# The Quality and Effectiveness of One-to-One Private Tuition in England

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I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

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# Abstract

There is a belief amongst educators and laymen that one-to-one tutoring is inevitably positive and effective. Although some research has shown that tutoring programmes can be very effective in raising achievement, other surveys have found negligible learning gains. These findings raise questions about the quality of PT. Literature has focussed on effective practice for specific subjects and age groups; few studies have examined effectiveness from the perspective of the tutor and student. This thesis aimed to determine the impact of private tuition (PT) on KS2 and GCSE achievement and to explore tutors' and students' views of effective pedagogy. Data on PT participation collected from over 2000 pupils in years 6 and 11 enrolled in 30 primary and 28 secondary schools was matched with government achievement and pupil background data. Using statistical modelling that reflects school effects in the data, pupils who received PT in maths achieved significantly higher GCSE maths results. There was no evidence to suggest that PT in English and science made an impact on respective GCSE or KS2 attainment. Using a combined measure of tuition in any subject, findings indicated that extended periods of PT made a small impact on maths and average KS2 score.

In the second study, data was collected to determine tutors' and students' views of effective pedagogy by contacting tutors who advertise online and by utilising word-of-mouth recruitment methods. A total of 204 tutors and 90 tutored students completed questionnaires. The achievement gains perceived by both tutors and students contradict the quantitative findings; almost all participants considered PT to be effective in raising achievement and confidence, demonstrating that for some students PT can be very beneficial. Tutors' and students' views of effective tutoring included the perceived importance of subject knowledge, rapport and patience; although there was some variation by subject and age group.

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# Abbreviations and Glossary of Terms

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| A-Level | The Advanced Level General Certificate of Education (GCE) is commonly referred to as an A-level and taken during Key Stage 5 (see KS5) when students are aged 16-18. Following the introduction of curriculum 2000, an A-level now consists of six modules studied over two years. In the first year students study to advanced subsidiary (AS) level, this is either a free standing qualification, or can be the first half of the full A-level. In year two of a full A-level, students take A2 examinations - this is not a separate qualification, but the second half of the A-level. |
| AERA | The American Educational Research |
| BERA | British Educational Research Association |
| BMRB | British Market Research Bureau |
| CPD | Continuing Professional Development |
| CRB | The Criminal Records Bureau has implemented the disclosure service to provide criminal record checks for all persons who come into contact through their work with children, the elderly or other vulnerable people. |
| DCSF | Department for Children, Schools and Families (previously DfES now the DfE) was a department of the UK government between 2007 and 2010, responsible for issues affecting people in England up to the age of 19, including child protection and education. The DCSF was replaced by the Department for Education (DfE) after the change of government following the General Election in May 2010. |
| DfE | Department for Education (previously the DCSF) was formed on 12 May 2010 by the Conservation/Liberal Democrat coalition government taking on the responsibilities and resources of the Department for Children, Schools and Families. A Department for Education previously existed in 1992, when the Department of Education and Science was renamed, and 1995 when it was merged with the Department for Employment to become the Department for Education and Employment. |
| DfES | Department for Education and Skills (see DCSF) was responsible for the education system and children's services in England between 2001 and 2007. On 28 June 2007 the department was split in two by Gordon Brown's Labour government. The Department for Children, Schools and Families and the Department for Innovation, Universities and Skills took over its responsibilities. |
| DISS | Deployment and Impact of Support Staff was the largest study of school support staff completed in the UK. It tracked changes over a key period (2003-2008), following the implementation of the workforce remodelling reforms in England and Wales. It was the first longitudinal study to analyse the impact of support staff - in particular, Teaching Assistants - on teachers, teaching and pupil learning, behaviour and academic progress in everyday school settings. |
| DV | Dependent variable |

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| EAL | English spoken as an additional Language. |
| EM | Expectation-maximization |
| EMSKS2 | Mean English maths and science Key Stage 2 score, calculated for each student when all three values were available. |
| EMSKS3 | Mean English maths and science Key Stage 3 score, calculated for each student when all three values were available. |
| EMSKS4 | Mean English maths and science Key Stage 4 score, calculated for each student when all three values were available. |
| EPPE | The Effective Provision of Pre-School Education study originally aimed to follow children to the end of Key Stage 1 (age 7). It explored the impact of pre-school on children's cognitive and social/behavioural outcomes, as well as other important background factors (family and home learning environment). The EPPE project now follows the children to 16+ in the final extension following the same group of students through their final year of compulsory schooling and into their post school education, training and employment choices. |
| ES | Effect size. Effect sizes in this document represent a proportion of a Key Stage level for the Key Stage 2 analysis and a proportion of a GCSE grade for the Key Stage 4 analysis. Standardised effect sizes have also been calculated to allow international comparisons, standardised effect sizes have been indicated using the symbol: Δ. |
| ESRC | The Economic and Social Research Council funds research and training in social and economic issues. The ESRC are an independent organisation, established by Royal Charter but receives most of its funding from the government. |
| FGPS | Fine grade point score. In the past, point scores have been based on the levels that pupils achieved in Key Stage (KS) assessment; pupils achieving level 4 getting 27 points, those at level 5 getting 33 points and so on. Fine grades use the actual test score data to create a finer measure. |
| FSM | Free School Meals. Parents do not have to pay for school lunches if they receive any of the following: Income Support, income-based Jobseeker's Allowance, income-related Employment and Support Allowance, support under Part VI of the Immigration and Asylum Act 1999, the Guarantee element of State Pension Credit and Child Tax Credit, provided they are not entitled to Working Tax Credit and have an annual income that does not exceed £16,190. Children who receive any of the qualifying benefits listed above in their own right are also eligible to receive free school meals. FSM is often used as an indicator of parental social-economic status. |
| GCSE | General Certificate in Secondary Education. GCSEs are the main qualification taken by 14 to 16-year-olds during Key Stage 4 (KS4), but are available to anyone who would like to study a subject that interests them. GCSEs can be taken in a wide range of academic and applied subjects. GCSEs are usually studied full-time at school or college and take five terms to complete. GCSEs are at levels 1 and 2 on the National Qualifications Framework, depending on the grade achieved. |

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| *Hakwons* | Private for-profit school-like learning institutions in Korea |
| HPI | Home Possessions index adapted from PISA (see Appendix F) |
| Hpw | Hours per week |
| HT | Head Teachers |
| IDRC | International Development Research Centre |
| ILO | The ILO is the international organisation responsible for drawing up and overseeing international labour standards. |
| INSPIRE | Lepper et al.'s model of effective tutoring practice: intelligent, nurturing, Socratic, progressive, indirect, reflective, encouraging. |
| IOE | Institute of Education |
| ISCO | The International Standard Classification of Occupations is one of the main international classifications for which ILO is responsible. It belongs to the international family of economic and social classifications. ISCO is a tool for organising jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job. |
| ITS | Intelligent tutoring systems. ITS simulates aspects of human tutoring using artificial intelligence through a computer to produce customised feedback. |
| *Juku* | Private after school classes in Japan that constitutes a wide range of supplementary tuition. For more details see Roesgaard (2006). |
| KS | Key Stage - The National Curriculum is divided into four Key Stages according to pupils' ages.<br>Key Stage 1 - Infant School (5-7 years).<br>Key Stage 2 - Junior School (7-11 years).<br>Key Stage 3 - Lower Secondary School (11-14 years).<br>Key Stage 4 - Upper Secondary School (14-16 years). |
| KS1 | Key Stage 1 - Infant School (5-7 years). At the end of year 2 students take their KS1 tests; the level is based on the teacher's assessment, taking into account the test performance. |
| KS2 | Key Stage 2 - Junior School (7-11 years). At the end of year 6, students take their KS2 tests. The KS2 level reflects the teacher's assessment and the national test results. |
| KS3 | Key Stage 3 - Lower Secondary School (11-14 years). The KS3 level is based on the teacher's assessment after KS3 national tests were abolished in 2008. |
| KS4 | Key Stage 4 - Upper Secondary School (14-16 years), at the end of KS4 students take their GCSE examinations. |
| KS5 | Key Stage 5 – Post-compulsory education (16-19 years). Halfway through Key Stage 5, students sit the GCE Advanced Subsidiary (AS) Level examinations and at the end of Key Stage 5, the A2 Level examinations. |
| KS1APS | Key Stage 1 average point score calculated from the test scores for reading comprehension, writing and maths taken at the end of KS1. |
| Kumon | Kumon is a type of tuition programme which originated in Japan. Each child receives an individualised learning programme and typically attends a study centre twice per week to interact with an instructor. Students also complete daily timed learning tasks on their own (see Kumon Education UK, 2009). |

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| LA | Local Authority. A local authority is an administrative unit of local government which provides a wide range of services to support schools, including information about advisory, finance, personnel and ICT services as well as covering school management, special educational needs, the Education Client Unit and services for Governors. |
| LSYPE | Longitudinal Study of Young People in England. LSYPE, also known as Next Steps, was commissioned by the former Department for Education and Skills (DfES). It is a major panel study of young people which brings together data from a number of different sources, including annual interviews with young people and their parents.<br>The main role of the study is to achieve a better understanding of the key factors affecting young people's progress in transition from the later years of compulsory education, through any subsequent education or training, to entry into the labour market or other outcomes. |
| MESE | Mapping and Evaluating Shadow Education, see (Ireson and Rushforth, 2005). |
| MGP | Making Good Progress was a consultation document produced by the DfES in January 2007 and was concerned with pupils who do not achieve the required progress. The document proposed piloting four new approaches: (a) Changes to educational assessment, including options to take an externally-marked test whenever the pupil is ready. This will imply more frequent, shorter tests which can help shape the child's future learning. (b) Individual tuition for pupils not making enough progress. (c) School progress targets (alongside existing targets). (d) A progression premium – payable for success in achieving progress targets, and used to support a richer curriculum. |
| MGPP | Making Good Progress Pilot. On 6 June 2007, the Secretary of State for Education and Skills, announced a major two-year pilot from September 2007. The pilot trialled new ways to assess, report and stimulate progress in schools (see MGP). Part of the pilot included the introduction of 10 hours one-to-one tuition in maths or English for pupils in KS2 and KS3. |
| MLM | Multilevel modelling |
| MLwiN | MLwiN is a statistical software package for fitting multilevel models. |
| MVA | Missing value analysis |
| NC | The National Curriculum is a framework given to teachers by government that sets out the most important knowledge and skills that every child has a right to learn and at what stage; it also gives standards that measure how children are doing in each subject. It covers the ages 5-16 and is divided into Key Stages. |
| NCLB | No Child Left Behind was originally proposed by the administration of George Bush, and became law in Jan 2002. NCLB supports standards-based education reforms, which stem from the belief that setting high standards and establishing measurable goals can improve individual outcomes in education. The Act requires states to develop assessments in basic skills to be given to all students in certain grades. If a school does not make adequate yearly progress |

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| | for three years, the school must provide supplemental services, such as free tutoring or after-school assistance. |
| NVivo | NVivo is a qualitative data analysis computer software package. |
| OECD | Organisation for Economic Co-operation and Development |
| OLS | Ordinary least squares |
| PISA | Programme for International Student Assessment |
| PLASC | Pupil Level Annual School Census. The 1996 Education Act required each school in England and Wales to return a census to the DfES. Initially the information requested from the school was limited to general statistical data and names and addresses of pupils were not sought, instead they were given a 'Unique Pupil Number' (UPN) to safeguard their anonymity. Changes were made to the Education Act via secondary legislation. By 2001 schools were being asked to supply detailed information about each pupil. |
| PT | Private tuition |
| Pw | Per week |
| *Ronin* | Private education in Japan helping students to gain admission into higher education. |
| RQ | Research question |
| RQ1, RQ2, RQ3 | Research question 1 etc |
| Schools VA measure | See VA |
| *SD* | Standard deviation |
| SE | Standard error |
| SEN | Special Educational Need - the needs of pupils who have learning difficulties or disabilities which significantly affects access to the curriculum and who appear on the school's special needs register. Pupils with SEN statements require further help than provision given through school action and school action plus. |
| SES | Socio-economic status |
| SPSS | Statistical Package for the Social Sciences. Computer software used for statistical analysis. |
| Stata | Stata is a general-purpose statistical software package |
| TA | Teacher Assessment data is an essential part of the National Curriculum and is carried out as part of the teaching and learning process. It spans the programmes of study and takes into account evidence of attainment in many contexts, including discussion and observation. |
| TDA | Training and Development Agency |
| TIMSS | Originally the Third International Mathematics and Science Study which later became the Trends in International Mathematics and Science Study |
| Tripartite System | The Tripartite System was the arrangement of state funded secondary education in England and Wales from 1944 to 1970s (from 1947 to 2009 in Northern Ireland), which was established following the 1944 Education Act (1974 Education Act in Northern Ireland). State funded secondary education was arranged into a structure containing grammar and secondary modern schools. Pupils were allocated to their respective types of school according to their performance in the 11-plus examination. It was formally abolished in |

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| | England and Wales in 1976 when the comprehensive system was established; however elements of the system persist in several English counties. |
| UCLA | University of California, Los Angeles |
| UPN | Unique Pupil Identifier (see PLASC) |
| VA | Value added is a measure of the progress students make between different stages of education; an individual student's progress is compared with the progress made by other students with the same or similar prior attainment. The school VA measure for KS1 and KS2 are shown as a measure based on 100. Scores above 100 represent schools where pupils on average made more progress than similar pupils nationally, while scores below 100 represent schools where pupils made less progress. For KS1 to KS2 value added, a measure of 101 means that on average each of the school's pupils made one term's more progress between KS1 and KS2 than the median for pupils with similar KS1 attainment. Conversely, a score of 99 means that the school's pupils made a term's less progress.<br><br>The value added scores KS3 and KS4 show how schools have helped students at the end of compulsory schooling progress since taking their KS3 tests (KS3 to Age 15 value added measure). A school's value added measure is a simple average of the value added scores for all students in the school. The national KS3 to Age 15 value added measure was 990.7 for 2004, see (Department for Education and Skills, 2004c) |
| VITAE | Variations in Teachers' Work, Lives and Their Effects on Pupils |
| VPC | The Variance Partition Coefficient denotes the residual correlation of level one units within level two units after controlling for the effect of $x$. A high intraclass correlation or VPC indicates that within the grouping structure, respondents within each group are alike (Goldstein, 2003). |
| Y | Year |

# Introduction

International surveys indicate wide variation in the extent of private tutoring (Baker, Akiba, LeTendre, & Wiseman, 2001). Recent research in England involving parents found that 12% of primary and 8% of secondary school pupils participate in private tuition (PT) (Peters, Carpenter, Edwards, & Coleman, 2009). The "Mapping and Evaluating Shadow Education (MESE) project" found that 7.6% of sampled pupils in year 6 were in receipt of tutoring in mathematics, 8.1% in English and 3.2% science. Similar figures were found for year 11 students in maths and science (7.9% and 2.8% respectively); a smaller proportion had received English tuition (2.6%) (Ireson & Rushforth, 2011). Overall the MESE survey found 27% of pupils had participated in private tutoring at some point during their schooling. These findings suggest that a large proportion of parents consider PT a worthwhile investment, perceiving a link between educational achievement and future career progression. Despite these findings, Ireson and Rushforth (2005) found that PT raised pupil achievement by half a GCSE grade in mathematics with negligible impact on English achievement. These findings sparked headlines such as "Private tuition fails results test" (A. Bloom, 2005, p. 3) and "Private tuition unlikely to boost pupils' exam grades" (Gardner, 2005, p. 8), and called into question both the quality of PT provision in this country and its effectiveness in raising achievement.

A number of studies have been undertaken to investigate the components of effective tutoring and a plethora of suggestions provided for what is considered as good or effective practice. Much of the research is focussed on specific subjects for specific age groups and has been used to develop and advance the design of intelligent tutoring systems (ITS). ITS simulates aspects of human tutoring using artificial intelligence through a computer to produce customised feedback. Evidence stemming from this research indicates that tutoring is a complex process, which requires considerable sensitivity. Tutoring programmes that are well designed and implemented can be very effective in terms of raising attainment and improving attitudes to learning (B. S. Bloom, 1984; P. A. Cohen, Kulik, & Kulik, 1982); however there is considerable variability in the effectiveness of such programmes (Elbaum, Vaughn, Hughes, & Moody, 2000). Contrary to findings that question the effectiveness of tutoring (Baker et al., 2001; Ireson & Rushforth, 2005; Smyth, 2008, 2009), Ellson (1976) argues "there is a widespread belief among educators and laymen that individualised instruction, especially in a one-to-one teaching situation, is almost infallibly effective" (p. 133). These contradicting views and findings demonstrate the need for further rigorous research to identify characteristics of effective practice.

The thesis is concerned with the impact of PT on achievement and factors that may explain the variability in its effectiveness. It examines the impact of PT on achievement in English, mathematics and science and explores both tutors' and students' views of effective pedagogy. Amidst reports that the PT industry is rapidly expanding and government pledges to fund one-to-one tuition for a substantial number of students, this investigation aims to extend the work started by the MESE project and broaden the knowledge base about PT in England. As little is known about PT and effective practice from both the tutors' and pupils' perspective, this study aims to contribute to an area where substantial exploration is needed.

In response to the MESE findings a cynical journalist wrote:

> *It never ceases to amaze me that educated adults believe that a few hours of extra help from a teacher they have never met can transform the life chances of their child. For all they know, their tutor of choice could be a classroom dud in another part of the city (Reilly, 2005 para. 4).*

This research aims to add new insight to the field of the effectiveness of one-to-one tuition in England. It is hoped that the elements of effective tuition from the perspective of both tutors and students will influence good practice in one-to-one tuition.

## Personal motives

On completion of my Master's degree and in pursuit of work in the education research field, I began work on the Mapping and Evaluating Shadow Education (MESE) project (see Ireson & Rushforth, 2005). From an early age I had received private and part-school-funded one-to-one music lessons for a number of instruments, and for a short period of time I was also tutored once a week in music theory. Yet, having attended a comprehensive school in a rural non-selective area of England, PT in school subjects other than music and sport pursuits was rather uncommon; I was unaware of any friends or acquaintances who had participated. As I became more familiar with the area through the MESE project, I was surprised at the level of PT in some regions of England where the study had taken place. I also became frustrated at the lack of British educational research in this field. Throughout my initial involvement in the MESE project I was confronted by a number of researchers, journalists, and parents posing questions in this area and I was unable to provide anything other than personal observations.

The desire to know more and to reduce the research gap increased my desire to pursue this topic. I was also intrigued by the quantitative results from the preliminary analysis in the MESE project. If PT resulted in such limited achievement gains, why then were so many parents choosing to invest in it? Would the results be different for a larger sample of students, or for pupils taking Key Stage 2 (KS2) tests rather than General Certificate of Education examinations (GCSEs)? It was clear that some tutors were making an enormous impact on their students and I had interviewed numerous parents who were very satisfied with the progress their children were making as a result of PT investment. What were these tutors and students doing that was so effective in raising achievement? Were there other benefits to PT apart from the grade improvements we had measured?

This thesis aims to make a contribution to knowledge in the field of PT by addressing some of these important questions, with a specific focus on aspects of quality and effectiveness.

## Thesis structure

The thesis contains two main studies to address the three RQs. The first focuses on the effectiveness of PT in terms of the impact on achievement. This study extends the analysis completed for the MESE project and addresses the question:

> To what extent does PT impact on attainment at KS2 and GCSE level?

The literature on the effectiveness of PT reveals a very varied picture with some studies showing large gains in achievement and others revealing negligible gains. This suggests that PT can be variable in quality which explains the mixed findings. The quality of PT could be explored in a number of different ways, this thesis will investigate aspects of tuition from the perspective of both tutors and students and address the following questions:

> What pedagogic techniques do tutors believe to be important for achieving learning gains?

> What do pupils and tutors consider to be effective tuition and how is this evaluated?

The thesis consists of 11 chapters that consider the three research questions noted above. Chapter 1 presents the background and conceptualisation of PT. Findings in the literature regarding the impact of PT on attainment are discussed in chapter 2. This chapter which is linked to research question (RQ) 1, includes studies completed in a selection of countries and contexts in an attempt to determine how effective PT is at raising achievement. Chapter 3 extends the review in chapter 2 and contains a critical discussion of the relevant literature centred on effective pedagogic practice in the one-to-one situation, this chapter links closely with RQs 2 and 3.

The variables and methods employed to measure the impact of PT on attainment are discussed in chapter 4, together with a detailed description of the methodology used to address RQs 2 and 3. A presentation of the results outlining the impact of PT on achievement at KS2 and GCSE are presented in chapters 5 and 6. Chapter 7 contains a discussion of the results and methodological challenges confronted by completing an analysis of this nature.

Chapters 8 and 9 present the results from the tutor and student analysis addressing RQs 2 and 3. These findings are discussed in chapter 10 where themes of effective tutoring from tutors' and pupils' perspectives are contrasted with the literature presented in chapter 3. The final chapter brings together the findings from all the RQs, discussing implications for policy and practice alongside areas for future research.

To assist the reader and ensure the content is accessible to an international audience, all terms related to the English education system and any acronyms used have been defined and explained in full. These explanations have been included in the abbreviations and glossary of terms section at the beginning of this thesis.

# 1 Conceptualisation and Background

## 1.1 Introduction

Despite the rapid expansion of shadow education worldwide, PT has received relatively little attention from academics and policy makers. One reason for this may be due to the difficulties of researching this topic when conventional education is more easily monitored and researched. In contrast to information readily obtainable from mainstream schools, tutors are often reluctant to declare their income and parents unwilling to state their expenditure (Bray, 1999, 2010). In England there are no regulating organisations through which tutors can be contacted, and many parents rely on word-of-mouth recommendations to find suitable tutors for their children (Ireson & Rushforth, 2005). PT is a challenging area to investigate due to its hidden nature and the wide variety of forms it can take. In his research concerning shadow education, Bray (1999) described PT to include the following:

> *Some tutoring is provided one-to-one in the home of either the tutor or his/her client. Other tutoring is in small groups, in large classes, ar even huge lecture-theatres with video screens to cater for overflows. Some tutoring is provided entirely by correspondence in the mail or over the Internet; and in some societies tutoring is provided by telephone. (pp. 21-22)*

VanLehn et al. (2003) highlighted further variation; "the characteristics of tutoring depend on factors such as the material being taught, the student's prior knowledge and the tutor's pedagogical objectives, practises and knowledge" (p. 210). With such a vast array of what has become known as "tutoring", many researchers often fail to include a clear conceptualisation in their work. Shadow education and PT are often used interchangeably as umbrella terms, including within them diverse forms of education with no clear definition.

This chapter will discuss the conceptualisation of PT followed by an examination of its history and development. The prevalence of PT and a summary of studies in England investigating its form, content and duration are considered in the second half of the chapter. The chapter ends with an overview of the policy context and a critique of recent policy initiatives.

## 1.2 Conceptualisation

Bray and Kwok (2003) define private supplementary tutoring as "tutoring in academic subjects which is provided by the tutors for financial gain and which is additional to the provision by mainstream schooling" (p. 612). This definition clearly explains certain aspects of PT: it is a paid for service, in addition to mainstream education and in academic subjects; but it does not include any consideration of the numbers involved and what form the tuition will take.

In his book "Centuries of Tutoring" Gordon (1990) states "The word 'tutor' has a long and confusing history. Its meaning as an education concept has shifted over time, country and culture" (p. 2). Tutoring is defined by Ellson as "one-to-one instruction" (1976, p. 130) where he argues one-to-one can also be applied to a group situation without causing contradiction, as each member of the group can receive individual attention. Again this definition could not be applied to PT on the scale provided in some Asian countries where tuition is sometimes provided in lecture theatres to a large number of students.

The use of the term "shadow education" was first used in the 1990s. Several authors used this term referring to supplementary tutoring which developed alongside mainstream primary and secondary education. In their paper concerning schooling in Japan, Stevenson and Baker (1992) used 'shadow education' to comprise a wider remit of supplementary education including correspondence courses, practice examinations, private tutors, private after-school classes (*juku*[1]) and full time preparation following high school (*ronin* – helping students to gain admission into higher education). A shadow seems a very appropriate metaphor to describe this phenomenon which resonates the form and content of mainstream education and develops alongside it. In some countries the nature of tutoring is better described as a parallel system of education due to the extent of those receiving tutoring (Baker & LeTendre, 2005). In countries such as South Korea, Japan, Colombia and the Philippines more than three quarters of all year 7 and 8 pupils engage in some form of supplementary tuition (Baker & LeTendre, 2005). Bray and Silova (2006) point out that academics who have referred to supplementary tuition as shadow education have made three important distinctions. Firstly, PT only exists because mainstream education exists to which tutoring is supplementary; secondly, changes that are made to mainstream education are echoed by changes to the supplementary shadow system; and lastly, much less public attention is given to the shadow system in comparison to mainstream education (Bray & Silova, 2006). This third descriptive distinction helps to explain why this topic has been relatively neglected and why there is limited research available. Like Bray (1999) I am concerned only with "supplementation" and "privateness" (p. 20). My focus will be on subjects taught in schools and on tutors who are

[1] Juku constitutes a wide range of supplementary tuition, for more details see Roesgaard (2006).

providing support for profit-making purposes. This study does not include teachers who give extra support (one-to-one, groups or classes) during out of school hours to the pupils they are responsible for. I will be focussing solely on academic subjects provided in school (excluding sport and music tuition) for which tutoring is supplementary to mainstream schooling. Music and sport tuition may be provided as part of the main curriculum for example GCSE music or A-level PE (physical education), however to be explicit to the research participants and consistent in the analysis any form of sport or music tuition has been excluded from the remit of this thesis.

PT encompassed in this definition can exist on a one-to-one basis, in small groups, or can involve large lecture theatres of students with one tutor. It is important to make a distinction between the different numbers involved in tuition as this creates a vastly different learning experience. Although it could be argued that working in small groups is very similar to working on a one-to-one basis, this project will focus specifically one-to-one tuition. This distinction has been made according to the research remit in attempting to determine the views from both tutors and pupils on what makes tutoring effective.

## 1.3 Background: History of tutoring

> *Consider only the education of an aristocratic boy, to which one man's whole time is devoted. However excellent might be the results of such a system, no man with a modern outlook would give it serious consideration, because it is arithmetically impossible for every child to absorb the whole time of an adult tutor. The system is therefore one which can only be employed by privileged caste; in a just world, its existence would be impossible. Bertrand Russell "On Education" (Park, 1963, p. 14).*

Education has changed significantly since Bertrand Russell made this observation. Before schools were established, private tutors were considered the best way to educate children. After the establishment of schools, many continued to feel that educating children through private tutors was a preferable alternative to the schooling system (Locke, 1693; Stockdale, 1782; Thomson, 1865; Unknown, 1852). Gordon and Gordon (1990) argue that many of the "philosopher-tutors" played an important part in the development of modern educational philosophy forming "a cornerstone in contemporary schooling" (p. 1).

It is difficult to trace the history of PT in England. There are few books available on the subject, and these date back to the 1600s and focus on what tutors should teach. Gordon and Gordon

(1990) argue "a principal cause for lack of a unified history of tutoring may be that the concept of tutoring has been called so many different names and that it exists only as a jumble of related terms dispersed over 2,500 years of social history" (p. 2).

A small number of books from the 1800s provide advice on how to select private tutors. Based on this advice it is possible to map out the position of the tutor in education and culture during this period in history. As with a number of other authors in this era, Thomson (1865) stresses the importance of the selection process and presumes the reader will employ both a male and female tutor (or governess). He advises they should be placed *in loco parentis* "true lieutenants of the parents themselves – another father and another mother, in so far as instruction goes" (Thomson, 1865, p. 60).

In England the term private tutor in the nineteenth century encompassed a much broader spectrum in comparison to its usage today. PT included the development of a mind and the moulding of character optimally involving instruction from both male and female tutors (Thomson, 1865). Tutors were expected to fill many varying roles and possess skills in a broad spectrum of subjects. Stockdale (1782) advised parents to seek a tutor "who is intimately conversant with polite literature, and who is endowed with a liberal and expanded mind" (p. 14). The term "tutoring" as referred to here has now been radically transformed into mass education through classroom teaching. PT defined here is in supplementation to schooling, however in nineteenth century England tutors for the aristocracy were on the whole alternatives to classroom schooling rather than in supplementation to it.

A private tutor practising today is likely to be a specialist in one or more subjects rather than the full spectrum of subjects as referred to above. At present in England the majority of tutors advertising their services teach students on a one-to-one basis usually charged per hour (Tanner et al., 2009). Unless children are home schooled, tutors now work on a supplementary basis in addition to classroom education.

## 1.4 PT in England

As mainstream and private schooling expands, so does the supplemental nature of tutoring (Baker & LeTendre, 2005). A report published by the World Bank argued "tutoring is now a widespread educational phenomenon, and one that is on the rise" (Dang & Rogers, 2008b, p. 1). Due to the difficulty in measuring prevalence (Bray, 2010) and its hidden nature, data on participation rates is extremely limited. Tutors often avoid taxation and pupils may be unwilling to admit the extent of participation in PT due to the extra help they require or the advantages they have gained (Bray, 2006). From the restricted evidence available, patterns suggest that the shadow education market in some countries has grown exponentially over the past few decades. Dang and Rogers state that in some countries such as the Republic of Korea and Turkey, household spending on PT rivals public-sector expenditure on education. In 2008 Dang and Rogers (2008b) stated the expenditure of Korea on PT comprised 2.9% of GDP. Literature on the prevalence of PT worldwide has not been included here; for a summary of data from a large number of countries see Bray (2009). The remainder of this section will focus on the prevalence of PT in England including data from a number of international surveys. This section ends with a summary of the form, content, intensity and duration of PT in England.

A small scale study involving a sample of 107 children aged 10-11 from both private and mainstream schools in England found that one-third of all parents employed tutors (West, Noden, & Edge, 1998). This relatively high estimate may have been influenced by the sampling strategy which included only families with parents employed in non-manual occupations in inner and outer London Local Authorities (LAs). However in support of these high estimates Reay (1998) suggested that a large proportion of middle class families with children in the final year of primary schooling employed tutors. In her case study the majority of mothers from a school in a very affluent area of London employed tutors for their children.

The MESE project provided systematic mapping of PT for pupils in the primary, secondary and post-16 phases of education in England (Ireson & Rushforth, 2011). The survey involved 3615 students in years 6, 11 and 13, from a total of 65 state maintained primary and secondary schools and colleges. The overall results showed that 27% of pupils had received PT at some point during their schooling; in year 13 29.5% reported having had tuition compared to 26% in year 6 and year 11. Within the schools used in the study there was a large variation in the level of tuition. For primary schools involved in the project the percentages of students receiving tuition ranged from 0% to 59% and for secondary schools this varied from 6% to 65% (Ireson & Rushforth, 2011).

Since the completion of the MESE project, a number of additional studies have reported on the prevalence of PT in England. In 2008 the Department for Children, Schools and Families (DCSF) commissioned British Market Research Bureau (BMRB) Social Research to investigate the prevalence of PT in England as part of the Cost of Schooling Survey (Peters et al., 2009). Respondents were asked if their child had received PT in any academic subject. Further questions were asked to determine which subjects were taught, how often the tuition took place, length and cost of sessions and whether tuition was on a one-to-one or group basis. In total 1500 parents who had children aged 5-16 in the state education system were interviewed by telephone. Overall 11% of parents/carers stated their child received tutoring in an academic subject (excluding music and sport). This was higher for primary school children (12%) than for children attending secondary school (8%). Primary school children were more likely to receive tutoring in English, while it was marginally more common for secondary aged children to have maths tutoring. When comparing each Key Stage, children in KS2 (aged 7 – 11) were the most likely to undertake tuition (14%), compared to 9% at KS1 (age 4-7), 7% at KS3 (age 11-14), and 11% of KS4 pupils (aged 14-16) (Peters et al., 2009). The survey also found that those within the highest income bracket were more likely to employ private tutors for their children (16% of those earning £50,000 per annum compared to 9% earning £25,000 to £49,999 and 9% earning less than £25,000) (Peters et al., 2009).

Additional research published by Ipsos MORI on behalf of the Sutton Trust presented findings from the 2009 Young People Omnibus Survey of secondary school pupils (Ipsos MORI, 2009). This study involved students in years 7 to 11 from a nationally representative sample of middle and secondary schools. This survey included several questions about PT, and collected data through self-completion questionnaires from 2,447 pupils. The results showed that pupils in year 11 were more likely to receive tuition than pupils in any other year group included in their study (30% of year 11 students compared with 17% of year 7 pupils) (Ipsos MORI, 2009). Overall, 22% of pupils indicated they had received PT, which was an increase of 4 percentage points on parallel data collected in 2005 (Ipsos MORI, 2005).

Questions were asked regarding private lessons in all three waves of data collection for the LSYPE (Longitudinal Study of Young People in England) questionnaire. Commissioned by the Department for Education and Skills (DfES) and now managed by the Department for Education (DfE), the major aim of this longitudinal study is to identify key factors that affect transition in education (Department for Children, Schools and Families and National Centre for Social Research, 2008). The first wave of the LSYPE study was undertaken when the students were in year 9 (age 13-14), it was repeated by the same students in years 10, 11 and 12 for those students who chose to stay in education. The parent/carers were asked if they had paid for the student to attend private classes in any subjects taught at school. Table 1.1 shows the percentages for all those that were interviewed and mentioned private classes.

The prevalence of tutoring appeared to increase for most subjects from age 13-16, with a slight drop in the second wave when the students were aged 14-15. Inevitably the numbers are less in Wave 4 as some students were no longer participating in full-time education.

*Table 1.1 Percentage of pupils who reported private classes in school subjects in the LSYPE study*

| LSYPE extracurricular Activities | Wave 1 2004 Age 13-14 yr 9 | | Wave 2 2005 Age 14-15 yr 10 | | Wave 3 2006 Age 15-16 yr 11 | | Wave 4 2007 Age 16-17 yr 12 | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % |
| **Paid for private classes in school subjects** | 1952 | **12.6** | 1498 | **11.2** | 1927 | **15.7** | 746 | **9.3** |
| No Private lessons | 13552 | 87.4 | 11855 | 88.8 | 10357 | 84.3 | 7257 | 90.7 |
| TOTAL | 15507 | 100 | 13353 | 100 | 12284 | 100 | 8003 | 100 |
| MISSING | 266 | | 186 | | 155 | | 3798 | |
| ***Of those receiving private classes:*** | | | | | | | | |
| Maths | 1000 | **51.2** | 760 | **51.1** | 1225 | **63.6** | 345 | **46.2** |
| English | 639 | **32.7** | 392 | **26.4** | 521 | **27** | 94 | **12.6** |
| Science | 316 | **16.2** | 263 | **17.7** | 520 | **27** | 207 | **27.7** |
| Languages | 86 | **4.4** | 89 | **6** | 153 | **7.9** | 59 | **7.9** |

In 1995 data was collected about shadow education across many nations through TIMSS (Trends in International Mathematics and Science Study) which enabled some cross country comparisons to be made on academic performance, this was followed by the Programme for International Student Assessment (PISA) another comparative study. Both surveys included questions on participation in extracurricular activities and out-of-school classes. These surveys allow comparisons of prevalence in England (and the UK for PISA) with other countries; they can also be used to indicate growth of PT participation through repeated data collection.

In the first TIMSS study students were asked about participation in out-of-school lessons in both maths and science. Data from the 1995, 1999 and 2003 TIMSS surveys are presented in Table 1.2 (International Association for the Evaluation of Educational Achievement (IEA), 2005). In his paper on the methodological challenges of researching shadow education Bray (2010) highlights the importance of distinguishing between shadow education which includes fee-paying and unremunerated out-of school lessons. The 1995 and 1999 questions in the TIMSS survey asked the students about participation in out-of-school lessons, Bray (2010) states: “the responses could – and it is clear from the patterns many of them did – include extra coaching by teachers on an unremunerated basis as of their normal workloads” (p. 5). If this data is used to indicate shadow education participation which Stevenson and Baker (1992) describe as “firmly rooted within the private sector” (p. 1643) then this data is “contaminated” (Bray, 2010, p. 5). In 2003 the question was changed to specifically mention extra lessons and tutoring (Martin, 2005), this may explain the jump in participation rates found in the English data.

*Table 1.2 Percentage of pupils in year 8 who reported out of school lessons in maths and science in 1995, 1999 and 2003[2] in England in the TIMSS study*

| TIMSS: out of school lessons in Maths and science (year 8) | 1995 | | 1999 | | 2003 | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| **Maths** | 172 | **10.5** | 358 | **13.1** | 550 | **20.9** |
| TOTAL | 1642 | 100 | 2735 | 100 | 2632 | 100 |
| **Science** | 113 | **6.9** | 245 | **9** | 439 | **16.6** |
| TOTAL | 1638 | 100 | 2725 | 100 | 2637 | 100 |

The first PISA questionnaire administered in 2000 included one question regarding PT. In total 15.4% of 15-year-old students indicated they had participated in some or regular tutoring in the last 3 years. In 2003 students were asked to indicate how much time they currently[3] spent studying with a tutor in all subjects and repeated specifically for maths. Analysis of the UK data suggests that 12.1%[4] of students stated they worked with a tutor and 8.2% specifically with a maths tutor. In addition to this, 20.7% indicated they were involved in some form of out-of-school classes. In 2006 the phrasing of the question changed again; 16.8% indicated they had spent time in lessons held on a one-to-one basis with a teacher not from their school. These results provide further data on levels of PT participation, although due to the differences in the scope and wording of the questions it is difficult to make accurate comparisons between each survey.

[2] The question on extra lessons in maths and science outside of school time was not included in the 2007 TIMSS study.
[3] This question referred to the time students were currently involved in tutoring and did not refer to the previous 3 years as the 2000 questionnaire had done.
[4] This question was not available on the interactive dataset so was calculated from the downloaded database. The percentages have been calculated on valid responses.

In England the PT industry is unregulated; anyone can advertise their services as a tutor without the requirement of specialised training or qualifications. In 2008 the DCSF commissioned a study on PT in England (Tanner et al., 2009). This report was designed to inform the government about the PT market place in England, specifically with reference to implementing the "Making Good Progress Pilot" (MGPP, discussed in section 1.5). "Private Tuition in England" reported on the visible part of the tutoring market place, therefore it includes only tutors and PT agencies who advertise their services. The report did not include the hidden aspects of the market which consists of tutors who find students only through recommendations, who do not advertise and do not work for PT agencies. Ireson and Rushforth (2005) found that over 50% of parents/carers found tutors through word-of-mouth recommendation, compared with just 13% who used advertisements and 8% who used tutoring agencies. This may mean a large proportion of tutors operating in England were excluded from this study.

In the study 'Private Tuition in England' (Tanner et al., 2009), web searches identified 504 PT agencies in England and 130 of these participated in the telephone survey. The report found that in 43% of agencies all tutors were qualified teachers, and a further 40% required tutors to hold a degree. One-to-one tuition was the most common form of PT, with sessions usually taking place in the home of the student and lasting for 1 hour.

