and attendance of mentally tough individuals has been found to be significantly higher than those with lower levels of Mental Toughness (St Clair-Thompson et al, 2015).

Studies show that Mental Toughness has an impact on and is the best predictor of classroom behaviour (St Clair-Thompson et al, 2014). An interrelationship has been found between Mental Toughness, student motivation and classroom behaviour. Results show a positive correlation between Mental Toughness and the positive aspects of student

motivation, as well as a negative association between Mental Toughness and negative classroom behaviour. This suggests that higher levels of Mental Toughness result in higher levels of motivation and more positive behaviours.

It is equally important in adult development and behaviour and is widely used in staff development and in school leadership development. Indeed, studies indicate that staff Mental Toughness is a factor in pupil's Mental Toughness (Strycharczyk & Clough, 2014). It has also been shown that teachers may have a causal effect on other factors such as student absences and grade progression (Jackson, 2013). Developing psychological or emotional resilience and Mental Toughness is a very important life skill, which brings lots of benefits not only for the young person but for our society.

As Dan=ian Allen, Director of Learning Opportunities & Skills at Doncaster Council put it "Not only can we, in many cases, enhance a young person's performance, these particular skills are useful for just about everything else that person is going to have to do in life".

Preparing young people for employment involves equipping them with the essential soft skills that they need to succeed. These skills play a key role in the employability of a young person (Strycharczyk & Clough, 2014). Further research has shown how Mental Toughness has benefits across various aspects of life such as, sleep, stress, and memory.

Higher levels of Mental Toughness have been associated with lower levels of stress and better sleep quality with fewer awakenings (Gerber et al, 2013; Brand et al, 2014; Dewhurst, Anderson, Cater, Crust & Clough, 2012). It has also been shown that individuals with high levels of Mental Toughness are able to recall information better. They have also been shown to be better at preventing old and unwanted information from interfering with new information (Dewhurst et al, 2012).

Developing young people's Mental Toughness is an investment made towards creating a more resilient society of the future that is capable of managing new challenges with a positive outlook.

### **Can we develop Mental Toughness in young generations?**

The good news is that Mental Toughness can be developed. There is a wide range of interventions, almost all experiential, developed by the subject experts, which enable parents and educators to work with young people helping them to grow their mindset.

It is worth noting that it isn't always necessary to develop Mental Toughness in an individual. Self-awareness is the key here.

Some more mentally sensitive individuals can become more effective by showing them the core behaviours and actions that a mentally tough person adopts and supporting them to adopt these behaviours. Essentially this shows them how to **cope** with stress, pressure, challenge and opportunity.

Others, on reflection, will consciously seek to change. They will be more open to changing mindset and through that behaviour and attainment. This shows them how to **deal** with stress, pressure, challenge and opportunity.

Some of those who learn to cope, in time move on to learning how to deal with life and its challenges.

As with any development activity, the starting point is to define areas of attention for development and to assess the situation. We need to examine where we are now. Only carefully designed, valid and reliable assessments will deliver the information required to make better informed decisions as to which areas require our attention, what might come next and which tools we might usefully deploy in our work.

### **How do we assess the level of Mental Toughness?**

The Mental Toughness of young people is assessed using either the MTQ48 Young Person's Questionnaire, or the Junior Mental Toughness Indicator (JMT-i). The JMT-i is completed by a teacher and is used for pupils between the ages of 5 and 9. The MTQ48 Young Person's Questionnaire is generally completed by young people from age 10.

The MTQ48 is based on Professor Peter Clough's original work and assesses individuals across the 4 Cs and 4 subscales.

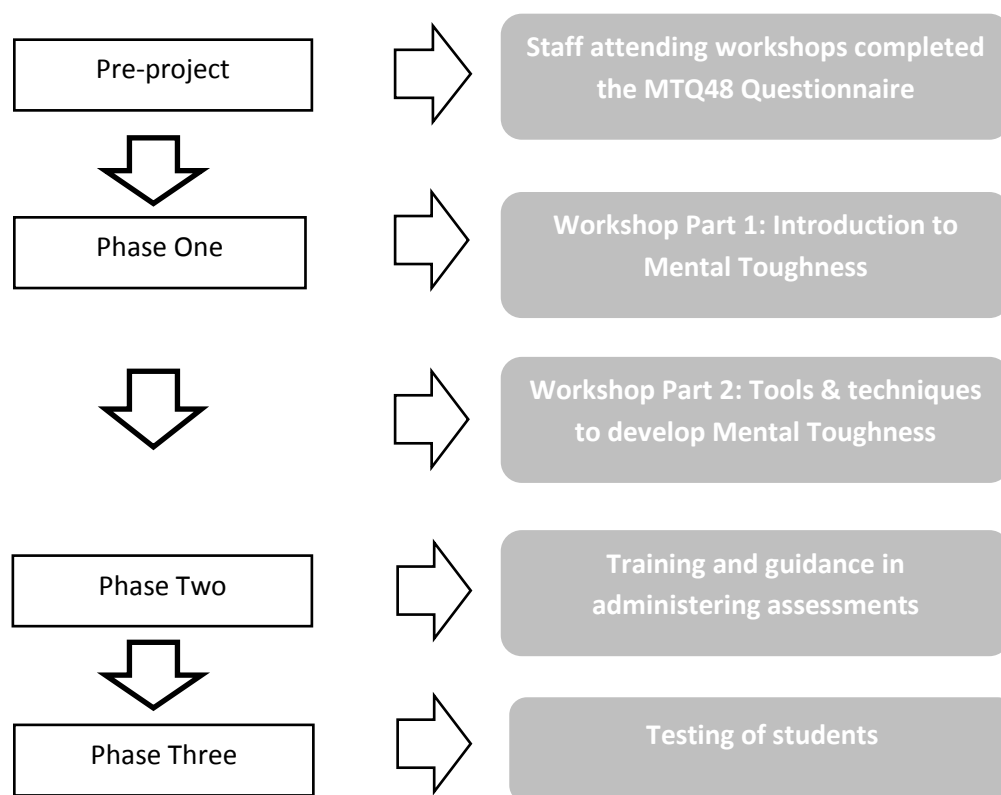
The JMT-i also assesses individuals across the 4 Cs but has been developed to assess 8 subscales. The MTQ48 is currently in development to do the same.

Both measures are widely accepted as high quality measures and are normative. This means that test results are compared to the results of a norm group which represents the population at large.

AQR have previously tested a large number of State Schools using the MTQ48 and JMT-i measures. This bank of data will be used to compare independent school pupils' scores to pupils in State Schools.

## Method

The process of participation consisted of three phases outlined in the chart below:



Phase one involved one or two members of staff from each school attending a one day workshop. During the workshop they were provided with an understanding of the Mental Toughness model and questionnaire and how to apply it with their pupils. It also involved an introduction to tools and techniques for developing Mental Toughness.

Nine workshops were run over a two-week period. Prior to the workshop, all attendees completed the MTQ48 Questionnaire.

The second phase involved other members of staff to attend an online administration training session where they were provided with training, support and guidance for testing students using the measures.

This is an important step. Good test administration is significant in ensuring that the study is based on clean reliable data. A small number of staff who were responsible for handling the administration procedures also completed the MTQ48 Questionnaire. 26 x 30-minute online sessions were run over a three-week period.

Administration and testing was completed using an online assessment management system.

For phase three, time was set aside from pupil's lesson time to complete the assessment.

For younger students between the ages of 5-9, staff who knew the pupils well, completed an alternative form of the Mental Toughness questionnaire - the JMT-i. This is a behaviour based questionnaire which enables third parties to assess the Mental Toughness of participants in terms of the 4 Cs.

## Participants

A total of 58 ISC schools volunteered to participate in the project. The candidates consisted of a sample of pupils across the whole spectrum from Year 1 to Year 13 from a range of day schools, boarding schools, co-ed and single-sex schools.

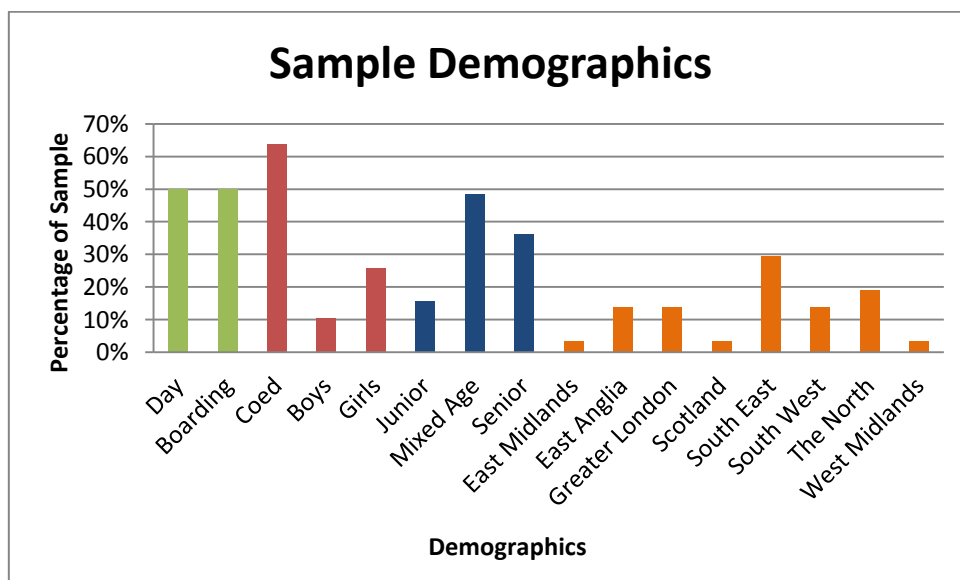
Several of the schools were based in the London area, but the sample of schools was fairly distributed across the UK. For a small number of pupils, English was not their first language.

### The Data Set – Characteristics

With any research project, there are potential limitations.

#### Sample

Figure 1. Sample demographics



Firstly, the schools that did participate were largely self-selecting. This means that it is not necessarily a stratified sample with the pattern of students tested being representative of all independent school pupils in terms of characteristics such as academic attainment of the school, gender, location, school type etc.

However, a sample analysis revealed the following:

- There was a good mix across regions.
- The sample might be slightly over-represented in boarding schools (over day schools) and also girls' schools (over co-educational and boys' schools) but sample sizes for each are significant.
- There was a bias towards senior schools over junior schools (and similarly senior year groups over junior year groups) but this was anticipated given the nature of the test.

In addition, junior and senior school pupil results are largely analysed separately as senior pupils complete the MTQ48 test and junior pupils the JMT-I test therefore this sample bias is of little concern.

- In terms of the GCSE rankings (based on % of A/A\*s in 2015) the spread of participating schools also emerges as satisfactory. The highest ranking school was at #34 on the list, the lowest was #497 (out of 550). So again a good spread. The average ranking was 224.
- In terms of year groups, the project offers a snapshot view of Independent Schools as it consisted only of a selected number of year groups from each school, which again may not be representative of the whole population.

This does need to be considered carefully when examining data.

What we can say with certainty is that the results represent a picture of the Mental Toughness of students from the participating schools. We cannot say with certainty that this represents a picture of *all* Independent School pupils. However, the sample analysis suggests a good representative sample.

Data was gathered on 9,057 pupils (of which 8,229 completed the MTQ48 and 828 completed the JMT-i) and on 105 staff. These are statistically significant numbers and enable us to analyse data and report observations with a degree of confidence that they provide useful and valuable information.

Furthermore, given the size of the sample and the significant number of participating schools, we are confident that the sample is broadly representative of Independent Schools.

#### Data consistency and cleanliness

Another potential factor here is consistency of test administration. To reliably compare results from different schools and different year groups, one needs to be confident that all testing took place in the same way and under equivalent conditions.

This impacts on another important factor - the cleanliness of the data. By this we mean that the data has been gathered carefully in such a way that it is indeed representative of the group being assessed. An important test here is "spread".

One would expect, in any situation, to see a spread of tests results from high to low. Different schools would have different means but we would still expect to see a spread of scores for individual pupils around that mean score.

The results from the application of the MTQ48 show a good variation of scores. The MTQ48 was used with year groups 7 – 13 with some data from Years 5 and 6 in some schools.