In research completed by Ireson and Rushforth (2005), parents were asked their reasons for arranging tuition for their child. A total of 59% of respondents chose: 'to help achieve the highest examination grades' (Ireson & Rushforth, 2005). Stevenson and Baker (1992) argue that allocation processes in formal education promote the development of shadow education. High-stakes tests often act as gate keepers to opportunities in education and the labour market; as a result it has been argued that formal centrally administered examinations are an important causation factor in shadow education development (Bray & Kwok, 2003; Kwan-Terry, 1991; Stevenson & Baker, 1992). This contrasts findings from an analysis of the TIMSS data, Baker et al. (2001) who found that cross-national variation in the prevalence of out-of school lessons was unrelated to the timing of high-stakes tests. However the inaccuracies and contamination of the data collected on tutoring (see above) may have impacted on the results of this analysis. The high proportion of parents who indicated they invested in tuition to achieve top examination grades (Ireson & Rushforth, 2005), demonstrates that PT in England is directly linked to the examination system. Tanner et al. (2009) also found that provision for tutoring was most common for KS2 and KS4 students. At the end of KS4 students take GCSE examinations and during KS2 students who wish to attend selective secondary schools take entrance exams (including the 11-plus); at the end of KS2 students take KS2 examinations. Further evidence for the emphasis of achieving high grades through tutoring in England is demonstrated by the names of a number of tutoring agencies, including: "A Plus Tutoring", "A* Tutors", "Higher Marks Tutoring" etc.

## 1.5 Policy context – Making Good Progress

In 2007, the government announced a two-year pilot and produced the consultation document "Making Good Progress" (MGP). This outlined plans to provide an "intensive burst of individual tuition" in English and/or maths for a number of pupils in KS2 and KS3 (Department for Education and Skills, 2007a, p. 23). The pilot began in September 2007 and in April 2009 the government provided funding directly to all LAs to allow 3.5% of KS2 and KS3 pupils to access one-to-one tuition. Funding was also provided for 3.5% of KS4 pupils in National Challenge Schools. In the early part of 2010 the scheme was extended to include pupils in KS1 (Department for Children, Schools and Families, 2010). With a small number of exceptions, the aim was to provide tuition by qualified teachers, including private tutors. Data on the success of this one-to-one tuition programme has recently been published and is presented in the following chapter (see section 2.3).

Bray (1999, 2003) identified 4 types of government response to PT: (1) ignore the phenomenon, (2) prohibit participation, (3) recognize and regulate, and (4) actively encourage. In the past a number of academics have argued that the action of the UK government towards PT has been to ignore the phenomenon and allow it to be regulated by market forces alone (Bray, 2006; Dang & Rogers, 2008b; Lee, Park, & Lee, 2009). However since the consultation on MGP in 2007, elements of the PT market have come out of the shadows in England and one-to-one tuition is now at the forefront of education policy. It appears that this laissez-faire attitude towards PT still exists in combination with both regulation and active encouragement. One-to-one tuition provided through MGP is not PT; it is provided through the school and funded by the LA. However, it is likely that MGP has, and will to make an impact on the provision and providers of PT in England. Firstly, private tutors who are qualified teachers have been targeted by DCSF as potential one-to-one tuition providers (Department for Children, Schools and Families, 2009b). Secondly, parents whose children are not included in the initiative may feel under pressure to provide additional support; and lastly, parents of students who have received 10 hours of tuition may want or feel obliged to continue providing regular tuition for their children.

The MGPP was developed on the basis of evidence from similar initiatives in Australia and the USA (Taylor, 2007). Similar schemes also operate in South Africa and in Singapore and have been designed to reduce the imbalance in educational achievement (particularly in Singapore, for ethnic Malays) (Bray, 2009). The pilot was specifically aimed at pupils who entered KS2 below the national expectations and children in LA care likely to benefit from one-to-one support (Department for Children, Schools and Families, 2008). Each student involved received up to 10 hours one-to-one tuition in English and/or 10 hours tuition in maths, and funding was made available for two additional hours of teacher/tutor liaison time per subject.

The initiative was designed to target specific gaps in students' learning and offer an "intensive-burst" of 10 hours tuition in English and/or maths (Department for Children, Schools and Families, 2009a). It is unclear as to how or why this "intensive burst" of tuition was prescribed to be 10 hours in length, and on what research evidence this was based. Indeed, in Taylor's (2007) paper describing the development of the Making Good Progress initiative she specifically highlights a lesson learned from the Australian initiative: "parents and tutors suggested that the scheme would have been more effective if the number of tutorials offered had been greater" (p. 6).

Late in 2009 the government was criticised by the House of Commons Science and Technology Committee for the lack of research on cost-effectiveness before the roll-out of Every Child a Reader (see section 2.3) (House of Commons Science and Technology Committee, 2009). However, the decision to prescribe a fixed 10 hours of tuition for struggling students as part of MGP appears to have received no such criticism and has not been formally questioned. The MGPP evaluation included a very interesting comment from a National Stakeholder demonstrating these concerns:

> *My question is how did the DCSF decide that this was something to invest in? How do you know that one-to-one tuition is better value than one-to-four tuition? How do we know this is the most effective use of money? We have queried the extent of the research basis for this but have not yet had this explained. (PricewaterhouseCoopers LLP, 2008, p. 92)*

Due to logistical problems of providing 10 hours tuition and serious tutor recruitment issues, the initiative was changed to allow sessions to run during the school day. The evaluation noted that the number of schools running such sessions was low and effort had been made to rotate timing so pupils did not miss the same lessons or core subjects (PricewaterhouseCoopers LLP, 2010). However, allowing tuition sessions during the school day means one-to-one tuition is subject to the same criticisms directed at all pull-out remedial programmes, where students are removed from the classroom to receive targeted support (Cunningham & Allington, 1994). According to Cunningham and Allington (1999) these problems include the division of responsibility for poor performance and curriculum fragmentation due to skipping in and out of lessons. A fundamental criticism of pull-out programmes is that students do not increase the amount of instruction time (Allington & Cunningham, 1996).

A study by Mantzicoloulos et al. (1992) on reading tuition highlighted the need to ensure interventions are not isolated instructional activities. If MGP is implemented in the way it is intended, making full use of the 2 hours liaison time between tutor and teacher, constant communication between them may prevent problems of conflicting methodologies. Tuition can then be specifically targeted to meet the needs of the student that have been identified by the classroom teacher and communicated to the tutor.

Following the UK general election in May 2010 the new Secretary of State for Education confirmed that one-to-one tuition in schools would continue for the next academic year (Gove, 2010). Funding has also been made available for future years to provide extra one-to-one tuition for children from disadvantaged families (Gove, 2010, p. 1); although no details have been provided as to how this announcement affects the current arrangements.

## 1.6 Chapter summary

PT is a challenging area to investigate due to the wide variety of forms it can take. This chapter has presented a conceptualisation of PT and identified the remit of this thesis. Research on the prevalence of PT in England shows that rates of participation can vary significantly between schools, but studies have estimated that between 7% and 30% of students at any given time are in receipt of PT. Participation in PT is most common during KS2 and KS4; mathematics and English are the most frequently tutored subjects. Recent policy initiatives have seen the introduction of one-to-one tuition for all eligible pupils across England in maths and/or English. The following chapter will examine research on the impact of PT on attainment.

# 2 Literature review: The impact of private tuition on attainment and other educational outcomes

*"the shadow system of supplementary tutoring differs from most other shadows in the ways that it affects the body which it imitates"* (Bray, 1999, p. 46)

## 2.1 Introduction

Ellson (1976) states that "there is a widespread belief among educators and laymen that individualised instruction, especially in a one-to-one teaching situation, is almost infallibly effective" (p. 133). Logically one could conclude that spending time engaged in supplementary learning activities would increase achievement; however as often found in the literature, this does not always convert into higher test results (Baker et al., 2001; Ireson & Rushforth, 2005). From the perspective of parents, students and teachers, school grades are often considered the main criterion for measuring the effectiveness of tutoring (Mischo & Haag, 2002), although using such indicators of performance and cognitive ability can be problematic (Helmke, 1992). Many factors contribute to achievement gains which vary widely for different tutors and tutoring programmes, all of which require consideration. As discussed in the previous chapter, tutoring takes place with different numbers of students, in a range of subjects, provided by tutors who have varying levels of experience and expertise. Differences in tutoring programmes also need consideration; these can be very structured courses or flexible programmes using a variety of methods to adapt to the needs of the individual students.

The factors that contribute to the wide variation in achievement gain justify the need for the two studies contained in this thesis. The first study will explore data on achievement and the impact of PT on performance at KS2 and GCSE level. This chapter critically reviews a number of studies that have attempted to measure the impact of PT on achievement in different countries and for different groups of students. These studies show there is significant variation in effectiveness of different PT programmes, which may be due to the quality of the tuition provided. The second study explores issues surrounding the quality of PT provision from the perspective of both tutors and students. The current chapter is followed by a critical review of the relevant literature centred on effective pedagogical practice in the one-to-one situation linked with RQs 2 and 3.

It should be noted that the impact of PT is by no means limited to achievement issues; it has far reaching implications for both economic and social development (Bray, 1999). For a comprehensive review of the implications of PT in a large number of countries refer to Bray's (1999, 2003, 2009) work. This chapter will outline details of research which has attempted to measure the impact of PT on attainment. Following this, the impact on confidence, motivation and student attitudes will also be considered.

A proportion of the research literature measuring the impact of PT has included within its remit one-to-one, small and large group tuition. As the focus of this thesis is PT provided on a one-to-one basis, effort has been made to indicate the tutor-tutee ratios and the components of the studies included in this chapter. The variation in student-tutor ratios are likely to impact on the results and their significance to this thesis.

## 2.2 Impact on attainment

The first review of multiple tutoring studies completed in the US questioned the assumption that all tutoring is effective and raised achievement (Rosenshine & Furst, 1969). Of the 14 studies that were reviewed, only five demonstrated a clear effectiveness of tutoring. In six studies no significant improvement was found and in three of these at least one condition measure favoured the untutored group. There was a statistically significant negative difference in one of these cases for the results of the tutored students.

Following this, Hartley (1977) completed the first meta-analysis of individualised instruction programmes in mathematics. She concluded that one-to-one tutoring (including adult, peer and cross-age tutoring) effects on achievement were positive and stronger than other forms of individualised teaching such as computer-based instruction. However, Hartley included studies in this analysis that did not involve control groups, so the results from this meta-analysis should be used only as an indication. Also Hartley relied solely on measuring academic achievement and did not attempt to measure gains in subjects other than maths.

Cohen, Kulik and Kulik (1982) extended Hartley's study, using only research studies completed to a reasonable standard, including a variety of subjects and distinguishing between effects on tutors and tutees. Of the 65 studies included in the meta-analysis, 52 reported effects on achievement on the tutees as a result of tutoring. This investigation focussed on peer-tutoring and cross-age tutoring. The research papers included students in years 1-9 with tutors from years 1-12. Of the 52 studies, 45 reported that students who were tutored (by other students) achieved higher test results than students in the control group; although only 16 led to substantial gains. There was a large variety in the effect sizes of the 52 studies but overall the average tutored student scored at the $66^{th}$ percentile of the students in the control group which was a similar estimate to that made by Hartley (1977). Cohen et al. (1982) found there were features of certain tutoring programmes that had a greater effect on achievement. They found that highly structured programmes of short duration led to higher gains in achievement. Outcomes were greater for maths tutoring compared to reading tuition and when lower level skills were being taught and tested. Studies using locally developed tests reported larger effect sizes than research using standardised national tests. No significant differences were found in the amount of training the tutors had received or between tutoring that was provided by peers or older students. It is important to highlight the distinct differences between adult and peer or cross age tutoring included in this review, particularly with regards to the tutor-tutee relationship. However, Cohen's review has been included due to the insight provided regarding different elements of effective tutoring programmes and the number of studies that included older tutors in year 12 (age 18).

Research reported by Bloom (1984) with more details in Anania (1983) and two doctoral theses (Anania, 1981; Burke, 1983), describe substantial gains in student achievement which Bloom labelled the "2 sigma effect" (B. S. Bloom, 1984). Students involved in this study were randomly assigned to three groups, conventional learning, mastery learning and tutoring. Those students in the conventional group were taught in a classroom setting and were tested after the 3 week experimental period. The mastery learning group were taught in a similar way to the conventional students and were administered the same test; however, for this group the test was used as an indicator for further corrective procedures. The tutored group were taught by "good tutors" on a one-to-one, or small group basis (maximum 3 students) (B. S. Bloom, 1984, p. 4). All groups were given an equal amount of instruction time, although the mastery and tutored students had additional time for corrective procedures. The research design was repeated four times with different year groups and with different subjects. Using the conventional group as the control, the tutored group improved performance by 2 standard deviations compared to 1 standard deviation from the mastery learning group. Although the research did not take into account previous levels of achievement, the "2 sigma effect" (which equates to the average tutored student outperforming 98% of the students in the conventional learning group) demonstrates the large impact one-to-one tutoring can make on student performance.

Since these reviews and research findings were published, there have been a number of studies all over the world reporting effects of tutoring in varying proportions. A selection of these research studies are included below, although no studies have reported effect sizes to rival those outlined by Bloom (1984).

Research completed in Kenya found a positive correlation between participation in shadow education and achievement and a negative correlation with grade repetition (Buchmann, 2002). Shadow education in this study included one-to-one tuition provided by tutors, group tutoring and after school classes. The research involved nearly 600 households from three geographically distinct areas. Data was collected through questions posed to mothers in each household concerning their child's schooling. Verbal reporting of school results may be somewhat variable, but the information on repeated years of schooling is likely to be more reliable and demonstrates that in Kenya tutoring is considered a worthwhile economic investment for families.

Research completed by the Ministry of Education in Egypt (1993) using 18,000 primary school pupils, found no significant impact of PT on achievement. When a similar investigation was repeated in 1994 by Fergany (1994) again no significant effects were found between participation in PT and levels of attainment. However, for both these research papers it was not possible to include a pre-test, so these studies do not take into account levels of achievement before engaging in PT. These results could simply reflect the fact that tutoring in Egypt is primarily a remedial measure where large gains in achievement are likely to be less apparent (Ireson, 2004). However Fergany's (1994) report included a significant correlation between PT participation and completion of primary education. This suggests that in Egypt PT may be a worthwhile investment to prevent grade repetition and to ensure school completion.

Wolf (2002) correlated the amount of engagement in the shadow system with levels of achievement measured through the TIMSS survey. He found that in every country involved, students who participated in extra educational instruction did less well in both the maths and science tests (with one exception of the Republic of Korea where achievement was slightly higher than average). Therefore it could be argued that for the countries involved in the TIMSS study (excluding Korea) tutoring is primarily a remedial measure and gains in achievement should be measured controlling for prior attainment scores. It should be noted that engagement in shadow education measured through TIMSS includes any participation in after school lessons which incorporates one-to-one or large group tuition, provided privately or through the school.

From their review of five one-to-one tuition programmes in reading, Wasik and Slavin (1993) concluded that one-to-one tuition alone was not sufficient to explain achievement gain as certain programmes involving teachers did not result in short or long term achievement gains. This review highlighted the benefits that arise from specific training in tutoring methods (particularly for reading tuition).

VanLehn and his team (2007) aimed to test the hypothesis that one-to-one tuition will always yield higher learning gains compared with low-interaction learning activities such as reading. Using four different types of tutoring (spoken human tutoring, typed human tutoring and two intelligent tutoring systems), they found that novice physics students who were tutored at intermediate level performed considerably better than the control group who read the material. However, when novice level students studied material for novice students, and intermediate students studied intermediate level material, there was no advantage in tutoring over reading the material (VanLehn et al., 2007). One explanation given was that tutored students may learn more when working in their zone of proximal development[5] compared with working at the level below.

Ireson and Rushforth (2005) in England evaluated achievement data collected from 296 year 11 students who took their GCSEs in 2003. The results found that tutoring in mathematics raised pupil achievement by half a GCSE grade, with negligible impact on English grades. However this analysis was completed on a small sub-sample of the data including only 48 pupils receiving tuition in maths and 20 in English. An extended analysis of the full sample of students involved in this project will be analysed in chapters 5 and 6.

Research completed in Singapore by Cheo and Quah (2005) aimed to establish the impact of different home background variables (including the employment of a private tutor) on academic performance. To reduce the school level variation the sample was selected from a

[5] Vygotsky's concept of the "zone of proximal development" is defined as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

homogenous group attending only upper-tier schools. Contrary to national expectations, the estimate for the variable measuring time spent with a private tutor was negative. These results suggest that in Singapore excessive studying may lead to diminishing returns perhaps due to educational overload.

Kang's (2007) research involved analysing data from the Korean Education and Employment Panel (KEEP). The sample consisted of 1752 mainstream high school (year 12) students, stratified to reflect the national year group. The questionnaire collected data on family background and school related issues (including PT participation). Participation in PT included attendance at *hakwons*[6] as well as one-to-one and one-to-many tuition. Achievement was measured through performance in Korean language, mathematics and English, and prior achievement was measured through asking teachers to rank each students performance during the second semester in grade 12 from 0-100. Kang found that a 10% increase in expenditure on PT was associated with a 1.1% increase in test score. This was not significant, probably due to the fact that parents tend to spend more money on lower-performing students in the family compared to higher performing siblings. Kang also found that a 10% increase in time spent having weekly tutoring in maths, English or Korean failed to make a significant impact on test scores. Teachers in the public sector in Korea enjoy many privileges including long-term employment; in contrast, employment in the private sector can be more transient and unstable (Kang, 2007). For this reason Hanushek (2003) implies that one reason for the lack of impact of PT on attainment may be the quality of teachers in the Korean private sector as compared to teachers in the public sector.

In Germany, research involving 1266 17-year-olds, showed that those who had received tutoring in German, foreign languages and maths (the most commonly tutored subjects) over a 10 month period showed lower than average results. The study did not involve a pre-test but the results indicate that tutoring in these subjects may be a remedial measure for students who are underachieving in comparison to their peers (Schneider, 2004). Further research also completed in Germany by Mischo and Haag (2002) used a pre-post control group design involving 244 pupils (122 pupils receiving tutoring and 122 pupils as a matched pair control group) in years 5-11. The results from the post-test taken after 9 months of tutoring 90 mins per day, 4 days per week, showed pupils achieved significantly higher grades in the four subjects measured (maths, English, Latin and French) than the un-tutored group. The group of

[6] Defined by Kang (2007) as "private for-profit school-like learning institutions" (p. 7)

tutored students improved by 1 grade in the German 6 mark system for each subject they had received tutoring. This controlled research study demonstrates the significant difference tutoring can make to academic performance. However, this project involved students being tutored for 90 mins per day 4 times per week. It is not clear how much time was spent on each subject, but the total time students spent with a tutor equated to 6 hours per week. The improvement in academic performance could be as a result of more time on task e.g. through homework (see Cooper, Lindsay, Nye, & Greathouse, 1998 who found that for students as young as year 2 and 4, frequency of completed homework assignments was a strong predictor of achievement) and may have occurred without the instruction of a tutor. These gains may not have been apparent if the students in the study were having 1 hour of tutoring in one subject, once per week, which is consistent with patterns of participation in England (Ireson & Rushforth, 2005; Tanner et al., 2009).

Bunting and Mooney's (2001) study examined the effects of 11-plus coaching on 552 pupils aged 9 and 10 who completed five practice 11–plus papers. Using 10 experimental conditions split into two groups; group 1 (experimental conditions 1-5) had 3 hours coaching after test three, group 2 (experimental conditions 6-10) mirrored group 1 apart from all students were given 3 additional hours coaching prior to each exam. Coaching was provided by the year 6 teachers in the classroom and based on a previous 11-plus test paper. Teachers were advised to employ any test preparation strategies they would normally use. The results showed that coaching in an uncontrolled but "focused environment", led to children more than doubling their initial test score (Bunting & Mooney, 2001, p. 249). This study supports the findings of Cohen et al. (1982) who suggested that structured programmes of short duration lead to higher gains in achievement.

In her research concerning PT in the Republic of Ireland, Smyth (2009) argues that when social class, gender, prior achievement and educational aspirations are controlled for, PT does not make a significant impact on achievement. Before controls were added to the models in Smyth's (2009) study, the students participating in PT achieved 1 grade point per subject more than students not receiving PT. However, Smyth (2009) argues that one third of this gap in performance was accounted for by the fact that in Ireland female middle class students were more likely to participate in PT. A similar amount was accounted for by the prior achievement measure; students who scored higher in the Junior Certificate were also more likely to participate in PT. After educational aspirations and time spent doing homework were included in the models, participation in PT no longer produced a significant advantage in achievement. The effect of PT did not vary by social background, gender, ability or prior attainment (Smyth, 2009). This study used a nationally representative sample of 4,813 Leaving Certificate students across 108 secondary schools, surveyed 5 months before their examination (Smyth, 2009). Achievement was measured using a grade point average across all subjects for both the Junior Certificate (prior achievement) and the Leaving Certificate.

In a further study Smyth (2008) looked at the impact of intensity of involvement in PT and the subsequent impact on achievement. Students were asked if they had participated in PT in the previous 3 months and the number of hours they had been tutored. She found 32% of students had received some PT in the 3 months prior to the survey, of which 55% had received 5 hours or less, 23% 6-10 hours, 9% 11-20 hours and 4% had received more than 20 hours. Before adding controls, students who participated in less than 20 hours of PT scored 1 grade point higher than students who did not receive PT, but those taking more than 20 hours scored 1.8 points higher than those who had no tuition (Smyth, 2008). As with the previous research, when the controls for gender, social class, prior achievement, educational aspirations and time spent doing homework were added to the model, no significant differences were found. An additional study was completed focussing on the impact of PT on maths performance (Smyth, Dunne, Darmody, & McCoy, 2007), again the results obtained from this analysis reflected the findings in the two studies described above.

Although one of Smyth's studies considered the impact of tuition on one specific subject, none of the studies differentiated between the subjects for which tutoring was received. In addition, one of the studies accounted for the intensity of tuition during a 3 month lead up to the examination but did not control for tuition received prior to this period. Some participants may have engaged in 1 hour of tutoring per week for several years, others may have attended a 5 hour revision course immediately before the exam. There was also the difficulty of distinguishing between "grind"[7] schools and PT tailored to the individual needs of the student on a one-to-one basis. The different forms of PT, the duration of tuition and the subject(s) taught had the potential to impact on student achievement and the corresponding findings. However, this study included a substantial number of students from a nationally representative sample, therefore these results make a significant contribution to the field.

[7] "Grind" is the colloquial expression for PT in Ireland (see Smyth, 2008). These can be grind schools providing courses for groups of children or one-to-one tutors .

Smyth questions the benefit of PT participation and argues that the type of students who participated in PT "would have fared well academically anyway" (Smyth, 2009, p. 15).

Smyth's (Smyth, 2008, 2009; Smyth et al., 2007) findings and a number of other studies outlined in this section, contradict the assumption that PT raises achievement and calls into question the widely held belief that tutoring is inevitably positive and effective.

Cohen et al.'s (1982) review is often cited to demonstrate the gains that can arise from one-to-one tuition. However, this review focussed on peer and cross-age tuition provided by tutors in years 1-12. One study included in this review found no difference in achievement and in six others exam performance was higher for the control group. Such results are difficult to explain, especially when the belief among policy makers, teachers and many researchers is that one-to-one tuition leads to achievement gains. Cunningham and Allington (1994) have estimated that children lose 10-15 minutes of instructional time each day moving between tutor and classroom. When tutoring programmes take place within the school day, Shanahan (1998) notes the difficulty in outweighing such time loss no matter how well designed the tutoring programme may be. There is also the problem of inconsistent teaching, alterations in the curriculum or "less achievement-supportive" teaching compared to teaching in the classroom; "Trading sound instruction for weak inappropriate instruction, even when the replacement teaching is offered on a one-to-one basis, is obviously a poor deal" (p. 221).

This sentiment is echoed in the findings of the Deployment and Impact of Support Staff (DISS) project; this large scale nationally representative study looked at the impact of support staff on students throughout compulsory schooling (Blatchford, Bassett, Brown, Koutsoubou et al., 2009). These findings showed that support staff (working within the classroom or in a one-to-one situation) did not make an impact on student achievement; in fact the more support a student received the worse the subsequent results. Although support staff are not qualified teachers and the majority are not qualified above GCSE level (Blatchford, Bassett, Brown, Martin et al., 2009), they are often employed to assist SEN students with the greatest needs. These results clearly show that working one-to-one with a student does not necessarily lead to higher results, and when this support means the child is removed from the teacher and the classroom situation, the students may actually achieve poorer results.

As previously discussed, Teaching Assistants (TAs) often have low level qualifications (Blatchford, Bassett, Brown, Martin et al., 2009); however in a study comparing how young readers were tutored, Wheldall et al. (1992) argued that qualified teachers tended to use inappropriate materials, interrupt after errors and use little praise – all associated with lower learning achievement in previous research. Chi also demonstrated that experienced tutors may not provide adequate support during tutoring. In her case study an experienced physics tutor failed to correct five of the seven misconceptions displayed by the student, instead he pursued his own prescriptive tutoring plan using long-winded didactic explanations (Chi, 1996).

There is also the problem of reporting inflated gains from tutoring through the selection of inappropriate control groups. Shanahan (1998) argues that whenever participants are specifically chosen from the low performing end of achievement distribution and the control group is not equivalent to the participants, this creates the problem of regression toward the mean and may favour the tutored group over the student controls. This problem was highlighted in an investigation into the effects of Reading Recovery; Shanahan and Barr (1998) found that regression effects had substantially inflated the gains made from this programme.

Baker et al. (1995) found that in the majority of countries involved in TIMSS (including England), motivation for participation in out-of-school lessons was considered to be remedial. This was calculated based on the relationship between performance in maths and participation in PT controlling for Socio-economic Status (SES), first language and gender. These findings were replicated in Lee, Park and Lee's (2009) exploration of the PISA 2006 dataset. Ireson (2004) argues that remedial tutoring is likely to confer smaller gains in achievement in comparison to higher performing students who experience less difficulty with the curriculum. This may be another reason why the results outlined in this chapter present such a mixed picture.

It is important to remember that one-to-one tuition (specifically in reading) will not help all children, "it is not a panacea" (Shanahan, 1998, p. 221; Vellutino et al., 1996). It is likely that tuition works better for some students than for others but there is also a marked variation in the skills and qualities of the tutors undertaking the tuition. Following his review of one-to-one tuition in reading Shanahan (1998) concluded "In establishing tutoring programs, care must be taken to ensure adequate time on task for students, high quality of instruction, and appropriateness of curriculum. Otherwise, tutoring can actually lead to *lower* rather than higher achievement" (p. 223) [emphasis added].

## 2.3 Impact on achievement from government initiatives

Bray (2009) argues "tutoring which is entirely driven by the marketplace must be treated very differently from tutoring that is fully or partly driven by government incentives" (p. 29). Although MGP (summarised in section 1.5) is very different from the studies outlined above, the results of the pilot have been included due to their relevance to the current study and the lack of additional research on the impact of PT on achievement in England.

The MGPP used the teacher assessment data to establish the impact of tuition on attainment from Dec 2007-Jul 2009. Extreme caution should be exercised when interpreting these findings due to the lack of reliability of the early teacher assessment data used in the analysis (PricewaterhouseCoopers LLP, 2010). In English the results indicated that pupils progressed just over a quarter of a sub-level[8] more than pupils not receiving tuition. In reading, tutored students progressed on average between one-fifth to one-half a sub level, compared to pupils not receiving tuition. The maths results did not show a significant positive improvement and towards the end of the pilot there were significant negative differences for pupils who had received maths tuition. Although 10 hours of one-to-one tuition made a significant difference to achievement in reading and writing sustained throughout the course of the pilot, these gains were limited in size.

Interview and survey data revealed that 75% of a small sample of teachers in MGP schools felt that students had made progress as a result of tutoring (19% to a great extent, 56% to some extent); no data was reported on the tutors' perceptions of achievement gains. A total of 76% of KS2 pupils interviewed and 57% of KS3 pupils surveyed reported a positive impact as a result of one-to-one tuition (PricewaterhouseCoopers LLP, 2010); although it is unclear if the positive impact was specifically related to achievement, or other perceived gains from the programme. Most Head Teachers (HTs) and six out of nine Local Authority (LA) pilot leaders indicated that attendance records and levels of parent/carer engagement were important factors influencing allocation decisions for one-to-one tuition. Therefore it is difficult to make any meaningful analysis on attainment when a specific group of students were targeted without an equivalent control.

[8] A sub level is a division of the National Curriculum levels 1 to 8 achieved through progression from KS1 to KS3. Students progress through sublevels from level 1c (weak level) to 1b (sound level) to 1a (strong level) and then move to level 2c (Department for Children, 2009e).

Every child a Reader, similar to MGP, is a short term one-to-one intervention programme; although this involves children being taught individually by a specially trained teacher for 30 mins each day for 12-20 weeks (Every Child a Chance Trust, 2009a). The results show larger achievement gains, possibly due to the duration of the initiative and the nature of daily instruction. On average a child makes a 21 month gain in reading after 40 hours of individual teaching (Every Child a Chance Trust, 2009a); and long term benefits have also been demonstrated (Hurry & Holliman, 2009). Based on Every Child a Reader, Every Child Counts involves specialised teaching for 30 mins daily for a period of around 12 weeks in maths (Every Child a Chance Trust, 2009b). Results from this programme show that on average children make 13.5 months progress in 3 months.

In 2001 the USA introduced No Child Left Behind (NCLB), which allocated substantial government funding to provide supplemental education services (including tutoring). Eligible pupils, were from low income families attending schools that had failed to make adequate yearly progress for two or more years (Zimmer et al., 2007). Evaluation of the initiative found that pupils involved in the scheme make 0.09 *SD*s progress in maths and 0.08 *SD*s progress in English compared to the control group. However a more recent evaluation reported results from two areas in America showed some variation in effectiveness. In Hillsborough achievement gains were similar to those reported above, although results from Anchorage (where the participant group was small), showed no overall significant impact on achievement (Socias, deSousa, & Le Floch, 2009).

In Australia "An Even Start" (currently being evaluated, Australian Government, 2010) was introduced in 2007 following the "Tutorial Voucher Initiative" pilot and was used to inform the development of MGP. The evaluation of the pilot found that on average students made a 12 month gain in reading age; however there was no control group and self-selection effects may have had an impact on the results (Watson, 2008). Satisfaction among parents/carers however was around 80% and a similar proportion of tutors considered the pilot to be very or mostly effective (Commonwealth of Australia, 2006).

## 2.4 Impact on student attitudes, motivation and confidence

In addition to school performance, Mischo and Haag (2002) measured test anxiety, self-concept of ability, action control and learning motivation in their research on tutoring effectiveness - all constructs deemed significant predictors of school achievement (Helmke, 1992). Each of the motivation constructs yielded an overall significant effect apart from action control. An explanation provided by the authors as to why action control was not significant stated that tutoring to such an extent each week does not encourage self-regulating strategies and thus action control did not improve (Mischo & Haag, 2002). It remains unclear from this research whether it was the grade improvement itself that enhanced the motivation constructs or if grades improved as a consequence of an increase in motivation (Mischo & Haag, 2002). The authors stated: "whereas the broad expansion of paid tutoring may indicate the lacking effectiveness of the normal school system on a cognitive level, the improvement of motivational variables by paid tutoring may also indicate deficits of the normal school system concerning the pupils' learning motivation" (p. 270).

Tutoring is often a remedial measure for poorly performing pupils (Schneider, 2004; Wolf, 2002). Such pupils are likely to have motivational deficits from continual failure in comparison to peers in the classroom. These motivational deficits and low self-efficacy beliefs can make employment of appropriate learning strategies less likely (Bandura, 1997; Klauer & Lauth, 1997; Pintrich, 1999, 2000). Mischo and Haag (2002) argue that an improvement in motivational factors from PT may be due to the fact that students are working one-to-one or in homogenous groups allowing favourable comparisons. One-to-one or small group instruction allow teachers to recognise student improvements and maintain high levels of motivation (Pintrich & Schunk, 2002). From the parents' perspective, the second most common reason for arranging PT for their child was 'to increase self confidence' mentioned by 68% of participants. This was also the second most important outcome measure (Ireson & Rushforth, 2011).

In addition to gains in motivation, studies have demonstrated improvements in student attitudes and perceptions of achievement. For the different groups involved in the International Development Research Centre (IDRC) study, a large proportion of students believed that PT had facilitated gaining higher marks (de Silva, 1994). The majority of students (69% - 93%) also believed that PT had raised their educational aspirations, allowed them to acquire more knowledge, improve on class work and have increased confidence in their studies (de Silva, 1994). Mischo and Haag's (2002) study included a measure of students' perceived effects of tutoring on attainment. They found 54% of pupils stated the positive effects of tutoring with only 4% declaring PT was not helpful.

Cohen et al.'s (1982) meta-analysis on the effects of peer and cross-age tutoring included studies which measured the change in attitude of the student toward the subject matter and change in self-concept. From the nine studies included in the review the authors found insufficient evidence to suggest that tutoring made an impact on student self-concept. However, these findings may be due to the poor quality of the unidimensional instruments used to measure this concept (Marsh, 2006). Of the eight studies in the analysis that measured student attitudes, all recorded increases; however only one study demonstrated gains that were statistically significant. Despite this, findings were sufficiently consistent for the authors to conclude that tutoring programmes had a positive effect on students' attitudes towards the subject.

Although based on perceptions and not empirical measurement, a large proportion of teachers, pilot leaders and HTs felt that one-to-one tuition through MGP substantially increased pupil confidence (PricewaterhouseCoopers LLP, 2010). Ten hours tuition also appeared to have a positive impact on pupil engagement. Nine out of ten tutors and 72% of teachers surveyed believed that tuition had helped pupils to become more engaged in their own learning and progression (PricewaterhouseCoopers LLP, 2010). Gains in motivation were also reported by students. In response to the question 'I feel more motivated about school since working with my tutor', 56% of the students surveyed agreed with this statement (9% strongly agreed). However it should also be noted that 20% disagreed with this statement (13% strongly disagreed). These results suggest that tutors and teachers are slightly more positive about the impact of MGP on engagement in comparison to students (PricewaterhouseCoopers LLP, 2010).

Lee, Park and Lee (2009) used data from the 2006 PISA survey and compared students who had participated in out-of-school classes with those who had not. The authors compared students' general interest and enjoyment in science and their science self-efficacy beliefs. The results revealed that in most countries students who participated in out-of-school classes showed less interest, enjoyment and lower self-efficacy than students not receiving tutoring. However this may be related to the finding about remedial motivated tutoring discussed above.

## 2.5 Chapter summary

Tutoring programmes that are well designed and implemented can be very effective in terms of raising attainment and improving attitudes (B. S. Bloom, 1984; P. A. Cohen et al., 1982). However there is considerable variability in the effectiveness of such programmes (Elbaum et al., 2000; Polydorides, 1986). Contrary to findings that question the effectiveness of PT (Baker et al., 2001; Bray, 2003; Ireson & Rushforth, 2005), Ellson (1976) argues there is widespread belief that individualised instruction is "almost infallibly effective" (p. 133). These contradictory views and research findings demonstrate the need for further rigorous research to identify characteristics of effective practice. The need for more research was also emphasised in Cohen et al.'s meta-analysis which challenges researchers to "identify the key variables underlying variation in tutoring outcomes" (1982, p. 247). These issues will be addressed in the following chapter where literature on effective pedagogical practice will be critically examined.

# 3 Effective Tutoring Practice

## 3.1 Introduction

With the absence of a regulatory authority in the UK, anyone can advertise their services as a tutor. Tutors can be qualified teachers, professionals, students, and volunteers etc; these differences may assist in explaining the variation of outcomes from PT discussed in chapter 2. The differing and sometimes limited effects on achievement raise questions on the quality of the PT provided and the effectiveness of the pedagogical techniques involved. These questions form the basis of this chapter and RQ2 and RQ3. This chapter will critique the literature on one-to-one learning techniques, highlight areas where further research is needed, and present a rationale for the empirical study that follows.

Despite research that has shown that tutoring can raise achievement using volunteer or peer tutors with no experience or training (P. A. Cohen et al., 1982; Fantuzzo, King, & Heller, 1992; Ritter, Barnett, Denny, & Albin, 2009; Rogoff, 1990), much of the success of one-to-one tuition has been accredited to the tutors' pedagogical expertise (Chi, Siler, Jeong, Yamauchi, & Hausmann, 2001; Collins & Stevens, 1982; Lepper, Drake, & O'Donnell-Johnson, 1997; McArthur, Stasz, & Zmuidzinas, 1990; Merrill, Reiser, Ranney, & Trafton, 1992). This prompts the question asked on numerous occasions "what do tutors do that is so effective?" (Chi, 1996; Merrill et al., 1992; VanLehn et al., 2003).

The focus of this review of the literature will not be exclusively on what Chi et al. (2008) termed, but did not advocate, the tutor-centred pedagogical hypothesis, which assumes learning from tutoring is achieved only through the tutors' pedagogical techniques. Rather, the focus of this chapter will evaluate literature that considers the roles of both the tutor and tutee.

## 3.2 Pedagogical expertise for one-to-one tutoring

There is limited relevant literature on the systematic process of tutoring. This can be contrasted to the considerably larger field of literature regarding effective pedagogic techniques involved in classroom teaching. Although this literature is very helpful and many techniques can be applied to a one-to-one situation, tutoring is more individualised, more interactive and more immediate than the classroom situation (Lepper & Woolverton, 2002).

The following section in this chapter will focus on research concerned with pedagogical expertise in the one-to-one learning environment. A number of models of tutoring will be discussed and a critique of different pedagogical techniques used in one-to-one tuition will be included.

### 3.2.1 Models of tutoring

A number of dominant approaches underpin much of the research on tutoring. The first is a diagnostic and remedial model, where the task of the tutor is to determine the root of the problem and use this information to develop a programme of intervention (e.g. Brown & Burton, 1978). Brown and Burton (1978) argue "a detailed model of a student's knowledge, including misconceptions, is a prerequisite to successful remediation" (p. 156).

Putnam (1987), however, found that diagnosis was not the primary goal of teachers, and the diagnostic remedial model did not provide an adequate description of the tutoring he observed by the expert teachers. Instead he proposed a "curriculum script" model where the teacher has an ordered set of objectives which form an agenda, where minor adjustments can be made to match student performance. This was similar to Collins et al. (Collins & Stevens, 1982; Collins, Warnock, & Passafiume, 1975) who also argued that teachers determine where to place students at a particular point in a partially ordered subject-matter domain separating components that are known and unknown to the student. McArthur et al. (1990) proposed a more complex model of tutoring that forms the middle ground between diagnostic/remedial and curriculum scripts. McArthur, Stasz & Zmuidzinas (1990) argue that remedial tutoring is more data driven rather than being constrained by a lesson plan, and that tutoring involves "task management" where a task is planned, introduced and continually monitored. Tutors have microplans that are constantly shifting in response to proceedings (McArthur et al., 1990). Other studies have also rejected the "curriculum script" view indicating that tutoring is often guided by student led events (Merrill, Reiser, Merrill, & Landes, 1995).

The sociocultural approach to tutoring is particularly concerned with interactions between the tutor and learner, including concepts of scaffolding, contingency (Reichgelt, Shadbolt, Paskiewicz, Wood, & Wood, 1993; D. Wood & Wood, 1996) and guided participation (Rogoff, 1990). The sociocultural model of tutoring research has been particularly influenced by Vygotsky's concept of the "zone of proximal development" (see footnote 5).

Parallels between this notion and the concept of scaffolding have not gone unnoticed. Scaffolding was first used by Wood, Bruner and Ross (1976) to describe a process in tutoring that:

> *enables a child or novice to solve a problem, carry out a task, or achieve a goal which would be beyond his unassisted efforts... This scaffolding consists essentially of the adult 'controlling' those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence" (p. 90).*

Originally the term focussed on identifying ways to assist the learner to structure the task. It is since been recognised as a more subtle occurrence involving "a complex set of social and semiotic dynamics" (Stone, 1993, p. 180).

Within a sociocultural framework, Wood et al. (1976) observed the "contingent shift principle" pattern in tutoring. This involves two contingent tutoring behaviours: providing less support when the child makes a successful step in problem solving, and more support when a child is experiencing difficulties. Contingent tutoring was found to be effective for problem solving in long division (Pratt, Green, MacVicar, & Bountrogianni, 1992; Pratt & Savoy-Levine, 1998).

The previous section has briefly outlined research on the theoretical models of tutoring. There is no single dominant theoretical model of one-to-one tuition; instead the literature reflects a wide range of interests. The aim of the following section is to critically analyse and synthesise this dispersed body of work. The discussion will now focus on the pedagogical techniques and structure of tutoring sessions.

Acknowledging the lack of research into effective tutoring, Lepper and his colleagues (Lepper & Chabay, 1988; Lepper et al., 1997; Lepper & Woolverton, 2002; Lepper, Woolverton, Mumme, & Gurter, 1993) determined to develop work in this area by analysing the pedagogical techniques of effective tutors. They did this by asking schools and tutoring agencies to identify tutors whom they thought were particularly effective. It is unclear what criteria were used for this selection process, but all potential tutors were interviewed and included if their prior experience matched the remit of the study.

The focus of the research was on mathematics tutoring for students from years 1-6. Suitable tutors were then invited to participate in the study and were asked to tutor a total of 6 students. These tutoring sessions were videotaped and then transcribed. Students were given both pre and post written tests on the material to be covered during the project (Lepper & Woolverton, 2002). To assess motivational gains, students were assessed at various points during the tutoring sessions by "blind" observers who reviewed sections of the sessions. These blind observers were shown the students reactions but not the tutors actions (Lepper et al., 1997).

The majority of students involved in the study had been identified as being in need of help on the topic, so the tutors were engaged primarily in remedial tutoring. However a proportion of students were also selected for being highly successful and were used as a comparison (Lepper & Woolverton, 2002). Tutors were categorised by the degree of observable success in both learning and motivation for at least 5 of the 6 students they were asked to tutor. Comparisons were made between highly effective and less effective tutors, and tutors with less experience (Lepper & Woolverton, 2002). A significant finding from this research was that the authors were able to identify individuals that were highly effective through empirical results, improving both learning and motivation levels of almost all the students they tutored. Lepper and his team were able to draw several commonalities in the pedagogic techniques of these "expert" tutors which has become known as the INSPIRE model of tutoring success (Lepper et al., 1997). This acronym stands for seven characteristics which comprise a model of behaviours of effective tutors during tutoring sessions, these include: Intelligent, Nurturant, Socratic, Progressive, Indirect, Reflective and Encouraging.

As there is no single agreed model of effective tutoring, the INSPIRE model offers a useful organisational framework to assist the reader in navigating the literature in this area. Each element of the INSPIRE model has been explained, critiqued and contrasted with other research in the field. Research into one-to-one tutoring will be the focus here; however appropriate findings from the literature on classroom instruction will also be included.

## 3.3 INSPIRE

### 3.3.1 Intelligent

This aspect of tutoring effectiveness is split into 3 parts and corresponds with subject matter expertise in Weinert, Helmke and Schrader's (1992) model of teaching proficiency. These include subject knowledge, pedagogical knowledge, and subject specific pedagogical knowledge. Lepper et al. argue that effective tutors have a vast subject knowledge base in their specialist area. This enables them to include relevant historical information surrounding the topic which can help interest and motivate students. It also allows tutors to produce real life analogies to aid understanding of new concepts (Lepper & Woolverton, 2002). As with Sternberg and Horvath (1995) and Weinert et al.'s (1992) model, in addition to advanced subject knowledge the model includes both subject-specific and general pedagogical knowledge. Within the subject being tutored, the "experts" in Lepper's study knew which problems were likely to cause students the most difficulty. Lepper et al. found that general pedagogic knowledge manifested itself in the way the effective tutors were able to use a variety of pedagogical techniques to both instruct and motivate students in different situations.

In their discussion on expertise Bédard and Chi (1992) state "it is not merely the fact that experts have more knowledge that is important; more crucially, they have their knowledge organised in particular ways, ways that make that knowledge more accessible, functional, and efficient" (p. 136). Leinhardt and Greeno (1986) argue that skilled teaching requires a complex interrelationship between knowledge of lesson structure and subject matter (p. 75). One of the biggest discrepancies between expert and novice teachers found in Leinhardt and Greeno's study was the content and pedagogical knowledge required to effectively plan and structure teaching sessions.

Grossman, Wilson and Shulman's (1989) research investigating the role of subject knowledge on the planning and instruction of beginning secondary school teachers, found that subject knowledge affected both the content and processes of instruction "influencing both what teacher's teach and how they teach it" (Grossman et al., 1989, p. 26). Lampert (1985) claims that in order for teachers to encourage their students to think mathematically, they must have a sound understanding of mathematical concepts. Grossman's research found that teaching in areas that were unfamiliar to the teacher caused a number of difficulties including avoidance of unfamiliar topics. Knowledge, or lack of it, impacts at many levels in the teaching and learning process and can affect "how teachers critique textbooks, how they select material to teach, how they structure their courses, and how they conduct instruction" (Grossman et al., 1989, p. 28).

Despite evidence that highlights the importance of teachers' content knowledge affecting student achievement (see Wayne & Youngs, 2003), not all studies have found this relationship significant (Dunkin & Biddle, 1974; Murnane & Phillips, 1981; Summers & Wolfe, 1975, 1977). These inconclusive findings seem difficult to comprehend when one considers that the more a teacher knows, the more knowledge they will be able to impart to their students. Theories have been put forward to explain this non-significant relationship. Many have questioned the methodology and the conceptualisation of both teacher and student achievement. Perhaps the most plausible explanation provided by Grossman, Wilson and Shulman (1989) suggests that there may be a threshold of "content" knowledge that teachers require and any subject knowledge possessed beyond this is not necessary.

Several research studies have shown that peer tutoring is associated with a positive impact on achievement (Britz, 1989; P. A. Cohen et al., 1982; Fantuzzo et al., 1992). These findings call into question any theory that both subject and pedagogical knowledge are important to raise achievement. Tutors often possess little or no pedagogic expertise (Fitz-Gibbon, 1977), yet research with unskilled tutors has also shown that tutoring can be effective (Fantuzzo et al., 1992; Rogoff, 1990). In Cohen et al.'s meta-analysis (1982) discussed in chapter 2, the authors argue that there is very little understanding of what tutoring skills really are, so it is difficult to be trained in tutoring practices. The results of the meta-analysis showed that the amount of training a tutor had undertaken, or the age difference between tutor and student did not make a significant impact on learning (P. A. Cohen et al., 1982).

Research by VanLehn et al. (2003) and Chi et al. (2008) also contradict the importance of subject knowledge to provide comprehensive explanations for student learning. The results from VanLehn et al.'s study revealed that explanations from tutors were not important predictors of student achievement. The authors concluded that learning gains were achieved as a result of the student reaching an impasse. An impasse occurs when a student gets stuck, makes or detects an error, or completes an action but demonstrates a degree of uncertainty (VanLehn et al., 2003). The research team suggested that the benefit of explanations was to prompt students to think further about the topic using the knowledge the student already possesses. Therefore the findings suggest that it does not appear to matter what the tutors say or whether the students understand what they have said, only that the student had been prompted to think harder about the subject. These findings question the perceived need for tutors to have advanced subject knowledge. In contrast, Renkl's (2002) research found that tutorial explanations were necessary and beneficial to learning when students could not self-explain their learning (see section 3.3.6). So if tutor explanations are necessary, this raises the question of what types of explanations are beneficial to learning.

In VanLehn et al.'s study they found that explanations that were sufficient enough just to answer the question were the most beneficial; explanations that went deeper than this were "simply wasted breath" (p. 246). The authors suggest that when tutors must give an explanation, this should be as simple and short as possible. This study was conducted in controlled conditions and to aid analysis, tuition took place through a phone line. It is possible that long explanations were less effective due to the fact that they were given in an artificial situation where no gestures, facial expressions and illustrations could be used to keep the student engaged.

### 3.3.2 Nurturant

"That instructor who is loved the best will commonly prove the most efficacious" (Gisbourne, 1797, p. 57)

The highly effective tutors in Lepper's study spent longer at the beginning of the session building rapport, enquiring about the students' likes, dislikes and interests inside and outside of school than the less effective tutors involved in the research (Lepper & Woolverton, 2002). The expert tutors were more concerned with the emotional state of the tutee and displayed high levels of empathy for the difficulties experienced. Unlike other studies, Lepper et al. found that tutors displayed similar amounts of concern for the cognitive state as the affective state of the tutee. The tutors emphasised the difficulty of a problem to students with less self-confidence. This was done in an attempt to ensure that if the student failed it was due to the difficulty of the problem rather than the students' inability to solve it. Sometimes this involved the tutor taking responsibility for the child's failure by suggesting the error was due to the tutors' poor explanation. In their earlier research they found many decisions during the tutoring session were based equally on a sense of the students' feelings as on the tutors' assessment of the student's understanding (Lepper & Chabay, 1988, p. 244)

There is very little literature conceptualising the relationship between student and tutor in a one-to-one learning situation. The majority of literature in this field refers to the student-teacher relationship in classroom settings and has become known as "pedagogical caring"

(Hult, 1979; Mayeroff, 1965). Much of this school based research can be applied to aspects of one-to-one tutoring.

There is huge disparity in what academics, teachers, students and parents think of what constitutes "caring". Hult (1979) argues that when "caring" is used in reference to the teaching profession, it creates confusion between pedagogical and psychotherapeutic responsibilities. Wentzel (1997) argues that this lack of understanding and clear definition of what it means to care may explain why some students become disengaged with the education system. Caring as defined by Mayeroff (1965) includes a sense of encountering, apprehending, and appreciating the total being as an individual. Hult (1979) argues that a relationship of this nature is not possible unless it is close, personal, and long-term; within the school environment, time and circumstance would not allow such a relationship to develop. On the other hand, one-to-one tutoring relationships can often be long-term, and the nature of tutoring could endorse a relationship which is professional yet closer and more personal than in a school/classroom situation.

In her research on reading tuition Juel (1996) highlighted affection, bonding and verbal and non-verbal reinforcement of child progress as a characteristic of successful tutoring dyads; however after further analysis Juel found that bonding and reinforcement appeared to be a characteristic of all dyads in the study. Kaiden (1994) investigated the differences between college students who elected to attend a college tutoring centre and those who, after the initial visit, never returned. She explored the perception of caring in the tutor/tutee relationship from 169 questionnaire responses and found that the students' perception of care from the tutor had a significant impact on subsequent attendance at the tutoring centre.

The interviews with teachers, HTs, and school pilot leaders as part of the MGP evaluation (see section 1.5), highlighted the relationship between the tutor and student as a key factor that impacts on the effectiveness of tuition (PricewaterhouseCoopers LLP, 2010). Likewise, the VITAE project focussing on teacher effectiveness found that teachers viewed positive relationship with pupils "as a central factor in their professional identity" (Day et al., 2006, p. 45). Also, year 9 pupils who reported more certainly that "my teacher seems to like all the pupils" demonstrated greater improvement in English (Day et al., 2006). Care must be taken however to ensure that a close student tutor relationship, does not foster student dependence on the tutor, as was found in Johnson's (1984) work.

Any learning gains achieved from intelligent tutoring systems contradict the need for a nurturing one-to-one relationship between student and tutor. However, Lepper and Chabay (1988) highlighted the substantial benefits that could arise from creating computer tutors that are able to display "empathy" as well as intelligence during interactions with students (p. 244). The evidence presented here suggests that rapport and understanding built between a tutor and student is an important aspect of human tutoring, and one which requires further investigation.

### 3.3.3 Socratic

Lepper et al.'s study found that the most effective tutors used more Socratic rather than didactic approaches to tutoring, particularly for remedial students. This was most apparent in the tutors' continual use of questions rather than giving specific directions. They found that over 90% of tutors' remarks were in the form of questions trying to draw out student responses as often as possible (Lepper & Woolverton, 2002). In conversations with the tutors, the team found that questions were used to promote active involvement from the tutee and to enhance knowledge retention. The use of questions also appeared to be a tool used by tutors to balance both affective and cognitive concerns (Lepper et al., 1997).

Graesser and Person's (1994) research on question asking during tutoring found that tutors asked 1.5 times as many questions during tutoring compared to teachers in a classroom setting. Interestingly they also found that students ask 240 times as many questions during a typical tutoring session compared to results from research in school classrooms. Student achievement was also positively correlated to quality of student questions, but not significantly related to frequency of question asking. This research involved fine grained analysis of 44 tutoring sessions by graduates to undergraduates in research methods. In addition to this, 22 sessions of high school students tutoring seventh grade students struggling with algebra were also analysed. Despite using two distinct groups of tutors and students, findings from both samples provided the same results. Graesser and Person found these unskilled tutors tended to ask short-answer questions and students used more deep-reasoning questions than the tutors. The authors suggested that tutors should be instructed to ask more deep-reasoning and long-answer questions during tutoring sessions to promote learning gains.

There have been many varied studies looking at effective techniques for error correction leading to learning gains. None of Lepper's seven themes in the INSPIRE model directly address error correction, but rather correction of errors is mentioned in almost all aspects of the model. This reflects Lepper's argument that error correction is a subtle aspect of tutoring. There are however differing views on this subject, including research which suggests that the context of the error is crucial in influencing the response. The following section discusses these contrasting views.

A number of studies have highlighted the skill of guiding a student to the correct answer rather than directly answering student questions. Research by McArthur, Stasz and Zmuidzinas (1990) found that tutors respond differently to different student errors. When the error was associated with a current knowledge goal, the tutors in this study responded by guiding the student's attention to the specific information required to reason correctly without completing the task for the student (McArthur et al., 1990).

Based on a summary of research on tutoring, Merrill et al. (1992) argue that tutoring is effective because experienced tutors can maintain the balance between allowing students to complete as much work as possible, whist providing enough support to prevent frustration and confusion. The authors encourage "guided learning by doing", where the tutor guides learning through student participation (Merrill et al., 1992, p. 358).

A study by Lesh and Kelly (1997, p. 19) involved 20 exceptional middle school classroom teachers tutoring 80 students over a 10 week period. Teachers taught two maths sessions a week to the same 2 students for 5 weeks and another 2 students for the following 5 weeks. Students whom the teacher considered "might profit" from one-to-one tuition were selected from years 5, 6 and 7 (Lesh & Kelly, 1997, p. 405). The research involved teachers developing and reflecting on their teaching and learning strategies in mathematics and developing concepts about the nature of "excellence" in tutoring. Data was also collected on student achievement. The tutor-pupil dyads worked together in a laboratory environment where the student was tutored by an "intelligent computer", operated by the tutor who was watching behind a one way mirror. Research undertaken in this artificial environment loses a certain amount of data due to the exclusion of social interactions; however using this highly structured environment allowed for clear comparison and discussion on content and techniques between teachers and researchers.

Lesh and Kelly (1997) observed that as the teachers became more experienced tutors, they were able to use student errors to reorganise conceptual misunderstandings with a greater degree of skill. One of the teachers in Lesh and Kelly's research said:

> *I don't like it when I feel I'm trying to be a guru who's supposed to know all the right answers ... leading students by the nose along the path I want them to take ... I'd rather be more like an alert or well-organized butler, tidying up (and keeping records of) the things students do, and keeping them informed about their next options (Lesh & Kelly, 1997, p. 413).*

Similarly, Gutstein and Mack (1995) found that rather than directly answering students' questions the tutor used their questions to guide the student to determine the answer on their own. Likewise, Fox's (1991) observations did not find that tutors allowed their students to participate in an unfocussed discovery of material, instead learning was guided without constricting the student's autonomy.

Similar patterns of guiding the student to correct an error rather than simply re-teaching the concept were found by Merrill et al. (1995). They found tutors collaboratively led the students through a process of error repair and this process differed depending on the level of error. When higher level errors were made, tutors gave students the opportunity to recognise the error and plan and execute the stages of recovery. When lower level semantic errors were made by the student, the tutor highlighted these without suggesting an explicit correction (Merrill et al., 1995).

Another significant difference was found between less effective tutors and "expert" tutors in Lepper et al.'s work. As with the tutors in Merrill et al.'s (1995) and McArthur et al.'s (1990) research, the effective tutors were able to distinguish between different types of errors made by students (Lepper et al., 1997). Less effective tutors responded in a similar manner to virtually every student error, whereas the more effective tutors could distinguish between what Lepper and his team termed "productive" and "non-productive" errors (Lepper & Woolverton, 2002, p. 147). Productive errors were ones that could be left uncorrected and following subtle guidance from the tutor the student discovered the mistake for themselves. Productive errors thus provided ideal occasions for lasting learning opportunities. Non-productive errors required direct explicit and immediate intervention to prevent any further errors being made by the student (Lepper & Woolverton, 2002).

Anderson, Corbett, Koedinger and Pelletier (1995) manipulated the feedback received by students when programming with an intelligent tutoring system. Students performed better on tests when they received feedback on errors than when they did not. In addition, when students received feedback immediately, they progressed more quickly, although their final test scores were not superior to those of students who received delayed feedback. In contrast to this, research by Wheldall et al. (1992; Wheldall & Metten, 1985) found that teachers can respond too quickly to errors in reading. According to Wheldall, responding too quickly to errors does not allow sufficient time for students to decode words and recall information. This research advocated the model of "Pause, Prompt and Praise" allowing students opportunity to self-correct their responses (Wheldall & Metten, 1985, p. 27).

Effective tutors in Lepper et al.'s study were also found to offer hints and suggestions rather than give their students the answers. Some tutors used as many as five or six hints in succession rather than providing the answer. This could perhaps be considered as an inefficient use of time, but this method was found to be particularly beneficial to remedial students, with gains outweighing the substantial amount of time taken (Lepper & Woolverton, 2002).

Hume, Michael and Rovic (1996) found that hinting made up a substantial part of the tutoring dialogue in their research using expert tutors. They found that in 30 hours of tutoring 315 hints were used. Hints were generally used in response to student errors, prompting the student to reach the correct answer without the tutor explicitly providing the solution. Hints were discontinued when students did not yield an appropriate response. Through the use of hints the tutors encouraged the tutee to engage in active cognitive processes that would result in deeper learning gains.

There is a plethora of error correction techniques that have been observed and proposed as effective in helping students solve problems and achieve learning gains. Despite the similarities in findings from a number of these studies, the minor differences demonstrate the complexity within the field of error correcting in the one-to-one learning environment.

### 3.3.4 Progressive

This refers to the progression of the tutoring session and how it is planned by the tutor. This includes such things as the selection of appropriate problems to match the correct learning needs of the student. In Lepper et al.'s research, the expert tutors used their skills to diagnose levels of understanding and make decisions on problem selection. One obvious difference between the effective and less effective tutors was the extent of planning that went into the session. Expert tutors had a clear routine for each session, having this structure meant less guidance was required from the tutor for successful progression through the session (Lepper & Woolverton, 2002).

Also linked to "progressive" in the Lepper et al. model is what has become known in the literature as task management or task structuring (McArthur et al., 1990). Task management is an important and interesting part of the tutoring session (see section 3.2.1). It describes the reasoning behind the tutor's choice of task which often involves breaking down the problem into a hierarchy of sub-goals that meet the objective. Task management requires the tutor to have a clear picture of the students' level of understanding in order to choose an appropriate task, and then correctly manage the task to suit the needs of the learner (McArthur et al., 1990). In their research, McArthur, Stasz and Zmuidzinas (1990) identified 44 techniques employed by teachers tutoring high school students in algebra. These tasks were grouped into techniques for assessment of performance, task management and remediation. A total of 45% of the 44 tasks identified could be used for task management purposes.

In Ireson's (2000) research on adult child interaction, she discusses the complex nature of structuring in pedagogical contexts. She argues the process of structuring involves teachers' pedagogical culture, the choice of task and the level of engagement in the learning activity. Her model of interaction demonstrates how choice and actualisation of the learning task is continually influenced by adult-child interaction and the perceptions of purpose from both the teacher and the student. It is important, therefore, to consider task management as a continuous process constantly being influenced and modified through the interaction. Lesh and Kelly's (1997) study revealed that task structuring and session planning can change with tutoring experience. As the teachers in this study became more experienced, their focus changed from structuring the session to cover all 10 maths problems they had been asked to tutor; instead they aimed to focus on just two or three problems to ensure the students had fully grasped each topic area in turn.

Task management involves selecting a task that suits the student's level of ability. This idea of tutoring can be contrasted with VanLehn et al.'s (2003) findings. This research suggested that learning gains were more common when students reached an impasse. VanLehn et al.

suggested that rather than demonstrating how to do it, tutors should encourage impasses by allowing students to attempt a task even though they may make an error. The researchers argue that "as a general policy, tutoring should let impasses occur unless there are compelling reasons (e.g., affective ones) for avoiding them" (VanLehn et al., 2003, p. 244).

Chi, et al. (2004) argue that to be adaptive and responsive to the student, the tutor must be able to "monitor students' understanding accurately" (p. 363). Indeed, task management or task structuring skills rest on first being able to determine a student's correct level of understanding. Despite the focus placed on diagnosis of students' understanding, there has been very little research in this area; instead work has concentrated on the prescriptive or assumed diagnosis of teachers and tutors. Chi et al. (2004) argue that monitoring understanding can be divided into two forms: assessment and diagnosis "assessment evaluates the degree of incorrectness in a student's normative understanding, whereas diagnosis evaluates a student's alternative understanding" (p. 370).

The literature suggests that tutors seldom give customised feedback that is based on diagnosis of students' alternative understanding (Graesser, Bowers, Hacker, & Person, 1997; Graesser & Person, 1994; Graesser, Person, & Magliano, 1995; McArthur et al., 1990; Putnam, 1987). Instead, tutors focus their efforts in asking the student to answer self-evaluating questions such as "do you understand this?" Graesser et al. (1997) found low correlation between student achievement and positive feedback to tutors' comprehensive gauging questions. In his study of mathematics tuition, Putnam (1987), found little evidence to suggest that tutors adopted a diagnose-and-remediate pattern. He attempted to measure diagnosis by analysing the tutors' choice of questions following students' errors. He found that instead of adapting question sequences to match students' understanding, tutors followed a uniform progression with only 7% of student errors followed up by diagnosis questions. Similar results were found in Graesser et al.'s (1995) study of untrained tutors, this research found that only 8% of tutoring interactions were related to or dealing with students' misconceptions. In McArthur et al. (1990) tuition study using teachers who had previously been given awards for their teaching, he found that the teachers would ask only comprehensive-gauging questions dealing with surface level understanding. They found no evidence to suggest that the tutors dealt with the students' misconceptions and alternative knowledge. Similar results were found in Chi's (1996) microanalysis of tutoring actions, although these conclusions are based on just one tutoring dialogue.

From the evidence present in the literature, it appears tutors try to ascertain a students' level of understanding and comprehension of the subject by asking primarily comprehension gauging questions. These questions are predominantly dealing with the normative level of understanding, very little time and effort is directed at diagnosis of students' misconceptions in their alternative knowledge. However, this may be as result of problems in measuring this phenomenon. Chi et al. (2004) point out the difficulties in measuring how well a tutor monitors a student's level of comprehension as there is very little other than comprehensive-gauging questions that are present in the tutoring dialogue protocol.

Chi et al. (2004) attempted to overcome these methodological problems by asking the tutors to report the level of students' understanding at regular intervals during the tutoring session. Tutors were given a tutoring dialogue on the circulatory system and each tutoring session was interrupted at two set points. During these interruptions students were asked to draw and explain the circulatory system as they understood it and at the same time the tutor had to draw and explain what they thought the student had understood. The results of this study revealed that tutors were ineffective at assessing students' knowledge and extremely poor at detecting students' alternative knowledge beliefs.

It is unclear from the methodology outlined by Lepper et al., how diagnosis of students' misconception was attempted in his study and how this was evaluated. Task management, an important aspect of the tutoring process, rests on the ability to successfully gauge a student's level of understanding. However, the tutoring literature is characterised with findings concerning the inferior ability of tutors to monitor students' understanding accurately, even with research using experienced tutors. Perhaps then, effective tutoring is a result of continually updating, breaking down and changing tasks as a recurrent process during which tutors attempt to gauge the level of understanding.

### 3.3.5 Indirect

The indirect nature of Lepper's effective tutors was evidenced in both their negative and positive feedback, especially for less-confident students. The effective tutors in this research managed to avoid ever explicitly telling the student they had made an error. Instead they were able to ask specific questions that implied there was a mistake and helped the students to review their own work to find the errors themselves.

In terms of positive feedback, Lepper and his team made some interesting findings; they found that the most effective tutors did not explicitly praise their students. Less effective tutors thought that using recurrent praise would motivate the students; however the outcome data from the project proved the opposite. Using too much direct praise turned the tutoring session into a highly evaluative situation which had a negative impact especially for students at risk (Lepper & Woolverton, 2002).

These findings are not consistent with research advocating the "pause, prompt, praise" method of reading tuition (Leach & Siddall, 1990; Wheldall & Metten, 1985). The untrained peer tutors in Wheldall and Metten's (1985) study made almost no attempts to praise their tutees. The tutors who were trained in Pause, Prompt, Praise were instructed to "praise [the] reader as often as possible for correct behaviour" (p. 33). These tutors praised their students on average 8.8 times per session and achieved significantly more learning gains (Wheldall & Metten, 1985). The findings from an extensive meta-analysis by Cameron and Pierce (1994) also dispute Lepper's work and found that verbal praise significantly increased intrinsic motivation by both time on task and attitude.

Boyer et al. (2009) compared dialogue structures of one-to-one tuition sessions involving students with high and low self-confidence. They found purely cognitive feedback from the tutors was associated with significantly higher learning gains than cognitive feedback combined with praise. However, motivational dialogue was associated with greater gain in self-confidence. It is unclear how far these results would reflect a natural tutoring session as the students and tutors worked remotely and the text dialogue was limited to strict turn-taking; however these results indicate the significant impact feedback can have on student outcomes.

A number of studies support Lepper's claims concerning the indirect nature of error correction (Fox, 1993; Graesser et al., 1995; McArthur et al., 1990; Merrill et al., 1995). Fox (1993) states that tutors rely on the timing of responses and the take up of opportunities to complete sentences as an indirect method of error correcting and assessing understanding. Merrill et al. (1995) found that tutors were sensitive to errors in terms of timing and taking into account the learning consequences of the error. Tutors also rely on such things as the students' facial expressions, sighs and laughter to gather information on diagnosis and error correction (Fox, 1993).

Lesh and Kelly (1997) found that the effective tutors became skilful at setting up situations where students could see their own errors - using what Schwartz (1989) termed "conceptual mirrors". Effective tutors in this study also avoided the use of negative feedback by attempting to find something positive about students' incorrect answers and building on the positives rather than eliminating the negatives.

### 3.3.6 Reflective

The effective tutors in Lepper's study asked their students to reflect aloud what they had learnt and articulate their answers and ideas. This helped the tutors to discover students' misconceptions and enabled them to determine if the students had a conceptual understanding of the problem. Effective tutors also asked the students to explain their working methods and to generalise the problem to a real-life situation. Asking students to discuss their learning in some ways echoes aspects of conversation learning theory (see Pask & Scott, 1975). Likewise, Easley and Zwoyer (1975) emphasised the benefits of listening carefully to student responses:

> *If you can both listen to children and accept their answers not as things to just be judged right or wrong but as pieces of information which may reveal what the child is thinking you will have taken a giant step towards becoming a master teachers rather than merely a disseminator of information* (p. 25).

Tutors in Lesh and Kelly's (1997) study also used self explanation as a method of determining misconceptions. The researchers found that little time was spent trying to determine the students' exact level of understanding, instead this information was obtained by directly asking the students to explain how they interpreted the material they were working on.

Research has suggested that tutoring success is partly due to the actions of the tutee in a tutoring session which differ from opportunities in a classroom situation (Chi, 1996). Chi (1996) argues that in comparison to a classroom situation, students are given many more opportunities to put forward explanations and generate answers. In her research, self-explanation was considered more than a device for the tutor to discover misconceptions. Chi argues self-explanation may be very beneficial in reducing misconceptions in student learning and producing deep learning gains. The one-to-one learning environment provides more opportunity than the classroom for active student learning and self-regulation (Graesser et al., 1997). However Graesser et al. (1995) found little evidence to suggest that active student learning occurred during tutoring sessions. This study found that the activities of the session were directed by the tutor rather than the student. Of all the motivation constructs measured by Mischo and Haag (2002 see section 2.4) action control was the only one that was not significantly linked to achievement following participation in PT. The authors argued that receiving extensive amounts of PT each week did not encourage self-regulated learning (Mischo & Haag, 2002).

VanLehn's (2007) study (see section 2.2), compared different methods of tutoring with a control group of students who read "canned text". This control group were instructed to answer an essay question, read standard feedback given in response and then correct their answer. Under certain conditions the students in this group made the same achievement gains as the tutored groups. The researchers hypothesised these learning gains may have been a result of giving the students the opportunity to engage in self-explanation. Learning gains from self-explaining or the generation effect were also found in a study by Foos et al. (1994). Juel (1996) found role reversal to be a successful technique used by dyads in reading tutoring. This involved the tutor pretending to be the child and the child giving instructions and explaining concepts.

Due to the importance of the self-explanation effect found in the literature, researchers working with intelligent tutoring systems have advocated the need to advance one-to-one tuition technology to develop tutors that can comprehend student explanations (Rose, Jordan, Siler, VanLehn, & Weinstein, 2001; VanLehn et al., 2002).

Although not directly related to self explanation, Gutstein and Mack (1995) made an interesting observation linked to handing over of responsibility of the learner. In their research there were several instances during the tutoring process of fractions when students failed to make the link they had been expected to make. Mack discovered that in each of these instances she had failed to ask the student to write down the fraction in symbols (1 ¾) rather she had written this down herself. In these cases the students' knowledge of formal symbols and procedures had remained disconnected from their informal knowledge of fractions. Mack concluded that showing or telling students things they could construct for themselves was ineffective, she stated "it was crucial that I guided students through questions and encouraged them in constructing all aspects of their knowledge, which included recording symbolic representations" (Gutstein & Mack, 1995, p. 32)

### 3.3.7 Encouraging

This encompasses a number of motivational strategies used by effective tutors which are discussed in detail in Lepper et al. (1993), and include 5 categories: *"confidence, challenge, curiosity, control* and *contextualisation"*. The primary aim of many of the effective tutors involved in the research was to boost students' "confidence". Instead of overly praising the students they used more indirect methods, including emphasising the difficulty of the problem as discussed earlier. Linking to Bandura's work, this would lead to high levels of motivation when students have high-self-efficacy and a level of uncertainty about the outcome of the task (Bandura, 1989). To "challenge" the students, the tutors carefully selected problems that would be difficult, but not impossible, and create a desire in the student to demonstrate how much they could accomplish. Lepper et al. found that to develop a sense of "curiosity" in the students, the effective tutors would present irregularities in topics previously studied to encourage the student to investigate the topic further. These tutors also sought to allow students to feel in "control" of the tutoring session, always giving students the choice to comply with certain questions and requests. To motivate students, the "expert" tutors attempted to "contextualise" problems into everyday situations that were of interest to the students.

Lepper and Woolverton (2002) stated "Our best tutors are those who are concerned *simultaneously* with students' learning on the one hand and their motivation on the other" (p. 151). During a tutoring session with an effective tutor, Lepper et al. asserted that both cognitive and motivational student models were being continually changed and updated as things were discussed and students' reactions and behaviours to certain problems were observed by the tutor. Lepper et al. argue that the students' affective and cognitive states could be entirely harmonious with one another, in conflict or completely independent, each having implications for the tutoring session and on the decisions and actions of the tutor (Lepper & Woolverton, 2002).

Unlike Lepper et al., Merrill and his team (1995) found very little evidence of tutorial feedback that was motivational in character. The authors suggested that the difference in the age of students involved in the two studies (Merrill et al. used university graduates and undergraduates compared to younger students used by Lepper et al.) might explain the lack of evidence of motivational feedback; however the team did mention that the students were highly motivated and had not previously suffered difficulty in this domain. Merrill et al. (1995)

point out that this large discrepancy between Lepper et al.'s findings and their own, highlights the importance of considering the multidimensionality of tutorial behaviour.

There is very little research on motivational techniques of tutors besides research by Lepper et al.. Recent research by Boyer et al. (2009) (outlined above) found that certain tradeoffs exist between achieving high learning gains and high motivational gains during a tutoring session. Results showed that purely motivational dialogue was associated with greater gains in self-confidence than a cognitive statement or a cognitive statement combined with encouragement. Similarly, purely cognitive feedback from the tutors was associated with a significantly higher learning gain than cognitive feedback combined with praise. Lepper found that the expert tutors in his study were concerned simultaneously with student learning and motivation. These results demonstrate the significant impact different types of dialogues can have on both learning and motivation and the tradeoffs that exist between the two.

Lesh and Kelly (1997) found that the most effective tutors rarely attempted to match specific fine-grained learning tasks and instruction with specific learning needs. Instead, similar to the "*control*" part of Lepper's model, effective tutors provided the students with a series of options which were communicated throughout the session. This facilitated students' progress instead of dictating or limiting choices using a fine-grained pre-prepared task, method or specific type of feedback.

Pratt and Savoy-Levine (1998) found that contingent style or moderate support tutoring in long-division yielded low levels of negativity compared to high levels of support. These findings suggest that very high levels of support can have a detrimental impact on students' emotional wellbeing.

In some situations, tutors have been shown to use very little motivational support. Apart from the motivational aspects of task structuring, of the 44 techniques identified by McArthur, Stasz & Zmuidzinas (1990) only "the tutor expresses her confidence in the student's ability to complete a task" (p. 244) directly addressed motivational considerations. This area is clearly in need of further research to clarify findings such as these with the important encouraging role effective tutors play in Lepper's model.

## 3.4 Structure of tutoring sessions

Research outlining views of effective pedagogic techniques involved in one-to-one tutoring have been discussed previously; this section will examine session structure. Several research studies have attempted to outline the structure of tutoring sessions or emphasised the importance of session order and structure. The teachers in Lesh and Kelly's (1997) study placed emphasis on the important need to focus on teaching procedural rules in effective tutoring. Throughout the 10 weeks of tuition experience they learnt that aiming to gain just correct answers, without spending time to change the "foggy" thinking processes, meant the students would forget the instruction and would not achieve learning gains (p. 410).

Graesser, Person and Magliano (1995) aimed to establish the features of one-to-one tutoring that produce learning gains during tutoring sessions with unskilled tutors (see above). The sessions were examined using eight components emphasised in pedagogical theory and intelligent tutoring system research. These included:

1) Active student learning
2) Sophisticated pedagogical strategies
3) Anchored learning in specific examples and cases
4) Collaborative problem solving and question answering
5) Deep explanatory reasoning
6) Convergence towards shared meanings
7) Feedback, error diagnosis, and remediation
8) Affect and motivation (p. 497)

The researchers found that steps 3, 4 and 5 are most common during tuition sessions, but the remaining components were not manifest during tutoring sessions with untrained tutors and require training to be used successfully for achievement gains.

In Lepper's work, all experienced tutors, regardless of their observable success, had a common pattern to the tutoring process. Lepper et al. described this as problem selection, problem presentation, problem solution, reflection and finally instruction. The first stage, problem selection, is based on tutors' diagnosis of students' understanding and observation of the motivational state. This stage would then be used as an opportunity for further diagnoses of students' abilities. Problem presentation involved various levels of encouragement and prior warning of potential difficulties that may be encountered. The next phase, problem solution is student centred; involving the tutor providing sufficient scaffolding and encouragement to reach a correct answer. Reflection requires articulating the steps that have been followed and lessons that have been learnt. The final stage, which Lepper et al. argue is uncommon for remedial tutoring, occurs when the tutor provides direct instruction about new procedures and concepts to the tutee (Lepper & Woolverton, 2002).

The use of the term "scaffolding" here has a number of contested and confusing definitions (see Stone, 1993). For the study described above, the authors discuss the confusions that can be drawn from the use of the scaffolding metaphor. Instead, Lepper et al. chose to use the metaphor that "refers to scaffolding as the sorts of temporary structures that are used to support arches or tunnels under construction, but which later, once construction is complete, can be removed without danger of the arch or tunnel subsequently collapsing" (Lepper et al., 1997, p. 110). Scaffolding, in Graesser's five step "tutoring frame" which closely reflects Lepper's model, was defined by Chi et al. (2001) as "any kind of guidance that is more than a confirmatory or a negative feedback" (p. 473). Interestingly scaffolding is not explicitly mentioned in the INSPIRE model but rather it is one step in Lepper's session structure. Lepper argues these steps are continually repeated in a helical fashion of increasing complexity (Lepper et al., 1997). Both the Lepper and Graesser models describe a continuous tutoring dialogue, constantly repeating itself during the process of a one-to-one learning and teaching situation.

VanLehn et al.'s (2003) work suggested that a student is required to reach an impasse before successful learning can take place (see section 3.3.1). The authors suggested an impasse can motivate the student to then take an active part in learning to obtain a fuller understanding of the problem (VanLehn et al., 2003). Of the available data, VanLehn et al. (2003) suggested that:

> *an optimal tutoring strategy may be to (a) let the student reach an impasse, (b) prompt them to find the right step and explain it, and (c) provide an explanation only if they have tried and failed to provide their own explanation. Human tutors often fail to do step (b) and sometimes even fail to do step (a) (VanLehn et al., 2003, p. 244)*

With regard to session structure, this research would suggest that the student should be presented with a problem early in the session; thus causing the student to reach an impasse to allow learning to take place.

In their research on teaching for understanding in mathematics using fractions, Gutstein and Mack (1995) found the sequencing of tasks on the topic was determined by responses to addition and subtraction problems. Where problems involved concepts, time would be spent exploring the concept in some depth, when the problem had been rectified, Mack would return to the original task.