Table 1, which can be found in the aggregate results section, shows a summary of the statistical analysis for the whole MTQ48 data set.

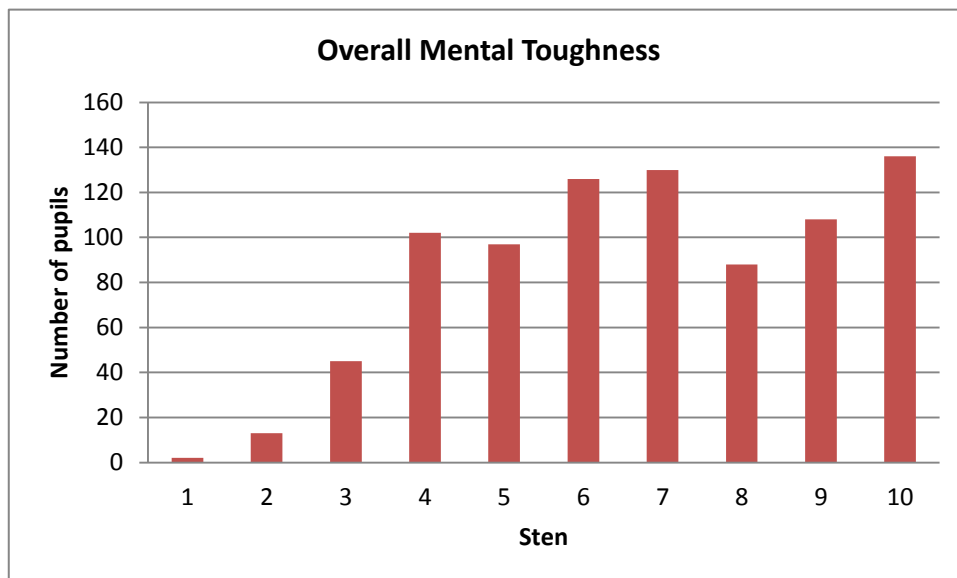
However the application of the JMT-i reveals that, although there was a good spread of data there was also some evidence that a small number of schools may have over assessed their pupils.

Staff were asked to assess their pupils on a scale of 1 – 5 across 24 behavioural statements. Most assessed students reasonably across that range. A very small number appear to have assessed almost all of their students as being at the higher end of the scale.

This gave rise to a distribution curve with “two peaks”.

Figure 2 below shows this. This shows the pattern of overall Mental Toughness for all participants from the JMT-i data set.

**Figure 2. Overall Mental Toughness (JMT-i)**



We therefore need to treat this data with caution. For the majority of schools, the person completing the tests on behalf of students was not necessarily the person who attended the explanatory workshops. It may be that communications within some schools was imperfect and those completing the questionnaire did not have any background knowledge or understanding about Mental Toughness or the process.

Table 2, which can be found in the aggregate results section shows a summary of the statistical analysis of the whole JMT-i data set.

Nevertheless, bearing all of this in mind, it is still possible to analyse the data and arrive at useful observations.

## **The Survey Results**

## Summary Results: MTQ48 & JMT-i

A total of 9,057 pupils participated in the project. 8,229 pupils from Years 4-11 completed the MTQ48 and staff completed the JMT-i on behalf of 828 pupils from Years 1-5.

Additionally, 105 staff also completed the MTQ48 Questionnaire. This report will address the results from both the MTQ48 Questionnaire and the JMT-i, examining the overall results of the project as well as breaking the results down to examine each component of Mental Toughness, variations in schools, year groups and gender.

### Descriptive Statistics

Data was screened for outliers, missing data and normality. No major issues emerged with the MTQ48 results. Issues in relation to the JMT-I dataset were highlighted earlier.

Descriptive statistics for the MTQ48 Young Person's Questionnaire are presented below in Table 1 and JMT-i in Table 2. Examination of the minimum and maximum values indicated a satisfactory range of scores for all components of Mental Toughness.

**Table 1. Descriptive statistics for MTQ48 Young Person's Questionnaire**

Descriptive Statistics	Min	Max	Mean	SD	Skewness	Kurtosis
<b>Overall Mental Toughness</b>	1	10	4.26	1.93	.26	.31
<b>Control</b>	1	10	4.16	1.71	.51	.29
Life Control	1	10	4.00	1.81	.54	.255
Emotional Control	1	10	4.47	1.82	.36	-.27
<b>Commitment</b>	1	10	4.34	1.98	.29	-.19
<b>Challenge</b>	1	10	4.19	2.06	.35	-.42
<b>Confidence</b>	1	10	4.47	1.97	.34	-.21
Confidence in Abilities	1	10	4.37	2.05	.45	-.11
Interpersonal Confidence	1	10	4.59	0.02	.54	.25

**Table 2. Descriptive statistics for JMT-i**

	Min	Max	Mean	SD	Skewness	Kurtosis
Descriptive Statistics						
<b>Overall Mental Toughness</b>	1	10	6.58	.08	-.03	-.094
<b>Control</b>	1	10	6.89	.08	-.12	-.92
Life Control	1	10	6.70	.09	-.01	-1.05
Emotional Control	1	10	6.50	.07	-.02	-.50
<b>Commitment</b>	1	10	6.74	.08	-.20	-.80
Goal Orientation	1	10	6.46	.08	-.01	-.63
Does what it takes	1	10	7.12	.07	-.41	-.40
<b>Challenge</b>	1	10	6.27	.08	.08	-.75
Stretches oneself	1	10	6.82	.07	-.39	-.09
Learns from all outcomes	1	10	5.76	.08	.03	-.57
<b>Confidence</b>	1	10	6.24	.08	-.12	-.43
Confidence in Abilities	1	10	6.16	.08	-.06	-.37
Interpersonal Confidence	1	10	6.16	.08	-.13	-.18

## MTQ48: Comparison of results with State Schools: Summary

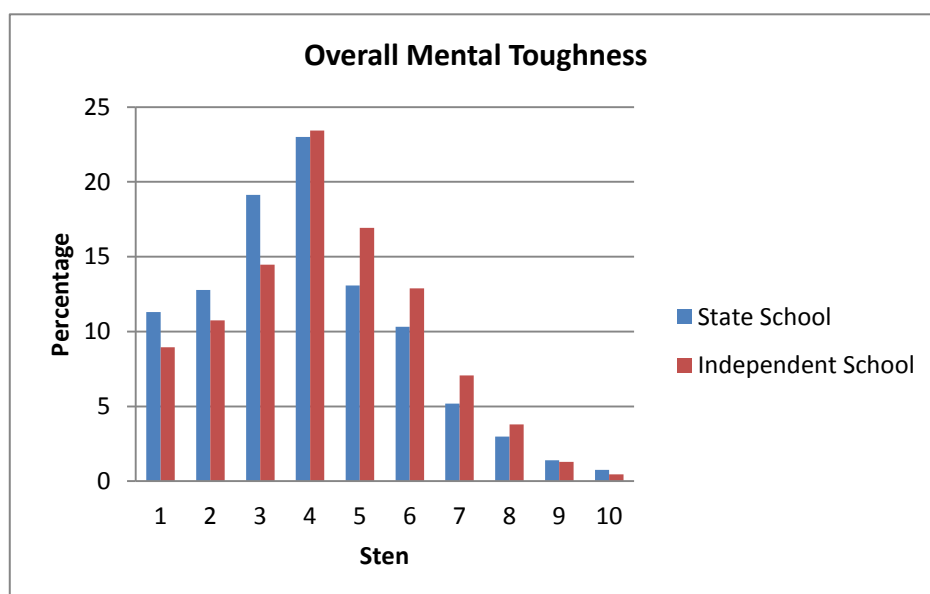
Over the years, AQR International have accumulated data for the MTQ48 from State Schools in the UK. Within this data set there is a set of clean reliable data based on almost 32,000 pupils across the whole range from years 6 – 13.

At this stage this too is not a stratified sample but has been used to offer a picture of the Mental Toughness levels and the Mental Toughness profile of pupils in State Schools in the UK. We can use this with some degree of confidence to compare the data from this study and to observe any differences in scores.

**Table 3. Overall Mental Toughness for Independent Schools and State Schools**

	Independent Schools Average	State Schools Average	Difference IS > SS
<b>Overall Mental Toughness</b>	4.26	3.94	+ 0.32
<b>Control</b>	4.16	4.06	+ 0.10
Life Control	4.00	3.72	+ 0.28
Emotional Control	4.47	4.56	- 0.09
<b>Commitment</b>	4.34	3.76	+ 0.58
<b>Challenge</b>	4.19	3.68	+ 0.51
<b>Confidence</b>	4.47	4.49	- 0.02
Confidence in Abilities	4.37	4.59	- 0.22
Interpersonal Confidence	4.59	4.59	-

**Figure 3. Overall Mental Toughness for Independent Schools and State Schools**



The results in table 3 and figure 3 show the average overall Mental Toughness score of Independent school pupils is 4.26. This is .32 stens higher than the State school average of 3.94. This is a small but statistically significant difference.

To put this into perspective, recent studies on the development of Mental Toughness show that achieving an average change of + 0.35 – 0.50 stens over a period of 1 year is recognised as a meaningful change in average Mental Toughness across large groups of young people particularly when there is a specific focus on developing Mental Toughness. This would normally be expected to translate into better attainment, behaviour and well-being.

We are now seeing the emergence of longitudinal studies which show that average Mental Toughness scores can be improved, for the benefit of the individuals, by 1.5 stens over a period of 2- 3 years.

Next, we will examine the results of each scale and subscale of the MTQ48 Young Person's Questionnaire and the JMT-i. We will firstly address the results of the MTQ48 Young Person's Questionnaire before moving onto the JMT-i.

Using the data from 32,000 state school pupils we make comparisons between the results from Independent Schools and State Schools throughout. Below, table 3 and 4 show how Independent School data compares to the data gathered from State Schools.

The value of the Mental Toughness framework and model lies in its capability to dig deeper than an overall picture of Mental Toughness. The MTQ48 enables data to be gathered about the 4 components of Mental Toughness (the 4 Cs) and in greater detail about two of those scales where there are two subscales for each.

This is where some rich observations can be made. See tables 1 and 2 for a summary of the data.

## **MTQ48: Comparison of results with State Schools: By Scales and Subscales**

### **Scales**

This helps to put some of the findings into context. There are significant differences between the detail on Mental Toughness between Independent School data and State School data.

This is explored in more detail below but the key observations are as follows:

The Commitment and Challenge scores are significantly higher for Independent Schools than for the State School data.

Commitment is 0.58 stens higher. Commitment is where there is a sense of goal orientation and a sense of doing what it takes to achieve the goal. It correlates with Conscientiousness (and is the core of Duckworth's Grit model). This suggests that Independent Schools are significantly more effective at developing this with their pupils. Duckworth's work (and the work of others) suggests that this is a significant factor in attainment.

This is supported by findings from the Centre for Education Monitoring and Durham University (2016) which have found that pupils from Independent Schools tend to achieve higher academic success than State school pupils after prior ability is controlled for.

The Challenge score is also significantly higher (+0.51). Challenge is where there is a sense of openness to new things, being prepared to stretch one self and not be afraid of the "new" (e.g. new subjects, topics, teachers, etc). They are also more likely to volunteer for activities. Challenge is where there is a strong sense of openness to learning.

Scores for Control and Confidence do not exhibit such large differences.

### **Sub-scales**

The first observation is that, where the overall mean is 4.26, one of the scores on subscales is significantly below this and two are significantly above this mean.

The one score significantly below is Life Control (4.00) which is perhaps not surprising in light of the recently published report by the Department for Education (Lessof et al., 2016) showing that pupils now generally feel less in control of events affecting them.

The two scores significantly above the mean are Emotional Control (4.47) and Interpersonal Confidence (4.59).

Life Control assesses to what extent there is a "can do" mindset and to what extent individuals feel they are able to shape their own destinies.

Interpersonal Confidence assesses to what extent individuals are minded to express themselves and show what they know – including to what extent they will ask questions and engage with others – teachers, peers, mentors, etc.