## 3.5 INSPIRE – summary and critique

The INSPIRE model developed by Lepper and his team provides a useful framework for synthesising literature in the field of one-to-one tutoring expertise. This model extends much of the literature by placing emphasis on the affective motivational aspects of tutoring. Lepper also highlights the active role played by the student in the tutoring process. This is shown in the aspects of "control" and in the self-explanation part the model termed "reflective".

One considerable concern in drawing significantly from Lepper et al.'s (Lepper & Chabay, 1985, 1988; Lepper et al., 1997; Lepper & Woolverton, 2002; Lepper et al., 1993) research is the vagueness of the number of tutors involved; more particularly, the unknown number of tutors labelled as "experts" and used to form the basis of the INSPIRE model. All tutoring took place in maths and from years 1 to 6. This model therefore may not easily be applied to different subjects and to older students. The majority of students involved in the study were suffering with low self-confidence and high anxiety and the tutoring provided was primarily remedial (Lepper et al., 1997). Such tutoring may require a certain kind of pedagogy and would influence specific parts of the model, particularly motivational concerns (see Boyer et al., 2009).

Lepper's model of effective tutoring is broad and all-encompassing. The effective tutors were described as experts in both instructional and motivational methods and appeared to be experts in all the areas outlined. The INSPIRE model was used as an organisational device in this chapter; however some studies focussing on specific aspects of tutoring were not easily placed inside the model. It was not clear if the experts in Lepper's model incorporated the actions described by the additional studies placed inside Lepper's model. For example, the INSPIRE model discusses how the tutors progress through tasks based on students' misconceptions, however it is unclear how the "expert" tutors diagnosed these misconceptions and how successful they were at doing so.

Bray (1999) suggests effective tutoring, in terms of gains in achievement, are likely to be dependent on the following factors:

- The content and mode of delivery of the tutoring
- The motivation of the tutors and the tutees;
- The intensity, duration and timing of tutoring; and
- The types of pupils who receive tutoring (p. 50)

These factors may divert some attention from the tutors' pedagogic competence and propose that in order for tutoring to be effective (with specific reference to raising achievement), the "motivation" and "type" of tutee is important, in addition to the timing, mode and intensity of the tuition. Lepper's model is concerned with keeping the student motivated but does not acknowledge that if the child does not want to participate in tutoring it is unlikely that any method of tutoring will be effective in achieving learning gains. There is considerable literature on how students with varying characteristics respond differently to various teaching methods (see Cronbach & Snow, 1977). Lepper's model emphasises the importance of being flexible to the needs of the learner, but does not acknowledge the role of the student in effective tutoring. Bray also mentioned "duration" of tutoring to be an important factor in successful tutoring; interestingly duration is not mentioned in the Lepper model. It is unlikely that even "expert" tutors would facilitate substantial learning gains in a very short time period.

Some of the tutoring sessions in Lepper's research took place in laboratory conditions and others in more naturalistic school settings. No acknowledgement was made to the significance of the different contexts in which this research took place. A considerable oversight of the research team was the impact of employing pre-tests. The students were handpicked based on answers to a pre-test to ensure the correct material was tutored. For example, the research team made sure that the student could complete single digit addition before they asked the tutor to teach more complex addition which involved carrying. In naturalistic tutoring, tutors would not have the benefit of knowing the students' ability to complete a certain task (e.g. single digit addition) before tutoring commenced. The full initial diagnosis of a student's level of understanding was therefore missing from the tutoring process in this research. The INSPIRE model may be missing important elements of one-to-one interaction essential in determining a student's level of understanding.

## 3.6 Chapter summary

In comparison to the volume of studies on effective teaching, there is limited research in the field of effective tutoring. A selection of studies in the field of effective teaching has been evaluated and effort has been made to establish links with the one-to-one tutoring situation. The INSPIRE model of tutoring effectiveness proposed by Lepper et al. has provided a framework for synthesising the literature on one-to-one tuition.

### 3.6.1 Research Questions

A number of studies mapping the extent of PT participation in England (outlined in chapter 1), have shown that approximately 22% to 30% of students participate in PT at some point during schooling (Ipsos MORI, 2009; Ireson & Rushforth, 2011), with lower proportions reported within specific school year groups (Mullis et al., 2000; Peters et al., 2009). However, apart from MGPP (evaluating the impact of 10 hours one-to-one tuition organised within schools for pupils falling behind) and the provisional analysis of results completed as part of the MESE project, no research has been completed exploring the impact of PT on achievement in England. Studies completed elsewhere (reviewed in chapter 2), have shown substantial variations in effectiveness. These results demonstrate the need for further research, particularly in England where limited information is available. RQ1 will address this research gap: to what extent does PT impact on attainment at KS2 and GCSE level?

The research reviewed in chapter 2 showed that tutoring programmes that are well designed and implemented can be very effective in raising achievement (B. S. Bloom, 1984; P. A. Cohen et al., 1982); however there is considerable variability in the effectiveness and some studies have shown limited grade improvements (Elbaum et al., 2000; Ireson & Rushforth, 2011; Polydorides, 1986; Smyth, 2008, 2009). These contradictory research findings call into question the quality of PT provision and demonstrate the need for further rigorous research to identify characteristics of effective practice. These issues are addressed in RQs 2 and 3 discussed below.

Research on effective tutoring has been limited to specific subjects (particularly maths and reading), specific age groups and has often involved remedial techniques for struggling students. Effective pedagogic techniques common across subjects, levels and extension/remedial learning needs have not been identified. Aside from Lesh and Kelly's (1997) work with teachers, few studies have consulted with tutors and students on what is considered as effective one-to-one tutoring techniques and how effectiveness is evaluated by these key players.

In addition to setting out the design of the study to address RQ1, the following chapter outlines methods designed to collect the views of tutors and tutees and their perceptions of effectiveness. This study aims to determine features of effective PT practice common across subjects and levels. By consulting tutors and students on perceptions of effectiveness, it is hoped that a basis of common characteristics can be established. In support of this, Graesser and his team found negligible differences between the pedagogical strategies and dialogue patterns used by tutors teaching research methods and tutors teaching maths (Graesser et al., 1997). Perhaps then, it is possible to outline aspects of the tuition process that are considered effective by tutors and students common to all subjects and levels.

There is not an expectation to identify a set of rules or a prescriptive theory of tutoring; rather the aim is to uncover key skills, attributes and pedagogic techniques that tutors and students perceive to be associated with effective tutoring. Du Boulay and Luckin (2001) argue:

> *It is unrealistic to expect that an all-embracing, prescriptive theory of teaching will easily emerge given the complex, social nature of the enterprise. It would be like expecting a prescriptive theory of "being a politician" or "being an actor". Of course in each of these activities there are guidelines which the novice teacher (or politician or actor) can make use of and some theories and practical tips... But these theories can never be entirely prescriptive in that the activities do not occur in a vacuum but often depend for their effectiveness of the personalities of the participants. (p. 242)*

Similarly Lesh and Kelly (1997) found that tutors were unable to identify a single "best" type of teacher or tutor, as "characteristics and teaching techniques that lead to success in one situation often lead to failure in others" (p. 409). They also concluded that there is no fixed state of excellence in teaching or tutoring, but rather tutors must constantly adapt and develop effective practice without basing learning activities on a preconceived concept of "best" (Lesh & Kelly, 1997, p. 410). In a similar vein, Sternberg and Horvath (1995) argue there is no defined standard which all expert teachers meet and novices fail to reach, more that experts bear a "family resemblance" and these similarities form the category of expert (p. 9). Instead of focussing on a rule based list of "best", this thesis aims to determine if there is a "family resemblance" of effective tutoring practice common across subjects and levels of tutoring.

Due to the lack of research and consideration given to effective pedagogic techniques for one-to-one tuition common across subjects and levels, it is hoped that this study will make a significant contribution in this area. By obtaining tutors' and tutees' views on effectiveness, this research will determine skills, attributes and techniques considered important in achieving learning gains. How effective tutoring is evaluated will also be considered to aid in establishing what effective tuition entails. Tutors and students perceptions of effective tuition will be compared and contrasted with findings in the literature. Comparisons will be made using themes from the INSPIRE model and from a number of other studies outlined above. The second study in this thesis will attempt to address RQs 2 and 3:

> RQ2 what pedagogic techniques do tutors believe to be important for achieving learning gains?
>
> RQ3 what do pupils and tutors consider to be effective tuition and how is this evaluated?

The following chapter contains the detailed research design and methodology used for the two studies addressing the aims and research questions in this thesis.

# 4 Research Design and Methodology

## 4.1 Aims and focus

This thesis aims to address three RQs:

RQ1: To what extent does PT impact on attainment at KS2 and GCSE level?

RQ2: What pedagogic techniques do tutors believe to be important for achieving learning gains?

RQ3: What do pupils and tutors consider to be effective tuition and how is this evaluated?

These research questions require the collection of both quantitative and qualitative data to engage with the research aims. In making this statement, it is important to note that the distinction between qualitative and quantitative paradigms has been referred to as a 'false dualism' (Frazer, 1995; Pring, 2000). Gorard (1997; , 2004; , 2007; Gorard & Taylor, 2004) fiercely criticises this distinction and argues "all methods of analysis use some form of number, such as 'tend, most, some, all, none, few, and so on'... Words can be counted and numbers can be descriptive" (2001, p. 6).

To answer the three RQs a mixed methods approach has been adopted. Mixed methods research has been defined as "a type of research design in which QUAL[9] and QUAN[10] approaches are used in types of questions, research methods, data collection and analysis procedures, and/or inferences" (Tashakkori & Teddlie, 2003, p. 711). Mixed methods research "moves past the paradigm wars by offering a logical and practical alternative" (R. B. Johnson & Onwuegbuzie, 2004, p. 17). Instead of being entrenched in the positivist/post positivist epistemology of quantitative methods or constructivism from the qualitative tradition, mixed methods advocates pragmatism using the research questions to shape the choice of research methodology. However, the introduction of the third paradigm of mixed-methods has been criticised for further entrenching the existing qualitative and quantitative paradigms; Symonds and Gorard (2008) argue that labels should be shelved altogether and instead there should be a "rebirth of real-life research from the ashes of mixed methods" (p. 2).

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[9] qualitative
[10] quantitative

This thesis has adopted a sequential mixed design (see Teddlie & Tashakkori, 2009) where the findings from the primarily quantitative RQ1 have been used to lead onto RQ2 and RQ3. The latter RQs require a more qualitative approach to explore the perceptions of effectiveness in aspects of one-to-one tuition. The conclusions and inferences of this thesis are taken from both strands of the quantitative and qualitative studies.

This chapter will discuss the research methodology used to address all three RQs. The opening section will focus on the quantitative methodology used to undertake the first RQ; this will then lead on to inform the design and methodologies used to address RQs 2 and 3.

## 4.2 Measuring the impact[11] of private tuition on attainment

Very little is known about the impact of PT on attainment in England. Studies completed elsewhere have revealed inconclusive and conflicting findings as discussed in chapter 2. This thesis aims to make a contribution to the field by exploring the impact of PT on attainment using information collected from a number of pupils attending English schools.

The first part of this chapter will discuss the methods used to address RQ1:

> To what extent does PT impact on attainment at KS2 and GCSE level?

The data used in this analysis was collected from questionnaires during the MESE project which took place between May 2003 and Jan 2005. All subsequent data matching and analyses were completed as part of this thesis.

The section begins with a comprehensive report of the data collection process and a description of the research tools. This is followed by a discussion on the statistical techniques employed.

### 4.2.1 Research design - 'Mapping and Evaluating Shadow Education'[12] (MESE)

In its initial conception the MESE project employed a proportionate stratified sampling strategy through the distribution of questionnaires in schools selected to represent a range of socio-economic backgrounds and demographic areas. The original sampling frame was drawn up on the bases of centrally held data on the percentage of pupils eligible for free school meals in LAs. These data were used to place LAs in three groups of low, medium and high FSM

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[11] The word impact has been used throughout the following chapters merely to signify an effect and not to imply causality.

[12] A detailed description of the methodology can be found in Ireson and Rushforth (2005, 2011)

percentage. In each group, two authorities were chosen, one with a selective schooling system and one without. Schools were then selected within authorities using local and national data on the percentage of FSM and on advice from LA advisors and school inspection reports to provide more detailed demographic characteristics including ethnicity. The sample did not include any private schools, and data from grammar schools was limited due to the difficulties in recruitment.

As the sampling progressed it became clear that insufficient schools would be obtained in the selected LAs due to a large number of schools being unable to take part in the research. When schools opted not to participate in the study, the main reasons provided were involvement in other projects or under too much pressure. When substitutions had to be made, where possible these were chosen to match the characteristics of the planned sample. Within each school a maximum of two classes were selected to represent a cross-section of year 6 (Y6) and year 11 (Y11) pupils. Response rates varied by LA, for example, every secondary school in one LA were contacted but only one agreed to participate. In another LA there was a 50% response rate. The original design of the study included the use of six LAs; however schools from additional LAs were included to supplement the sample where schools had not been willing to participate in the study. In total 30 primary and 28 secondary schools were involved in the study from 10 LAs. This provided questionnaire responses from a total of 2468 pupils (1254 in Y6 and 1214 in Y11).

Table 4.1 displays the characteristics of the 30 primary schools involved in the MESE project, the percentage of pupils in each school that were eligible for FSM, the ethnicity of the pupils that attend and the percentage of students with special educational needs (SEN) (with and without statements). Table 4.1 shows that primary schools involved in the MESE project had from 0.3% up to 90.5% (*M* 26.7 *SD* 28.5) whose first language was known or believed to be other than English. The table also indicates the average point score for KS2 results and the value added (VA) school measure with scores above 100 indicating above average progress. Table 4.2 displays the same information for the secondary schools involved in the MESE project. The performance data for these schools indicates the percentage of students who achieved five A*-C grades and the VA measure from KS3 to KS4. The national average VA figure during this period was 990.7[13] (Department for Education and Skills, 2004c).

[13] See VA in glossary of terms for more information.

To accurately report participation rates in PT, data collection was specifically timed to include phases in education during which students would most likely be receiving PT. Data for Y6 students was obtained in the latter part of the autumn term in 2003. Students aged 11 take their KS2 tests during Y6 and in counties where the Tripartite System remains, students also prepare for the 11-plus examinations which usually take place during the autumn term. For Y11 students, fieldwork was completed in the summer term immediately before the GCSE examinations. Due to unforeseen circumstances, Y11 data from only seven schools was acquired in the summer term of academic year 2002-2003; the remaining schools participated in the study at a similar time in the following academic year.

The questionnaire used to collect PT data from students was comparable for both year groups; the Y6 version was simplified and adapted to suit the appropriate subjects taught (see Appendix A and B). Questions were included regarding extracurricular activities, the extent of family support and how much time students spent on homework. Information was sought on reasons for and for not having PT. Data was also collected on student background characteristics including age, gender, ethnic origin together with education and employment status of parent(s)/carer(s).

One aim of the MESE project was to evaluate the impact of PT on learning (Ireson & Rushforth, 2005). This involved a provisional analysis of the sample of Y11 students (*n*302) collected in the first half of the project. This thesis extends the analysis to involve all participants in Y6 and Y11[14].

[14] The MESE project involved students in years 6, 11 and 13; this thesis includes students in years 6 and 11 only. The year 13 data was not considered here due to the focus on the compulsory core subjects of English, maths and science taken by pupils to the end of year 11 (KS4). In addition to this, the data collected on PT participation from the year 13 students was phrased slightly differently making comparisons between the KS2 and KS4 data difficult.

*Table 4.1 Characteristics of the primary schools involved in the MESE project (data based on academic year 2003-2004)*

| LA | Average point score | School VA measure | % FSM | % SEN with statement | % SEN without statement | % first lang not English | % White Ethnicity | % Mixed† ethnicity | % Asian ethnicity | % Black ethnicity | % receiving PT[15] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 27.1 | 100.5 | 52.3 | 1.3 | 17.7 | 90.5 | 11.9 | 3.3 | 59.3 | 25.5 | 5.3 |
| | 26.5 | 100.6 | 51.9 | 3.3 | 23.7 | 46.6 | 37.3 | 18.6 | 10.5 | 33.6 | 23.5 |
| | 25.8 | 99.3 | 52.5 | 1.4 | 24.7 | 50 | 47.3 | 10.5 | 16 | 26.2 | 5.7 |
| | 28.3 | 100.5 | 30.1 | 2.5 | 15.7 | 27.1 | 65.7 | 16.3 | 4.1 | 14 | 17.2 |
| B | 24.9 | 99.7 | 38.9 | 1.6 | 11.4 | 18.8 | 78.5 | 6.9 | 0 | 14.5 | 11.5 |
| | 26.9 | 99.1 | 38.4 | 2.1 | 22.2 | 12.9 | 75.5 | 3.1 | 2.4 | 19 | 9.3 |
| | 28.5 | 102.4 | 22.4 | 3.1 | 15.3 | 14.2 | 59.6 | 14.6 | 0 | 25.8 | 3 |
| C | 26.3 | 101.3 | 38.9 | 5.9 | 16.9 | 49.8 | 35.6 | 28.5 | 12.6 | 23.3 | 19.4 |
| | 28.2 | 100.4 | 15.7 | 1.6 | 13.3 | 19.5 | 79.1 | 6 | 9 | 6 | 30 |
| | 29.4 | 99.7 | 5.7 | 3.5 | 19 | 14.6 | 72.7 | 11.1 | 2.8 | 13.4 | 10 |
| D | 29.5 | 101.8 | 5.6 | 3.6 | 2 | 15.2 | 75.1 | 9.2 | 10.9 | 4.8 | 18.2 |
| | 29.1 | 100.3 | 1.9 | 0.7 | 13 | 1.8 | 79.9 | 7 | 4.2 | 8.9 | 38 |
| E | 30.6 | 102.3 | 9.4 | 1.8 | 7.5 | 10.2 | 81.6 | 10.4 | 4.3 | 3.7 | 42.6 |
| F | 26.6 | 99.6 | 21.4 | 6.2 | 11.9 | 9.1 | 82.8 | 3.4 | 6.9 | 6.9 | 26.7 |
| | 26.2 | 101.4 | 36.2 | 0.8 | 25.5 | 89.3 | 6.2 | 5.9 | 79.9 | 8 | 25.5 |
| | 28.3 | 103.4 | 61.9 | 3.2 | 16.1 | 83 | 3 | 21.2 | 57 | 18.8 | 38.9 |
| | 23.9 | 96.5 | 50.8 | 2.1 | 30.7 | 27.2 | 28.2 | 14.5 | 28.2 | 29 | 0 |
| | 29.4 | 101.1 | 32.5 | 1.3 | 7.2 | 47.7 | 24.6 | 10.6 | 50.9 | 14 | 22.4 |
| | 28.8 | 99.6 | 8.6 | 1.4 | 9.7 | 4.2 | 86.1 | 8.8 | 2.3 | 2.8 | 15.7 |
| G | 26.2 | 100.3 | 22.8 | 0.9 | 19.8 | 25.5 | 52 | 9.5 | 23.7 | 14.8 | 16.2 |
| H | 30.6 | 100.1 | 0 | 0 | 14.6 | 1.9 | 95.7 | 4.3 | 0 | 0 | 48.8 |
| | 30.3 | 99.8 | 0 | 1 | 6.1 | 2.8 | 95.6 | 2 | 2.3 | 0 | 45.3 |
| | 27.8 | 98.4 | 2.8 | 5.1 | 9.8 | 5.8 | 94.2 | 1.9 | 3.9 | 0 | 17.4 |
| | 28.8 | 99.1 | 0 | 0 | 6.8 | 4.2 | 100 | 0 | 0 | 0 | 25.8 |
| | 25.3 | 100.2 | 33.6 | 4.7 | 30.7 | 45.6 | 42.3 | 3.6 | 45.2 | 8.9 | 43.3 |
| | 23.7 | 99.3 | 20.9 | 1.8 | 18.9 | 80.1 | 13.1 | 2.4 | 80.3 | 4.2 | 22 |
| I | 30.2 | 100 | 6 | 1.4 | 9.3 | 1.2 | 100 | 0 | 0 | 0 | 45.5 |
| | 28.1 | 100.1 | 1.3 | 0 | 5.2 | 1.1 | 96.4 | 1.8 | 1.8 | 0 | 61.5 |
| | 27 | 98.3 | 17.5 | 0.6 | 17.9 | 0.3 | 95.7 | 3.3 | 0 | 1 | 3.9 |
| | 29.6 | 99.2 | 1.7 | 0.4 | 8.4 | 1.7 | 92.3 | 5.4 | 2.3 | 0 | 28.6 |

† mixed includes other ethnic group

[15] These percentages differ slightly from those presented in section 1.4 and in Ireson and Rushforth (2011). This is due to the reduction in sample size when cases were matched to DCSF achievement data and rechecked for discrepancies (see section 4.2.8).

*Table 4.2 Characteristics of the secondary schools involved in the MESE project (data based on academic year 2003-2004)*

| LA | % scoring A*-C | School VA KS3-KS4 measure | % FSM | % SEN with statement | % SEN without statement | % first lang not English | % White ethnicity | % Mixed† ethnicity | % Asian ethnicity | % Black ethnicity | % receiving PT[16] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 55 | 984.6 | 27 | 5.1 | 19.1 | 27.6 | 64.2 | 6.3 | 15.2 | 14.4 | 43.5 |
| B | 61 | 993.8 | 15.5 | 1.5 | 7.7 | 30.2 | 54.4 | 3.9 | 26.9 | 14.8 | 42.9 |
| | 23 | 959.4 | 32.8 | 3.1 | 12.4 | 24.8 | 72.8 | 1.6 | 10 | 15.6 | 3.2 |
| | 58 | 996.3 | 35.7 | 2.4 | 24.8 | 15.1 | 85.1 | 3.6 | 2.2 | 9 | 15.9 |
| | 33 | 995.8 | 35.3 | 2.4 | 16.2 | 22.5 | 84.1 | 2.2 | 2.6 | 11 | 10 |
| | 85 | 1033 | 12.8 | 1.3 | 10.3 | 6.3 | 74.8 | 5.5 | 2.9 | 16.7 | 11.9 |
| C | 60 | 974.5 | 9.8 | 3.2 | 3.9 | 19.2 | 85.6 | 7.4 | 4.5 | 2.6 | 42.9 |
| D | 76 | 994.8 | 3 | 1.3 | 9.6 | 3 | 86.7 | 4.7 | 2.1 | 6.5 | 56.2 |
| | 61 | 996.8 | 10.2 | 1 | 12.9 | 9.8 | 73.4 | 10.1 | 8.9 | 7.6 | 46.2 |
| | 32 | 978.6 | 27.8 | 3.3 | 11.3 | 22.4 | 60.7 | 10.7 | 21.1 | 7.5 | 16.7 |
| E | 61 | 979.9 | 17.8 | 3 | 12.5 | 11.2 | 82.9 | 6.4 | 4.7 | 6 | 31.7 |
| | 44 | 986.4 | 26.7 | 2.9 | 17.2 | 17.5 | 66.2 | 14 | 3.8 | 16 | 31.4 |
| F | 30 | 950.5 | 42.1 | 2.2 | 17.3 | 0.8 | 89.6 | 6.1 | 1.1 | 3.1 | 16.1 |
| | 38 | 976.8 | 20.4 | 1.2 | 18.9 | 0.8 | 90.9 | 5.6 | 0.5 | 3 | 7.5 |
| | 50 | 989.4 | 11.7 | 1.2 | 7 | 6.7 | 76.2 | 4.2 | 9.5 | 10.1 | 16.9 |
| | 70 | 1000 | 7.4 | 1.5 | 6.1 | 4.8 | 92.7 | 4.4 | 1.8 | 1.1 | 31.4 |
| H | 32 | 983.5 | 8.1 | 3.7 | 13.9 | 19.1 | 79.3 | 3.2 | 15.7 | 1.8 | 23.3 |
| | 69 | 994.3 | 2.8 | 2 | 6.4 | 5 | 95.9 | 1.1 | 3.1 | 0 | 42.1 |
| | 16 | 968.8 | 22.6 | 4.1 | 29.3 | 23.5 | 70.2 | 5 | 21.8 | 3 | 16 |
| | 42 | 977.7 | 13.9 | 2.6 | 25.4 | 17.6 | 81.2 | 0 | 17.7 | 1.2 | 19.5 |
| I | 66 | 1002 | 5 | 2 | 10.1 | 5.8 | 90.7 | 3.2 | 4.4 | 1.7 | 46.3 |
| | 44 | 975.8 | 14.1 | 2.6 | 13 | 1 | 99.6 | 0.4 | 0 | 0 | 13.5 |
| | 16 | 974.9 | 19.8 | 3.2 | 50.2 | 7.5 | 88.2 | 4.6 | 5.3 | 1.9 | 4.3 |
| | 74 | 997.4 | 3.8 | 1.3 | 3.3 | 1.7 | 97.7 | 1.2 | 0.7 | 0.4 | 27.3 |
| | 79 | 989.6 | 1.4 | 0.6 | 7.7 | 1 | 96 | 2.7 | 0.6 | 0.6 | 54.8 |
| J | 51 | 970.5 | 5.8 | 2 | 12.5 | 15.4 | 73 | 8.5 | 9.5 | 9 | 39.1 |
| K | 60 | 1010 | 21.9 | 3.5 | 19.1 | 28.8 | 64.3 | 3.2 | 29 | 3.5 | 16.2 |
| | 40 | 973.7 | 10.8 | 3.2 | 17.3 | 2.5 | 93.7 | 3.5 | 2.2 | 0.6 | 10.3 |

† mixed includes other ethnic group

[16] These percentages differ slightly from those presented in section 1.4 and in Ireson and Rushforth (2011). This is due to the reduction in sample size when cases were matched to DCSF achievement data and rechecked for discrepancies (see section 4.2.8).

### 4.2.2 DCSF data

To answer RQ1 and determine the impact of PT on attainment, information was taken from the questionnaires and combined with DCSF achievement data. Information was obtained for pupils who had taken their GCSEs in 2003 and 2004 along with KS3 data for the corresponding years. Both KS1 and KS2 results were obtained for the Y6 sample.

Pupil Level Annual School Census (PLASC) data was also acquired and matched to the examination results. PLASC data includes information on special education needs (SEN), ethnicity, FSM and first language (Department for Education and Skills, 2006b). PLASC information was provided with each set of results. This was updated when the final achievement data had been received ensuring the figures were accurate when the students took their exams.

The UPN (Unique Pupil Number) used by the DCSF as a unique pupil identifier was not supplied by the schools involved so matching data from the DCSF to the original sample proved challenging. The DCSF provided named data; nevertheless matching had to rely on the spelling of student names included on the front of the questionnaires. This time-consuming process was relatively successful; 98.2% of students in the Y11 sample were matched to DCSF data and 97.5% of Y6 students. However, a proportion of matched students did not have corresponding achievement data (Y6, *n*87, Y11 *n*19). Despite repeated requests for the missing Y6 data, the information was not available and no explanation was provided.

### 4.2.3 Ethical considerations

PT is a sensitive area, so the design and administration of the questionnaire was approached in an appropriate and diplomatic manner. Parental consent was sought, information sheets were provided and the investigation was thoroughly explained to all participants. During data collection teachers were asked to remain on the periphery of the classroom to ensure that students would not feel uncomfortable disclosing their involvement in PT. Data provided by the DCSF required conformity to a confidentiality agreement. All data utilised in this analysis has been held in strictest confidence ensuring anonymity of every participant and school. Guidelines for ethical research provided by BERA (2004) and the ESRC Research Ethics Framework (2006) were followed at all times.

### 4.2.4 Statistical methodology

Before the main analysis was completed, a preliminary study explored the differences in the 'treatment' and control groups – those participating and not participating in PT. There is considerable debate surrounding the use of regression techniques when participants and non-participants differ substantially (Conniffe, Gash, & O'Connell, 2000). Logistic regression was used to calculate propensity scores indicating the probability of students to participate in PT and therefore determining if the subsequent analysis would be comparing 'like with like' (see Rosenbaum & Rubin, 1983). If large differences had been found between treatment groups, using regression techniques to investigate the impact of PT may have produced inaccurate estimates (see Rubin, 1997). Results exploring the propensity scores are discussed in section 5.1.1.

Substantial research within the field of education has been published criticising research findings for failing to acknowledge the presence of hierarchal data (Gray, Jesson, & Jones, 1986; Raudenbush & Bryk, 1986; Woodhouse & Goldstein, 1988). Goldstein (2003) argues "the existence of such data hierarchies is neither accidental nor ignorable" (p. 1). As the data had been collected from pupils attending different schools, there was variability between pupils that could be explained at the school level, and similarities between pupils attending the same schools. Snijders and Bosker (2004) argue that one may draw wrong conclusions from data if these sources of variability are ignored. Provisional analyses were completed using random-effects multilevel models (MLM) using MLwiN (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). MLM recognises the existence of data hierarchies allowing for residual components at each level within the hierarchy. A two-level model allows grouping of child outcomes within schools which includes residuals at both the child and school level (Goldstein, 2003). Table C.1 in Appendix C illustrates the partitioning of the variance of the null multilevel models.

The schools involved in the MESE project were not randomly selected from a population of schools and obtaining a normal distribution of level two residuals proved problematic. Significant improvement in the models was achieved by adding random slopes on prior attainment; however this was often driven by results from one or two schools. When these influential schools were removed from the random part and included as dummy variables in the fixed part of the model, the random slope was no longer beneficial to the model fit.

The focus of the analysis was to determine the impact of PT on attainment and not to make inferences at the school level. Therefore, due to the problems encountered during the preliminary investigation it was decided to complete the analysis using fixed effects models. In these models, schools were included as dummy variables to control for school differences. It is important to note that comparisons between estimates of institutional effects using MLM and ordinary least squares (OLS) are relatively similar, although differences are apparent with smaller samples (see Fitz-Gibbon, 1997; Fitz-Gibbon, 2000).

Since there are likely to be similarities between pupils within the same schools, and schools within LAs, using standard regression methods violates the independence of measurement assumption. After exploring the data using OLS in SPSS (SPSS for Windows, 2006), to reduce the risk of making inaccurate inferences in the presence of heteroskedacity, it was decided to utilise the robust estimate of variance[17] (Huber, 1967; White, 1980, 1982) using Stata (StataCorp, 2007). This covariance matrix estimator allows a model to be fitted that contains heteroskedastic residuals, where proper statistical inferences can be obtained (White, 1980). The models calculated using OLS and robust estimate of variance models were compared. The comparison revealed that using the robust method made very little difference to the standard errors (SE) and in most cases the SE for the PT estimates marginally decreased (see section 5.1.2 and Appendix D).

Although the Y6 and Y11 samples contained around 1000 cases, the numbers of students participating in PT was limited, particularly for the models exploring PT participation by subject and duration (see section 4.2.7). Diagnostics carried out on the models revealed that several cases had large Cook's distances and residuals (see section 5.1.2). Although removing these cases made marginal difference to the estimates, if the outlying student had participated in PT the decision to exclude or include the case influenced the PT estimate in a small number of models. Due to the impact of removing or leaving in these cases, it was decided to use robust regression to give less weight to outlying cases and to ensure transparency during data analysis. Robust regression in Stata uses both Huber weights (Huber, 1964) and biweights

[17] The formula for the robust variance estimator is:

$$\hat{\mathrm{v}} = \widehat{\mathrm{V}}\left(\sum_{j=1}^{N} u_j' u_j\right)\widehat{\mathrm{V}}$$

Where $\hat{\mathrm{v}} = (-\partial^2 \ln L/\partial\beta^2)^{-1}$ (the conventional estimator of variance) and $u_j$ (a row vector) is the contribution from the $j$th observation to is the contribution of the $k$th group $\partial \ \ln L/\partial\beta$ (StataCorp, 2009, p. 301)

(Beaton & Tukey, 1974) in an iterative process which calculates case weights from absolute residuals and reruns the regression applying these weights (StataCorp, 2009). Both Huber and biweights are used in this process to improve the behaviour of the other; Huber weights can prove problematic in dealing with severe outliers whereas biweights produce multiple solutions and can fail to converge (StataCorp, 2009).

The outliers given minimal or no weight in the Y11 robust regression models, were all cases where students scored U (0 points) at GCSE. It is clear that the models were inefficient at being able to predict a zero outcome score. For Y6 very few cases were given zero weight, less weight was given to outlying students who achieved above average results at KS1 but scored very low on KS2 tests. In addition to this, less weight was given to outlying scores from students with SEN who achieved very high KS2 or GCSE results. The final models presented in chapters 5 and 6 have been calculated using robust regression.

It should be noted that values of $R^2$ calculated using robust regression are significantly smaller in comparison to values obtained using OLS. During the robust regression calculation, after the programme reaches convergence, one final step is made calculating pseudo values of the dependent variable based on the calculated weights. Street, Carroll and Ruppert (1988) argue that using these pseudo values for the calculation of the $R^2$ are meaningless. Instead the $R^2$ values have been calculated using an adjustment developed by UCLA statistical consulting (Ender & Chen, 2009). As both the independent and dependent variables have been affected by the weights in robust regression, it is not appropriate to compare the $R^2$ OLS and robust regression values (see Greene, 2003) even when the $R^2$ is adjusted using the method suggested by Schrader and Hettmansperger (1980).

Several researchers in the field of social science have highlighted the need for data analysis and interpretation to be completed in a way that is meaningful for policy makers (e.g. Elliot & Sammons, 2004; McCartney & Rosenthal, 2000). Coe (2004) recommends that effect sizes should be interpreted by comparison to familiar metrics. With this in mind, the effect sizes for the final models were calculated to indicate the impact on GCSE grades and National Curriculum (NC) levels. For example, an effect size of 0.5 shows the estimate improves performance by half a GCSE grade (Y11 models) or half a NC level (for Y6). Effect sizes were reported for both significant and insignificant predictors (see J. Cohen, 1990) with clear indication of either positive or negative impact (Elliot & Sammons, 2004). To make the results accessible to an international audience standardised effect sizes have also been calculated.

These are presented in Table 7.1 where the PT effects have been summarised, they have also been referred to in the text. To make a distinction between the two types of effect sizes, 'ES' has been used to indicate a grade or level effect size and the symbol 'Δ' has been used to indicate a standardised effect size.

To explore the impact of PT on achievement, models were constructed using GCSE and KS2 attainment as the dependent variables. Other known predictors of achievement, obtained from the DCSF and questionnaire responses, were added to the models. Smyth's (2008, 2009) work (see section 2.2) demonstrates the importance of controlling for background characteristics when modelling the impact of PT on attainment. Her results revealed that when characteristics such as SES, educational aspirations, gender and prior achievement were controlled, the additional impact of PT on achievement was negligible.

The next section of this chapter discusses the dependent variables and prior achievement measures in detail. The variables used to control for pupil background characteristics are then outlined.

### 4.2.5 Achievement data

#### *4.2.5.1 Key Stage 4 (Y11 models)*

As explained above, a preliminary analysis of the impact of tutoring on achievement was completed for a small proportion of the Y11 sample who took their exams in 2003 (Ireson & Rushforth, 2005). For this analysis a scale was used ranging from 0-8 indicating the grade achieved at GCSE. However for the following year a number of new qualifications (including entry level qualifications) were offered at KS4 which did not map onto the 0-8 scale. As an alternative, it was decided to utilise the equivalent point score (Department for Education and Skills, 2004a). The scale ranged from 0-58, with 0 being a grade U (ungraded) and 58 being equivalent to an A*, A representing 52 points and so on until 16 equivalent to grade G. GCSE double awards or vocational qualifications worth 2 or 4 GCSE grades were divided by 2 or 4 respectively to give a single grade score to create comparable measure of achievement for each of the core subjects. Therefore the maximum score achieved in any one subject was 58 points (A* equivalent).

Due to the focus of PT in English, maths and science KS4 achievement measures were created for each of these subjects. All qualifications taken in these subjects were adjusted and averaged to give a representative grade for each student. For example, a grade C at GCSE in

English literature (40 points) and a grade D in English language (34 points) would give an average English score of 37 points. A GCSE double award in vocational science (equivalent to 2 GCSEs) at grade C (40 points (80 divided by 2)) and a GCSE in chemistry at grade B (46 points) would create an average science score of 43 points. The decision to average the subject grades was taken due to the data collected regarding PT participation. Information was obtained for English, maths and science though students were not asked about PT participation in individual science subjects or to distinguish between English language and literature tuition.

The distributions of GCSE English, mathematics and science scores are shown in Figure 4.1-4.3. Figure 4.3 shows there are high numbers of students at certain grade boundaries and very small numbers in between; this is due to creating an average science grade. Figure 4.4 shows the distribution of the KS4 average English, maths and science score (mean EMSKS4) calculated only for pupils who had been awarded scores for all three subjects. The descriptive statistics for the KS4 attainment levels are included in Table 4.3.

*Figure 4.1 KS4 English score: Histogram with normal curve*

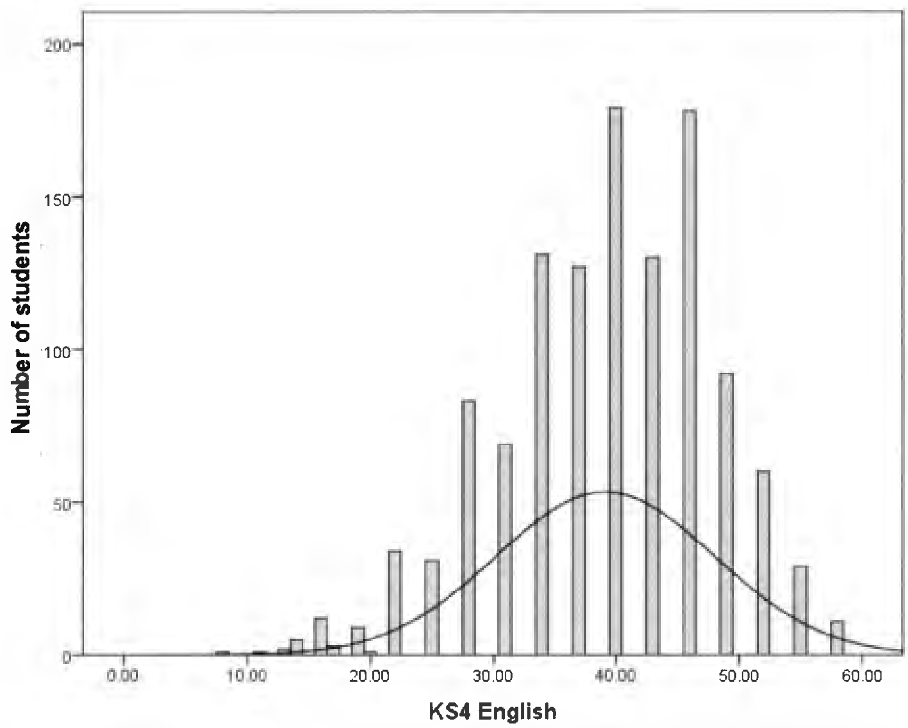


*Figure 4.2 KS4 maths score: Histogram with normal curve*

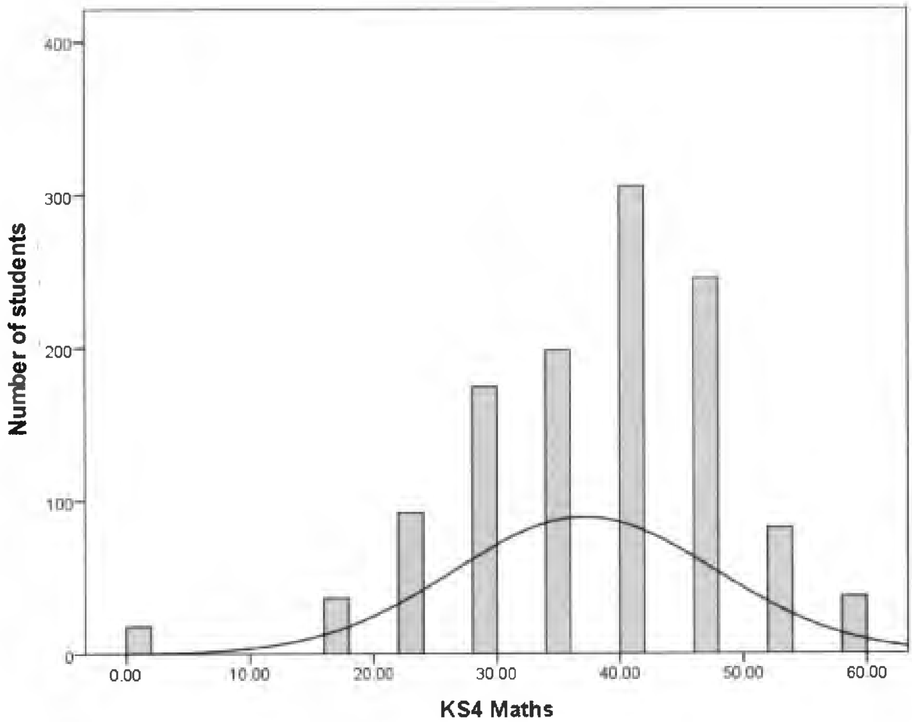



*Figure 4.3 KS4 science score: Histogram with normal curve*

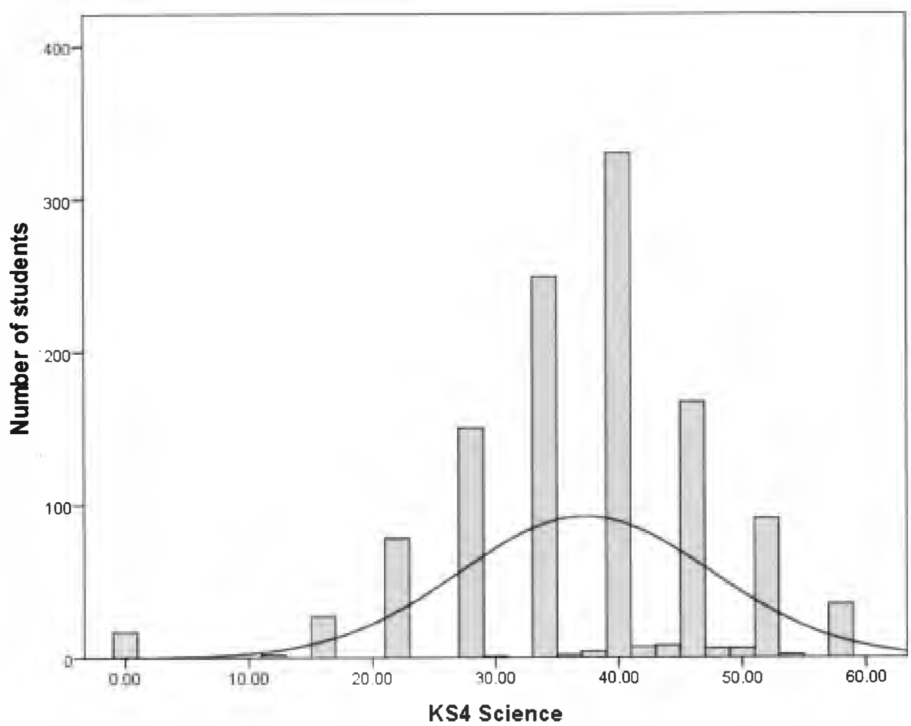


*Figure 4.4 Mean EMSKS4 score: Histogram with normal curve*

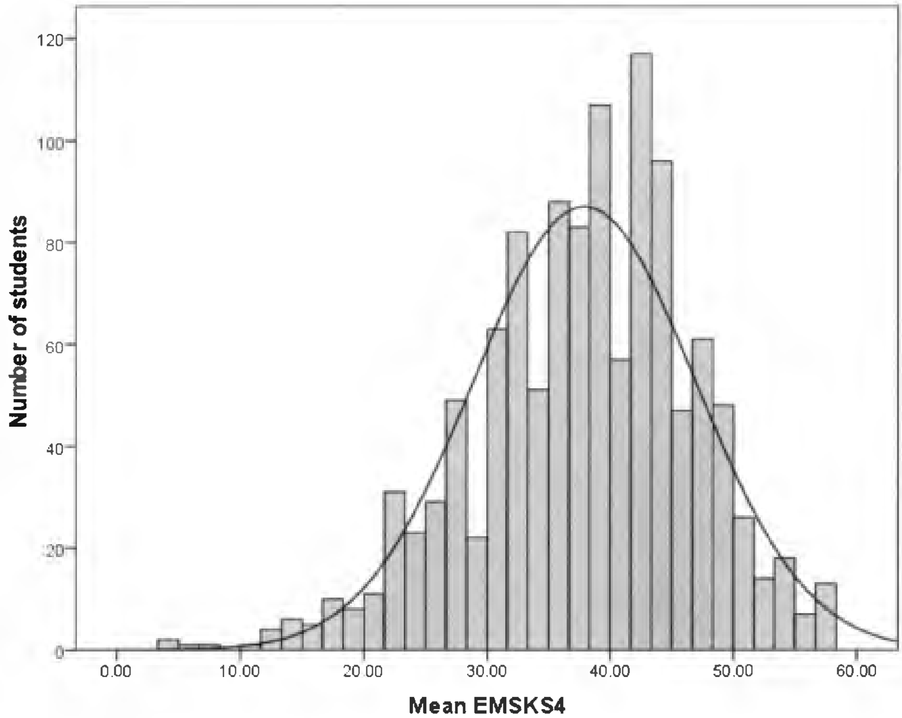



*Table 4.3 Descriptive statistics for KS4 (GCSE) achievement data (dependent variable)*

| | *N* | Min | Max | *M* | *SD* |
|---|---|---|---|---|---|
| English KS4 score | 1188 | 8 | 58 | 39.13 | 8.89 |
| Maths KS4 score | 1187 | 0 | 58 | 37.14 | 10.65 |
| Science KS4 score | 1182 | 0 | 58 | 37.29 | 10.23 |
| *M* EMSKS4 score | 1181 | 4.33 | 58 | 37.90 | 9.02 |

No students obtained 0 (grade U) in English. This was due to the introduction of the entry level qualifications aimed at students with SEN unable to access GCSEs (Department for Education and Skills, 2006a). After attempting several transformations which failed to improve the distribution of the data, it was decided to use the raw scores. With reference to calculating effect sizes, Coe (2004) notes that unstandardised raw estimates can be reported when the outcome measure is on a familiar scale. Although the 6 point grade scale 58, 52, 46 etc is less familiar than the previous A* = 8, A= 7 etc., this scale is measured in a similar way to the prior achievement measure and can be easily converted into familiar GCSE grade improvements.

#### 4.2.5.2 Key Stage 3 (KS4 prior achievement measure)

Achievement at KS1, KS2 and KS3 is measured on a NC level basis, these levels range from 1 to 8. At KS3 level, students can score from level 2 to level 8 (level 3 to 8 in English). KS3 tests are taken at the end of Y9, 2 years prior to the GCSE examinations. Due to the lack of differentiation in scores from levels 2 to 8, it was decided to calculate the DCSF fine grade point score (FGPS) as the prior achievement measure to increase the distribution of attainment. The FGPS is used in the calculation of value added measures used by the DCSF (Department for Education and Skills, 2005). FGPS converts the test scores taken in different tiers onto a similar 6 point scoring system as the one outlined above, with 6 points representing 1 KS level. Details on FGPS and the complex calculation are included in Appendix E; Table 4.4 displays the descriptive statistics. The mean English, maths and science KS3 score (mean EMSKS3) was calculated only for students who had scores for all three subjects.

*Table 4.4 Descriptive statistics for KS3 FGPS*

| | *N* | Min | Max | *M* | *SD* |
|---|---|---|---|---|---|
| English KS3 FGPS score | 1165 | 21 | 54 | 33.88 | 6.10 |
| Maths KS3 FGPS score | 1157 | 15 | 54 | 35.41 | 7.40 |
| Science KS3 FGPS score | 1159 | 15 | 54 | 34.12 | 6.13 |
| *M* EMSKS3 score | 1138 | 17.77 | 51.33 | 34.51 | 5.89 |

As expected, calculating correlation coefficients between the KS3 and KS4 scores revealed strong significant relationships for each respective subject (see Table 4.5). However, for KS4 English and science, prior mean EMSKS3 had a slightly stronger relationship than achievement at KS3 in English and science. It was therefore decided to use mean EMSKS3 score as the prior achievement variable for the English and science models and Maths KS3 performance as the prior achievement indicator for the maths models. For all models using mean EMSKS4 score as the dependent variable, mean EMSKS3 was used as the prior achievement indicator.

*Table 4.5 Correlation coefficients between KS3 and KS4 achievement measures*

| | KS3 Eng | KS3 Mat | KS3 Sci | KS3 *M* | KS4 Eng | KS4 Mat | KS4 Sci |
|---|---|---|---|---|---|---|---|
| KS3 Mat | .65* | - | | | | | |
| KS3 Sci | .66* | .83* | - | | | | |
| EMSKS3 *M* | .85* | .93* | .92* | - | | | |
| KS4 Eng | .77* | .68* | .69* | **.79*** | - | | |
| KS4 Mat | .63* | **.84*** | .74* | .82* | .71* | - | |
| KS4 Sci | .63* | .75* | .79* | **.80*** | .74* | .79* | - |
| EMSKS4 *M* | .74* | .83* | .81* | **.88*** | .88* | .92* | .93* |

* p>.001

To determine if the effect of PT upon achievement varied for students with different prior achievement scores, the EMSKS3 and KS3 maths scores were grouped to reflect high, average and low achievement (see section 5.1.3). Table 4.6 displays the numbers and mean scores for each group (calculated using the full sample of students).

*Table 4.6 Grouped KS3 prior achievement indicators (high, average and low) for mean EMSKS3 and KS3 maths scores*

| | *n* | Min | Max | *M* | *SD* |
|---|---|---|---|---|---|
| EMSKS3 grp1 high | 281 | 38.70 | 51.33 | 41.79 | 2.52 |
| EMSKS3 grp2 average | 572 | 30.51 | 38.69 | 34.82 | 2.34 |
| EMSKS3 grp3 low | 285 | 17.77 | 30.48 | 26.72 | 2.84 |
| KS3 maths grp1 high | 263 | 42 | 54 | 44.86 | 2.55 |
| KS3 maths grp2 average | 614 | 30 | 41.80 | 35.98 | 3.14 |
| KS3 maths grp3 low | 280 | 15 | 29.83 | 25.28 | 3.35 |

#### 4.2.5.3 Key Stage 2 (Y6 models)

Students score from level 2 to a maximum of level 5 in KS2 tests. However, as students can score up to level 3 (and in exceptional circumstances 4+) at KS1, KS2 only allows progression of 2 levels over a 4 year period. As a result, a high number of students achieved level 5 in these tests and there is substantial negative skew in the data for which no transformations could adequately substitute. Due to problems with skew and 'ceiling' effects, it was decided to use both the level and the total score achieved in the tests to create the FGPS calculated in a similar fashion to that used with the KS3 data (see Appendix E).

The descriptive statistics for these variables are shown in Table 4.7. The mean English maths and science (mean EMSKS2) score was calculated only for students who had results for all three subjects. The distributions of the KS2 English, mathematics, science and mean EMSKS3 scores are shown in Figures 4.5-4.8.

*Table 4.7 Descriptive statistics for KS2 FGPS*

| | *N* | Min | Max | *M* | *SD* |
|---|---|---|---|---|---|
| English KS2 FGPS | 1206 | 15 | 35 | 26.88 | 4.26 |
| Maths KS2 FGPS | 1207 | 15 | 35.73 | 27.30 | 5.05 |
| Science KS2 FGPS | 1207 | 15 | 35.10 | 28.63 | 4.05 |
| *M* EMSKS2 | 1203 | 15 | 35.07 | 27.61 | 4.11 |

*Figure 4.5 KS2 English score: Histogram with normal curve*

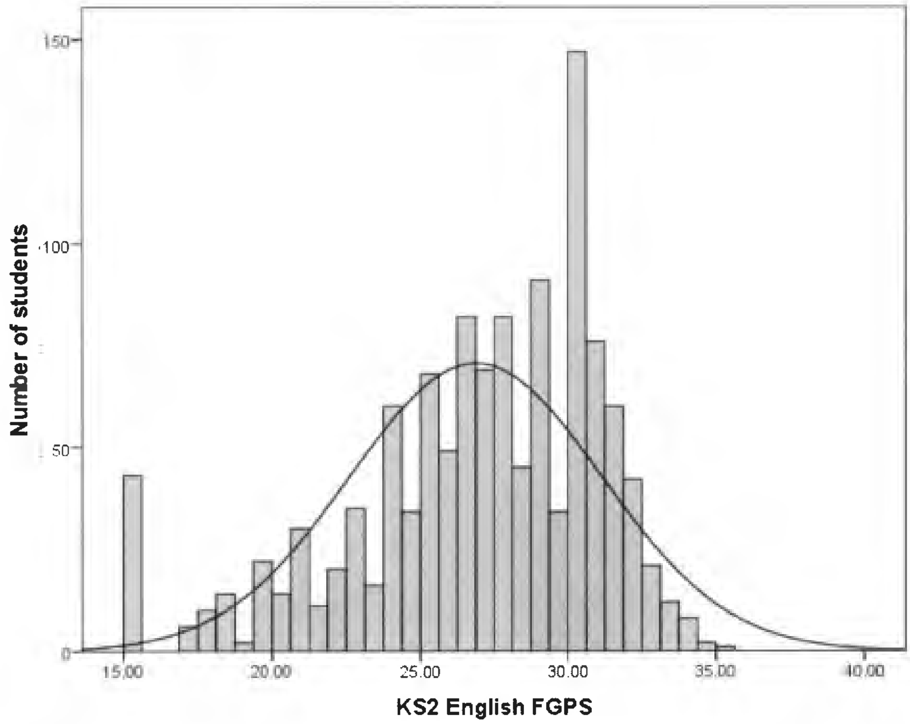



*Figure 4.6 KS2 maths score: Histogram with normal curve*

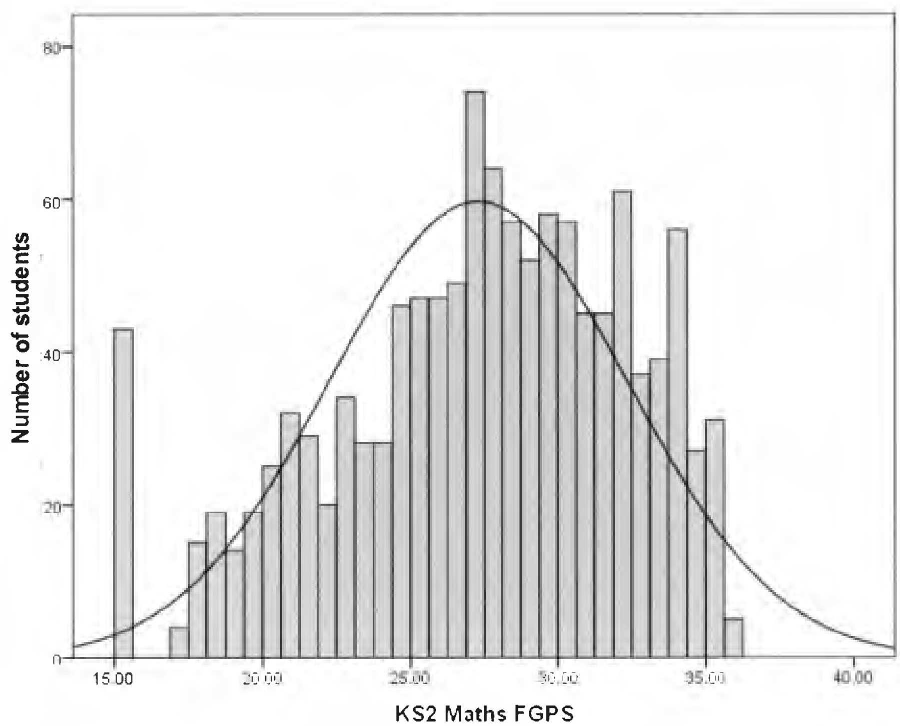


*Figure 4.7 KS2 science score: Histogram with normal curve*

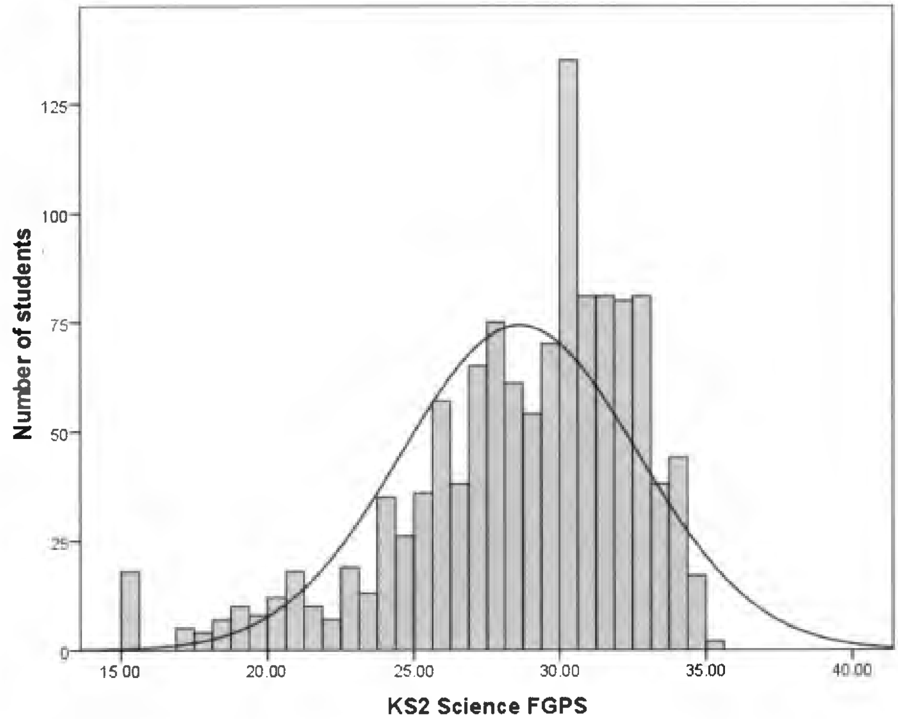
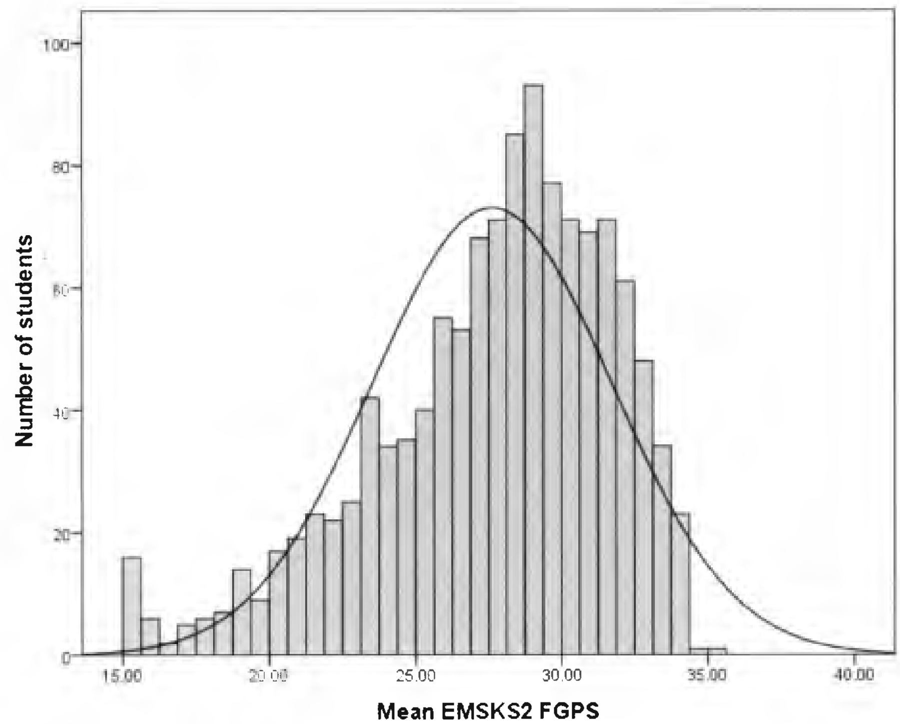



*Figure 4.8 Mean EMSKS2 score:  Histogram with normal curve*



These graphs reveal some deviation from normality. Just under 50 students achieved what the DCSF terms a compensatory level 2 (level 3 in English), which is awarded to all students who score below a certain level on the KS2 test or who were not eligible to take the test (see Appendix E). As a substitute, the raw examination score was considered; however this excluded over 30 students from the sample. This also caused further negative skew to the maths and science scores. Due to the mapping of the FGPS onto the prior achievement measure at KS1 (see section 4.2.5.2 and Appendix E), it was decided to utilise the KS2 FGPS paying particular attention to the residual plots.

#### *4.2.5.4 Key Stage 1 (KS2 prior achievement measure)*

For the Y6 sample, prior achievement was measured using KS1 scores. These tests are taken 4 years prior to the KS2 tests and are therefore not ideal prior achievement indicators. At KS1 students achieve between levels 1 and 3 (with students scoring 4+ in exceptional circumstances, *n*6 in this sample). The levels were awarded their equivalent point score (see Appendix F), including students classified as 'working towards level 1'. For a conversion table of the equivalent point score see Table F.1 in Appendix F, for discussion on how the 'readcomp' score was calculated also refer to Appendix F. As with KS2 and KS3, KS1 levels are measured on a 6 point scale.

The mean KS1 score was calculated using the levels achieved in KS1 readcomp, KS1 writing and KS1 maths results. This measure is called the KS1 average point score (KS1APS) used in government value added calculations (Department for Education and Skills, 2006c), KS1 science score, measured using a different scale was not included in the KS1APS (see Appendix F). The KS1APS score was calculated only for students who had three valid test scores. Table 4.8 displays the descriptive statistics for the KS1 data.

*Table 4.8 Descriptive statistics for KS1 achievement data*

| | *N* | Min | Max | *M* | *SD* |
|---|---|---|---|---|---|
| KS1 Readcomp | 1146 | 3 | 27 | 15.98 | 4.71 |
| KS1 Write | 1145 | 3 | 27 | 14.26 | 4.17 |
| KS1 Maths | 1145 | 3 | 27 | 16.31 | 3.89 |
| KS1 Science | 1150 | 3 | 21 | 16.02 | 3.91 |
| KS1APS | 1143 | 3 | 25 | 15.52 | 3.91 |

It was originally assumed that prior achievement for the KS2 models would be measured by achievement in the respective subjects taken at KS1. However the correlation coefficients showed that KS1APS had the strongest relationship with all three core subjects at KS2 (see Table 4.9). It was therefore decided that the KS1APS score would be used as the prior achievement measure for all Y6 models.

*Table 4.9 Correlation coefficients between KS1 and KS2 achievement measures*

| | KS1 Read comp | KS1 Write | KS1 Mat | KS1 Sci | KS1 *M* | KS2 Eng | KS2 Mat | KS2 Sci |
|---|---|---|---|---|---|---|---|---|
| KS1Write | .84* | - | | | | | | |
| KS1Maths | .74* | .71* | - | | | | | |
| KS1Sci | .73* | .71* | .70* | - | | | | |
| KS1*M* | .94* | .93* | .88* | .78* | - | | | |
| KS2Eng | .75* | .74* | .66* | .62* | **.78*** | - | | |
| KS2Mat | .68* | .67* | .75* | .62* | **.76*** | .76* | - | |
| KS2Sci | .63* | .62* | .66* | .58* | **.69*** | .76* | .83* | - |
| EMSKS2*M* | .75* | .73* | .75* | .66* | **.81*** | .90* | .94* | .93* |

*$p$>.01

The KS1APS was also divided up to determine if the effect of PT upon achievement varied for students with different prior achievement scores (see section 5.1.3). Table 4.10 displays the numbers and mean scores for each group (calculated using the full sample of students).

*Table 4.10 Grouped KS1APS prior achievement indicators (high, average and low) for mean KS1APS scores*

| | *N* | Min | Max | *M* | *SD* |
|---|---|---|---|---|---|
| KS1APS grp1 high | 279 | 19 | 25 | 20.09 | 0.92 |
| KS1APS grp2 average | 655 | 13 | 18.33 | 15.57 | 1.64 |
| KS1APS grp3 low | 209 | 3 | 12.33 | 9.32 | 2.76 |

### 4.2.6 Pupil background data

The Y6 sample included a relatively equal proportion of males (51%) and females (49%). The Y11 sample had several more males (54.9%) than females (45.1%). Information on ethnicity was utilised from the DCSF PLASC data. Where this was missing or not obtained, responses in the questionnaire were used. Information on ethnicity was compared to the national average in England for pupils age 15 and age 11 (Department for Education and Skills, 2004b). The Y11 sample closely matched the national average with 81.6% white students (compared to 83.6%

in the national average), there was however a slight overrepresentation of black students (6% compared to the national average 3.3%).

The Y6 sample however contained substantially lower numbers of white students compared to the national average (64.3% in the sample compared to 82.6%). The main difference was related to the number of black and Asian students included in the sample. The most marked difference was in the number of Asian students; 10.1% of the sample comprised Pakistani students compared to 2.9% of the national average in 2004 (Department for Education and Skills, 2004b).

For the purpose of this analysis ethnicity was divided into 4 categories: black, white, Asian (including Chinese) and mixed (including other ethnic group). Three dummy variables were added to the models for black, Asian and mixed, with white used as the baseline category (see Table 4.11). However, due to the high numbers of Pakistani students in the Y6 sample these students were removed from the Asian group and included as an additional indicator in the model.

Unless otherwise stated, the tables presented in the remainder of this chapter include the number of participants involved in the final models (missing data has been excluded using listwise deletion, see section 4.2.8 and Appendix F).

Data on first language provided by the DCSF, indicates the language to which the child was initially exposed during early development (Department for Education and Skills, 2006b). The disparities between the Y6 sample and the national average for ethnicity were also reflected in the data on first language. In Y6 25.6% of the sample had a language other than English as their first language compared to just 11% of pupils in primary schools across England. This is due to the inclusion of schools in urban areas with a high proportion of students from Asian backgrounds. From the initial analysis, first language other than English was found to be strongly correlated to Asian ethnicity. Of all the Asian students included in the analysis, 92% of those in Y11 and 95.7% in Y6 spoke English as a second language. Due to this strong relationship, and to prevent the problem of multicollinearity in the subsequent models, first language was not included. However, the variables measuring ethnicity were included in all models.

Age in months at the start of the academic year was also calculated from the DCSF data and included in the models, however in the provisional analysis age was not found to be a significant predictor of achievement and was not added to the final models.

*Table 4.11 Frequency and percentage of Y6 and Y11 student background characteristics†*

| | Y6 | | Y11 | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| **Gender** | | | | |
| Male (baseline group) | 474 | 50.4 | 554 | 53.2 |
| Female | 467 | 49.6 | 487 | 46.8 |
| **Ethnicity** | | | | |
| Black | 78 | 8.3 | 53 | 5.1 |
| Mixed (inc other) | 69 | 7.3 | 40 | 3.8 |
| Asian‡ | 71 | 7.5 | 83 | 8 |
| Pakistani | 87 | 9.2 | - | - |
| White (baseline group) | 636 | 67.6 | 865 | 83.1 |
| **SEN** | | | | |
| No SEN (baseline group) | 784 | 83.3 | 942 | 90.5 |
| SEN | 157 | 16.7 | 99 | 9.5 |
| **HPI** | | | | |
| Group 1 High | 297 | 31.6 | 220 | 21.1 |
| Group 2 (baseline Group) | 378 | 40.2 | 504 | 48.4 |
| Group 3 Low | 266 | 28.3 | 317 | 30.5 |
| **Total** | | | | |

† The table frequencies and percentages are based on the sample used in the final models; the data is included in this table unless it was missing data for each of the core subject models and mean score.
‡For Y6 this group did not include Pakistani students.

Data obtained from the DCSF on SEN was utilised in the models. SEN data is recorded on a 4 point scale: school action, school action plus and statutory assessment and statement of SEN (Department for Education and Skills, 2006b). Due to the low numbers of students with SEN statements, it was decided to create a dummy variable indicating any SEN provision compared to no SEN provision.

There were a number of possible variables that could have been utilised to control for socio-economic status (SES) of participants (see Appendix F). The variable chosen was calculated from a home possessions index (HPI) that was adapted from the PISA study (Organisation for Economic Co-operation and Development (OECD), 2000). As part of a range of questions students were asked if they had a room of their own, a quiet place to study, a computer to use for school work, a link to the internet etc. Answers to these questions were used to calculate three dummy variables indicating high, medium and low home possessions indicators (see Table 4.11). Although the HPI does not directly reflect SES it was chosen as the most appropriate indicator for this analysis. For a discussion on possible measures of SES and how they relate to the HPI see Appendix F, Appendix F also explains how the HPI was calculated. HPI group 2 was used as the baseline group.

The variables shown in Table 4.11 were included in all the models regardless of whether or not they remained significant after controlling for prior achievement and other factors. This decision was made with reference to previous research on modelling achievement and for consistency across the models.

#### *4.2.6.1 Parental involvement and parental education*

It was considered important to include a variable which measured parental support due to the positive relationship between parental involvement in education and subsequent achievement (see Desforges & Abouchaar, 2003). Several variables were considered from the questionnaires and outlined in Appendix F.

During data collection students provided their contact details and a questionnaire was sent to their parent(s)/carer(s) to complete and return in a freepost envelope. Although the data collected from this questionnaire has not been analysed as part of this thesis, a variable indicating if the questionnaire was returned has been included. Return of the questionnaire was found to be a significant predictor of achievement and it was hoped this dichotomous variable would indicate an element of parental involvement in education.

Research has shown there is a significant association between parental education and the decision to invest in PT (Davies, 2004; Ireson & Rushforth, 2011). The impact of parental education on student achievement has also been demonstrated (Sammons et al., 2008). It was therefore considered important to include a measure of parental education. However, in addition to the high percentage of missing data, a substantial number of both Y6 and Y11 students indicated 'don't know' in response to this question. As well over a quarter of the sample had missing or incomplete information on parental education this variable could not be objectively utilised in this analysis (see Appendix F for further details).

#### *4.2.6.2 Extracurricular activities and educational aspirations*

Y6 and Y11 questionnaires incorporated a section on participation in extracurricular activities. This included school clubs and extra classes, sporting and musical activities which took place outside of lesson time (see Appendix A and B). In view of the established link between participation in extracurricular activities and school achievement (Mahoney, Larson, & Eccles, 2005), these indicators were included in the initial analyses. The final models included only those variables found to be significant predictors of achievement.

The students were asked about classes in specific subjects and given an option of including additional details. Variables were created to indicate participation in extra English, maths and science classes by combining responses to questions 17 and 18 (see Appendix A and B). The variable indicating extra English classes also incorporated participation in 'library or book club' and 'creative writing, school newspaper or magazine' (for Y11). These variables were not found to be significant in the Y6 models, but additional English and science classes were used in the Y11 analysis. Extra language classes were also found to be significant predictors of attainment in a number of Y11 models (see Table 4.12).

In addition to measuring participation in extracurricular activities, a variable was included in the models to indicate time spent each week on homework. After an exploratory analysis the variables included in the Y11 model indicated participation for less than 1 hour, 1-5 hours and more than 5 hours. In the Y6 models one dummy variable was added indicating more than 5 hours homework per week, with less than 5 hours as the baseline category (see Table 4.12).

Work by Smyth (2008, 2009) highlighted the importance of controlling for educational aspirations when measuring the impact of PT. In the Y11 questionnaire students were asked to indicate their plans following the GCSE examinations (see Appendix B). Each of these options was found to significantly impact on achievement and was included in the analysis. As the resolve to continue education may be viewed as a function of prior and current attainment rather than a predictor of future performance the decision to include educational aspirations in the models could be criticised. The data was collected in the spring and summer term before the GCSE examinations were completed, it is therefore likely that these students already had a good idea of their plans post-GCSE which may have been influenced by mock examination scores. PT may have improved the perception of ability and hence influenced aspirations; this may have masked a proportion of the PT effect.

Due to the concerns of including education aspirations in the analysis, models were completed with and without this variable and compared. These model comparisons are presented in Appendix G. Despite the concerns surrounding the use of this variable, the analysis included in Appendix G shows that there are no substantial differences between the models. As the data on aspirations was measured prior to the outcome score and prior attainment has been controlled for in the models, reverse causality is not a serious issue in the models. Ireson and Hallam (2009) found that academic self-concept was a stronger predictor of intention to continue studying than GCSE attainment, when prior attainment was controlled for. The authors also found no significant relationship between GCSE achievement in English and intention to continue studying. It was therefore decided to include the variables measuring educational aspirations in the final models presented in the results chapters.

*Table 4.12 Frequency and percentage of Y6 and Y11 parental support, music, sport and homework activities*

| Year 6 | *n* | % |
|---|---|---|
| **Parental Involvement** | | |
| Parent did not return the questionnaire | 576 | 61.2 |
| Parent returned questionnaire | 365 | 38.8 |
| **Music** | | |
| No participation in music activities (baseline group) | 351 | 37.3 |
| Any participation in music activities | 590 | 62.7 |
| **Sport** | | |
| No participation in sporting activities (baseline group) | 60 | 6.4 |
| Any participation in sporting activities | 871 | 93.6 |
| **Homework** | | |
| <5 hours per week | 870 | 94.5 |
| >=5 hours per week | 51 | 5.5 |

| Year 11 | *n* | % |
|---|---|---|
| **Parental Involvement** | | |
| Parent did not return the questionnaire | 733 | 70.4 |
| Parent returned questionnaire | 308 | 29.6 |
| **Homework** | | |
| <1 hour per week (baseline group) | 164 | 15.8 |
| >1 - 5 hours per week | 682 | 65.5 |
| >=5 hours per week | 195 | 18.7 |
| **Extra Classes** | | |
| English classes | 312 | 30.6 |
| No extra English classes (baseline group) | 709 | 69.4 |
| Science classes | 178 | 17.4 |
| No extra science classes (baseline group) | 843 | 82.6 |
| Language classes | 165 | 16.2 |
| No extra language classes (baseline group) | 854 | 83.8 |
| Revision classes | 540 | 52.9 |
| No extra revision classes (baseline group) | 480 | 47.1 |
| **Future Plans** | | |
| Sixth form (baseline group) | 589 | 56.6 |
| College | 266 | 25.6 |
| Apprenticeship | 67 | 6.4 |
| Leave School | 28 | 2.7 |
| Not sure / Other | 91 | 8.7 |

### 4.2.7 Participation in PT

The students were asked if they had ever participated in PT, when this tutoring took place and in which subjects (see Appendix A and B). Y11 students answered questions on PT participation in English, maths, science, history and geography with the option of including two additional subjects. Y6 participants were asked about tutoring in reading and writing, maths, science and one other subject. For the purpose of this study, data on English, maths and science was the primary focus. The analysis involved looking at the impact of English PT (reading and writing for Y6) on English score, maths PT on maths score, and the impact of science PT on science score. Further analysis was also completed looking at the combined impact of tutoring in any subject. The variable measuring PT in any subject included English, maths, science and PT in other subjects added by the respondents (for example: 11 plus preparation, French etc). The impact of any subject tuition was modelled with each of the core subjects and mean EMSKS2 and EMSKS4 score for the respective samples.

Y6 students were asked to indicate which terms during years 5 and 6 they had participated in PT and if they had received tuition prior to year 5. Likewise students in Y11 were asked to indicate which terms during years 10 and 11 they had received tuition and if they had participated prior to year 10 (see Appendix A and B). Students were also questioned about the amount of time spent with their tutor each week.

Models were developed to measure the impact of any amount of PT in any subject and similar indicators were used to asses PT in English, maths and science (see Table 4.13). The duration of PT was then considered. Variables were produced to represent participation in PT for a single term or an extended period of 2 or more terms. PT duration indicators were produced for each of the core subjects and for PT in any subject. Two or more terms PT in any subject indicated an extended period of tuition within one specific subject. For example, if a student had 1 term of geography tuition and 1 term of English tuition they were considered as having 1 term of tuition in the any subject duration measure; 2 terms tuition in French was considered as 2 terms tuition in any subject.

Determining correct measures of PT to use in the analysis proved challenging. Despite piloting the questions before the final data collection, there were a number of students who ticked 'yes' to having PT, but did not indicate the subject or duration. These responses had to be excluded from the models exploring PT duration within specific subjects. Similarly, a number of students indicated the subject for which they had been tutored but not the duration. Other participants stated how long they spent with a tutor per week, but did not complete the question regarding when this tuition had taken place (see q11 and q15 Appendix A and B).