Low Interpersonal confidence scores can indicate a culture of “obedience”. Individuals learn to speak when they are spoken to and individuals are directed (in their learning) to a significant extent.

As we will see later in the report, the Life Control score for Independent Schools is still significantly higher than its equivalent in State Schools.

A potential hypothesis here might be that this corresponds to the notion of Learned Helplessness described by Seligman. Where education (and other learning opportunities) is “delivered on a plate” this may be a factor in the pupil’s sense that they are in control of their ability to learn.

It may be that teaching styles in Independent Schools are a (positive) factor in the development of Life Control in pupils. This is an interesting area for further exploration.

Emotional Control assesses to what extent individuals will mask their true emotions and avoid revealing their internal state to others. This is not a high score but might indicate that some pupils do not share their emotions and feelings with others – which can mean that others will not always appreciate what is going on in the mind of the young person.



## **MTQ48: Comparison of results with State Schools: Redefining the 4 Cs**

The data presented so far can be examined in another way. See table 3.

Some of the data is shown as shaded. This is the data for Control and Commitment. These two scales broadly correlate with what is understood by Resilience (particularly Life Control and Commitment). Resilience is the quality which enables individuals to survive adverse events and difficulties.

The Control and Commitment scores are broadly in line with overall Mental Toughness.

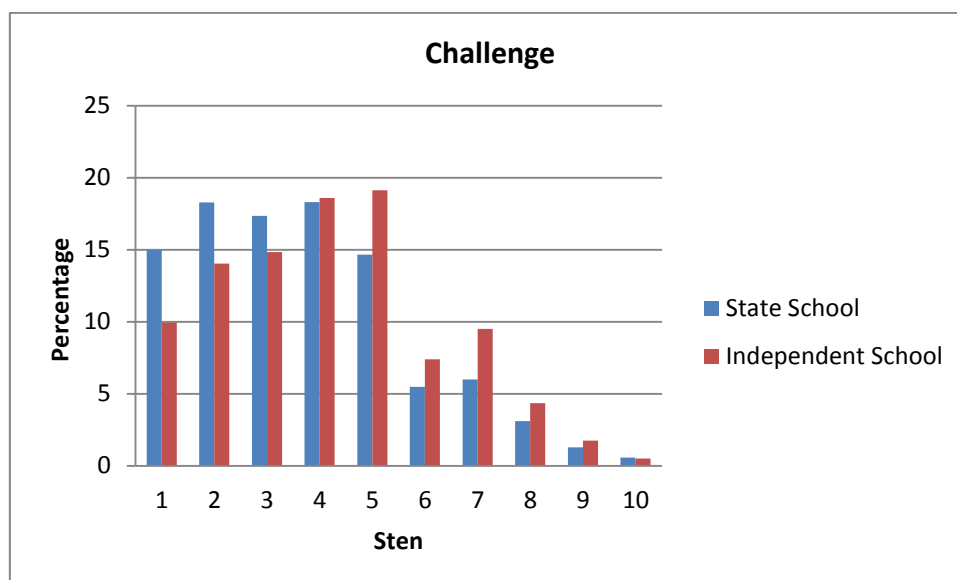
When compared to state school scores, there are significant positive differences. This indicates that Independent School pupils are more resilient than State School pupils – and therefore may be better at dealing with adversity and setbacks (such as getting a poor mark for a piece of work).

The sets of data which are unshaded represent the “positive” elements of Mental Toughness. This is where Resilience turns from being a neutral quality to being a positive quality - notions associated with this are ideas such as “the cup is half full” or “seeing the opportunities as well as the threats”. Challenge and Confidence underpin this.

The score for the Challenge scale is meaningfully higher than the scores for State School pupils. This indicates that Independent School pupils may be more open to learning.

## MTQ48: Comparison with State Schools: Challenge

Figure 4. Independent and State School comparison of the Challenge scale



The Challenge component of Mental Toughness addresses how individuals see challenge. These challenges can come in the form of change, setbacks and doing something new and different.

There are two elements – one is being prepared to stretch oneself, take calculated risks, do something new or different. The mindset is one of being excited or interested in new things. It relates to drive and to openness to learning. Doing different things represents an opportunity to experience new things. Mentally tough individuals on this scale will readily volunteer for new activities.

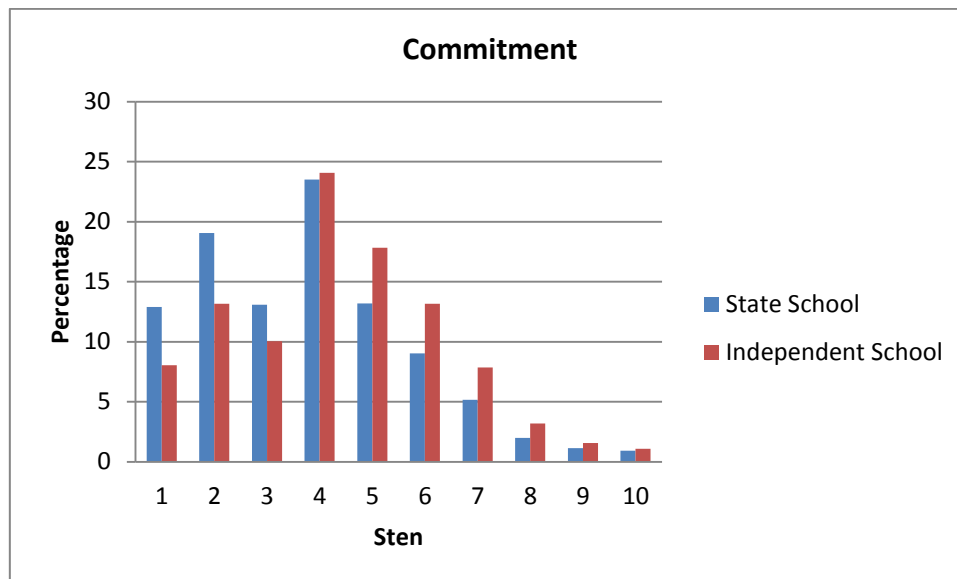
The other element is being prepared to learn from any outcome – good or bad. They are not likely to be daunted by failing at something. They are more likely to reflect, learn from the experience and then perhaps try again.

The MTQ48 presently assesses overall levels of Challenge.

The average score for the Challenge component of Mental Toughness for Independent School pupils is 4.19. Statistically, this is significantly higher than the state school average of 3.68.

## MTQ48: Comparison with State Schools: Commitment

Figure 5. Independent and State School comparison of the Commitment scale



The Commitment component refers to the extent to which an individual is inclined to think in terms of goals and targets and will stick to them.

Again there are two elements – the first is goal orientation. Individuals who have a strong sense of goal orientation will like setting goals and targets (e.g. an athlete setting a personal best or a student aspiring to get better marks). This becomes an important driver for some. Individuals with lower scores will often learn to avoid setting targets – thereby avoiding the risk of failure and all that this implies.

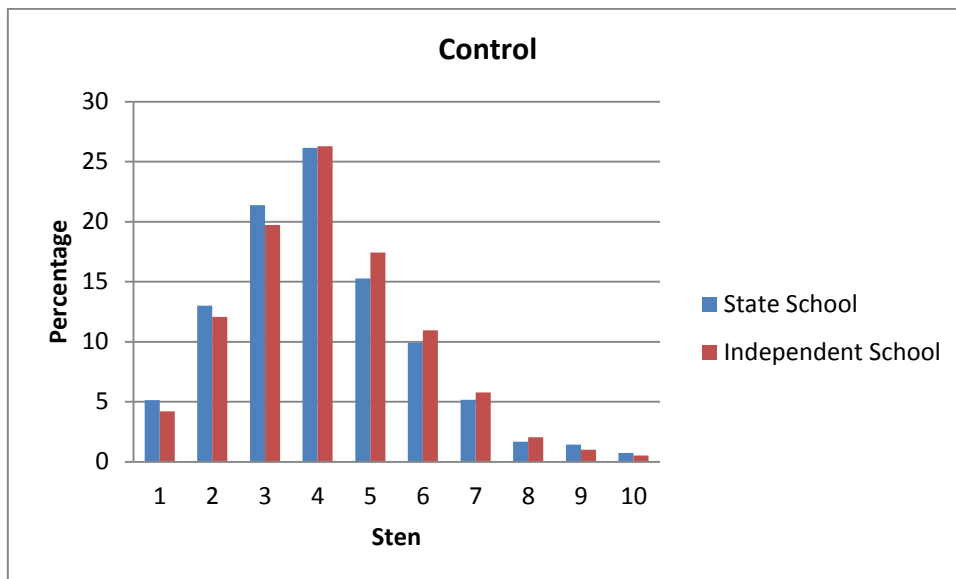
The second element is essentially about being hard working. It describes the mindset that is associated with doing what it takes to achieve the goal. They understand that effort is as important as ability and that achievement cannot be reached without making that effort.

The MTQ48 presently assesses overall levels of Commitment and does not break this scale down into sub-scales.

For the Commitment component of Mental Toughness, the average score for an independent school pupil is 4.34. This is 0.58 higher than the average Commitment score of state pupils (3.76) making it a meaningful difference. It represents statistically the most significant difference between Independent and State pupils.

## MTQ48: Comparison with State Schools: Control

Figure 6. Independent and State School comparison of the Control scale

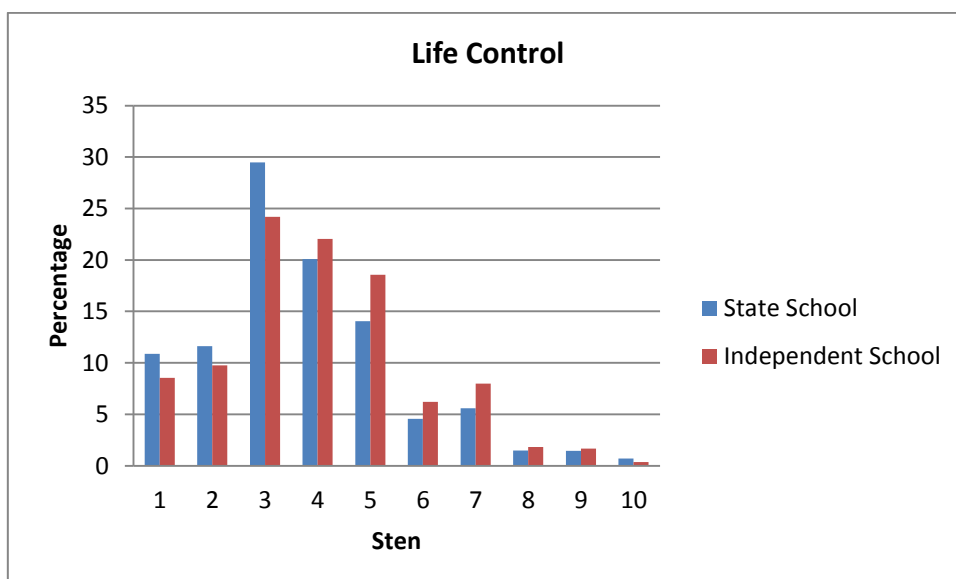


The Control element looks at the extent to which an individual feels that they have a significant degree of Control over their lives and circumstances and that they can shape to some extent what happens to them and what they do.

The MTQ48 assesses overall Control as well as its two components which are described below.

The average score for an independent school pupil for Control was 4.16, slightly higher when compared to the state school average of 4.06.

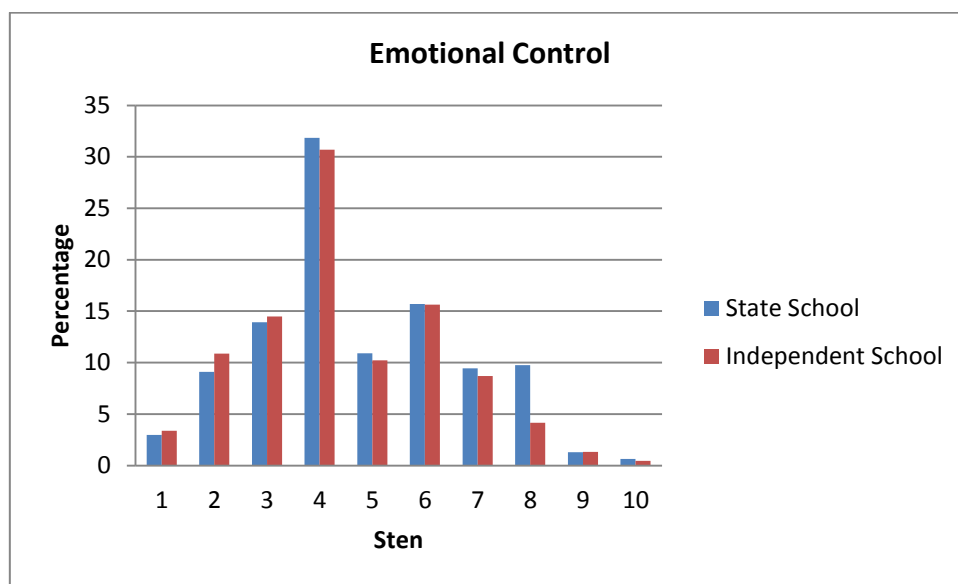
Figure 7. Independent and State School comparison of the Life Control scale



Life Control is the aspect of Mental Toughness that determines to what extent an individual has the belief that they can control enough of the world around them, their thinking about their situation and approach tasks with a positive attitude. It is often described as the place where “can do” sits. It is itself a component (with Confidence in Abilities) of self-efficacy.

The average score on the Life Control subscale for an independent school is 4.00, 0.28 higher than the state school average. Both scores are amongst the lowest scores for both Independent Schools and State Schools.

**Figure 8. Independent and State School comparison of the Emotional Control scale**



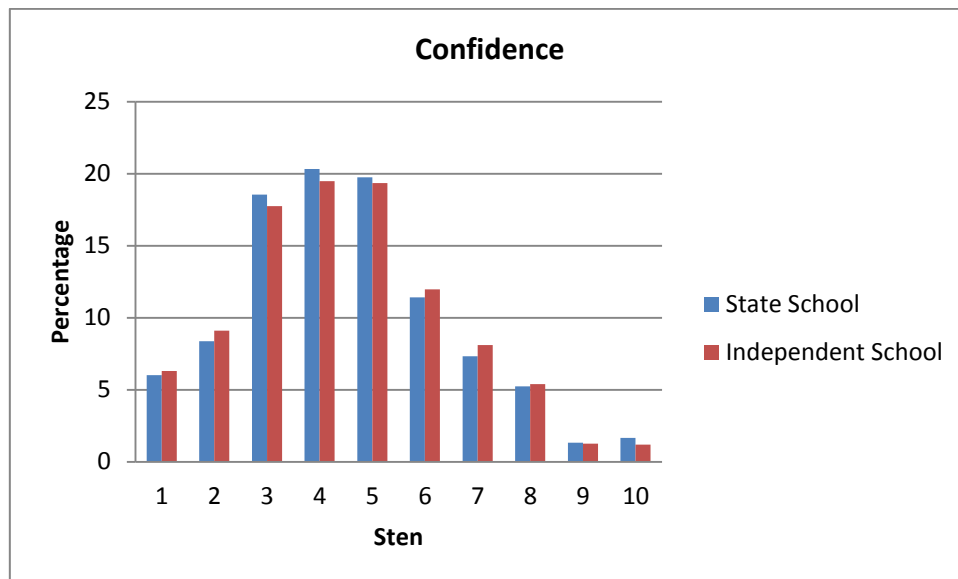
Emotional Control refers to an individual’s ability to manage their emotions when needed and to impact upon the emotions of those around them. Someone with a high level of Emotional Control (Stens 8 – 10) will typically be effective at masking their emotions and not revealing their emotional states to others. In education this can manifest itself as staff not recognising when these students are stretched.

The average score for an independent school is 4.47, which is marginally lower than the state school average of 4.56. Statistically the difference is negligible.

Curiously Emotional Control scores are amongst the highest scores for both Independent Schools and State Schools.

## MTQ48: Comparison with State Schools: Confidence

Figure 9. Independent and State School comparison of the Confidence scale

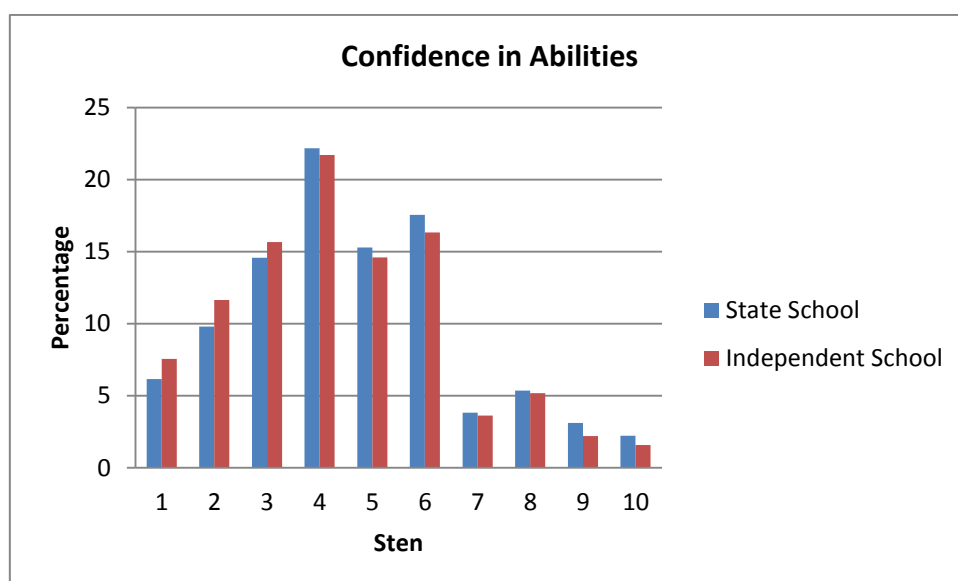


The Confidence element of Mental Toughness refers to an individual's self-belief about their ability, their capability to develop ability and their confidence in expressing themselves, either in arguing their corner or being prepared to ask questions.

The MTQ48 assesses overall Confidence and its two components, described below.

The average score for independent school pupils for the Confidence scale was 4.47, compared to the state school average of 4.49. Essentially both are equivalent.

Figure 10. Independent and State School comparison of the Confidence in Abilities scale



Confidence in abilities is a sub-scale of Confidence. It refers to the extent to which an individual feels worthwhile, believes in their own abilities and the extent to which they feel they need external validation.

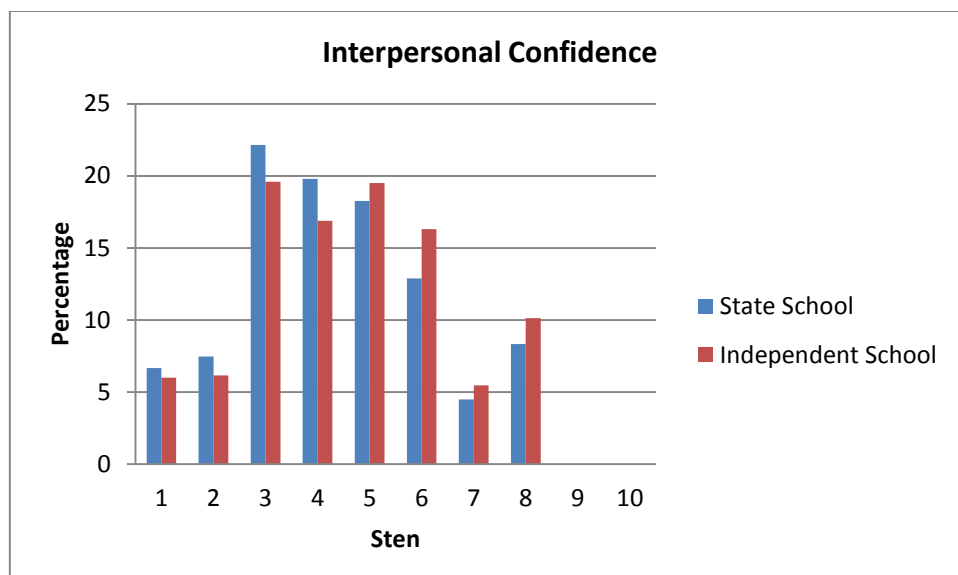
There can be an interesting relationship with ability. Students, who are able, can sometimes not trust their own ability – and therefore won't use it. Others with a high level of Confidence in Abilities, may only have a normal level of ability but will use every bit of it and will achieve – particularly in exams and tests.

The overall average score for independent school pupils is 4.37. The average score for state school pupils is 0.22 higher at 4.59. This is a meaningful difference.

Confidence in Abilities can be influenced by a number of factors – parental support being one. Another may be teaching style in terms of the degree of engagement with pupils in enabling students to learn how to learn.

Life Control and Confidence in Abilities are often seen as the two elements of self-efficacy. The two scores are opposite when comparing Independent and State Schools. Overall there is little difference between them. The data suggests that State Schools emphasise Confidence in Abilities (Self Belief) a little more than do Independent Schools. Whereas Independent Schools emphasise Life Control (Self Worth) a little more than do State Schools.

**Figure 11. Independent and State School comparison of the Interpersonal Confidence scale**



The Interpersonal Confidence subscale looks at an individual's ability to deal positively with others – engaging orally (or in writing) with others whether in discussion or in asking questions - and to deal confidently with challenges from others.

Pupils with higher level of Interpersonal Confidence are more likely to set out what they know in responding to exams and tests.

The average score of an independent school pupil on the Interpersonal Confidence subscale is 4.59. The average score for state school pupils is 4.59. The two scores are identical.



## MTQ48 Analysis by School

The overall average Mental Toughness score and averages for each scale and subscale have been calculated for each school. This will allow for comparisons to be made between the different schools.

Below, table 4 shows the breakdown of average Mental Toughness scores for each school that participated in the research project. The blue line indicates the average score for Independent Schools. The brown line indicates the State School average.

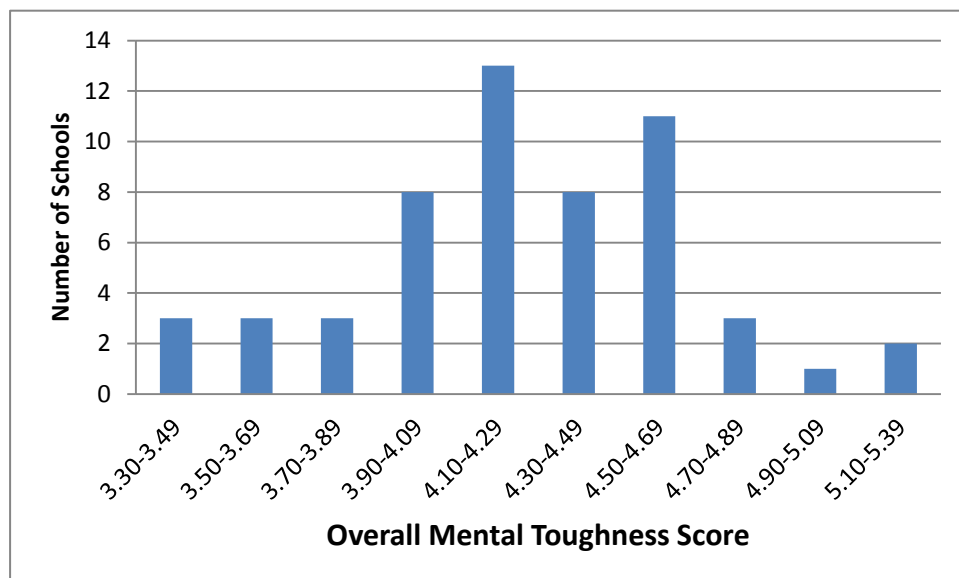
The data shows a good variation in the pattern of results. This is summarised in figure 12.

Table 4 shows participating schools ranked anonymously in order of their overall Mental Toughness score. What is worth noting is, if ranked by the different scales, the rank order changes.

This might indicate that some schools appear to develop different aspects of Mental Toughness with their pupils. Although it is also broadly true that the same schools often appear in the top third, the middle third and the lower third change for each ranking.