*Table 4.13 Frequency and percentage of Y6 and Y11 participation in PT*

| | Year 6 | | Year 11 | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| PT in any subject | | | | |
| Any participation in PT | 223 | 24.4 | 248 | 24.9 |
| †PT in any subject for 1 term | 139 | 15.5 | 65 | 6.6 |
| †PT in any subject for 2 or more terms | 67 | 7.5 | 95 | 9.6 |
| PT in any subject during yrs 5 & 6/yrs 10 & 11 | 168 | 18.7 | 160 | 16.2 |
| PT in any subject before: year 5/year 10 | 77 | 8.6 | 114 | 11.6 |
| PT in any subject only before: year 5/yr 10 | 38 | 4.2 | 77 | 7.8 |
| **PT in English** | | | | |
| Any PT in English | 159 | 17.1 | 93 | 9.4 |
| †PT in English for 1 term | 102 | 11.2 | 18 | 1.8 |
| †PT in English for 2 or more terms | 42 | 4.6 | 27 | 2.7 |
| PT in English during yrs 5 & 6/yrs 10 & 11 | 103 | 11.3 | 45 | 4.6 |
| PT in English before: year 5/year 10 | 54 | 5.9 | 55 | 5.6 |
| PT in English only before: year 5/year 10 | 41 | 4.5 | 46 | 4.7 |
| **PT in Maths** | | | | |
| Any PT in Maths | 167 | 18.1 | 185 | 18.5 |
| †PT in maths for 1 term | 111 | 12.3 | 53 | 5.3 |
| †PT in maths for 2 or more terms | 46 | 5.1 | 73 | 7.3 |
| PT in maths during yrs 5 & 6/yrs 10 & 11 | 115 | 12.7 | 126 | 12.7 |
| PT in maths before: year 5/year 10 | 64 | 7.1 | 80 | 8 |
| PT in maths only before: year 5/year 10 | 42 | 4.6 | 59 | 5.9 |
| **PT in Science** | | | | |
| Any PT in Science | 69 | 7.6 | 60 | 6.1 |
| †PT in Science for 1 term | 46 | 5.1 | 15 | 1.5 |
| †PT in Science for 2 or more terms | 14 | 1.6 | 28 | 2.9 |
| PT in science during yrs 5 & 6/yrs 10 & 11 | 39 | 4.4 | 43 | 4.4 |
| PT in science before: year 5/year 10 | 26 | 2.9 | 23 | 2.3 |
| PT in science only before: year 5/year 10 | 21 | 2.4 | 16 | 1.6 |
| **Examination PT** | | | | |
| PT in preparation for an entry examination | 156 | 16.6 | - | - |
| Any PT in English inc verbal reasoning | 187 | 20.1 | - | - |
| Any PT in Maths inc non-verbal reasoning | 192 | 20.6 | - | - |

† For Y11 1 term or 2 or more terms includes PT during years 10 and 11 only

It is important to note that all of the students who indicated they had been tutored but failed to include the subject or duration did not complete the questionnaire correctly. This may signify additional learning needs or problems with English language. There were no significant differences in mean score between Y6 students receiving PT who correctly answered the PT question and those who did not. However, in the Y11 sample the mean EMSKS4 score was significantly lower for students who failed to fully complete this section ($M$=32.9, $SE$=8.48 compared to $M$=40.11, SE=9.01; $t(276)$ =-3.34, $p$>.01).

The analysis of the Y11 students focussed on the impact of PT on GCSE grade, controlling for prior achievement at KS3. The duration analysis using the variables indicating 1 and 2 or more terms tuition aimed to determine the impact of PT during KS4 on the outcome score (GCSE grade). A variable indicating PT before year 10 was included to control for the impact of earlier PT participation.

For the Y6 analysis, KS1 tests taken at the end of Y2 were used as the prior achievement score. The focus of this analysis was to determine the impact of PT on KS2 results controlling for prior achievement. The PT duration variables for Y6 were calculated to include students who had PT before year 5. PT prior to year 5 was counted as 1 term, and added to the other terms indicated. For example, if a student had PT in maths before year 5 and 1 term during year 6, they would be included in the PT for 2 or more terms variable. For the Y6 analysis, models were also developed to include students who had participated in PT during years 5 and 6, with a control for PT before year 5.

Due to the inclusion of schools in selective areas of England (see section 4.2.1) and the number of students who stated they had received 11-plus, verbal and non-verbal reasoning tuition[18], three additional PT variables were included in the Y6 analysis. Students were asked to include their reasons for participating in PT, 66.7% of the Y6 sample who indicated they had PT, ticked the option 'to help me pass an entry exam into secondary school'. As a result of this finding it was considered important to measure the impact of 11-plus preparation on KS2 achievement. The PTexam variable was created by including any student who indicated they had received PT as preparation for an entry examination and for any student who included 11-plus, verbal and/or non-verbal reasoning as an additional subject. The PTverbal variable combined all students who noted they had English tuition with those receiving verbal reasoning tuition. Similarly, PTnon-verbal was produced by amalgamating all students who had maths and non-verbal tuition.

### 4.2.8 RQ1 Methodological issues

The first question regarding PT required the students to answer 'yes', 'no' or 'don't know' if they had ever participated in PT. A small proportion of students answered 'don't know' ($n$22

[18] These subjects are commonly associated with the 11-plus entrance examination

Y6 students and *n*16 Y11 students); however, a substantially larger number of participants failed to answer this question or were excluded due to contradictory or inappropriate answers (*n*74 and *n*53 in Y6 and Y11).

After a provisional analysis of the data it became clear there were several problems with the consistency of responses to the PT questions, particularly in the Y6 sample. Some students stated they had PT but then included contradictory responses to the additional questions on the topic. For example, some students had stated they had participated in PT but did not state in which subject or when; other students stated they had never participated in PT but then ticked they had received PT in the past. Every questionnaire was re-checked to ensure the data inputted reflected the PT responses. When it was impossible to interpret the meaning of the responses, the answers were excluded. In the Y6 sample, a total of 96 students were not included in the PT question due to missing data, ambiguous responses or answering 'don't know' (*n*22). There were significantly higher levels of SEN amongst these students (40.9% had SEN compared to just 17.2% in the remainder of the sample ($\chi^2(1) = 29.8$, $p < .01$ with the Phi Value .16). There were marginally higher numbers of students with first language other than English (first language: $\chi^2(1) = 3.6$, $p < .05$ with the Phi Value .06).

In the Y11 sample, 69 responses were excluded due to missing PT data, ambiguous or 'don't know' answers. These students also had a significantly higher proportion of SEN ($\chi^2(1) = 12.09$, $p < .01$ with the Phi Value .1) and first language other than English ($\chi^2(1) = 6.6$, $p < .05$ with the Phi Value .08). In the Y6 and Y11 samples SEN was also significantly linked to gender (male students), black ethnicity, reduced participation in music activities (in the Y6 sample) non-return of parent questionnaire and negatively related to mixed ethnicity. As higher levels of SEN students were excluded through non-completion or ambiguous responses, this impacts significantly on the other variables related to SEN.

Due to the number of SEN participants that were excluded from the analysis, it is not possible to generalise these findings to apply to other SEN students. This is also true for students with first language other than English, although to a lesser extent. To fully explore the relationship between tutoring and SEN, participants need to be specifically recruited and an effective measuring tool created to ensure SEN students and those with difficulties in understanding English, can participate fully in the research. Despite efforts made to clearly define PT, there remains the possibility that the SEN students included in the analysis may have confused the help they received within school with participation in PT. There were several students who indicated they had received English, maths and science tuition throughout years 5 and 6 and before year 5. These students may have received PT in all these subjects for an extended period; however it is also possible that these students misunderstood the question and referred to subjects taught or supported in school. As the questionnaires had been completed correctly, there was no reason to exclude them from the analysis, but these responses may have biased the results.

The large proportion of ambiguous responses to the PT question raised concerns about the validity of the data collected. It was decided to verify the remaining cases by contrasting the student answers to the parent questionnaire responses (see section 4.2.6.1). Parents were questioned about their child's participation in PT during years 5 and 6 (for the Y6 sample) and years 10 and 11 for the Y11 sample. A total of 36.7% of the Y6 sample and 28.8% of the Y11 sample had corresponding parent questionnaires. Appendix H outlines the results from this comparison, the findings are summarised below.

One of the largest discrepancies existed between parents who indicated their child had not been involved in PT during years 10 and 11 (or years 5 and 6) whereas the students themselves stated they had participated in PT during this period (*n*19 Y6 and *n*15 Y11). Due to these discrepancies a variable was created to reflect the parental response to PT. A 'like for like' analysis was completed comparing the student responses for PT during years 5 and 6 (or years 10 and 11) with the parent response to this question. Models were run using the mean EMSKS4 and EMSKS2 scores and are reported in Appendix H. These show that incorporating the parent responses slightly reduced the PT estimates.

The discrepancies between the parent and student questionnaires highlight the problems with measuring and defining PT. During fieldwork, effort was made to explain the term PT to the students; however this same discussion did not take place with the parents. It appears that tuition for the 11 plus was considered by some parents to be PT but not for others. In fact many of the discrepancies between the Y6 student and parent responses arose from either the parent or student mentioning 11 plus tuition and the other stating they did not participate in PT. Also, a small number of students answered no to participating in PT but mentioned 11 plus tuition in the section of the questionnaire asking about extra classes outside of school.

Kumon[19] also caused a problem for both parents and students. Although students who participate in Kumon receive an individualised learning programme, students are not taught by a tutor, for this reason Kumon was not considered to be PT for this study. In the questionnaire some students mentioned Kumon in the extra classes section and did not indicate they were receiving PT; however some parents included Kumon as PT in the parent questionnaire. It is possible a number of students who indicated they had received PT were actually attending Kumon centres.

Section 4.2.7 explained how the PTexam variable was calculated for the Y6 sample. Although a proportion of Y6 schools were included from selective areas, a surprisingly large proportion of pupils indicated they had PT 'to help [me] pass an entry exam into secondary school'. At least 1 pupil from every school (excluding 1 school where no participation in PT was indicated) ticked this reason for PT participation. It is possible this question may have been misunderstood or misread by participants who were receiving PT to help them prepare for their KS2 tests rather than an entry exam.

In addition to the missing data from the PT question, a number of other variables included in the analysis from the questionnaire also had missing data. This was particularly problematic for the HPI variable discussed in Appendix F. The missing data for the other variables included in the questionnaire followed a similar pattern to the missing data to the PT question. Higher numbers of students with SEN provided incomplete responses. To make use of the available data (which would otherwise be excluded through listwise deletion), it was decided to use dummy variable adjustment to determine if the missing data was biasing the results. This technique involves 'plugging in' a value for missing data and then including a dummy variable coded as one if the data in the original variable was missing and zero otherwise (J. Cohen & Cohen, 1975). Using this technique capitalises on the information available on the variable of interest, despite missing data in other control variables (J. Cohen & Cohen, 1975). Dummy variable adjustment once advocated by Cohen and Cohen (1975), has since been criticised for producing biased estimates (Allison, 2001; Jones, 1996), or for simply redefining the parameter or the population (Schafer & Graham, 2002). Clearly using such a technique is not ideal, but neither is the loss of a proportion of the sample.

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[19] Kumon is a type of tuition programme which originated in Japan. Each child receives an individualised learning programme and typically attends a study centre twice per week to interact with an instructor. Students also complete daily timed learning tasks on their own (see Kumon Education UK, 2009).

It should be noted that due to the concerns surrounding this technique, the dummy variable adjustment method was not used for missing PT information to ensure there was a clear comparison of treatment and control groups. The models were run using dummy variable adjustment and repeated, excluding missing cases listwise. Although these two methods produced small differences in the estimates, the patterns of the findings remained the same. Dummy variable adjustment was not used in the final models due to the methodological concerns with using this technique (Allison, 2001; Jones, 1996; Schafer & Graham, 2002).

This section began with a detailed description of the data collection process used to obtain data on PT participation from Y6 and Y11 pupils. Fieldwork completed during the MESE project obtained data from Y6 and 11 students from 30 primary schools and 28 secondary schools in England. This data was matched with achievement and PLASC data received from the DCSF. A rationale for employing robust regression was outlined followed by a comprehensive description of each of the variables used in the analysis. Chapter 5 reports the findings from the Y6 analysis exploring the impact of PT on attainment at KS2. Chapter 6 presents the results from the Y11 data to show the impact of PT on achievement at GCSE level.

## 4.3 Addressing RQs 2 and 3

### 4.3.1 Research aims

There is a need to focus on the quality of PT by exploring perceptions of effective pedagogical strategies across different subjects and levels. Chapter 2 showed that findings in the literature on the impact of PT are inconsistent; the results from RQ1 presented in chapters 5 and 6 are also mixed.

The previous chapter identified a number of areas in the literature that have been found to account for student learning. Much of this research has been focussed on specific subject areas, with specific age groups, and has often involved students requiring remedial support. The current study aims to obtain information on pedagogic strategies believed to be important in achieving learning gains that are common across different subjects and levels. Views of both tutors and students provide information on effective tutoring practice and how effectiveness is evaluated. By looking for both commonalities and differences in responses, it is hoped that a 'family resemblance' of effective pedagogical strategies can be established across a diversity of subjects and levels.

The second section of this chapter will discuss the research methods used to address RQs 2 and 3:

> RQ2 what pedagogic techniques do tutors believe to be important for achieving learning gains?
>
> RQ3 what do pupils and tutors consider to be effective tuition and how is this evaluated?

### 4.3.2 Research design

For RQs 2 and 3 it was decided to collect primarily qualitative data to ascertain the perceptions of effectiveness from tutors and students building on from the quantitative data analysed for RQ1. Questionnaires were utilised as the primary method of data collection to obtain views of tutoring effectiveness from both tutors and students. The sample included students and tutors from a wide age range, studying various subjects at different levels. To inform the development of the questionnaire, focus groups with experienced tutors were employed.

Ideally this study would have involved the same participants who were used to address RQ1. Dyads which had achieved substantial learning gains (based on value added examination results) would be investigated to determine what pedagogic techniques were utilised and considered particularly effective from the point of view of the tutor and tutee. Unfortunately this linked mixed-methods approach (see R. B. Johnson & Onwuegbuzie, 2004) proved to be impossible for a number of reasons. Every effort was made to obtain contact details for a sufficient number of tutors; however due to the period of time that had elapsed between collecting the original data and re-contacting the parents, this proved impossible. It was therefore decided to obtain a new sample of tutors and students, focussing on perspectives of effective tutoring practice without triangulating these findings with levels of achievement. The triangulation of tutor and student perceptions of effective pedagogy with data on achievement is an area for future research.

The remainder of this chapter will discuss the development of the questionnaire used to address the RQs outlined above.

### 4.3.3 Focus groups

Focus groups are often used by researchers as a pilot study where results are used to inform later research methods (1990). In this study it was decided to hold focus groups with experienced tutors to conceptualise effective tutoring and to determine how best to measure perceptions of quality and effectiveness.

Hess (1968), noted a number of strengths that arise through the use of group interviews rather than individual interview methodology, all of which were considered as beneficial for gathering data from the tutors; these include synergism, snowballing, stimulation, security and spontaneity (see Hess, 1968, p. 194).

Morgan and Krueger (1993) argue that the composition of a focus group will determine whether participants feel at ease and be able to voice their views. The ideal size of a focus group has been contested, but the majority suggest a group size of between 6-10 participants (see Krueger, 1994). Rather than ask direct questions it has been argued that to stimulate discussion and participation in a group setting focussing exercises should be utilised (Bloor, Frankland, Thomas, & Robson, 2001). Bloor et al. (2001) argue that there are 4 broad types of focussing exercises: vignettes, ranking exercises, news bulletins and photo interpretations. It was decided for the purpose of this investigation that tutors could undertake a ranking exercise to aid, stimulate and guide conversation.

#### *4.3.3.1 Pilot*

In preparation for the first focus group, a pilot took place at the IOE involving doctoral students and staff with experience in one-to-one tuition or small group teaching. The group consisted of 4 participants in addition to the moderator. Although this was designed not to be a question and answer session, to aid and direct discussion a number of questions were posed. The aim of this group was to pilot the discussion questions and activities to be used in the first main focus group.

The group was planned to focus on the three research areas outlined in the RQs above: effective tutoring techniques, perspectives on effectiveness and how tutors and students evaluate effective tutoring. Three short activities were planned and piloted. The first involved a number of statements listing different tutoring techniques taken from the research literature. Tutors were asked to choose the most important and give examples from their own experience. The second exercise involved independently noting down five aspects of effective tutoring which then became the basis for a discussion. To obtain an indication of how tutors evaluate effective tutoring, the final exercise involved tutors collaboratively ranking statements on positive outcomes of tutoring in order of importance (see Appendix J for these activities).

This group provided very interesting data in its own right, as well as highlighting areas that required improvement. For example, one of the participants suggested that as well as providing a set of cards for the activity, the statements should also be put on a large screen so all the group members could participate no matter where they were sitting and which way the cards were facing.

#### *4.3.3.2 Sample and structure*

A large UK PT agency became aware of this research project and agreed to assist in the fieldwork. This agency selected their most experienced tutors and paid for their time to attend the discussions to assist in developing the questionnaire. Experienced tutors were selected for the focus groups to ensure they had a wide range of experience to draw upon for the focus group discussion. The purpose of the first focus group was to discuss the effectiveness of PT and different pedagogic techniques, it was therefore essential to use experienced tutors who had worked with large variety of students. The first group consisted of 7 tutors and took place at the end of March 2006. This group followed the outline of the pilot with the proposed changes. The discussion questions are contained in Appendix K. The focus group transcript was coded using NVivo software (QSR, 2006), which provided opportunity to code, attach and recall specific parts of the text (see Coffey, Holbrook, & Atkinson, 1999). The codes and a diagrammatic presentation of the themes that arose are shown in Appendix L Figure L.1. These themes and other findings from the focus group have been discussed in section 4.3.4 with reference to the development of the questionnaire.

### 4.3.4 Questionnaire development

It was decided that the most appropriate method for collecting data from as many participants as possible would be through the use of questionnaires. Using interviews would have restricted the number of respondents feasibly possible to include in the study. One of the aims of the study was to ascertain whether there were commonalities in perceptions of effective tutoring characteristics, so restricting the number of participants would mean data would not be gathered from a wide range of tutors teaching different subjects.

Questionnaires would also facilitate collection of accurate consistent background data on subjects and levels taught. Although emphasis was placed on collecting qualitative data, it was considered that the use of open-ended questions in conjunction with closed questions (for background information), was the most time and cost effective method for collecting data from significant numbers of tutors and students.

An open-ended approach was adopted in an attempt not to influence the responses. It was important to ensure, as advised by Spradley (1979) (in reference to an interview situation) "before you impose your theories on the people you study, find out how these people define the world" (p. 11). Brown and McIntyre (1993) attempted to measure the perceptions of good teaching from the perspective of students and teachers. They piloted interviews with students but found the most sensible data collected was in the written form. In the interview situation they found a number of pupils reacted quickly saying they had nothing to say, whereas when they were asked to provide written responses they had more time to respond and think about their answers. Brown and McIntyre (1993) decided that using questionnaires requesting open ended responses was the most beneficial tool to collect maximum data and have minimal influence on the student answers.

The preliminary questions were composed based on the data collected from the focus groups, a review of the literature and previous research on the topic involving parents and students (Ireson & Rushforth, 2005).

#### *4.3.4.1 Questionnaire pilot - tutors*

Campenelli (2008) argues that consulting experts and using focus groups are an ideal forum for testing survey questions. A further focus group discussion with four[20] tutors took place in London at the IOE. These tutors had been selected for their expertise and experience by the same tutoring agency and were compensated for their time. Despite the limited numbers, the group discussion flowed and was extremely beneficial in the development of the questionnaire. Prior to this discussion the tutors were sent the first draft of the questionnaire and were directed to specific areas that would be considered during the session (see Appendix M for a copy of this letter and other communications to participants). Although this could have been done on an individual interview basis, the benefit of giving feedback in a group situation was to determine if the suggested changes from the participants were shared opinions or specific to the individual tutor. One participant in particular had come to the group with substantial notes on the questionnaire, although this could have potentially

[20] Unfortunately two additional participants, who were scheduled to attend, cancelled on the day of the focus group due to unforeseen circumstances

dominated the discussion (see Stewart & Shamdasani, 1990), it prompted responses from the other participants and improvements were made following a general consensus between the tutors.

Following the changes a further 7 tutors completed the questionnaire and made further suggestions for improvements; it was finalised in December 2006. The questions included on the tutor questionnaire outlined below, formed part of a longer version. The questions that are the focus of this study have been included in Appendix N.

Rather than asking tutors to report on particular techniques specified in the literature, it was decided to ask questions that would lead tutors to reflect on their own effectiveness and the techniques they perceived as successful for achieving learning gains. Key aspects of teaching and learning were chosen to glean information that could be compared and contrasted with findings on effective pedagogical techniques found in the literature. With this in mind, the participants were asked two broad questions which would allow them to reflect on what they considered to be effective pedagogy rather than asking about specific methods which might bias the response. Firstly, tutors were asked to reflect on effective strategies for helping students gain and recall new information. They were then asked to explain their most effective strategy for helping students to think for themselves. As noted in section 3.3.6 the one-to-one learning environment provides more opportunity than the classroom for active student learning and self-regulation (Graesser et al., 1997). However the literature has found little evidence to suggest that self-regulated learning is an element of the tutoring session (Graesser et al., 1995; Mischo & Haag, 2002). This question was included to determine what tutors perceive as effective strategies to promote self-regulated learning and to determine if these strategies vary by different subjects and levels taught.

Tutors were also asked how they ascertain a student's level of understanding. As explained in section 3.3.4, ascertaining a student's level of understanding is closely linked to effective task management. The literature includes a number of studies that have demonstrated how tutors often lack the skills required to effectively determine levels of understanding (Chi et al., 2004; Graesser & Person, 1994; Graesser et al., 1995; McArthur et al., 1990; Putnam, 1987). In Lepper's (Lepper et al., 1997) INSPIRE model students had been given a pre-test which meant that elements of this process may have been missing from the research findings. In the current study, tutors were provided with a list of five tutoring actions and asked to record how often they used them; they were also asked to enter details of any other techniques employed. The list of actions were gleaned from the literature and through discussion with tutors in the focus groups during the piloting phase; the list included: asking questions and discussing with the student, looking at work previously completed, using a test, setting homework and working through a problem (see Appendix N question 4.2 and 4.3). The aim of these questions was to determine if the methods used in ascertaining understanding were common across different subjects and levels.

As outlined in section 2.4, student motivation plays an important role in learning and low self efficacy can make employment of appropriate learning strategies less likely (Bandura, 1997; Klauer & Lauth, 1997; Pintrich, 1999, 2000). There is limited research on the role of self-efficacy in the one-to-one learning situation (see section 3.3.7). The MESE project revealed that for parents the second most important outcome of PT was increased self-confidence (Ireson & Rushforth, 2011). In the focus group discussions this was a topic that surfaced regularly in relation to different pedagogic techniques and the importance of the student-tutor relationship. It was decided to include a question to elicit tutors' strategies for raising student self-efficacy but to use the term confidence in the stem of the question, instead of 'self-efficacy', to ensure the participants fully understood the question. Bandura (1997) argues "confidence is a non-descript term that refers to strength of belief but does not necessarily specify what the certainty is about"(p. 382); however in the context of the question it was considered an appropriate expression to measure how tutors build students self-belief in their ability. Tutors were asked: 'what do you consider as an effective strategy for increasing a student's confidence in the subject(s) you tutor?'

To evaluate and conceptualise effective tutoring, respondents were given the opportunity to reflect on their own performance, they were asked to explain their answer to the question 'do you feel you are an effective tutor?' This was designed to obtain data on effectiveness from the perspective of tutors to contrast with findings from the literature. It provided an opportunity both to conceptualise what constitutes effective tutoring and for tutors to explain their own effectiveness. In addition to helping tutors conceptualise effectiveness, tutors were asked to describe a successful and an unsuccessful tutoring session (see Appendix N questions 5.1 and 5.5). Responses to these questions also provided information on how tutors evaluated their performance, although this was more focussed on a session by session basis. In the focus group discussions a number of tutors expressed the importance of certain aspects of tutoring by describing sessions that had gone particularly well, or others that could have been improved. The tutors found it easier to conceptualise effective pedagogical strategies by describing real examples. For this reason it was considered important to ask tutors to describe particular successful and less successful sessions.

Question 5.2 (see Appendix N) was included to determine the importance placed on specific evaluation measures. Tutors were given a list of evaluation indicators, derived from the focus group discussions and piloting stages of the research. They were then asked to choose three and rank them in order of importance. The evaluation indicators included:

- when faced with a difficulty the students is less likely to give up,
- feedback from student,
- feedback from parent,
- the student is more willing to tackle new work,
- being recommended to teach another student,
- examination results achieved,
- grade increase from predicted to actual examination results, and
- an opportunity to include any other evaluation measures.

Tutors were asked to answer questions regarding a specific student they had tutored (Student 1). The participants were asked to consider if they felt their efforts as a tutor had made an impact on Student 1's achievement. This question was included in an attempt to compare the results from RQ1 with the perceived gains from PT from the tutors' perspective.

An exercise used in the focus groups that had involved listing skills, qualities or attributes of effective tutoring, worked particularly well at helping tutors to conceptualise effectiveness. This was included at the close of the questionnaire after the respondent had been given the opportunity to reflect on different aspects of tutoring. The aim of this question was to prompt tutors to reflect on previous responses and select key aspects from the answers they had provided; tutors were requested to limit their answers to three, skills, qualities or attributes.

#### *4.3.4.2 Questionnaire pilot - students*

It was decided that the student questionnaire needed to be similar to the tutor questionnaire to allow comparability in responses. A draft was composed and a pilot took place at a local school in London. Students were asked if they would like to participate in some research and help improve the design of a questionnaire. The students completed the pilot online in the school computer lab. If they did not have a tutor the students were asked to create a fictional tutor and answer questions accordingly. This was done in an attempt to prevent students from feeling uncomfortable in front of their peers and their teacher by differentiating for students who did or did not receive PT. At the end of the pilot questionnaire the students were asked to comment on the questions, the content, and if the questionnaire was the right length. Over half the respondents indicated that they felt the questionnaire was too long and a smaller number provided comments on the content. Based on these findings appropriate changes were made.

To determine effective tutoring techniques from the perspective of the student, the respondents were asked about one specific tutor (Tutor 1) and requested to reflect on the different actions used by Tutor 1 during the sessions. The students were provided with a list of strategies, techniques and actions that were composed from consulting tutors and through findings in the literature. The list included: checking work, providing resources, working through past examination papers, explaining work not understood at school and providing memorising strategies (see Appendix P, question 2.8 and 2.9). Students were then asked to consider which actions from the list provided, and any others they could think of, helped them the most. This question aimed to assist students to consider what happens during the tutoring session to enable them to distinguish which methods or actions were the most effective.

As with the tutor questionnaire, students were asked to provide their predicted grades before tutoring began and asked if their performance had improved as a result of receiving PT (see Appendix P questions 2.10 and 2.11). Students were requested to express their views on Tutor 1; they were asked: 'in your opinion is this tutor a good tutor? Why or why not?' Other questions used to help students conceptualise and evaluate effective PT included asking participants to reflect on the 'best thing' about PT and to consider any disadvantages. Respondents were also asked if they had encountered any bad or unpleasant experiences of tutoring. The same question on evaluation indicators used in the tutor questionnaire was adapted and included in the student version (see Appendix P question 3.4). Students were also asked to list three skills, qualities or attributes of effective tutors. The questions outlined here formed part of a larger questionnaire; the areas of interest in the current study have been included in Appendix P.

### 4.3.5 Tutor sample

Previous research shows that the PT market is complex (Ireson & Rushforth, 2005), containing both visible and invisible features (Tanner et al., 2009). The visible components of the market range from large international tutoring agencies to individual tutors who advertise their services online, in local newspapers, supermarkets and libraries. The invisible aspects refer to tutors who have no need to advertise their services and who obtain sufficient business through word-of-mouth recommendations (Tanner et al., 2009). Due to these complexities, it is not possible to achieve a representative sample of private tutors in England.

Snowballing was initially used to recruit tutors for the research. Snowball sampling is used when gaining access is difficult or when networks are underdeveloped (L. Cohen, Manion, & Morrison, 2000). Using this type of sampling strategy limits the external validity and generalisability of the findings; however as the population was unknown it was decided to use multiple recruitment strategies to establish an adequate sample size. All the staff at the Institute of Education were emailed and asked to provide contact details of any private tutors they knew. Recruiting participants using this method yielded few results, so a thorough internet search was completed to obtain contact information for tutors advertising online.

#### *4.3.5.1 Response rate*

Despite Manfreda and Vehovar's (2008) claim that web surveys have the greatest noncoverage problem, due to the substantial number of tutors using online advertising, an online survey was considered an appropriate method for reaching potential respondents. However when the response rate remained low, a hard copy of the questionnaire was produced.

It is very difficult to calculate an accurate percentage response rate due to the nature of data collection. In total 483 emails, which included a link to the online questionnaire, were sent out to individual tutors found advertising on the internet or through snowballing. From these emails 85 tutors completed the questionnaire. A further 37 contacts were made with tutoring agencies requesting that a link to the questionnaire be sent to their registered tutors. Only a small number of agencies agreed to participate and two included a link from their website for tutors to use. Another agency put a link to the questionnaire on their tutors forum which resulted in a further 14 responses. In total, three agencies agreed to email a link to all their tutors; although there were very few responses as a result. In addition to the 99 responses already mentioned a further 57 completed the questionnaire through a link from the project website.

The website was created to provide further details for tutors and students. There was also a link from the website to the student and tutor questionnaires. Each email sent out had an identification tag so each respondent could be linked to an agency or email address; however if the questionnaire was completed directly from the website the tutor could not be identified. Likewise, tutors may have responded to requests from tutoring agencies to complete the questionnaire or stumbled across the project on the Internet; therefore it is not possible to determine an accurate response rate.

To supplement the sample it was decided to produce a hard copy of the questionnaire which included, as an incentive, entry into a free prize draw if returned. One large agency agreed to send out a questionnaire with each new client information pack[21]. These were returned to the IOE using a freepost envelope. Of the 200 hard copies of the questionnaire sent out there was a 24% response rate. In total there were 204 responses to the tutor questionnaire.

The problem of non-response is a serious issue, particularly for surveys of a known population as the data obtained may no longer be representative of the population (Lynn, 2008). The population of tutors for this study is unknown; however the low response rate was disappointing particularly from the online questionnaire solicitations. There was also the problem of incomplete responses which was a particular issue for the online version of the questionnaire. No question had a complete set of 204 responses. Although the questionnaire had been specifically split up into sections, and participants had been given an estimate of the time required for completion, the response rate to questions towards the end of the questionnaire dropped considerably.

### 4.3.6 Student sample

Unlike the tutor participants, consulting students in research that concerns them is a legal requirement according to Article 12 on the Rights of the Child (United Nations, 1989). Online links or hard copy questionnaires were produced for the students and given to tutors to distribute. Snowballing to recruit student participants was also attempted, although this again proved difficult.

As the student questionnaire was designed to map onto the tutor questionnaire it was decided that it could not be modified enough for young children to complete. To ensure young children were not excluded from the sample, tutors were encouraged to have the tutee and

[21] Client information packs were sent to tutors registered with the agency when they started work with a new student. The questionnaires were sent inside these packs although tutors were specifically requested to answer questions regarding a pupil they had been tutoring for a longer period of time, rather than for the new student.

parent complete the questionnaire together. One of the final questions of the student questionnaire asked the participants if they received help in completing the questionnaire and to state who helped them. It is possible that this decision limited the number of young children who participated in the study

#### *4.3.6.1 Response rate*

In the tutor questionnaire respondents were asked about involving their student(s) in the research project. A total of 35.7% of the tutor sample agreed to pass on a questionnaire to their student(s). A number of tutors requested more than one questionnaire and 1 tutor offered to distribute them to other tutored students they were in contact with. The maximum number of student responses from 1 tutor was eight. Due to the emphasis of confidentiality it is not possible to determine if the student responses regarding 'Tutor 1' were referring to the tutor who originally requested the questionnaire or to another tutor the student may have had. The majority of tutors requested hard copies of the questionnaire for their students. In total there were 90 valid responses; although it is not possible to calculate a response rate as the number of questionnaires forwarded by tutors to their students is unknown.

### 4.3.7 Coding responses

Data analysis of the open-ended questions was drawn from the frameworks of Glaser and Strauss (1967) and Strauss' (1987) Grounded Theory, in that concepts and themes were extracted from the data. These themes were generated and categorized to form a coding frame. Establishing validity and reliability in interpretation of qualitative data can be problematic (Silverman, 2000). Bryman (1988) argues "there is a tendency towards an anecdotal approach to the use of data in relation to conclusions or explanations in qualitative research" (p. 77). It is particularly important that researchers include quotes that "accurately represent[s] the phenomena to which it refers" (Silverman, 2000, p. 176). To avoid anecdotalism, the focus of the analysis was on themes that arose most frequently. For each question, the top five most frequent themes to arise were discussed followed by other important elements.

A total of 20 responses (22.2%) to every question in the student questionnaire and 25 (12.3%) in the tutor questionnaire, were coded independently by three people to verify the consistency. The coding frame was discussed and altered accordingly to improve consistency and has been included in Appendix Q. There were a number of codes that covered similar areas that were not combined due to the distinction made by the respondents. For example, there was a code for communication skills and a code for listening skills, these were specified separately by respondents and were therefore left as separate codes. At the same time the code for task management was used to classify responses that referred to aspects of determining the level of knowledge and managing the difficulty of a task. The words 'task management' were not explicitly stated but implied by the responses.

### 4.3.8 Analysis

The aim of RQ2 and RQ3 was to determine a 'family resemblance' of effective tutoring common across different subjects and levels. However, to establish the similarities and differences, comparisons were made between different tutored subjects and age groups using Pearson's chi-square. The 'quantitizing' of qualitative responses with the aim to establish similarities and differences demonstrates the continuation of the mixed methods approach through the analysis phase of the study. Making these comparisons was not straightforward as the majority of respondents tutored more than one subject, and students were often tutored in multiple subjects. Tutors teaching maths were compared to those teaching any other subject apart from maths; the same was done for both English and science. However, almost a quarter of the respondents indicated they tutored both English and maths, therefore to make a thorough comparison between maths and English tutoring, the sample was split into two parts; those who tutored maths (and not English, *n* 66) and those who tutored English subjects (and not maths, *n* 34). Although this allowed a full comparison between both subjects, it substantially reduced the sample size. Levels of tutoring were also examined; again this was complex as many respondents tutored a wide age range of students. To investigate differences in the sample each level was examined individually against tutors who did not tutor at the specified level. Percentages were calculated from the total number of valid responses for each question.

### 4.3.9 Ethics

PT is a sensitive area in many respects, for this reason the research was approached in an appropriately diplomatic and sensitive manner. The ESRC Research Ethics Framework (2005) was followed as a guide in this study. The participants were informed about the research and were provided with a link to the project website. This made available additional information and full contact details if participants had any questions, concerns or comments. All the respondents were given the choice to participate in the study. However, to prevent students feeling under pressure from their tutors to complete the questionnaire, in addition to the information sheet, effort was made to ensure tutors emphasised to their students that participation was optional. All the student questionnaires were distributed with a freepost envelope, so that the students were assured of the confidentiality of their responses without having to return the questionnaire to their tutor. Delamont (1992) argues that the appropriate use of pseudonyms protects the identities of the participants. Although pseudonyms were not used, all quotes have been appropriately labelled to ensure confidentiality (see chapters 8 and 9). The participants were also given the opportunity to indicate if they wanted to receive a project report. Any personal data provided was kept confidential conforming to all aspects of the 1988 Data Protection Act.

### 4.3.10 Strengths and weaknesses

In addition to the number of respondents who failed to complete the questionnaire, there were several examples of both tutors and students who provided contradictory information. For example, at the start of the questionnaire tutors were asked to state the subjects and levels they taught, later they were asked to include the subject(s) they taught to Student 1. One tutor indicated that they tutored maths, English and history at secondary level; however when asked questions about Student 1, this tutor included a student who was tutored at primary level. Another tutor reported tutoring only at primary level but then commented how an unsuccessful session had involved a student who was being tutored as a punishment for bad behaviour in secondary school. These discrepancies would have been cleared up in an interview situation, although collection and recording detailed background information in this manner would have been particularly time consuming.

Due to the problem of incomplete responses, particularly from the online survey, the questionnaire would have benefitted from being shorter with the questions of particular interest at the beginning. The hard copy questionnaire appeared to have a higher response and completion rate. Perhaps more effort should have been made to obtain contact details to send hard copy questionnaires to all respondents.

Despite providing freepost envelopes and reassuring students their answers would be kept confidential; it is possible that some students may have thought their tutor would see the completed questionnaire and this may have impacted on their responses. Some tutors may have expected their tutoring performance to be judged and answered questions exaggerating their own skills. The nature of the student sample meant the tutors had to agree to pass on the questionnaire to their tutees; therefore there may be bias in tutors' selection of students.

It is possible that tutors who lacked confidence in their tutoring abilities would be reluctant to involve their students in the project. Gorard (2001) argues it is likely that those willing to participate in a study "could be very different from those who are not" (p. 56). Both the tutor and student population are unknown therefore there is no way of assessing how far this sample reflects tutors and tutees in England; however it is hoped that the results reflect effective aspects of one-to-one tuition and provide a useful framework for subsequent research.

# 5 Results: The Impact of Private Tuition on Attainment at KS2

## 5.1 Introduction

This chapter addresses RQ1 and presents the main findings from the KS2 analysis. The relationship between PT and student background characteristics are briefly examined, followed by the results of the KS2 models. The impact of PT on attainment in each of the core subjects is discussed in turn followed by the impact on mean EMSKS2 score. The chapter ends with a summary of significant findings.

### 5.1.1 PT and background predictors

A discussion on the relationship between PT participation and pupil background characteristics can be found in Ireson and Rushforth (2005 and 2011). For the purpose of this analysis Table 5.1 outlines the proportions of students who received PT in any subject with different background characteristics (calculated from the full Y6 sample). The variable used in this table relates to PT in any subject, at any point in schooling and PT for one or two or more terms (as explained in section 4.2.7).

Involvement in PT up to and including Y6 differs substantially in relation to the HPI, Table 5.1 (column 2) shows 45.5% of those who received PT were in HPI group 1 compared to 19.1% of students in HPI group 3. Analysis reported in Ireson and Rushforth (2011) also showed a significant association between PT participation and parental education levels. A total of 34% of year 6 students participated in PT when their father had a university degree compared to 18% of students whose father's attended only compulsory schooling. Similar proportions were found in education levels of mothers. Ireson and Rushforth (2011) also examined the links between parental occupation and participation rates in PT. Higher proportions of parents employed private tutors who were classified as managers, professionals and senior officials (Major group 1 37% and Major Group 2 34%) in comparison to the other occupations, for example 18% of fathers who worked as plant and machine operatives (major group 8) employed private tutors. These findings are perhaps not surprising due to the costs of employing a private tutor. The results from a web search as part of the 'Private Tuition in England' report found that costs of PT varied from £9 to £58.50 with typical costs between £23 and £29 depending on the subject and level (Tanner et al., 2009), similar figures were also found in the survey completed by Peters et al. (2009).

The cost of PT may also be reflected in the finding that students who participated in musical activities were also more likely to participate in PT (see Table 5.1). The other significant difference in the proportions of students participating in PT was the return of the parent questionnaire (see Table 5.1). A significantly higher proportion of parents who returned the parent questionnaire also employed a private tutor for their child. This result supports West, Noden and Edge's (1998) research which found that parents who were more involved in their child's education were also more likely to employ private tutors.