This aspect of spread is also a good indicator that the MTQ48 has been administered consistently across the piece.

**Figure 12. Pattern of results for MTQ48 by school**



This shows a good spread of average Mental Toughness scores for participating schools. There is clustering around the mean/median scores.

**Table 4. Descriptive statistics by school for the MTQ48 Questionnaire – ranked by overall Mental Toughness score**

The data should be treated with care. Participating schools assessed pupils in different years groups which differences may be reflected in their scores.

School	Overall Mental Toughness	Control	Life Control	Emotional Control	Commitment	Challenge	Confidence	Confidence in Abilities	Interpersonal Confidence
1	5.21	4.79	4.91	4.68	5.29	4.91	5.29	5.18	5.15
2	5.13	4.97	5.13	4.80	5.38	5.00	4.86	5.22	4.39
3	4.93	4.51	4.33	4.76	4.98	4.86	5.05	4.90	5.03
4	4.83	4.44	4.34	4.64	4.66	4.83	5.09	4.92	4.98
5	4.82	4.62	4.38	4.83	4.89	4.70	4.91	4.92	4.59
6	4.78	4.34	4.32	4.53	4.73	4.73	5.17	5.18	4.95
7	4.67	4.78	4.54	5.13	4.74	4.52	4.78	4.67	4.63
8	4.65	4.49	4.17	4.88	4.56	4.63	4.82	4.72	4.87
9	4.64	4.30	4.47	4.27	4.86	4.53	4.71	4.49	4.83
10	4.63	4.38	4.42	4.41	4.64	4.61	4.83	4.74	4.76
11	4.60	4.36	4.32	4.43	4.76	4.48	4.83	4.78	4.78
12	4.60	4.39	4.23	4.61	4.90	4.44	4.63	4.46	4.76
13	4.58	4.60	4.22	5.02	4.30	4.00	4.92	4.77	4.96
14	4.54	4.34	4.21	4.72	4.72	4.68	4.48	4.64	4.30
15	4.54	4.50	4.50	4.64	4.34	4.22	4.73	4.43	4.98
16	4.52	4.36	3.97	4.74	4.47	4.38	4.73	4.56	4.91
17	4.52	4.55	4.02	5.04	4.50	4.37	4.57	4.37	4.70
18	4.47	4.56	4.27	4.90	4.08	4.09	4.92	4.79	4.82
19	4.43	4.30	3.95	4.70	4.82	4.06	4.50	4.77	4.30
20	4.40	4.28	3.99	4.64	4.27	4.34	4.73	4.54	4.99
21	4.39	4.32	3.99	4.77	4.43	4.39	4.42	4.17	4.51
22	4.38	4.15	3.91	4.47	4.36	4.59	4.69	4.54	4.68
23	4.36	4.16	4.19	4.34	4.53	4.24	4.55	4.45	4.60
24	4.34	4.32	4.05	4.71	4.35	4.36	4.43	4.20	4.82
25	4.30	4.41	3.99	4.82	4.02	4.43	4.60	4.58	4.62
26	4.27	4.19	3.97	4.57	4.28	4.33	4.43	4.23	4.61
27	4.26	4.21	3.99	4.54	4.78	3.87	4.22	4.10	4.58

28	4.25	3.97	3.86	4.38	4.63	4.03	4.42	4.46	4.41
29	4.22	4.15	3.83	4.63	4.26	4.26	4.47	4.21	4.73
30	4.20	4.35	4.02	4.69	4.30	3.75	4.63	4.42	4.80
31	4.20	4.10	4.17	4.30	4.38	4.16	4.41	4.46	4.29
32	4.20	3.86	3.23	4.80	4.73	4.00	4.43	4.73	4.03
33	4.19	4.35	4.17	4.57	3.99	3.97	4.50	4.55	4.42
34	4.18	4.18	3.99	4.47	4.22	4.06	4.49	4.35	4.67
35	4.16	3.92	3.87	4.11	4.43	4.11	4.41	4.35	4.51
36	4.15	4.04	3.80	4.44	4.13	3.97	4.50	4.40	4.80
37	4.14	4.09	3.79	4.50	4.42	3.82	4.37	4.48	4.32
38	4.10	3.97	3.96	4.18	4.27	4.04	4.35	4.35	4.30
39	4.07	3.96	3.63	4.56	4.25	4.09	4.49	4.36	4.63
40	4.05	3.88	3.74	4.24	4.20	3.90	4.45	4.53	4.35
41	4.05	3.99	4.00	4.18	4.14	4.04	4.34	4.28	4.56
42	3.96	4.04	3.86	4.37	4.21	3.83	4.15	4.14	4.26
43	3.94	4.03	3.56	4.55	3.90	3.83	4.29	4.31	4.55
44	3.94	3.93	4.01	4.01	3.95	4.12	4.14	4.01	4.39
45	3.93	3.84	3.85	3.98	4.02	3.92	4.32	4.30	4.34
46	3.90	3.92	3.77	4.28	4.19	3.98	4.07	3.98	4.37
47	3.83	3.81	3.76	4.16	4.12	4.01	3.99	3.67	4.56
48	3.83	3.77	3.81	3.96	4.39	3.95	3.75	3.67	4.09
49	3.82	3.77	3.66	4.16	3.93	3.72	4.33	4.06	4.73
50	3.65	3.76	3.69	4.13	3.95	3.71	3.80	3.61	4.19
51	3.61	3.64	3.61	3.90	3.52	3.80	3.91	3.89	4.04
52	3.58	3.70	3.40	4.33	3.58	3.65	3.97	3.97	4.20
53	3.49	3.28	3.10	3.77	4.10	3.74	3.73	3.40	4.43
54	3.45	3.49	3.36	3.94	3.82	3.53	3.88	3.84	4.19
55	3.37	3.52	3.44	3.95	3.72	3.29	3.65	3.42	4.29
All Schools	4.26	4.16	4.00	4.47	4.34	4.19	4.47	4.37	4.59

The blue line indicates the average overall Mental Toughness score for all Independent Schools.

The brown line indicates the overall average Mental Toughness score for State Schools in the AQR database.

## MTQ48 - Analysis by Year Group

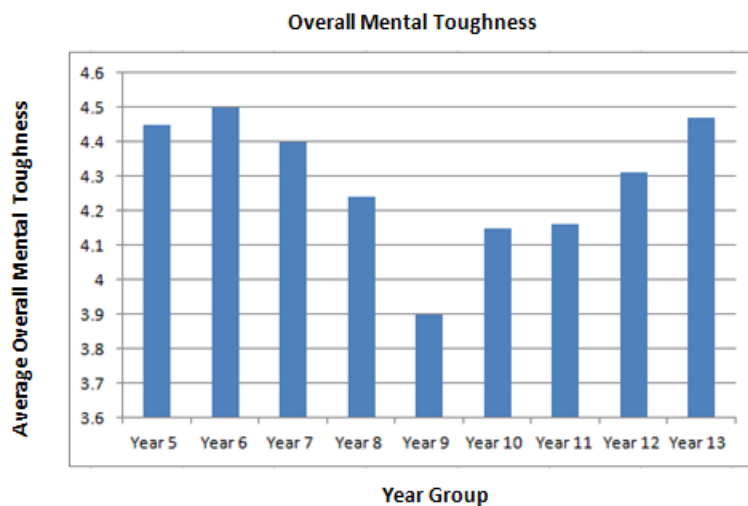
We have examined the average Mental Toughness scores for each year group that participated in the project to highlight if there were any patterns in the data. Table 5, below, shows the breakdown of average year group scores for their overall Mental Toughness and for each of the subscales.

**Table 5. Average Mental Toughness (MTQ48) scores by year group**

	Overall Mental Toughness	Control	Life Control	Emotional Control	Commitment	Challenge	Confidence	Confidence in Abilities	Interpersonal Confidence
Year 5	4.45	4.20	4.05	4.50	4.80	4.40	4.50	4.70	4.20
Year 6	4.50	4.36	4.30	4.55	4.66	4.36	4.72	4.94	4.35
Year 7	4.40	4.18	4.04	4.44	4.58	4.36	4.57	4.51	4.57
Year 8	4.24	4.10	3.95	4.40	4.43	4.16	4.43	4.39	4.45
Year 9	3.90	3.90	3.77	4.26	4.01	3.85	4.21	4.06	4.48
Year 10	4.15	4.18	4.00	4.48	4.20	4.15	4.55	4.34	4.79
Year 11	4.16	4.27	3.96	4.62	4.00	4.00	4.47	4.27	4.74
Year 12	4.31	4.26	4.05	4.60	4.34	4.29	4.50	4.28	4.76
Year 13	4.47	4.40	4.24	4.56	4.44	4.50	4.60	4.37	4.86
<i>All Years</i>	4.25	4.16	4.00	4.47	4.34	4.18	4.48	4.37	4.60

The results are interesting in that they show evidence of a U-curve in years 5 to 13. This U-Curve is shown in Figure 13 below.

**Figure 13. U-Curve pattern of overall Mental Toughness scores in years 5 - 13**



Interestingly, this is not unexpected and is consistent with findings from our work elsewhere.

The table shows significant decline in overall Mental Toughness between years 7 and 9 before a progressively upward trend is developed from year 9 to year 13.

This pattern is repeated across most of the subscales often achieving scores in years 12 and 13 which are not significantly greater than they were at year 7. One interesting exception is Interpersonal Confidence which progressively increases from year 7 through to Year 9 and, on average, is a high score compared to most other data. This might suggest that Independent Schools are effective in developing Interpersonal Confidence during these years.

Something similar occurs with Emotional Control although there is slight dip in Years 9 and 10.

Interpersonal Confidence can be an important factor in examinations. The greater the Interpersonal Confidence, the more likely the individual is to offer fuller answers to exam questions.

Again the drop in Mental Toughness scores in years 8 and 9 is not unexpected. It is often observed. Pupils often receive attention in year 7 (the transition year for many but not all schools) with a view to “bedding in pupils” into the new environment. Similarly, in years 10 + there is often additional attention as the focus on exam performance develops.

Years 8 and 9 are sometimes described as the “lost years” because there may not be a special imperative in those years. Yet they may offer a good opportunity to focus attention on soft skills development which later underpins attainment.

The decline in the average Life Control score during this period appears to take slightly longer than other scales to begin to rebuild. It is generally hypothesised that this is a period where pupils are beginning to make important decisions about their life choices and career paths. They may feel overwhelmed by the choice they are faced with and feel that they have less control over their environment, their options and their circumstances.

The second major observation is the drop in Mental Toughness between years 5/6 and year 7. Again this is a very common finding and two reasons are often offered:

Firstly, pastoral care in Junior Schools is often different in that the pupils are often in smaller classes and they are working with only one or two teachers for extended periods of time. This means that the teachers will often know pupils and their needs well.

In senior schools, teachers may not know their new pupils as well, at least at joining, and the pupils may feel they have less attention.

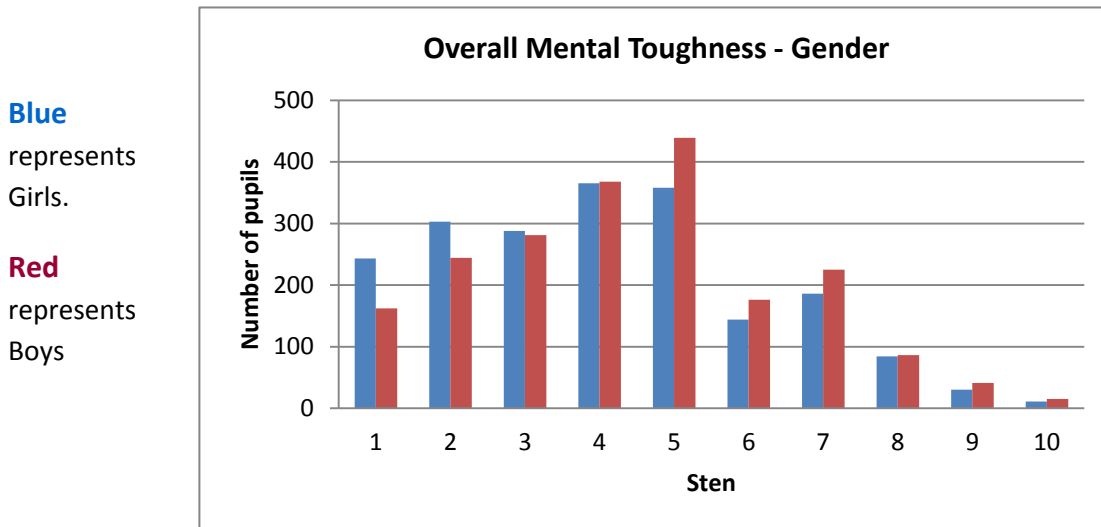
Secondly, any transition represents a significant change for many people. For young pupils, the transition from junior school to senior school is highly significant.

Table 4 indicates that Mental Toughness increases slightly from year 5 to year 6 before dropping during years 7, 8 and 9 until year 10 where it begins to steadily increase over the remaining school years.

The drop in Mental Toughness over years 7, 8 and 9 may be due to the transition between junior and senior school, as well as hormonal changes for some at this age. There is a significant decline in the average Life Control score during this period which takes slightly longer than other scales to begin to rebuild.

## MTQ48 – Analysis by Gender

Figure 14. Overall Mental Toughness scores (MTQ48) by gender



### Overall Mental Toughness Scores – Analysis of Independent School data

Figure 14 and table 6 (below) show the pattern of MTQ48 scores by gender for overall Mental Toughness and the sub-scales.

Generally, scores from males are significantly higher than scores on the same scales for females. There is a single exception – Commitment where the scores are almost identical with female scores being very slightly lower. The pattern of findings is consistent with our data from State Schools – shown in Table 6a and 6b.

The gender differences (common to both state and independent pupils) are interesting and might generate a number of hypotheses that would be worth exploring further. Why do females exhibit lower MTQ48 scores than males at secondary school age? Could it be driven by the different gender profile of teachers at primary and secondary schools? How do hormonal changes during adolescents affect this? Should all schools be doing more to get girls to same level of Mental Toughness as boys or is it more appropriate to develop both at the same rate despite the different baselines?

The MTQ48 theory suggests that the gender differences are negligible in adulthood therefore at what ages do females “catch-up”? And how? The answers to these questions are well beyond the scope of this project but seem appropriate to raise here for the reader’s interest.

Returning to the data for Independent Pupils, the most significant differences lie around Life Control and Confidence in Abilities. Differences for Emotional Control, Challenge, and Interpersonal Confidence are also quite high.

These differences are interesting and perhaps greater than expected. Other studies with young people have showed that, in teenage years, girls' scores often shifted to the left (i.e. became more mentally sensitive) before returning to normal scores later. This is indicated in the year group analysis shown later in this report (pages 44 and 45).

This does not necessarily mean that Independent Schools are more effective at developing Mental Toughness with boys than with girls or vice versa. The differences are so marginal a sensible conclusion might be that Independent Schools are equally effective with either gender.

Tables 6a and 6b below provide some insight here. The data shows that the average Mental Toughness sten scores for boys in Independent Schools is 4.56 as against 4.20 for State Schools. An uplift of 0.36 stens.

For females, the data shows that the average Mental Toughness sten scores for girls in Independent Schools is 4.00 as against 3.63 for State Schools. An uplift of 0.37 stens.

This is similar to the uplift for boys but, given the lower base, may actually represent a bigger uplift proportionately.

**Table 6. Average Mental Toughness scores (MTQ48) for males and females**

	Males	Females	Difference M>F
<b>Overall Mental Toughness</b>	4.56	4.00	+ 0.56
<b>Control</b>	<b>4.49</b>	<b>3.90</b>	<b>+ 0.59</b>
Life Control	4.17	3.87	+ 0.30
Emotional Control	4.88	4.15	+ 0.73
<b>Commitment</b>	<b>4.41</b>	<b>4.30</b>	<b>+ 0.11</b>
<b>Challenge</b>	<b>4.40</b>	<b>4.02</b>	<b>+ 0.38</b>
<b>Confidence</b>	<b>4.82</b>	<b>4.19</b>	<b>+ 0.63</b>
Confidence in Abilities	4.66	4.11	+ 0.55
Interpersonal Confidence	4.87	4.37	+ 0.50



Note: The apparent difference in scores for the combined samples is explained by the fact that not all the data was labelled by gender and the data set for these tables is slightly smaller and excludes data included in combined analyses. The report is based on data for 6,857 out of the 8,229 pupils. 4,073 females and 2,784 males could be identified as such. The remainder was not labelled by gender.

**Table 6a. Mental Toughness Scores for Females in Independent and State Schools**

The data shows that, despite female scores being lower in both samples, data for females in Independent Schools shows a significant positive difference on overall Mental Toughness scores.

The most significant differences come in the Commitment, Challenge and Life Control Scales. These are all key factors in attainment and in openness to learning.

Only when we look at Confidence in Abilities do we see a small difference in favour of State School pupils. This is an interesting piece of data. Confidence in Abilities assesses self-belief (and the extent to which the individual seeks validation from others). Why the State school scores are higher is not immediately clear but merits closer examination.

Confidence in Abilities of course, does not necessarily always correlate with ability. This scale picks up that some with ability don't believe they have ability and therefore may not use their abilities to the full.

For Emotional Control the differences are negligible.

FEMALES	State Schools	Independent Schools	Difference I>S
<b>Overall Mental Toughness</b>	3.63	4.00	+ 0.37
<b>Control</b>	<b>3.74</b>	<b>3.90</b>	<b>+ 0.16</b>
Life Control	3.56	3.87	+ 0.31
Emotional Control	4.18	4.15	- 0.03
<b>Commitment</b>	<b>3.68</b>	<b>4.30</b>	<b>+ 0.62</b>
<b>Challenge</b>	<b>3.45</b>	<b>4.02</b>	<b>+ 0.57</b>
<b>Confidence</b>	<b>4.13</b>	<b>4.19</b>	<b>+ 0.06</b>
Confidence in Abilities	4.22	4.11	- 0.11
Interpersonal Confidence	4.15	4.37	+ 0.22

**Table 6b. Mental Toughness Scores for Males in Independent and State Schools**

The data shows that results for males in Independent Schools shows a significant positive difference on overall Mental Toughness scores.

The differences are fairly consistent across all the subscales with the exception of Confidence in Abilities which is slightly but measurably lower for males in Independent Schools. This is an interesting piece of data. Confidence in Abilities assesses self-belief (and the extent to which the individual seeks validation from others). Why the State school scores are higher is not immediately clear but merits closer examination.

Confidence in Abilities of course, does not necessarily always correlate with ability. This scale picks up that some with ability don't believe they have ability and therefore may not use their abilities to the full.

Again, as with female pupils, Challenge and Commitment emerge as the most positive differences with Life Control scores also being notably higher. As noted earlier, these are key factors in attainment and openness to learning.

As with the female data, the Emotional Control scores are virtually identical for both State and Independent Schools.

MALES	State Schools	Independent Schools	Difference I>S
<b>Overall Mental Toughness</b>	4.20	4.56	+ 0.36
<b>Control</b>	<b>4.33</b>	<b>4.49</b>	<b>+ 0.16</b>
Life Control	3.86	4.17	+ 0.31
Emotional Control	4.88	4.88	+ 0.00
<b>Commitment</b>	<b>3.82</b>	<b>4.41</b>	<b>+ 0.59</b>
<b>Challenge</b>	<b>3.86</b>	<b>4.40</b>	<b>+ 0.54</b>
<b>Confidence</b>	<b>4.79</b>	<b>4.82</b>	<b>+ 0.03</b>
Confidence in Abilities	4.91	4.66	- 0.25
Interpersonal Confidence	4.51	4.87	+ 0.36

## MTQ48: Analysis by Gender and Year Group

### Male Pupils

Table 7 shows the Mental Toughness scores for overall Mental Toughness, the 4 Cs and 4 sub-scales for male pupils. For overall Mental Toughness the data shows a steady upward trend from year 5 through to year 12 with the exception of year 9.

When we look at Commitment, the data shows a dip at year 10 with a slight recovery at Year 11. These are the years important for GCSEs.

Life Control develops over the years; Emotional Control remains constant.

Both elements of Confidence vary slightly around the mean but do not change significantly between years 7 and 12.

**Table 7. Mental Toughness scores for male pupils**

This data is based on a sample of 2520 responses where we can identify both gender and year group. The overall mental toughness data (the bottom line in the table) differs slightly from the data for male pupils overall for this reason. That data includes all male data – labelled and unlabelled for year group.

	Overall Mental Toughness	Control	Life Control	Emotional Control	Commitment	Challenge	Confidence	Confidence in Abilities	Interpersonal Confidence
<b>Y4 = 55</b>	4.80	4.36	4.27	4.85	4.98	5.02	4.67	5.25	3.91
<b>Y5 = 101</b>	4.51	4.44	4.11	4.89	4.74	4.40	4.8	4.48	4.50
<b>Y6 = 78</b>	4.32	4.28	4.05	4.74	4.29	4.53	4.63	4.56	4.65
<b>Y7 = 448</b>	4.51	4.34	4.11	4.68	4.51	4.43	4.72	4.62	4.76
<b>Y8 = 267</b>	4.95	4.79	4.36	5.13	4.81	4.74	5.11	4.98	5.00
<b>Y9 = 441</b>	4.26	4.19	3.93	4.62	4.16	4.09	4.63	4.52	4.66
<b>Y10 = 458</b>	4.55	4.53	4.26	4.88	4.25	4.27	4.90	4.63	5.06
<b>Y11 = 108</b>	4.67	4.68	4.05	5.25	4.25	4.48	4.97	4.78	5.06
<b>Y12 = 517</b>	4.69	4.74	4.35	5.10	4.32	4.48	4.97	4.69	5.03
<b>Y13 = 47</b>	4.79	4.87	4.51	5.13	4.32	4.77	5.15	5.19	4.81
<b>All Males</b>	<b>4.57</b>	<b>4.51</b>	<b>4.19</b>	<b>4.89</b>	<b>4.39</b>	<b>4.40</b>	<b>4.83</b>	<b>4.68</b>	<b>4.86</b>

## Female pupils

This data set is particularly interesting. In terms of overall Mental Toughness, this increases significantly in years 10 and 11 – the GCSE years after a significant dip in Year 9.

Interpersonal Confidence builds steadily over the period years 7 – 11, whereas Confidence in Abilities dips in year 9 then increases significantly in years 10 and 11 – again the GCSE years, before falling away again in year 12. This pattern may in part be due to the mix of schools – different schools participated in different years but it does mirror what is seen in other studies.

**Table 8. Mental Toughness (MTQ48) scores for female pupils**

This data is based on a sample of 3204 responses where we can identify gender and year group. The overall mental toughness data (the bottom line in the table) differs slightly from the data for female pupils overall for this reason. That data includes all female data – labelled and unlabelled for year group.

	Overall Mental Toughness	Control	Life Control	Emotional Control	Commitment	Challenge	Confidence	Confidence in Abilities	Interpersonal Confidence
<b>Y5 = 183</b>	4.27	3.96	3.73	4.36	4.75	4.25	4.33	4.67	4.01
<b>Y6 = 223</b>	4.52	4.33	4.34	4.45	4.71	4.33	4.701	5.00	4.27
<b>Y7 = 523</b>	4.27	4.02	3.95	4.25	4.62	4.28	4.36	4.37	4.36
<b>Y8 = 522</b>	3.90	3.78	3.76	4.05	4.21	3.96	4.10	4.11	4.16
<b>Y9 = 611</b>	3.58	3.64	3.58	3.99	3.91	3.59	3.87	3.68	4.34
<b>Y10 = 434</b>	3.91	3.78	3.73	4.05	4.11	3.93	4.21	3.98	4.52
<b>Y11 = 36</b>	4.47	4.08	4.25	4.08	4.83	4.22	4.72	4.56	4.78
<b>Y12 = 539</b>	4.03	4.00	3.91	4.29	4.34	4.10	4.14	3.93	4.45
<b>Y13 = 133</b>	4.32	4.19	4.07	4.32	4.40	4.41	4.45	4.07	4.90
<b>All Females</b>	<b>4.01</b>	<b>3.90</b>	<b>3.84</b>	<b>4.17</b>	<b>4.31</b>	<b>4.02</b>	<b>4.20</b>	<b>4.12</b>	<b>4.36</b>

## MTQ48 Results: Staff

During the course of training 105 members of staff from Independent Schools completed the MTQ48 as part of their development.