*Table 5.1 Percentage of PT participation by Y6 student background characteristics*

| | No PT % | PT % of which: | PT 1 term % | PT 2 or more terms % |
|---|---|---|---|---|
| Involvement in PT (% of whole sample) | (74.9) | (25.1) | (15.6)† | (7.7)† |
| KS1APS grp 1 (high) | 25.7 | 26.3 | 27.2 | 26.2 |
| KS1APS grp 3 (low) | 16.1 | 16.9 | 17.3 | 16.2 |
| Female | 50.2 | 47 | 49.1 | 41.2 |
| SEN | 17.9 | 15.4 | 13.9 | 18.8 |
| Black | 11.4 | 8 | 6.8 | 7.1 |
| Mixed (inc other) | 7.8 | 7.6 | 9.1 | 4.7 |
| Asian | 7.5 | 7.3 | 8 | 7.1 |
| Pakistani | 8.4 | 12.2* | 11.9 | 12.9 |
| EAL | 24.6 | 25.6 | 26 | 24.7 |
| HPI: Group 1 High*** | 25.3 | 45.5 | 44.1 | 52 |
| HPI: Group 3 Low*** | 34.7 | 19.1 | 19.9 | 14.7 |
| Parent questionnaire* | 35.9 | 41.9 | 43.5 | 39.1 |
| Music** | 59.5 | 70 | 71.3 | 72.6 |
| Sport | 92.4 | 94.8 | 93.2 | 97.7 |
| Homework >=5 hrs | 5.2 | 6.7 | 5.8 | 9.4 |

*p<.05 **p<.01 ***p<.001

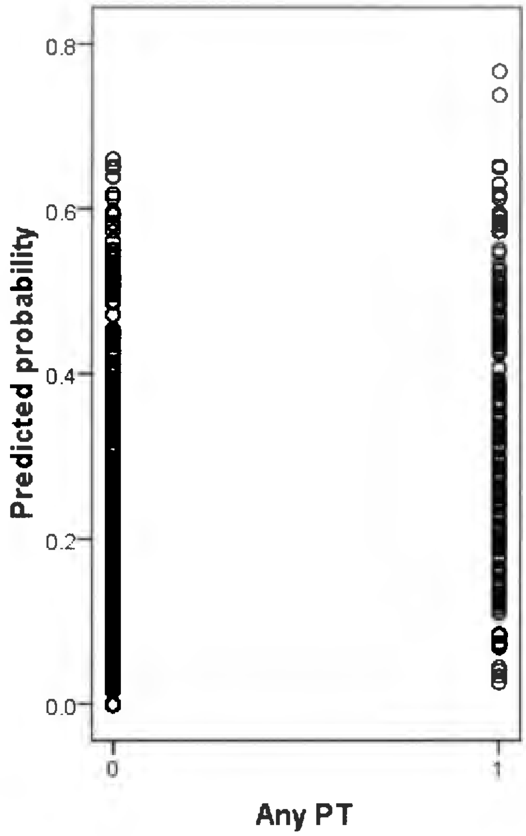
†Calculated based on valid percentages, they do not total 25.1% due to the removal of cases that failed to accurately complete the question on PT duration (see section 4.2.7)

There were similar proportions of students participating in PT from the different ethnic groupings, although there were a slightly larger percentage of Pakistani students who received PT. International surveys have indicated that PT participation varies enormously between different countries (Organisation for Economic Co-operation and Development (OECD), 2006). Due to the size of the sample it was not possible to further divide the ethnic classifications into more accurate and defined groups. It is possible that using this information with a larger sample of students would reveal different patterns of participation in PT.

An interesting finding in the year 6 sample was the similarities between the groups of students who did and did not participate in PT. There were no significant differences in the participation rates in PT between students with higher or lower KS1 scores and SEN students. Similarly there were no differences in the take up of PT and students who spoke English as an additional language (EAL). Also, across the whole sample there were no significant differences between students having one term or two or more terms PT.

To ensure that the sample of students who participated in PT were comparable with those that did not, logistic regression was undertaken to calculate the propensity scores and explore the predicted probability of participating in PT (see section 4.2.4). Figure 5.1 compares the propensity scores for students who did and did not participate in PT. It is clear from this analysis that although there is considerable overlap between the two treatment groups there are also some differences. Ireson and Rushforth (2005) found considerable differences in the number of students participating in PT within individual schools. The students in the plot below who had zero predicted probability of participating in PT were all from one school where no PT was reported. The two students with the highest predicted probability scores (.73 and .76) were from schools where nearly 50% of students indicated they had participated in PT, they were also of Asian ethnicity and in HPI group 1. This provisional analysis revealed considerable overlap between treatment and control groups enabling accurate comparisons to be made.

*Figure 5.1 Scatter Plot: Predicted probability scores for participation in PT, Y6 sample*




### 5.1.2 Analysis sequence

Each of the core subjects will be discussed, exploring the impact of PT on outcome score. A series of models have been included below showing achievement in each subject using different PT measures (see section 4.2.7 for more details on the PT variables).

- Model 1: Reports the combined impact of PT in any subject at any point in schooling
- Model 2: Reports the combined impact of PT in any subject by duration (1 term or 2 or more terms)
- Model 3: Reports the impact of PT in the respective subject by duration (1 term or 2 or more terms), (not modelled for mean EMSKS2)
- Model 4: Reports the impact of PT in the respective subject during years 5 and 6 (the mean EMSKS2 model includes any PT during years 5 and 6)
- Model 5: Reports the impact of examination preparation PT
- Model 6: Reports the impact of PTverbal (for English and mean EMSKS2, Model 6a) and PTnon-verbal (for maths and mean EMSKS2, Model 6b).

The models presented have been calculated using robust regression to account for outlying scores (see section 4.2.4). Preliminary analysis was completed using OLS, OLS with robust standard errors and using dummy variable adjustment. Appendix D presents the results for English KS2 Model 1 using each technique. Diagnostics are also reported for English Model 1 showing the outlying cases that were adjusted for using robust regression (see Appendix D). Schools were added to the models as dummy variables; these estimates have not been included in the tables.

### 5.1.3 Model interaction terms

In each of the models interaction terms were calculated only for statistically significant PT estimates together with other model predictors. A structured approach to modelling was adopted, when there was evidence of a significant average effect, this was explored to determine if the effect was inflated for certain groups of students.

The impact of PT was explored by duration, dividing participants into three groups: no tuition, 1 term and 2 or more terms. Variables which included small numbers of pupils e.g. SEN and mixed (including other) ethnicity did not have sufficient participants in each group to accurately estimate interaction terms. To investigate interactions with PT and ethnicity, the groups were combined to compare white and non-white groups. To fully explore the impact of PT on students with SEN, a larger sample is required. As there were insufficient numbers of SEN students to allow comparisons, all participants were grouped according to their performance in KS1 (and KS3 for the Y11 analysis). Interaction terms with PT and students with low (group 3), medium (group 2) and high (group 1) KS1 achievement were explored. These grouped prior achievement interactions were added to the models to determine if the impact of PT differed by ability groups. As KS1 performance was already controlled for by the continuous prior achievement score, only the interaction terms were included.

The results have been presented to show the average effect of PT. Where there was an effect of PT and significant interactions were found, the estimates of interest have been displayed. These appending tables do not include the control variables as these remain largely unchanged from the models presented previously. It should be noted that the majority of interaction terms included only 10-20 students from which accurate conclusions cannot be drawn. Interaction terms have been included in the analysis as a guide for future research in this area.

### 5.1.4 Effect sizes

The effect sizes (ES) have been calculated to represent NC levels (see section 4.2.4 and 4.2.5). To fully understand the size of the estimates it is important to appreciate how much progress students are expected to make between KS1 and KS2. During this period students are expected to make at least 2 levels of progress and within each academic year 2 sub levels of progress should be achieved (Department for Children, Schools and Families, 2009c). Every level is divided into 3 sub levels (see Appendix F), therefore 1 year of progress (2 sub levels) equates to 0.66 of a level. Standardised effect sizes for the PT estimates were also calculated and reported in Table 7.1, these effect sizes have also been referred to in the text. The symbol 'Δ' has been used to denote standardised effect sizes, whereas 'ES' has been used to indicate NC levels and GCSE grades.

## 5.2 KS2 English

The estimates obtained from modelling achievement in English at KS2 reflect patterns found in the literature (Department for Children, Schools and Families, 2009d; Melhuish et al., 2006) (see Table 5.2 where all six English models are displayed). For English KS2 the models show that on average girls outperformed boys at KS2 by 0.09 of a level after controlling for KS1APS attainment (see Table 5.2). Students with SEN performed just over a quarter of a level lower than other students. In the English models black students performed on average less well in comparison to white students by 0.11-0.13 of a level. There were no other appreciable differences in English performance when comparing other ethnic groups against the baseline group of white students.

Achievement of students in HPI groups 1 and 3 did not differ to those in the baseline group 2 after controlling for prior achievement and other background characteristics. Consistent with findings in the literature (Hallam, 2010), participation in musical activities was found to positively impact on achievement in English; however in all of the models the effect size was small (0.05) and not significant at the 5% level. The models found that 1 level change in prior achievement score (KS1APS), accounted for three-quarters of a level change at KS2.

*Table 5.2 Estimates for KS2 English Models 1-6[22] using different measures of PT participation*

| | KS2 ENGLISH MODEL 1 | | | | KS2 ENGLISH MODEL 2 | | | | KS2 ENGLISH MODEL 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.75 | (0.02) | <.001 | 0.75 | 0.75 | (0.02) | <.001 | 0.75 | 0.75 | (0.02) | <.001 | 0.75 |
| Any PT | 0.00 | (0.16) | ns | 0.00 | | | | | | | | |
| PT 1 term | | | | | -0.12 | (0.19) | ns | -0.02 | | | | |
| PT >1 term | | | | | 0.45 | (0.26) | .090 | 0.07 | | | | |
| Eng PT 1 term | | | | | | | | | -0.35 | (0.22) | ns | -0.06 |
| Eng PT>1 term | | | | | | | | | -0.06 | (0.33) | ns | -0.01 |
| Female | 0.56 | (0.14) | <.001 | 0.09 | 0.53 | (0.14) | <.001 | 0.09 | 0.49 | (0.14) | .001 | 0.08 |
| SEN | -1.59 | (0.23) | <.001 | -0.27 | -1.66 | (0.23) | <.001 | -0.28 | -1.63 | (0.23) | <.001 | -0.27 |
| Black | -0.65 | (0.27) | .018 | -0.11 | -0.75 | (0.28) | .008 | -0.12 | -0.75 | (0.28) | .008 | -0.13 |
| Mixed (inc other) | -0.19 | (0.28) | ns | -0.03 | -0.28 | (0.27) | ns | -0.05 | -0.31 | (0.28) | ns | -0.05 |
| Asian (exc) | -0.25 | (0.31) | ns | -0.04 | -0.28 | (0.31) | ns | -0.05 | -0.20 | (0.31) | ns | -0.03 |
| Pakistani | -0.40 | (0.39) | ns | -0.07 | -0.51 | (0.39) | ns | -0.09 | -0.48 | (0.39) | ns | -0.08 |
| HPI grp1 | 0.14 | (0.17) | ns | 0.02 | 0.08 | (0.17) | ns | 0.01 | 0.11 | (0.17) | ns | 0.02 |
| HPI grp3 | -0.17 | (0.17) | ns | -0.03 | -0.19 | (0.17) | ns | -0.03 | -0.20 | (0.17) | ns | -0.03 |
| Music | 0.26 | (0.16) | .092 | 0.04 | 0.28 | (0.16) | .073 | 0.05 | 0.30 | (0.16) | .057 | 0.05 |
| Total | 938 | | | | 919 | | | | 914 | | | |
| $R^2$ | 0.58 | | | | 0.58 | | | | 0.58 | | | |

| | KS2 ENGLISH MODEL 4 | | | | KS2 ENGLISH MODEL 5 | | | | KS2 ENGLISH MODEL 6 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.75 | (0.02) | <.001 | 0.75 | 0.75 | (0.02) | <.001 | 0.75 | 0.75 | (0.02) | <.001 | 0.75 |
| Eng PT yrs5 & 6 | -0.14 | (0.22) | ns | -0.02 | | | | | | | | |
| EngPT before Y5 | -0.38 | (0.30) | ns | -0.06 | | | | | | | | |
| Exam PT | | | | | -0.15 | (0.18) | ns | -0.02 | | | | |
| Verbal PT | | | | | | | | | -0.04 | (0.19) | ns | -0.01 |
| Female | 0.49 | (0.14) | .001 | 0.08 | 0.54 | (0.14) | <.001 | 0.09 | 0.54 | (0.14) | <.001 | 0.09 |
| SEN | -1.62 | (0.23) | <.001 | -0.27 | -1.58 | (0.23) | <.001 | -0.26 | -1.60 | (0.23) | <.001 | -0.27 |
| Black | -0.76 | (0.28) | .007 | -0.13 | -0.73 | (0.28) | .009 | -0.12 | -0.66 | (0.27) | .017 | -0.11 |
| Mixed (inc other) | -0.32 | (0.28) | ns | -0.05 | -0.20 | (0.28) | ns | -0.03 | -0.20 | (0.28) | ns | -0.03 |
| Asian (exc) | -0.15 | (0.31) | ns | -0.02 | -0.17 | (0.32) | ns | -0.03 | -0.19 | (0.32) | ns | -0.03 |
| Pakistani | -0.46 | (0.39) | ns | -0.08 | -0.37 | (0.39) | ns | -0.06 | -0.39 | (0.39) | ns | -0.07 |
| HPI grp1 | 0.10 | (0.17) | ns | 0.02 | 0.11 | (0.17) | ns | 0.02 | 0.13 | (0.17) | ns | 0.02 |
| HPI grp3 | -0.20 | (0.17) | ns | -0.03 | -0.18 | (0.17) | ns | -0.03 | -0.18 | (0.17) | ns | -0.03 |
| Music | 0.31 | (0.16) | .050 | 0.05 | 0.29 | (0.16) | .064 | 0.05 | 0.28 | (0.16) | .077 | 0.05 |
| Total | 914 | | | | 927 | | | | 935 | | | |
| $R^2$ | 0.58 | | | | 0.58 | | | | 0.58 | | | |

[22] See analysis sequence 5.1.2 for descriptions of models 1-6

### 5.2.1 The impact of PT on English attainment at KS2

The mean English KS2 and KS1APS scores for students who received PT are compared to those who did not receive PT in Table 5.3. Table F.9 in Appendix F compares the mean scores for each explanatory variable included in the models. The KS1 and KS2 scores in Table 5.3 show that students included in the combined measure of PT in any subject scored higher in all three of the core subjects; however students who participated in English PT scored marginally lower than students who did not receive PT.

The PT estimates for each model are highlighted in grey in Table 5.2. All the estimates are small and only one was marginally significant. The first model found that pupils who had received PT in any subject at any point in schooling did not perform significantly better or worse in English, relative to students who did not receive PT. Although not significant at the 5% level ($p$=.09), Model 2, exploring the combined impact of any subject PT by duration, suggests that extended periods of tuition may have positively impacted on English achievement. This estimate was not significant in the OLS analysis; however when more data was included in the model (using dummy variable adjustment), the robust regression estimate was significant at the 3% level with an effect size of 0.1. This estimate is clearly sensitive to outliers and requires more data to establish the link between PT participation and English KS2 score. These results should therefore be interpreted with caution.

Estimates for PT in Models 3 and 4 were minimal and not significant, suggesting that PT in English did not make a significant impact on English achievement. Likewise, PT in verbal reasoning and examination preparation did not appreciably improve English test score at KS2.

*Table 5.3 Mean KS1APS and KS2 scores for students who did/did not receive PT*

| | KS2 English | | KS2 Maths | | KS2 Science | | Mean EMSKS2 | |
|---|---|---|---|---|---|---|---|---|
| | KS1APS *M(SD)* | KS2 Eng *M(SD)* | KS1APS *M(SD)* | KS2 Mat *M(SD)* | KS1APS *M(SD)* | KS2 Sci *M(SD)* | KS1APS *M(SD)* | EMSKS2 *M(SD)* |
| **No PT** | **15.88(3.77)** | **27.32(3.97)** | **15.87(3.81)** | **27.70(4.77)** | **15.87(3.83)** | **29.04(3.78)** | **15.92(3.77)** | **28.07(3.83)** |
| **Model 1** | | | | | | | | |
| Any PT | 16.12(3.62) | 27.80(3.80) | 16.11(3.64) | 28.69(4.73) | 16.16(3.62) | 29.59(3.41) | 16.16(3.62) | 28.73(3.65) |
| **Model 2** | | | | | | | | |
| 1 term PT | 16.01(3.76) | 27.69(3.74) | 16.00(3.76) | 28.46(4.78) | 16.02(3.78) | 29.45(3.64) | 16.02(3.78) | 28.57(3.76) |
| 2 or more terms PT | 16.27(3.49) | 28.27(3.90) | 16.27(3.49) | 29.50(4.54) | 16.43(3.38) | 30.18(2.93) | 16.43(3.38) | 29.41(3.38) |
| **No PT in respective subject** | **15.99(3.72)** | **27.47(3.93)** | **15.94(3.81)** | **27.43(3.96)** | **16.00(3.75)** | **27.54(3.94)** | - | - |
| **Model 3** | | | | | | | | |
| 1 term PT in respective subject | 15.60(3.97) | 27.26(3.92) | 15.68(3.84) | 28.00(4.78) | 14.81(4.37) | 28.63(4.17) | - | - |
| 2 plus terms PT in respective subject | 15.40(3.61) | 27.10(4.00) | 16.19(2.91) | 29.17(4.57) | 15.48(3.56) | 29.00(3.22) | - | - |
| **Model 4** | | | | | | | | |
| PT during Y5 & 6 in respective subject | 16.00(3.72) | 27.70(3.80) | 16.25(3.35) | 28.74(4.65) | 15.19(4.25) | 28.61(3.98) | 16.52(3.47) | 29.25(3.41) |
| PT before Y5 in respective subject | 14.70(3.83) | 26.36(3.91) | 14.95(3.66) | 27.75(4.68) | 14.38(3.96) | 28.86(3.71) | 15.07(3.62) | 27.96(3.66) |
| **Model 5** | | | | | | | | |
| PTExam | 16.86(3.41) | 28.52(3.50) | 16.87(3.43) | 29.79(4.23) | 16.86(3.45) | 30.08(3.15) | 16.86(3.44) | 29.46(3.30) |
| **Model 6** | | | | | | | | |
| (English, mean (6a)) | | | | | | | | |
| PTVerbal | 16.00(3.75) | 27.64(3.90) | - | - | - | - | 16.06(3.75) | 28.64(3.73) |
| **Model 6** | | | | | | | | |
| (Maths, mean (6b)) | | | | | | | | |
| PTnon-verbal | - | - | 16.04(3.58) | 28.56(4.75) | - | - | 16.12(3.56) | 28.64(3.70) |

## 5.3 KS2 maths

Consistent with the literature on achievement at KS2 (Department for Children, Schools and Families, 2009d), boys performed significantly better than girls in mathematics by 0.2 of a level (see Table 5.4). SEN students performed significantly less well than other students, the effect size ranged from -0.25 to -0.27 and was similar to the estimates in the English models. Asian (excluding Pakistani) students consistently outperformed white students in all the maths models by 0.19-0.22 of a level; no other appreciable differences in attainment were related to ethnicity. The HPI indicator used in the models was not significant after controlling for prior achievement and other background characteristics.

Parental support (measured through the return of the parent questionnaire) was not included in the English models as it did not prove to be a significant predictor of English achievement; however in the maths models, students had significantly higher achievement when the parent questionnaire had been returned (ES 0.08-0.09 of a level). The effect of participation in musical activities was greater in maths with an effect size of between 0.08-0.1 compared to 0.05 in the English models. The research on gains in numeracy skills from music participation are mixed (Hallam, 2010). It has been argued that the varied findings are due to different types of music training and how these impact on achievement in maths (Cheek & Smith, 1999). Students who participated in sporting activities had notably higher maths scores, performing on average 0.15-0.16 of a level above those who did not participate in sporting activities. Achievement was notably higher for students participating in sports as against the estimate relating to musical activities. The sport participation variable indicated any amount of involvement in sporting activities (as the exploratory analysis found the effect size did not vary by frequency) and therefore encompassed the majority of students (see Table 4.12). It appears that students who did not participate in any sporting activities achieved significantly lower results in KS2 maths.

KS1APS achievement accounted for just under half a NC level in maths performance at KS2. KS1APS was calculated from an average of writing, reading comprehension and maths scores (see section 4.2.5.4). It is therefore not surprising that this effect size for the maths models was lower than the 0.75 effect size found in the English models. However the correlation between maths KS2 achievement and KS1APS was higher than the corresponding achievement in KS1 maths; therefore KS1APS was chosen as the prior attainment measure (see section 4.2.5.4).

*Table 5.4 Estimates for KS2 maths Models 1-6[23] using different measures of PT participation*

| | KS2 MATHS MODEL 1 | | | | KS2 MATHS MODEL 2 | | | | KS2 MATHS MODEL 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.43 | (0.15) | .003 | 0.43 | 0.42 | (0.15) | .005 | 0.42 | 0.42 | (0.15) | .005 | 0.42 |
| KS1APS² | 0.02 | (0.00) | .001 | 0.00 | 0.02 | (0.00) | .001 | 0.00 | 0.02 | (0.00) | .001 | 0.00 |
| Any PT | 0.33 | (0.23) | ns | 0.05 | | | | | | | | |
| PT 1 term | | | | | 0.14 | (0.27) | ns | 0.02 | | | | |
| PT >1 term | | | | | **1.14** | **(0.37)** | **.002** | **0.19** | | | | |
| Mat PT 1 term | | | | | | | | | -0.23 | (0.30) | ns | -0.04 |
| Mat PT>1 term | | | | | | | | | 0.76 | (0.44) | .088 | 0.13 |
| Female | -1.19 | (0.20) | <.001 | -0.20 | -1.18 | (0.20) | <.001 | -0.20 | -1.23 | (0.20) | <.001 | -0.20 |
| SEN | -1.51 | (0.33) | <.001 | -0.25 | -1.64 | (0.33) | <.001 | -0.27 | -1.55 | (0.33) | <.001 | -0.26 |
| Black | -0.04 | (0.39) | ns | -0.01 | -0.14 | (0.41) | ns | -0.02 | -0.13 | (0.41) | ns | -0.02 |
| Mixed (inc other) | 0.03 | (0.39) | ns | 0.00 | 0.00 | (0.39) | ns | 0.00 | 0.02 | (0.39) | ns | 0.00 |
| Asian (exc) | 1.18 | (0.44) | .008 | 0.20 | 1.15 | (0.45) | .010 | 0.19 | 1.24 | (0.45) | .006 | 0.21 |
| Pakistani | 0.18 | (0.55) | ns | 0.03 | 0.12 | (0.56) | ns | 0.02 | 0.27 | (0.56) | ns | 0.05 |
| HPI grp1 | 0.23 | (0.24) | ns | 0.04 | 0.16 | (0.25) | ns | 0.03 | 0.19 | (0.25) | ns | 0.03 |
| HPI grp3 | -0.01 | (0.25) | ns | 0.00 | -0.06 | (0.25) | ns | -0.01 | -0.10 | (0.25) | ns | -0.02 |
| Parent | 0.52 | (0.21) | .012 | 0.09 | 0.50 | (0.21) | .016 | 0.08 | 0.51 | (0.21) | .015 | 0.08 |
| Music | 0.46 | (0.22) | .037 | 0.08 | 0.50 | (0.22) | .027 | 0.08 | 0.57 | (0.23) | .012 | 0.10 |
| Sport | 0.92 | (0.40) | .021 | 0.15 | 0.91 | (0.40) | .024 | 0.15 | 0.94 | (0.40) | .020 | 0.16 |
| Total | 929 | | | | 911 | | | | 908 | | | |
| $R^2$ | 0.57 | | | | 0.57 | | | | 0.56 | | | |

| | KS2 MATHS MODEL 4 | | | | KS2 MATHS MODEL 5 | | | | KS2 MATHS MODEL 6 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.43 | (0.15) | .004 | 0.43 | 0.43 | (0.15) | .003 | 0.43 | 0.43 | (0.15) | .004 | 0.43 |
| KS1APS² | 0.02 | (0.00) | .001 | 0.00 | 0.02 | (0.00) | .001 | 0.00 | 0.02 | (0.00) | .001 | 0.00 |
| Mat PT yrs5 & 6 | 0.22 | (0.30) | ns | 0.04 | | | | | | | | |
| Mat PT before Y5 | -0.10 | (0.39) | ns | -0.02 | | | | | | | | |
| Exam PT | | | | | **0.57** | **(0.27)** | **.035** | **0.10** | | | | |
| Non-verbal PT | | | | | | | | | 0.18 | (0.25) | ns | 0.03 |
| Female | -1.26 | (0.20) | <.001 | -0.21 | -1.19 | (0.20) | <.001 | -0.20 | -1.21 | (0.20) | <.001 | -0.20 |
| SEN | -1.53 | (0.33) | <.001 | -0.26 | -1.50 | (0.33) | <.001 | -0.25 | -1.49 | (0.33) | <.001 | -0.25 |
| Black | -0.08 | (0.41) | ns | -0.01 | -0.08 | (0.39) | ns | -0.01 | -0.09 | (0.40) | ns | -0.01 |
| Mixed (inc other) | 0.01 | (0.39) | ns | 0.00 | 0.00 | (0.39) | ns | 0.00 | 0.04 | (0.39) | ns | 0.01 |
| Asian (exc) | 1.29 | (0.45) | .004 | 0.22 | 1.18 | (0.45) | .008 | 0.20 | 1.29 | (0.45) | .004 | 0.21 |
| Pakistani | 0.31 | (0.56) | ns | 0.05 | 0.11 | (0.55) | ns | 0.02 | 0.24 | (0.55) | ns | 0.04 |
| HPI grp1 | 0.19 | (0.25) | ns | 0.03 | 0.19 | (0.24) | ns | 0.03 | 0.22 | (0.25) | ns | 0.04 |
| HPI grp3 | -0.06 | (0.25) | ns | -0.01 | -0.04 | (0.25) | ns | -0.01 | -0.01 | (0.25) | ns | 0.00 |
| Parent | 0.51 | (0.21) | .014 | 0.09 | 0.50 | (0.21) | .015 | 0.08 | 0.54 | (0.21) | .009 | 0.09 |
| Music | 0.57 | (0.23) | .011 | 0.10 | 0.45 | (0.22) | .042 | 0.08 | 0.50 | (0.22) | .025 | 0.08 |
| Sport | 0.95 | (0.40) | .018 | 0.16 | 0.92 | (0.40) | .021 | 0.15 | 0.93 | (0.40) | .020 | 0.16 |
| Total | 908 | | | | 926 | | | | 919 | | | |
| $R^2$ | 0.56 | | | | 0.57 | | | | 0.57 | | | |

[23] See analysis sequence 5.1.2 for descriptions of models 1-6

### 5.3.1 The impact of PT on maths attainment at KS2

The average maths scores for students who participated in PT were higher at both KS1 and KS2 compared to the sample average (see Table 5.3); however students who had PT in maths prior to year 5 scored slightly below students who did not receive PT. The most pronounced difference in mean maths scores related to students who had extended periods of maths tuition, these participants scored above average at both KS1 and KS2.

On average students who had PT in any subject at any point did not have significantly higher KS2 maths results compared to students who received no PT (see Model 1). Maths Model 2 explored the combined impact of PT in any subject by duration and found that on average students who received 2 or more terms of PT performed 0.19 of a level higher in maths relative to students who received no PT (Δ[24] 0.24).

Interaction terms were investigated and added to the model when they were found to significantly impact on attainment (see Table 5.5). The interaction of 2 or more terms PT with the continuous KS1APS variable was not significant. However to determine if the impact of PT differed for low, average or high ability students, interaction terms with grouped prior achievement scores were added to the model (see section 5.1.3). As the KS1APS score was already included in the model to control for prior achievement, only the grouped interaction term was added. This analysis found that on average, students who received PT for 2 or more terms achieved higher attainment scores, especially those with low prior achievement scores. Within the group of low ability pupils, on average, those who had PT for 2 or more terms scored 0.48 (0.34+0.14) of a level higher than students who did not receive PT. For students in prior ability groups 1 and 2 (high and middle ability) the effect was not statistically different, so the groups were combined as the baseline group. Students in groups 1 and 2 who received extended periods of tuition achieved 0.14 of a level higher than students who had no PT. Upon closer examination of the 11 students in group 3, it was found that 63.6% had identified SEN. It is possible this interaction reflects the fact that SEN students within this group achieved substantially higher results relative to other SEN students in prior achievement group 3 who did not receive extended periods of PT. It should be noted that this interaction represented a total of only 11 students and was not significant at the 5% level (p=0.11) when more cases were included using dummy variable adjustment. In the larger model, the interaction contained two additional students and marginally reduced the estimate. This

[24] Standardised effect size see section 4.2.4

suggests that a greater sample size might produce a more consistent result among all ability groups. To clarify these results further research is required.

*Table 5.5 Significant interaction effects for KS2 maths Model 2: PT in any subject for more than 1 term with prior achievement KS1APS grouped score*

| PT and KS1 | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| KS1APS | 0.44 | (0.15) | .003 | 0.44 |
| $KS1APS^2$ | 0.02 | (0.00) | .001 | 0.02 |
| | | | | |
| PT 1 term | 0.14 | (0.27) | ns | 0.02 |
| **PT >1 term** | **0.84** | **(0.40)** | **.038** | **0.14** |
| **PT >1 term*KS1APSgrp3** | **2.06** | **(0.97)** | **.035** | **0.34** |

Models 3 and 4 found that students who had PT in maths did not achieve significantly different results relative to those who did not have maths PT; however Model 3 suggests that extended periods of maths tuition may have had a positive impact on maths achievement at KS2 although this estimate was not significant at the 5% level. Model 5 found that students who received PT in preparation for an entry examination scored on average 0.1 of a level higher than students without corresponding tuition (Δ 0.12). Interaction terms were calculated but none were significant indicating that the effect was constant across the sample.

## 5.4 KS2 science

Recent KS2 statistics published by the DCSF (2009d) reported limited gender differences in science achievement at KS2; however work completed through the EPPE project (Effective Provision of Pre-School Education) found that boys outperformed girls in science (Melhuish et al., 2006). In the current study, on average, females achieved 0.17 of a level lower than males in science (see Table 5.6). As with both the English and maths models, students with SEN performed less well in science although the effect sizes were smaller for science achievement. White students (the baseline group), outperformed black, mixed race and Pakistani students. The smallest effect sizes were found for mixed (including other) ethnicity students who scored on average 0.12 of a level less than white students. The main difference related to the achievement of black and Pakistani students, who scored on average -0.21 of a grade lower than white participants.

Students in HPI group 3 were found to perform less well in comparison to the HPI baseline group 2; however this difference was only significant at the 8% level. Participation in musical activities also had a small but positive effect on science performance. The completion of 5 hours or more homework per week was found to have a significant effect on science achievement. On average these students scored 0.12 of a level higher than those who spent less time on homework per week. One level change in KS1APS achievement accounted for over half a NC level in science score at KS2. The lower $R^2$ value in these models suggests the predictors of achievement used in the analysis explain less than half of the variation in science performance.

### 5.4.1 The impact of PT on science attainment at KS2

Within the Year 6 sample there were significantly fewer participants who received science PT compared with the numbers involved in both maths and English tuition (see Table 4.13). The mean KS2 science scores for those who had tutoring in science suggest this may have been a remedial measure for students who had lower than average KS1APS achievement (see Table 5.3). For example, students who had 1 term of science PT had a mean KS1 prior achievement score of 14.81 (*SD* 4.37) compared to a mean score of 16(*SD* 3.75) for those who had no PT in science. However, due to the limited number of students who received science PT, it is difficult to make accurate conclusions. Appendix F, Table F.9, reveals that students who received any amount of science tuition performed marginally below average at both KS1 and KS2 level; however science scores for students who participated in PT in any subject were slightly above the sample average (see Table 5.3).

Science Models 1-5 found no significant positive impact of PT on science attainment. In the OLS analysis using robust standard errors the PT estimate for 2 or more terms tuition in any subject (Model 2) was significant at the 4% level with an effect size of 0.1; however this estimate was no longer significant using robust regression indicating that this result may have been driven by outlying scores.

The negative estimate in Model 4 for PT in science during years 5 and 6 is difficult to explain, particularly as the same result was not found in Model 3. The estimate for science PT during year 5 and/or 6 was negative but not significant in the OLS and robust standard error models ($p=0.25$), and was not significant when the larger sample was used with dummy variable adjustment (an increase of *n*6 for this PT variable). Due to the low number of students participating in science tuition in this model and the very sensitive estimate of PT, more data is required to determine the effect of science PT on attainment at KS2 level.

*Table 5.6 Estimates for KS2 science Models 1-5[25] using different measures of PT participation*

| | KS2 SCIENCE MODEL 1 | | | | KS2 SCIENCE MODEL 2 | | | | KS2 SCIENCE MODEL 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | B | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.61 | (0.03) | <.001 | 0.61 | 0.60 | (0.03) | <.001 | 0.60 | 0.60 | (0.03) | <.001 | 0.60 |
| Any PT | 0.15 | (0.19) | ns | 0.02 | | | | | | | | |
| PT 1 term | | | | | 0.07 | (0.23) | ns | 0.01 | | | | |
| PT >1 term | | | | | 0.49 | (0.31) | ns | 0.08 | | | | |
| Sci PT 1 term | | | | | | | | | -0.42 | (0.37) | ns | -0.07 |
| Sci PT>1 term | | | | | | | | | -0.29 | (0.65) | ns | -0.05 |
| Female | -1.03 | (0.17) | <.001 | -0.17 | -1.00 | (0.17) | <.001 | -0.17 | -1.00 | (0.17) | <.001 | -0.17 |
| SEN | -1.11 | (0.27) | <.001 | -0.19 | -1.18 | (0.27) | <.001 | -0.20 | -1.22 | (0.27) | <.001 | -0.20 |
| Black | -1.15 | (0.32) | <.001 | -0.19 | -1.19 | (0.33) | <.001 | -0.20 | -1.18 | (0.33) | <.001 | -0.20 |
| Mixed (inc other) | -0.73 | (0.33) | .026 | -0.12 | -0.72 | (0.33) | .028 | -0.12 | -0.69 | (0.33) | .035 | -0.12 |
| Asian (exc) | -0.03 | (0.37) | ns | 0.00 | -0.03 | (0.37) | ns | 0.00 | 0.13 | (0.38) | ns | 0.02 |
| Pakistani | -1.34 | (0.45) | .003 | -0.22 | -1.22 | (0.46) | .008 | -0.20 | -1.12 | (0.46) | .016 | -0.19 |
| HPI grp1 | -0.09 | (0.20) | ns | -0.02 | -0.13 | (0.20) | ns | -0.02 | -0.09 | (0.20) | ns | -0.02 |
| HPI grp3 | -0.36 | (0.20) | .078 | -0.06 | -0.38 | (0.21) | .066 | -0.06 | -0.36 | (0.21) | .078 | -0.06 |
| Music | 0.42 | (0.18) | .024 | 0.07 | 0.43 | (0.19) | .020 | 0.07 | 0.44 | (0.19) | .018 | 0.07 |
| Homework>5 hrs | 0.74 | (0.35) | .036 | 0.12 | 0.67 | (0.35) | .058 | 0.11 | 0.71 | (0.35) | .046 | 0.12 |
| Total | 919 | | | | 902 | | | | 896 | | | |
| $R^2$ | 0.45 | | | | 0.44 | | | | 0.45 | | | |

| | KS2 SCIENCE MODEL 4 | | | | KS2 SCIENCE MODEL 5 | | | |
|---|---|---|---|---|---|---|---|---|
| | B | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.61 | (0.03) | <.001 | 0.61 | 0.61 | (0.03) | <.001 | 0.61 |
| Sci PT yrs5 & 6 | **-0.75** | **(0.40)** | **.058** | **-0.13** | | | | |
| Sci PT before Y5 | 0.44 | (0.50) | ns | 0.07 | | | | |
| Exam PT | | | | | 0.20 | (0.23) | ns | 0.03 |
| Female | -1.00 | (0.17) | <.001 | -0.17 | -1.03 | (0.17) | <.001 | -0.17 |
| SEN | -1.20 | (0.27) | <.001 | -0.20 | -1.11 | (0.27) | <.001 | -0.19 |
| Black | -1.14 | (0.33) | .001 | -0.19 | -1.17 | (0.32) | <.001 | -0.19 |
| Mixed (inc other) | -0.72 | (0.33) | .027 | -0.12 | -0.74 | (0.33) | .024 | -0.12 |
| Asian (exc) | 0.14 | (0.38) | ns | 0.02 | -0.03 | (0.37) | ns | -0.01 |
| Pakistani | -1.19 | (0.46) | .010 | -0.20 | -1.36 | (0.46) | .003 | -0.23 |
| HPI grp1 | -0.07 | (0.20) | ns | -0.01 | -0.10 | (0.20) | ns | -0.02 |
| HPI grp3 | -0.34 | (0.21) | .100 | -0.06 | -0.37 | (0.20) | .071 | -0.06 |
| Music | 0.42 | (0.19) | .023 | 0.07 | 0.41 | (0.18) | .025 | 0.07 |
| Homework>5 hrs | 0.68 | (0.35) | .055 | 0.11 | 0.73 | (0.35) | .037 | 0.12 |
| Total | 896 | | | | 916 | | | |
| $R^2$ | 0.45 | | | | 0.45 | | | |

Interactions were included in the model to further explore patterns in the data. These indicate that students who received science PT in years 5 and 6 who had either high (group 1 *n*11) or

[25] See analysis sequence 5.1.2 for descriptions of models 1-5

low (group 3 *n*9) attainment at KS1, performed significantly better than students who received PT with average KS1 attainment (group 2 *n*19) (see Table 5.7). Overall the significant negative finding was driven by students in the middle ability group where PT during years 5 and 6 had a significant negative effect upon performance. The effect of science PT during years 5 and 6 for students in ability groups 1 and 3 was not significantly different from students who had no science PT during this period.

*Table 5.7 Significant interaction effects for KS2 science Model 4: PT in science during yrs 5 and 6 with prior achievement KS1APS grouped score*

| **PT and KS1** | | β | *SE* | Sig. | ES |
|---|---|---|---|---|---|
| KS1APS | | 0.60 | (0.03) | <.001 | 0.60 |
| **Sci PT yrs5 & 6** | | **-1.87** | **(0.56)** | **.001** | **-0.31** |
| | **Sci PT yrs5-6*APSgrp1** | **2.41** | **(0.91)** | **.008** | **0.40** |
| | **Sci PT yrs5-6*APSgrp3** | **2.27** | **(0.97)** | **.019** | **0.38** |
| Sci PT before Y5 | | 0.52 | (0.49) | ns | 0.09 |

Closer examination of the group of students receiving PT during years 5 and 6 in average ability group 2, found that 57.9% did not have English as their first language. Due to multicollinearity with Asian ethnicity this variable had not been included in the models (see section 4.2.6). The model was recalculated using an ethnic group indicator of white and non-white, allowing the 'first language other than English' variable to be included. The estimate for first language was not significant and the PT coefficient remained negative and significant at the 7% level of probability. It was also found that none of these students completed 5 hours or more homework per week. When this variable was removed from the model, the estimate for PT was no longer statistically significant.