Although a comparatively small sample this provides an opportunity to gain an insight into the Mental Toughness profile of staff in senior and middle leadership positions in Independent Schools.

The Table below summarises the results.

AQR International has several datasets for staff, middle leaders and senior leaders. None are directly equivalent to this sample.

For comparison we are using 2014 data for 198 persons who were enrolled onto a middle leader development programme in England.

Both samples show broadly the same shape albeit at different levels of MTQ48 scores. It is possible though that Independent School staff may have been carefully selected for their part in this study and they might not be representative of school staff/leadership in general.

The data does show that the staff engaged with this project from Independent Schools generally had higher levels of Mental Toughness.

**Table 9. Mental Toughness scores for staff**

	Independent Schools	Middle Leaders Data - State	Difference I > S
<b>Overall Mental Toughness</b>	6.88	5.94	+ 0.94
<b>Control</b>	6.64	5.60	+ 1.04
Life Control	6.81	6.09	+ 0.72
Emotional Control	6.02	4.91	+ 1.11
<b>Commitment</b>	7.04	6.47	+ 0.57
<b>Challenge</b>	6.33	5.25	+ 1.08
<b>Confidence</b>	5.98	5.49	+ 0.49
Confidence in Abilities	6.06	5.53	+ 0.53
Interpersonal Confidence	5.42	5.03	+ 0.39

Curiously, both sets of data show a scale which is out of line with the most of the rest of the data. The scores for Interpersonal Confidence are particularly interesting. This is consistent with many, if not most, studies on school staff and school leaders. Mental Toughness scores on this scale very often appear in the range 5.00 – 5.50 and are sometimes below this.

A score of 5.50 is what you would expect if you tested a large sample of people from the general population.

This indicates that this might be a general issue for the teaching profession.

It might be reasonable to expect scores on this scale to be, on average, higher.

Possibly more useful is the result of a major (peer-reviewed) published piece of research which showed that Mental Toughness scores increased with level in the organisation (Merchant et al. 2009). This is summarised below:

Population	Target Mean	Range
General – All Staff	5.5	1 - 10
1 <sup>st</sup> Line Managers	6 - 7	4 - 10
Middle Managers/Leaders	7	5 - 10
Senior Managers/Leaders	7 – 8	6 - 10

There is a particular significance to this information. In most walks of life the Mental Toughness of the individual is often influenced by the Mental Toughness of those who have some form of responsibility for them. That's true for leaders and their staff, for parents and their offspring, etc. It appears to be also applicable to the teacher – pupil relationship.

A very recent, as yet unpublished, school improvement project in England found a close correlation between average teacher's Mental Toughness and average student Mental Toughness in schools.

Mental Toughness is an important life skill that is learned through experimentation and observation the behaviour and emotions of the people closest to them.

## JMT-i: Aggregate Results

The JMT-i is a behaviour based questionnaire which is completed on behalf of the pupil by staff. School staff completed the JMT-i on behalf of 828 pupils from years 1-5.

Although there was a spread of results across the whole range of possible scores there was a significant bias in the results towards the positive end of the scales. These results need to be treated with some caution.

The mean score for overall Mental Toughness is 6.79 which is higher than expected. Where the MTQ48 measure was used with pupils in years 5 and 6 this showed higher scores than those for years 7 – 13 but not at this level.

There is nevertheless an interesting spread of scores between scales and subscales indicating that some differentiation by assessors was taking place.

**Table 10. Descriptive statistics for the JMT-i – overall sample**

Descriptive Statistics	Min	Max	Mean	SD	Skewness	Kurtosis
<b>Overall Mental Toughness</b>	1	10	6.79	.08	-.15	-.99
<b>Control</b>	1	10	7.03	.07	-.17	-.97
Life Control	1	10	6.85	.08	.09	-1.11
Emotional Control	1	10	6.64	.07	-.0	-.63
<b>Commitment</b>	1	10	6.89	.08	-.28	-.83
Goal Orientation	1	10	6.56	.07	.06	-.70
Does what it takes	1	10	7.31	.07	-.49	-.43
<b>Challenge</b>	1	10	6.50	.07	-.01	-.87
Stretches oneself	1	10	6.97	.07	-.44	-.18
Learns from all outcomes	1	10	5.97	.07	.02	-.06
<b>Confidence</b>	1	10	6.45	.07	-.15	-.57
Confidence in Abilities	1	10	6.37	.07	-.08	-.49
Interpersonal Confidence	1	10	6.34	.07	-.14	.33

Note that JMT-i reflects a new development in our understanding of the Mental Toughness Model. Two of the scales which do not have sub-scales in MTQ48 – Commitment and Challenge – do have sub-scales in the JMT-i

The data differs from the MTQ48 data although it reports on the same framework. The MTQ48 is a self-report questionnaire completed by the individual. The JMT-i is a questionnaire completed by staff who know the individual well and are familiar with their behaviours.

The MTQ48 is normed against a general population norm. The norm has been largely established from data drawn from State Schools. This shows young person scores often as slightly lower than the norm achieved through the MTQ48 (which is normed against the general population). The JMT-i is only used with young people up to the age of 10 and is normed against that population. The data therefore indicates higher sten scores for Mental Toughness than would be indicated by MTQ48.

Work is currently underway to normalise the JMT-i outputs so that they can be directly compared to MTQ48 outputs.

The study indicates

- Above average Mental Toughness for younger students (the norm is 5.50 on all scales)
- Mental Toughness levels drop significantly around the age of 10 or 11. The prospect of transition may be a factor here

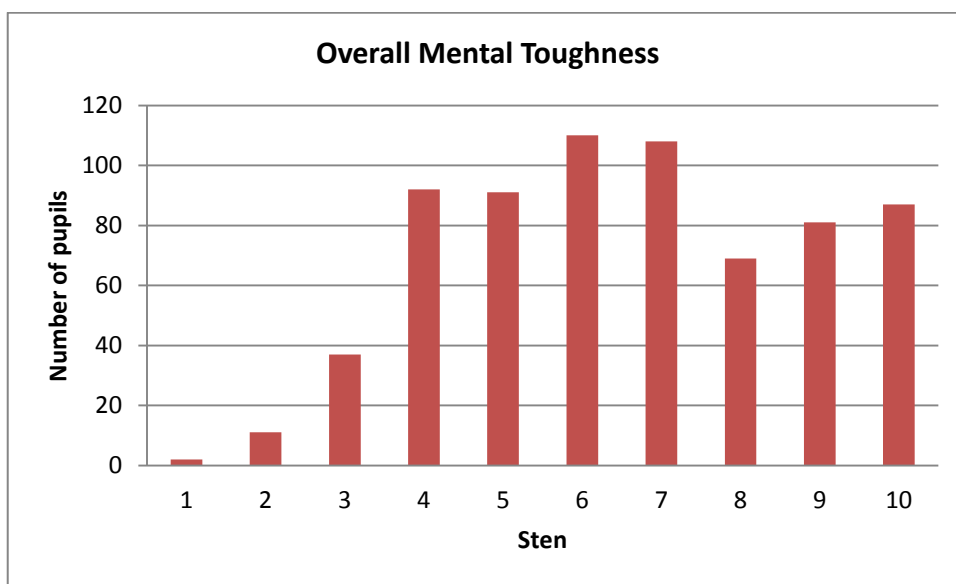
The data and histogram on the next page show the same data as above but with the removal of data from three schools which did not show a good spread of data and are strongly negatively skewed (i.e. they rate most/all their pupils as high on all scales).



**Table 11. Descriptive statistics for JMT-i – Excluding 3 sets of data which do not show a spread of results**

Descriptive Statistics	Mean	SD	Skewness	Kurtosis
<b>Overall Mental Toughness</b>	6.58	.08	-.03	-.094
<b>Control</b>	6.89	.08	-.12	-.92
Life Control	6.70	.09	-.01	-1.05
Emotional Control	6.50	.07	-.02	-.50
<b>Commitment</b>	6.74	.08	-.20	-.80
Goal Orientation	6.46	.08	-.01	-.63
Does what it takes	7.12	.07	-.41	-.40
<b>Challenge</b>	6.27	.08	.08	-.75
Stretches oneself	6.82	.07	-.39	-.09
Learns from all outcomes	5.76	.08	.03	-.57
<b>Confidence</b>	6.24	.08	-.12	-.43
Confidence in Abilities	6.16	.08	-.06	-.37
Interpersonal Confidence	6.16	.08	-.13	-.18

**Figure 15. Overall Mental Toughness (JMT-i) – Excluding 3 sets of data which do not show a spread of results**



## JMT-i Analysis - Results – Mental Toughness Scores by School

**Table 12. Descriptive statistics by school for the JMT-i**

Analysis by school shows a good spread of results. Some of the data (3 schools, labelled as School 1, 2 and 3 here) may be overstated. The spread of scores for those schools is not wide indicating that staff assessed almost all pupils as mentally tough across most or all scales. This suggests little differentiation and possibly over assessment.

Scores for scales and sub-scales for all other schools show good variation and, again, schools which rank highest for overall Mental Toughness do not necessarily rank highest on each of the subscales. Again, this may indicate that different schools might be more effective at developing different aspects of mindset.

	<b>Overall Mental Toughness</b>	<b>Control</b>	<b>Life Control</b>	<b>Emotional Control</b>	<b>Commitment</b>	<b>Goal Orientation</b>	<b>Does what it takes</b>	<b>Challenge</b>	<b>Stretches oneself</b>	<b>Learns from all outcomes</b>	<b>Confidence</b>	<b>Confidence in Abilities</b>	<b>Interpersonal Confidence</b>
<b>1</b>	9.21	8.07	8.93	6.36	8.36	7.29	9.36	9.21	8.93	8.29	9.00	8.79	8.14
<b>2</b>	8.09	6.69	7.03	5.94	7.84	7.25	8.31	7.97	7.75	7.41	8.44	8.38	7.66
<b>3</b>	7.83	8.28	7.85	8.07	7.73	7.20	8.23	7.41	7.69	6.82	7.12	6.99	7.06
<b>4</b>	7.15	7.33	7.08	6.95	7.08	6.73	7.48	6.70	7.08	6.15	6.95	6.60	6.88
<b>5</b>	7.13	6.47	6.47	6.13	6.93	5.47	8.87	7.07	6.80	6.87	7.00	6.87	6.40
<b>6</b>	7.10	7.34	7.27	6.78	6.82	6.61	7.14	6.99	7.60	6.22	6.81	6.63	6.67
<b>7</b>	7.10	7.76	7.64	6.99	7.11	7.06	7.14	6.60	6.80	6.09	6.77	6.80	6.41
<b>8</b>	6.79	7.00	6.84	6.54	6.79	6.53	7.15	6.25	7.03	5.42	5.42	5.92	5.96
<b>9</b>	6.65	6.27	6.4	5.71	6.81	6.46	7.27	6.25	7.00	5.60	6.79	6.29	6.87
<b>10</b>	6.47	6.54	6.28	6.19	6.68	6.37	7.18	6.32	6.81	5.92	6.06	6.28	5.90
<b>11</b>	6.40	6.82	6.47	6.64	6.47	6.3	6.68	6.03	6.53	5.72	6.27	6.31	6.06
<b>12</b>	6.25	6.83	6.14	6.79	6.30	6.00	6.75	6.12	6.61	5.70	5.75	5.53	5.93
<b>13</b>	5.93	6.23	5.93	6.18	6.75	6.45	7.10	5.50	5.88	5.40	5.33	5.13	5.63
<b>14</b>	5.87	6.48	6.6	6.08	6.48	6.25	6.95	5.50	6.29	5.18	5.35	5.52	5.37

## JMT-I Year Group Analysis

Table 13 shows the breakdown of average Mental Toughness scores for each year group that completed the JMT-i.

**Table 13. Descriptive statistics for the JMT-i by Year Group**

	Overall Mental Control	Life Control	Emotional Control	Commitment	Goal Orientation	Does what it takes	Challenge	Stretches oneself	Learns from all outcomes	Confidence	Confidence in Abilities	Interpersonal Confidence	
<b>Year 1</b>	6.34	6.82	6.49	6.58	6.66	6.32	7.13	6.12	6.77	5.56	5.71	5.52	5.92
<b>Year 2</b>	7.07	7.29	7.02	7.03	7.27	6.95	7.65	6.65	7.16	6.01	6.66	6.68	6.46
<b>Year 3</b>	5.66	6.17	6.09	6.02	6.38	6.16	6.79	5.34	6.07	5.1	5.29	5.41	5.33
<b>Year 4</b>	7.63	7.76	7.84	6.99	7.40	6.99	7.8	7.37	7.67	6.66	7.31	7.19	6.98
<b>Year 5</b>	7.80	8.68	8.04	7.92	7.20	7.08	7.24	7.72	7.72	6.8	6.84	6.68	6.44
<b>Year 6</b>	6.96	7.04	6.96	6.48	7.08	7.00	7.17	6.17	6.22	6.22	7.09	7.04	7.09

The results indicate a decline in overall Mental Toughness during year 3 albeit in all other years the overall Mental Toughness score is significantly above the norm. Levels of overall Mental Toughness then significantly increase during year 4 and year 5 before declining slightly in year 6. This may be a function of the sample size and composition (different schools contributed data for different years).

Similar patterns were found in scores on the Control and Challenge scales. However, results show a slightly different pattern for the Commitment and Confidence subscales.

The Confidence scale assesses the extent to which an individual believes that they have the capability to achieve something. Results show a decline during year 3 and again during year 5. Similarly, we also see this decline on the Commitment scale, but with levels continuing to drop through to year 6. Commitment refers to an individuals' approach to goals and targets.

If we take a closer look at Commitment on a subscale level, we can see that the decline is particularly on the 'does what it takes' subscale whilst scores on the goal orientation scale remain constant. This suggests that pupils will generally do what it takes to finish something

that they start, but this aspect of Commitment appears to decline slightly from year 4 onwards.

It may be that during this time, focus starts to shift toward assessment and performance. Pupils start to become aware of and encounter assessments and exams potentially for the first time. Expectations of pupils start to rise and what they have to do to meet and exceed those expectations also increases. This can have an impact on their levels of Confidence. Their self-belief that they have the capability to achieve expectations can fluctuate with the changing expectations.

A further observation is the significant decline in Life Control between year 5 and 6. Again, this may be related to the transition process. It is during year 5 and 6 that preparations begin for the move to senior education.

## JMT-i – Analysis by Gender

Figure 16. Overall Mental Toughness scores (JMT-i) by gender

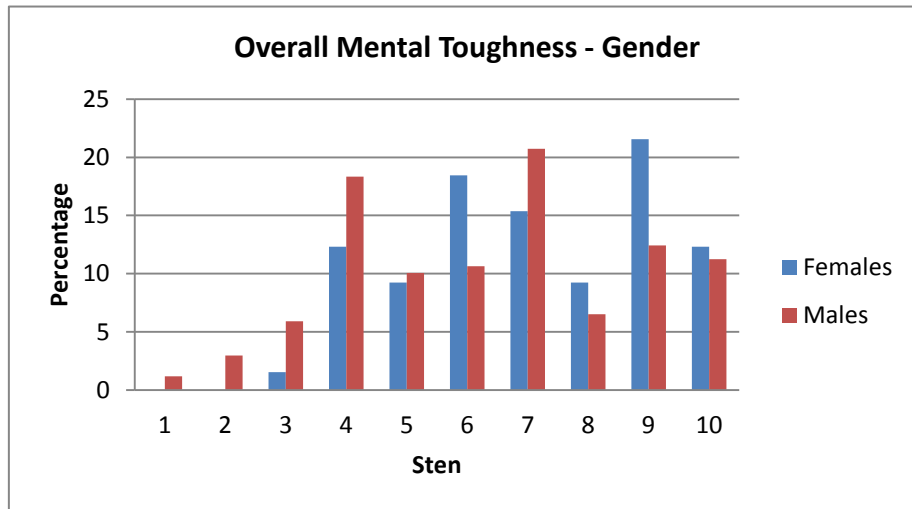


Table 14. Descriptive statistics by Gender for the JMT-i

	Males	Females	Difference F>M
<b>Overall Mental Toughness</b>	6.79	7.58	+0.79
<b>Control</b>	<b>7.11</b>	<b>7.78</b>	<b>+0.67</b>
Life Control	6.94	7.70	+0.76
Emotional Control	6.70	7.23	+0.53
<b>Commitment</b>	<b>6.75</b>	<b>7.77</b>	<b>+1.02</b>
Goal Orientation	6.51	7.27	+0.76
Does what it takes	7.08	8.16	+1.08
<b>Challenge</b>	<b>6.41</b>	<b>7.17</b>	<b>+0.76</b>
Stretches oneself	6.85	7.40	+0.55
Learns from all outcomes	5.90	6.71	+0.81
<b>Confidence</b>	<b>6.52</b>	<b>7.10</b>	<b>+0.58</b>
Confidence in Abilities	6.54	7.02	+0.48
Interpersonal Confidence	6.30	6.84	+0.54

The results in table 14 show that across the board, scores for female pupils are significantly higher than for male pupils. This is an interesting contrast with the data for male and female scores in years 6 – 13 and makes the questions in relation to gender, posed earlier, of even greater interest.

The most significant difference lies on the Commitment scale with female pupils rated 1.02 stens higher than boys are. The results indicate that girls are more prepared to do what it takes to achieve a goal.

## Bibliography

Annual Research Digest (2015) *Centre for the Study of Market Reform of Education*.

Brand S, Gerber M, Kalak N, Kirov R, Lemola S, Clough P.J., Pühse U, Holsboer-Trachsler E. (in press). Adolescents with greater mental toughness show higher sleep efficiency, more deep sleep and fewer awakenings after sleep onset. *Journal of Adolescent Health*. (in press), doi:10.1016/j.jadohealth.2013.07.017

Brand S, Gerber M, Kalak N, Kirov R, Lemola S, Clough P.J., Pühse U, Holsboer-Trachsler E. "Sleep well, our tough heroes!" – In adolescence, greater mental toughness is related to better sleep schedules. *Behavioral Sleep Medicine*. (2014)

Clough, P. J., Earle, K., & Sewell, D. (2002). Mental Toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32–43). London: Thomson

Clough, P. J., Earle, K., Perry, J. L., & Crust, L. (2012). A response to "Progressing measurement in mental toughness: A case example of the mental toughness questionnaire 48" by Gucciardi, D., Hanton, S., & Mallett, C. *Sport, Exercise and Performance Psychology*, 1, 283-287. doi:10.1037/a0029771

Clough, P.J. & Strycharczyk, D (2012 & 2015) *Developing Mental Toughness: Improving performance, wellbeing and positive behaviour in others*. Kogan Page:London

Crust, L and Clough, P.J. (2011) *Developing Mental Toughness: From Research to Practice*. *Journal of Sport Psychology in Action*, 2, 21-32

Dewhurst, S.A., Anderson, R.J., Cotter, G., Crust, L., & Clough, P.J. (2012). Identifying the cognitive basis of mental toughness: Evidence from the directed forgetting paradigm. *Personality & Individual Differences*, 53, 587-590.

Gerber, M, Kalak, N, Lemola, K, Clough, P.J., Pühse, U, Holsboer-Trachsler, E, Elliot, C. & Brand, S. (2012). Adolescents' exercise and physical activity are associated with mental toughness. *Mental Health and Physical Activity*, 5, 35-42

Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Perry, J. L., Pühse, U., Elliot, C., Holsboer-Trachsler, E., & Brand, S. (2012). Are adolescents with high mental toughness levels more resilient against stress? *Stress and Health*, 29, 164-171. doi: 10.1002/smi.2447

Horsburgh, V.A., Schermer, J. A., Veselka, L., Vernon, P. A. (2009). A behavioural genetic study of mental toughness and personality. *Personality and individual differences*. 46:2, 100-105

Jackson, C. K. (2013). Non-cognitive ability, test scores, and teacher quality: evidence from 9<sup>th</sup> grade teachers in North Carolina. *Personality and individual differences*. 54:7, 808-814

- Levy, A., Polman, R., Clough, P., Marchant, D., & Earle, K. (2006). Mental toughness as a determinant of beliefs, pain, and adherence in sport injury rehabilitation. *Journal of Sports Rehabilitation*, 15, 246-254.
- Marchant, D., Polman, R., Clough, P., Jackson, J., Levy, A., & Nicholls, A. (2009). Mental Toughness: Managerial & age differences. *Journal of Managerial Psychology*, 24, 428-437.
- Nicholls, A. R., Perry, J. L., Jones, L., Sanctuary, C., Carson, F., & Clough, P. J. (in press). The mediating role of mental toughness in sport. *Journal of Sports Medicine and Physical Fitness*.
- Oliver, B. R., Plomin, R. (2007) Twins' Early Development Study (TEDS): A multivariate, longitudinal genetic investigation of language, cognition and behavior problems from childhood through adolescence. *Twin research and human genetics*. 10, 96-105
- Perry, J. L., Clough, P. J., Crust, L., Earle, K., & Nicholls, A. R. (2013). Factorial validity of the Mental Toughness Questionnaire-48. *Personality and Individual Differences*, 54, 587-592. doi:10.1016/j.paid.2012.11.020
- St Clair-Thompson, H., Bugler, M., Robinson, J., Clough, P. J., McGeown, S., & Perry, J. L. (2014). Mental Toughness in education: Exploring relationships with attainment, attendance, behaviour and peer relationships. *Educational Psychology: An International Journal of Experimental Educational Psychology*
- Strycharczyk, D & Bosworth, C (OCR) (2016 in press) Developing Employability and Enterprise – for the 21st Century Kogan Page:London
- Strycharczyk, D & Clough, P.J. Eds. (2014) Developing mental toughness in young people for the 21st century. Karnac: London
- Strycharczyk, D & Elvin, C (CEO for ILM) (2014) Developing Resilient Organisations Kogan Page: London
- Veselka, L., Julie Aitken Schermer, K. V. Petrides and Philip Anthony Vernon (2009). Evidence for a heritable general factor of personality in two studies. *Twin research and human genetics*, 12, 254-260
- Who gets the top jobs? Centre for Market and Publications Research in Policy
- Ashley, L., Duberley, J., Sommerlad, H., & Scholarios, D. (2015). A qualitative evaluation of non-educational barriers to the elite professions, (June).
- Brimstone, B. (n.d.). Press Release Graduates who went to private schools earn more than graduates who did not.
- Green, F., Parsons, S., Sullivan, A., & Wiggins, R. (2015). Dreaming Big: Self-Evaluations, Aspirations, High-Valued Social Networks and the Private School Earnings Premium. Retrieved from [http://www.llakes.ac.uk/sites/llakes.ac.uk/files/55\\_Green\\_et\\_al\\_-\\_Dreaming\\_Big.pdf](http://www.llakes.ac.uk/sites/llakes.ac.uk/files/55_Green_et_al_-_Dreaming_Big.pdf)



Jerrim, J., Parker, P. D., Chmielewski, A. K., & Anders, J. (2015). Private Schooling , Educational Transitions , and Early Labour Market Outcomes : Evidence from Three Anglophone Countries, 1–15. <http://doi.org/10.1093/esr/jcv098>

Kirby, P. (2015). The university backgrounds of state and independent school teachers through education, (June). Retrieved from <http://www.suttontrust.com/wp-content/uploads/2015/06/Teaching-by-Degrees.pdf>

Macmillan, L., Tyler, C., & Vignoles, A. (n.d.). CENTRE FOR MARKET AND PUBLIC ORGANISATION RESEARCH IN PUBLIC POLICY WHO GETS THE TOP JOBS ?, 21–24.

Ndaji, F., Little, J., & Coe, R. (2016). A comparison of Academic Achievement in Independent and State Schools, (January).



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