There was also a marginally significant interaction with SEN students and those who had science PT during years 5 and 6; however this was based on very few cases and has therefore not been included here. This is an area which requires further exploration with a larger data set. The results from the interactions should be interpreted with caution due to the low number of students involved and the sensitivity of the estimates.

## 5.5 Mean EMSKS2

In the mean models the estimate for gender was consistent with work on the EPPE project (Melhuish et al., 2006) but not with recent KS2 national statistics (Department for Children, Schools and Families, 2009d). The results from the current study found girls performed less well than boys in mean EMSKS2 score by 0.1 of a level (see Table 5.8). SEN students scored on average 0.25 below other students after controlling for prior achievement score. The only significant difference in performance of ethnic groups related to the attainment of black students who achieved 0.09 of a level below white students.

After controlling for prior achievement and other background characteristics, the HPI variables did not have an effect on mean EMSKS2 achievement. Music was a significant predictor of attainment in all the core subjects and mean score. There was a significant positive effect in relation to the return of a parent questionnaire upon mean EMSKS2 score (effect size 0.05). Students who completed 5 hours or more homework per week performed 0.1 of a level higher than students who had spent less time on homework.

### 5.5.1 The impact of PT on mean EMSKS2 attainment at KS2

The effect of PT on mean EMSKS2 score was significant in two of the six models. Although the combined impact of PT in any subject did not appreciably impact on mean KS2 achievement, Model 2 found that extended periods of PT in any subject had a significant effect on attainment. On average these students performed 0.11 of a level higher that students who had no PT (Δ 0.17). There was also a significant effect for students who participated in PT (in any subject) during years 5 or 6 (Model 4) and KS2 achievement; however the effect size was smaller (0.06, Δ 0.09).

*Table 5.8 Estimates for KS2 mean EMSKS2 Models 1-2, 4-6b[26]using different measures of PT participation*

| | *M* EMSKS2 MODEL 1 | | | | *M* EMSKS2 MODEL 2 | | | | *M* EMSKS2 MODEL 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.78 | (0.02) | | 0.78 | 0.77 | (0.02) | <.001 | 0.77 | 0.77 | (0.02) | <.001 | 0.77 |
| Any PT | 0.09 | (0.16) | ns | 0.01 | | | | | | | | |
| PT 1 term | | | | | -0.02 | (0.19) | ns | 0.00 | | | | |
| PT >1 term | | | | | **0.66** | **(0.26)** | **.010** | **0.11** | | | | |
| PT yrs5 & 6 | | | | | | | | | **0.35** | **(0.18)** | **.054** | **0.06** |
| PT before Y5 | | | | | | | | | -0.19 | (0.25) | Ns | -0.03 |
| Female | -0.58 | (0.14) | <.001 | -0.10 | -0.58 | (0.14) | <.001 | -0.10 | -0.60 | (0.14) | <.001 | -0.10 |
| SEN | -1.36 | (0.22) | <.001 | -0.23 | -1.46 | (0.22) | <.001 | -0.24 | -1.42 | (0.22) | <.001 | -0.24 |
| Black | -0.49 | (0.27) | .066 | -0.08 | -0.54 | (0.28) | .052 | -0.09 | -0.53 | (0.28) | .057 | -0.09 |
| Mixed (inc other) | -0.32 | (0.27) | ns | -0.05 | -0.36 | (0.27) | ns | -0.06 | -0.35 | (0.27) | Ns | -0.06 |
| Asian (exc) | 0.25 | (0.31) | ns | 0.04 | 0.23 | (0.31) | ns | 0.04 | 0.27 | (0.31) | Ns | 0.04 |
| Pakistani | -0.43 | (0.38) | ns | -0.07 | -0.43 | (0.38) | ns | -0.07 | -0.40 | (0.38) | Ns | -0.07 |
| HPI grp1 | 0.09 | (0.17) | ns | 0.01 | 0.05 | (0.17) | ns | 0.01 | 0.02 | (0.17) | Ns | 0.00 |
| HPI grp3 | -0.19 | (0.17) | ns | -0.03 | -0.22 | (0.17) | ns | -0.04 | -0.20 | (0.17) | ns | -0.03 |
| Parent | 0.28 | (0.14) | .048 | 0.05 | 0.27 | (0.14) | .054 | 0.05 | 0.28 | (0.14) | .052 | 0.05 |
| Music | 0.48 | (0.15) | .002 | 0.08 | 0.50 | (0.15) | .001 | 0.08 | 0.52 | (0.15) | .001 | 0.09 |
| Homework>5 hrs | 0.63 | (0.29) | .031 | 0.10 | 0.55 | (0.29) | .061 | 0.09 | 0.59 | (0.29) | .043 | 0.10 |
| Total | 916 | | | | 899 | | | | 899 | | | |
| $R^2$ | 0.60 | | | | 0.59 | | | | 0.59 | | | |

| | *M* EMSKS2 MODEL 5 | | | | *M* EMSKS2 MODEL 6a | | | | *M* EMSKS2 MODEL 6b | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1APS | 0.77 | (0.02) | <.001 | 0.77 | 0.78 | (0.02) | <.001 | 0.78 | 0.77 | (0.02) | <.001 | 0.77 |
| Exam PT | 0.16 | (0.19) | ns | 0.03 | | | | | | | | |
| Verbal PT | | | | | 0.05 | (0.17) | ns | 0.01 | | | | |
| Non-verbal PT | | | | | | | | | -0.04 | (0.17) | ns | -0.01 |
| Female | -0.59 | (0.14) | <.001 | -0.10 | -0.59 | (0.14) | <.001 | -0.10 | -0.59 | (0.14) | <.001 | -0.10 |
| SEN | -1.36 | (0.22) | <.001 | -0.23 | -1.35 | (0.22) | <.001 | -0.23 | -1.36 | (0.22) | <.001 | -0.23 |
| Black | -0.52 | (0.27) | .055 | -0.09 | -0.53 | (0.27) | .052 | -0.09 | -0.52 | (0.27) | .056 | -0.09 |
| Mixed (inc other) | -0.34 | (0.27) | ns | -0.06 | -0.32 | (0.27) | ns | -0.05 | -0.31 | (0.27) | ns | -0.05 |
| Asian (exc) | 0.28 | (0.31) | ns | 0.05 | 0.31 | (0.31) | ns | 0.05 | 0.33 | (0.31) | ns | 0.06 |
| Pakistani | -0.45 | (0.38) | ns | -0.07 | -0.41 | (0.38) | ns | -0.07 | -0.39 | (0.38) | ns | -0.07 |
| HPI grp1 | 0.07 | (0.17) | ns | 0.01 | 0.06 | (0.17) | ns | 0.01 | 0.08 | (0.17) | ns | 0.01 |
| HPI grp3 | -0.20 | (0.17) | ns | -0.03 | -0.19 | (0.17) | ns | -0.03 | -0.19 | (0.17) | ns | -0.03 |
| Parent | 0.27 | (0.14) | .054 | 0.05 | 0.28 | (0.14) | .048 | 0.05 | 0.29 | (0.14) | .042 | 0.05 |
| Music | 0.48 | (0.15) | .002 | 0.08 | 0.51 | (0.15) | .001 | 0.08 | 0.51 | (0.15) | .001 | 0.08 |
| Homework>5 hrs | 0.62 | (0.29) | .032 | 0.10 | 0.59 | (0.30) | .045 | 0.10 | 0.60 | (0.30) | .043 | 0.10 |
| Total | 913 | | | | 905 | | | | 906 | | | |
| $R^2$ | 0.60 | | | | 0.60 | | | | 0.59 | | | |

Interaction terms were calculated for significant PT estimates and other predictors in the model where there were sufficient numbers. Similar patterns emerged in Models 2 and 4

[26] See analysis sequence 5.1.2 for descriptions of models 1-2, 4-6b

suggesting that the students who had low KS1APS achievement benefitted most from PT (see Table 5.9).

*Table 5.9 Significant Interaction effects for KS2 mean Model 2: PT in any subject for more than 1 term with prior achievement KS1APS grouped score*

| **PT and KS1** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| PT 1 term | -0.01 | (0.19) | ns | 0.00 |
| PT >1 term | 0.37 | (0.27) | ns | 0.06 |
| **PT >1 term*APSgrp3** | **2.12** | **(0.72)** | **.003** | **0.35** |
| KS1APS | 0.78 | (0.02) | <.001 | 0.13 |

The interaction terms for Model 2 found that students in the lowest prior achievement group who received 2 or more terms PT (*n*9) scored 0.35 of a level higher when compared to tutored students in groups 1 and 2 and 0.41 of a level (0.35+0.06) higher than students who received no PT. There was no significant difference in the effect of PT between prior achievement groups 1 and 2 so the estimate was removed from the model. The nature of this interaction suggests there was no benefit in receiving extended periods of PT for students in prior achievement groups 1 (*n*19) and 2 (*n*39). Upon closer examination of lower ability group 3 it was found that 6 of the 9 students had identified SEN. It is possible this interaction reflects the fact that these SEN students achieved substantially higher KS2 results relative to other SEN students in prior achievement group 3 who did not receive PT. Care should be taken when interpreting this estimate due to the low number of students involved.

In model 2 there was a negative estimate for pupils in HPI group 3 who had 2 or more terms PT (*n*11). However, this estimate was not significant at the 5% level and has not been explored in detail.

A similar pattern was found in Model 4, which explored the effect of PT during years 5 and 6 on attainment (see Table 5.10). Students who had PT during year 5 and/or year 6 and had a low prior attainment score (group 3, *n*20) achieved on average 0.26 of a level higher than students who had PT during the same period who were in prior achievement groups 1 (*n*54) and 2 (*n*94). Again 55% of students who were included in this interaction had identified SEN. This finding suggests there was no effect of PT during years 5 and 6 for students who had high and average KS1 prior achievement scores.

A significant negative interaction with the HPI revealed that students in HPI group 3 who had PT during years 5 and 6 (*n*25) achieved 0.19 of a grade lower than students who also received

PT during this period and were in HPI groups 1 (*n*86) and 2 (*n*57) (see Table 5.10). Again this interaction estimate should be interpreted with caution due to the low number of students involved.

It should be noted that when the HPI group 3 interaction was added to Model 2 and Model 4 together with the interaction on KS3 low prior achievement score, the baseline group revealed there was still a small significant effect of PT on achievement for students in prior ability groups 1 and 2 in HPI groups 1 and 2 (effect size of 0.1 in Model 2 and 0.07 in Model 4).

*Table 5.10 Significant interaction effects for KS2 mean Model 4: PT in any subject during yrs 5 and 6 with prior achievement KS1APS grouped score and the HPI index*

| **PT and KS1** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| PT yrs5 & 6 | 0.21 | (0.19) | ns | 0.04 |
| **PT yrs5 & 6*APSgrp3** | **1.55** | **(0.49)** | **.002** | **0.26** |
| KS1APS | 0.78 | (0.02) | <.001 | 0.78 |
| PT before Y5 | -0.20 | (0.25) | ns | -0.03 |

| **PT and HPI** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **PT yrs5 & 6** | **0.54** | **(0.20)** | **.006** | **0.09** |
| **PT yrs5 & 6*HPI grp3** | **-1.15** | **(0.46)** | **.012** | **-0.19** |
| HPI grp1 | -0.01 | (0.17) | ns | 0.00 |
| HPI grp3 | -0.08 | (0.18) | ns | -0.01 |
| PT before Y5 | -0.17 | (0.25) | ns | -0.03 |

## 5.6 KS2 results summary

Results for Model 1 found that the combined measure of PT in any subject did not have a significant effect on KS2 attainment in any of the core subjects or the mean EMSKS2 score. However Model 2, which divided this variable by duration, found a significant positive effect for extended periods of PT in maths and mean EMSKS2 score. A positive estimate was obtained for extended periods of PT in English Model 2, although this was not significant at the 5% level. The size of the effect of extended periods of PT in any subject ranged from 0.11 of a level in mean EMSKS2 score to 0.19 in maths. Interaction terms displayed in Tables 5.5 and 5.9 suggest that the effect for extended periods of PT was much greater for students in the lowest prior achievement group relative to those with high and average KS1 achievement. In maths Model 2, students who had low KS1 achievement and had extended periods of PT, scored 0.48 of a level higher than students who did not receive PT. As students are expected to make 2 sub levels of progress in 1 year (ES 0.66), extended periods of PT had a substantial impact on students in prior ability group 3. The results modelling the effect of PT on mean EMSKS2 score (Models 2 and 4) suggest that the effect of PT was also driven by students with low prior achievement scores. In mean Model 4, a significant negative interaction with the HPI suggested there was no positive effect of extended periods of PT for students in HPI group 3.

After controlling for prior achievement at KS1, PT in English did not have a significant effect on English achievement at KS2. Table 5.3 shows that KS2 students who had extended periods of maths tuition had higher scores than students who did not receive PT. However, when controls were added to the model, PT in maths was not a significant predictor of KS2 maths achievement. Conversely, although not significant at the 5% level, the estimates in Model 3 (see Table 5.4) suggest that extended periods of maths PT may have had a small positive effect on achievement (*β* 0.76 (0.44) *p*=.08), although more data is required to confirm this finding.

In comparison to the English and maths models, a smaller proportion of pupils had PT in science. Below average mean KS1 scores for students who received science PT indicate this may have been for remedial purposes. PT in science did not significantly improve science performance at KS2. The negative estimate measuring participation in science tuition during years 5 and 6 demonstrates the inconsistent nature of the science PT estimates. The significant interaction effect suggested that students with average achievement who received PT in science influenced the negative estimate. In all the models, the estimates from the interaction terms should be treated with extreme caution due to the small numbers involved and the sensitivity of the data.

Students who received PT in preparation for an entry examination achieved 0.1 of a level higher in maths than those who did not receive PT. In all other subjects, examination preparation, verbal and non-verbal reasoning PT, did not significantly impact on performance.

# 6 Results: The Impact of Private Tuition on Attainment at KS4

## 6.1 Introduction

This chapter addresses RQ1 and extends the analysis presented in chapter 5 by investigating the effect of PT on achievement at KS4. The outline reflects the previous chapter reporting findings from the Y11 sample. The relationship between PT and the other model predictors will be discussed followed by the main analysis. A summary of the significant findings from the Y11 sample will end the chapter.

### 6.1.1 PT and background predictors

The relationship between PT participation and pupil background characteristics is discussed in detail in Ireson and Rushforth (2005) and in section 5.1.1. This section will examine PT participation with reference to each background characteristic used in this analysis (see Table 6.1). As outlined in the previous chapter, the variable used for this comparison measures PT in any subject at any point in schooling and PT for one term or two or more terms. Duration of PT in the Y11 analysis was measured including participation in years 10 and 11 only (see section 4.2.7).

Involvement in PT through schooling up to and including Y11 differed substantially by ethnic group ($\chi^2(3) = 20.8$, $p < .001$ with the Cramer's V value .14), with significantly higher numbers of black and Asian students participating in PT. Due to the significant correlation between Asian ethnicity and speaking English as an additional language, there was also a significantly higher proportion of EAL students represented in the students who received PT. As mentioned in section 5.1.1, if the sample was larger and the ethnic classifications were further divided into smaller groups, it is likely that additional differences would be revealed in the patterns of participation in PT.

Consistent with the Y6 sample and previous research (Aurini & Davies, 2004; Smyth, 2008), considerably more students with higher HPI received PT. The analysis also shows that students with high HPI were also overrepresented in the group of students who participate in PT for extended periods. The relationship between PT and parent's education level and parental occupation was discussed in section 5.1.1. The analysis of the Y11 sample presented in Ireson and Rushforth (2011) shows the greatest disparity between father's education level and PT participation. A total of 43% of students had received PT if their father had obtained a university degree, compared to 19% if fathers had completed compulsory schooling only.

*Table 6.1 Percentage of PT participation by Y11 student background characteristics*

| | No PT % | PT % | of which: PT 1 term % | PT 2 or more terms % |
|---|---|---|---|---|
| Involvement in PT (% of whole sample) | (74.6) | (25.4) | (6.8) | (9.4) |
| mean EMSKS3 grp 1 (high) | 25.5 | 22.4 | 28.8 | 24 |
| mean EMSKS3 grp 3 (low) | 24.8 | 23.8 | 19.2 | 18 |
| GENDER: Female | 47.5 | 43.3 | 51.4 | 43.1 |
| SEN | 11 | 9.2 | 4.1 | 9.8 |
| Black*** | 4.9* | 8.9 | 9.5 | 5.9 |
| Mixed (inc other)*** | 4 | 3.9 | 2.7 | 3 |
| Asian*** | 6.4 | 13.2 | 18.9 | 14.9 |
| EAL*** | 8.9 | 17.4 | 18.9 | 17.6 |
| HPI: Group 1 High*** | 16.8 | 34.5 | 28.4(*) | 41.9 |
| HPI: Group 3 Low*** | 36.6 | 14.6 | 14.9 | 13.3 |
| Parent questionnaire** | 26.8 | 35.4 | 32.5 | 42.5 |
| Homework 1- <5hrs*** | 65.4 | 64.5 | 59.2 | 65.7 |
| Homework: >=5 hrs *** | 15.8 | 26.8 | 26.3 | 29.5 |
| English Classes | 30.3 | 33.9 | 40.5 | 36.2 |
| Science Classes* | 16 | 21.2 | 16.2(*) | 27.6 |
| Language Classes *** | 13.4 | 23.3 | 23 | 26.7 |
| College* | 26.4 | 24.4 | 27 | 19.2 |
| Apprenticeship* | 7.1 | 4.3 | 0 | 5.8 |
| Leave School* | 3.4 | 1.1 | 1.4 | 0 |
| Not sure/other* | 9.2 | 8.2 | 9.5 | 6.7 |

*p<.05 **p<.01 ***p<.001

Consistent with the finding in the Y6 sample, significantly higher numbers of students who received PT, had parents who returned the questionnaire; this finding supports work completed by West, Noden and Edge (West et al., 1998 see section 5.1.1.).

It is important to highlight that there were no differences in the uptake of PT for students with SEN and students with lower or higher achievement at KS3. This was consistent with the Y6 sample and discussed in section 5.1.1.

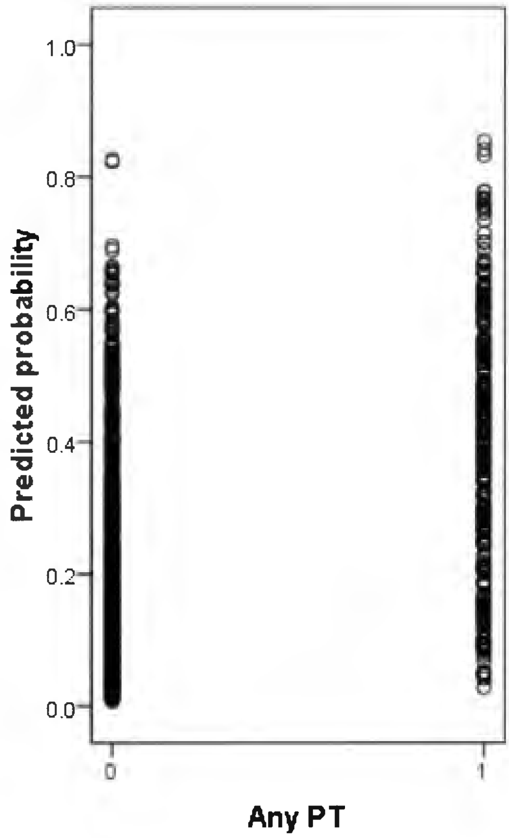
A higher proportion of students who had taken additional language classes also received PT ($\chi^2$ (1) = 15.13, $p$ < .001 with the Phi Value .12) as well as students who participated in extra science classes ($\chi^2$ (1) = 3.9, $p$ < .05 with a much smaller Phi Value .06). No relationship was found between PT participation and additional English classes. Unlike the Y6 sample, there were appreciable differences between the number of hours spent on homework per week and involvement in PT. Over 25% of students who completed five hours or more homework per week compared to 15.8% of non-tutored students. This finding may reflect the extra homework required as a result of PT, or perhaps more engagement in learning of tutored students.

In comparison to the Y6 sample there were more significant differences between those students who participated in PT and those who did not. Logistic regression was undertaken for the Y11 sample to explore the predicted probability of participating in PT (see section 4.2.4). Figure 6.1 displays a scatter plot of propensity scores for students who did and did not participate in PT.

The 13 students, clustered near the top of the plot showing very high predicted probability scores for participation in PT, did not appear to have matching propensity scores to participants in the non-tutored sample and displayed no obvious pattern to their responses. These students exhibited a variety of background characteristics found to be significantly linked to PT (see Table 6.1). Four of the 13 were attending a school where over 50% of the pupils reported receiving PT. Unlike the Y6 sample all the Y11 schools had some student participation in PT; however the total numbers varied and four secondary schools had less than five pupils receiving PT. Almost all of the students with low predicted probability scores who had not received PT were concentrated in these schools (see Figure 6.1).

Although this provisional analysis revealed similarities between the two samples, results of any regression analyses should be interpreted with caution due to the differences between the treatment and control groups.

*Figure 6.1 Scatter Plot: Predicted probability scores for participation in PT, Y11 sample*




### 6.1.2 Analysis sequence

This analysis reports the impact of PT on each of the core subjects and mean EMSKS4 score. Models have been presented in the following order (see section 4.2.7 for details on the PT variables):

- Model 1: Reports the impact of PT in any subject at any point in schooling on outcome
- Model 2: Reports the impact of any PT in the respective subject
- Model 3: Reports the impact of PT in any subject by duration (1 term and 2 or more terms) during years 10 and 11
- Model 4: Reports the impact of PT in the respective subject by duration (1 term and 2 or more terms) during years 10 and 11

Section 4.2.4 outlines the statistical methods used in this analysis; section 5.1.3 provides further information on the interaction effects that were explored. It should be noted that the majority of interaction terms included only 10-20 students from which accurate conclusions cannot be drawn. Interaction terms have been included in the analysis as a guide for future research in this area.

## 6.2 KS4 English

Table 6.2 shows the mean English KS4 and KS3 performance for students included in each of the PT variables used in the Y11 analysis. Mean scores for students who did not receive PT are also included. Table F.10 in Appendix F also reports the average achievement for each variable used in the models for students who did and did not participate in PT. English Models 1-4 are presented in Table 6.3.

Consistent with national statistics (Department for Education and Skills, 2007b), girls outperformed boys in English by 0.33-0.34 of a GCSE grade. Students with SEN scored on average 0.15 of a grade less than other students with no identified SEN; however after controlling for performance at KS3 this was not significant at the 5% level.

The models showed that Asian students performed better than white students by 0.19-0.23 of a GCSE grade, although this was only significant in Model 4 at the 5% level. Participants in HPI group 3 performed significantly worse than the baseline HPI group 2 students by -0.12 to -0.13 of a grade (Table 6.3).

The variable measuring the amount of time spent on homework found that students who spent 1 or more hours a week on homework had significantly higher English performance relative to those who completed less than 1 hour. Students who spent 5 hours or more per week on homework achieved on average 0.23-0.26 of a grade higher than the baseline group. Y11 students whose future plans did not involve attending sixth form (the baseline group), performed significantly lower in English at KS4. Students who determined to leave school after their GCSE examinations scored 0.55 of a grade below those who planned to attend a sixth form. The performance of students who attended extra English classes was 0.1 of a grade higher than those who did not participate in these classes. On average 1 level increase in mean EMSKS3 performance impacted on achievement at GCSE by over 1 grade.

*Table 6.2 Mean KS3 and KS4 scores for students who did/did not receive PT*

| | KS4 English Models | | KS4 Maths Models | | KS4 Science Models | | Mean EMSKS4 Models | |
|---|---|---|---|---|---|---|---|---|
| | EMSKS3 *M(SD)* | GCSE Eng *M(SD)* | KS3 Mat *M(SD)* | GCSE Mat *M(SD)* | EMSKS3 *M(SD)* | GCSE Sci *M(SD)* | EMSKS3 *M(SD)* | Mean EMSKS4 *M(SD)* |
| **No PT** | **34.94(5.88)** | **39.44(8.64)** | **36.15(7.34)** | **37.89(9.68)** | **35.05(5.81)** | **37.83(9.66)** | **35.00(5.84)** | **38.32(8.69)** |
| **MODEL 1** | | | | | | | | |
| Any PT | 34.98(5.05) | 41.56(7.37) | 35.61(6.54) | 39.57(8.80) | 34.95(5.07) | 39.86(8.21) | 35.01(5.04) | 40.25(7.51) |
| **MODEL 2** | | | | | | | | |
| 1 term PT | 35.26(4.89) | 42.91(6.95) | 35.44(6.07) | 40.18(8.29) | 35.26(4.89) | 39.88(8.48) | 35.26(4.89) | 40.78(7.38) |
| 2 or more terms PT | 35.62(4.91) | 41.74(7.29) | 36.34(6.41) | 41.19(8.56) | 35.62(4.91) | 41.49(7.75) | 35.62(4.91) | 41.52(7.08) |
| PT before Y10 | 34.93(4963) | 40.98(7.60) | 36.03(6.64) | 38.38(9.48) | 34.86(5.00) | 39.67(7.90) | 34.93(4.96) | 39.67(7.84) |
| **No PT in respective subject** | **35.07(5.68)** | **40.02(8.42)** | **36.23(7.33)** | **38.09(9.63)** | **35.11(5.66)** | **38.32(9.31)** | - | - |
| **MODEL 3** | | | | | | | | |
| Any PT in respective subject | 34.33(5.52) | 40.17(7.81) | 35.38(6.15) | 39.71(8.61) | 34.57(4.90) | 39.80(7.96) | - | - |
| **Model 4** | | | | | | | | |
| 1 term PT in respective subject | 34.09(6.23) | 38.83(9.03) | 35.21(5.59) | 40.23(8.15) | 35.10(4.59) | 39.60(8.32) | - | - |
| 2 plus terms PT in respective subject | 34.41(6.09) | 39.70(8.56) | 35.63(6.08) | 41.07(8.27) | 34.84(5.04) | 40.64(8.22) | - | - |
| PT in respective subject before Y10 | 34.12(5.13) | 39.96(7.70) | 35.64(6.53) | 39.03(9.08) | 34.11(4.81) | 38.96(7.60) | - | - |

*Table 6.3 Estimates for KS4 English Models 1-4[27] using different measures of PT participation*

| | KS4 ENGLISH MODEL 1 | | | | KS4 ENGLISH MODEL 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.03 | (0.03) | <.001 | 1.03 | 1.03 | (0.03) | <.001 | 1.03 |
| Any PT | **1.42** | **(0.35)** | **<.001** | **0.24** | | | | |
| Any Eng PT | | | | | 0.72 | (0.51) | ns | 0.12 |
| Female | 1.96 | (0.31) | <.001 | 0.33 | 2.01 | (0.32) | <.001 | 0.34 |
| SEN | -0.96 | (0.54) | .077 | -0.16 | -0.90 | (0.55) | ns | -0.15 |
| Black | 0.04 | (0.66) | ns | 0.01 | 0.29 | (0.66) | ns | 0.05 |
| Mixed (inc other) | 0.80 | (0.75) | ns | 0.13 | 0.86 | (0.76) | ns | 0.14 |
| Asian | 0.99 | (0.59) | .091 | 0.17 | 1.12 | (0.59) | .058 | 0.19 |
| HPI grp1 | -0.24 | (0.38) | ns | -0.04 | -0.17 | (0.38) | ns | -0.03 |
| HPI grp3 | -0.71 | (0.35) | .040 | -0.12 | -0.79 | (0.35) | .024 | -0.13 |
| Homework >1-<5 hrs pw | 1.11 | (0.44) | .011 | 0.18 | 1.14 | (0.44) | .010 | 0.19 |
| Homework >=5hrs pw | 1.37 | (0.55) | .013 | 0.23 | 1.58 | (0.55) | .004 | 0.26 |
| English class | 0.62 | (0.32) | .053 | 0.10 | 0.60 | (0.32) | .064 | 0.10 |
| College | -1.65 | (0.39) | <.001 | -0.28 | -1.65 | (0.40) | <.001 | -0.27 |
| Apprenticeship | -2.22 | (0.63) | <.001 | -0.37 | -2.22 | (0.64) | .001 | -0.37 |
| Leave School | -3.28 | (0.96) | .001 | -0.55 | -3.34 | (0.97) | .001 | -0.56 |
| Not sure/other | -2.51 | (0.54) | <.001 | -0.42 | -2.44 | (0.55) | <.001 | -0.41 |
| Total | 1005 | | | | 996 | | | |
| $R^2$ | 0.62 | | | | 0.62 | | | |

| | KS4 ENGLISH MODEL 3 | | | | KS4 ENGLISH MODEL 4 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.03 | (0.03) | <.001 | 1.03 | 1.03 | (0.03) | <.001 | 1.03 |
| PT 1 term | **2.00** | **(0.59)** | **.001** | **0.33** | | | | |
| PT >1 term | 0.43 | (0.51) | ns | 0.07 | | | | |
| Any PT before Y10 | **1.02** | **(0.47)** | **.029** | **0.17** | | | | |
| Eng PT 1 term | | | | | -0.44 | (1.08) | ns | -0.07 |
| Eng PT>1 term | | | | | 0.05 | (0.90) | ns | 0.01 |
| Eng PT before Y10 | | | | | 1.07 | (0.64) | .094 | 0.18 |
| Female | 2.00 | (0.31) | <.001 | 0.33 | 2.01 | (0.32) | <.001 | 0.34 |
| SEN | -0.90 | (0.55) | .099 | -0.15 | -0.91 | (0.55) | ns | -0.15 |
| Black | 0.12 | (0.66) | ns | 0.02 | 0.30 | (0.66) | ns | 0.05 |
| Mixed (inc other) | 0.85 | (0.75) | ns | 0.14 | 0.89 | (0.76) | ns | 0.15 |
| Asian | 0.97 | (0.59) | .098 | 0.16 | 1.21 | (0.59) | .041 | 0.20 |
| HPI grp1 | -0.27 | (0.39) | ns | -0.05 | -0.20 | (0.39) | ns | -0.03 |
| HPI grp3 | -0.74 | (0.35) | .032 | -0.12 | -0.80 | (0.35) | .022 | -0.13 |
| Homework >1-5 hrs pw | 1.07 | (0.44) | .015 | 0.18 | 1.11 | (0.44) | .011 | 0.19 |
| Homework >=5hrs pw | 1.40 | (0.55) | .012 | 0.23 | 1.56 | (0.55) | .005 | 0.26 |
| English class | 0.60 | (0.32) | .063 | 0.10 | 0.64 | (0.32) | .048 | 0.11 |
| College | -1.59 | (0.40) | <.001 | -0.26 | -1.61 | (0.40) | <.001 | -0.27 |
| Apprenticeship | -2.06 | (0.64) | .001 | -0.34 | -2.27 | (0.64) | <.001 | -0.38 |
| Leave School | -3.32 | (0.96) | .001 | -0.55 | -3.29 | (0.97) | .001 | -0.55 |
| Not sure/other | -2.55 | (0.54) | <.001 | -0.43 | -2.44 | (0.55) | <.001 | -0.41 |
| Total | 994 | | | | 992 | | | |
| $R^2$ | 0.63 | | | | 0.63 | | | |

[27] See analysis sequence 6.1.2 for descriptions of models 1-4

### 6.2.1 The impact of PT on English attainment at KS4

Table 6.2 shows the mean English scores were higher for students who had PT in any subject than those who had no PT. However, students who received 1 term or 2 or more terms of PT in English had lower average English scores at GCSE. This may indicate that the English PT received may have been for remedial purposes.

English Model 1 found that the combined measure of PT in any subject at any point during schooling had a positive significant effect on GCSE grade. Students who had PT achieved 0.24 of a grade higher in English compared with students who had never received tuition (Δ 0.17). Interaction terms were explored between this estimate and other model predictors (see Table 6.4). A significant positive estimate was found between students receiving PT who were unsure or had indicated 'other' future plans when they finished their GCSE examinations (*n*21), relative to students who planned to attend sixth form who also had PT (the baseline group). This finding is difficult to interpret due to the mix of participants included in this group. Upon closer examination 76.2% were male, 28.6% black and 52.4% were represented in the low KS3 achievement group. The estimate indicates that these participants achieved 0.43 of a grade higher than other students who had PT and planned to attend sixth form (see Table 6.4).

*Table 6.4 Significant interaction effects for KS4 English Model 1: PT in any subject for more than 1 term with ethnicity and future plans*

| PT and ethnic background | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Any PT** | **1.34** | **(0.40)** | **.001** | **0.22** |
| Any PT*Black | 0.24 | (1.32) | ns | 0.04 |
| **Any PT*Mixed (inc other)** | **3.88** | **(1.69)** | **.022** | **0.65** |
| Any PT*Asian | -0.90 | (1.13) | ns | -0.15 |
| Black | -0.07 | (0.82) | ns | -0.01 |
| Mixed (inc other) | -0.21 | (0.88) | ns | -0.03 |
| Asian | 1.30 | (0.72) | .073 | 0.22 |

| PT and future plans | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Any PT** | **1.36** | **(0.44)** | **.002** | **0.23** |
| Any PT*College | -0.44 | (0.78) | ns | -0.07 |
| Any PT*Apprenticeship | -1.22 | (1.65) | ns | -0.20 |
| Any PT*Leave School | 2.18 | (2.76) | ns | 0.36 |
| **Any PT*Not sure/other** | **2.61** | **(1.21)** | **.031** | **0.43** |
| College | -1.57 | (0.43) | <.001 | -0.26 |
| Apprenticeship | -1.99 | (0.68) | .003 | -0.33 |
| Leave School | -3.74 | (1.02) | <.001 | -0.62 |
| Not sure/other | -3.05 | (0.62) | <.001 | -0.51 |

In this model, students from mixed ethnic backgrounds (*n*10) who received PT achieved significantly better results than corresponding white students. On average mixed (including other) ethnicity students who participated in PT scored 0.65 of a grade higher than white students who also had PT. This sizeable difference in achievement should be interpreted with caution due to the small number of students in this group.

The results from Model 2 indicated that PT in English, at any point in schooling did not significantly impact on performance when compared to students who did not receive PT in English (see Table 6.3). Models 3 and 4 examined PT participation by duration to determine the difference in impact of short or prolonged periods of PT during years 10 and 11. Model 3 explored the impact of any subject tuition in years 10 and 11 for 1 term or 2 or more terms, with an additional measure of PT participation before year 10. This model found that those students who had 1 term of tuition during years 10 and 11 scored 0.33 of a grade higher than those who did not have PT during years 10 and 11 ($\Delta$ 0.24); however no significant improvement was manifest for students who had prolonged periods of tuition. The variable controlling for PT participation before year 10 was also found to be significant. Students who had tuition in any subject before year 10 achieved 0.17 of a grade higher than students who had no PT prior to year 10. This result suggests that students who participated in short periods of PT in year 10 or 11 achieved higher GCSE English results than students who had prolonged periods of PT during years 10 and 11.

Interaction terms were explored with PT for 1 term and none were found to be significant. Further interaction terms were run on the significant estimate of PT before year 10. A similar pattern was found for mixed (including other) race ethnicity and PT as shown in Model 1, although this was based on a smaller number of cases and not significant at the 5% level. A significant relationship was also found between SEN students who received PT; however this was based on a very small number of students (*n*2). This has not been explored here but should be considered in future research incorporating a larger number of students.

Model 3 was repeated, changing the baseline group of the estimates to determine the effect of PT according to when the tuition took place. Three groups were created: 1) PT during years 10 and 11 only, 2) PT only before year 10 and 3), PT prior to and during years 10 and 11. This model found that PT during years 10 and 11 had a significant effect on English score (ES 0.25), and PT only before year 10 had a significant effect (ES 0.26) compared to students who received no PT. However for students who had PT prior to and during years 10 and 11 the effect for PT and GCSE score was not significantly different from students who did not receive PT.

Model 4 found no difference in performance between pupils who received PT in English during Years 10 and 11 for any duration relative to students who did not receive English PT during the same period. Although not significant at the 5% level, the estimate for any participation in English PT before year 10 suggests this may have had a positive impact on GCSE performance.

In these models prior achievement was measured using mean EMSKS3 score. This score had a stronger correlation with KS4 English score than KS3 English performance and was therefore chosen as the prior attainment indicator (see section 4.2.5.2). In order to test the robustness of the data, the analysis was repeated using KS3 English score as the prior achievement indicator. This analysis yielded different results and in all models the estimates for PT participation were not significant at the 5% level. Therefore, care should be taken in making inferences about these results which do not appear to be consistent when using alternative prior achievement measures.

## 6.3 KS4 maths

Maths Models 1-4 are presented in Table 6.5; Tables 6.6-6.9 present the same models including all significant interaction terms. Ethnicity had a significant effect on achievement in maths after controlling for attainment at KS3. Asian students scored 0.38-0.41 of a grade higher than white students; although in this sample black students also outperformed white students by 0.21-0.22. This finding is not consistent with the national pattern of GCSE achievement (Department for Education and Skills, 2007b). Gender difference was not found to be significant in these models after controlling for prior achievement in maths at KS3.

A questionable finding was the estimate for HPI group 1 which was negative and significant at the 5% level in one of the four models. When using OLS, the estimates for group 1 and group 3 were similar indicating there was no significant impact of the HPI on maths achievement after controlling for prior achievement. However, the rescaling of the robust regression weights, gave more influence to the cases in group 1 relative to group 2 and 3 and changed the pattern in the estimates. The beta coefficients suggest that the HPI variable used in these models was not an appropriate control for modelling maths achievement. As a robustness check the model was repeated excluding the HPI variable and including FSM (see Appendix F), this estimate was very small and not statistically significant. For consistency with the other models the HPI has been included in all of the maths models.

The completion of 5 hours or more homework per week had a large significant effect on maths achievement of between 0.49-0.51 of a grade relative to students who spent less than 1 hour on homework. A positive significant effect was also found for students who completed 1 to 5 hours homework (ES 0.24). Interestingly the variable showing participation in extra maths classes was not significant and not included in the maths models; however extra classes in English, science and language all had a significant positive effect on maths GCSE grade. Students who participated in extra English classes scored 0.10 of a grade higher than participants who did not have additional English classes. The effect size was marginally higher for extra language (0.11-0.13 of a grade) and science classes (0.13-0.14 of a grade).

Consistent with the English models, students whose future plans involved anything other than attending a sixth form, performed significantly less well in their GCSE maths examinations. The models found that a 1 level increase in KS3 maths score impacted on maths score by 1.07 grade increase at GCSE. The $R^2$ value indicates that the maths models explained 71% of the variability in maths GCSE performance.

### 6.3.1 The impact of PT on maths attainment at KS4

The mean scores (displayed in Table 6.2) indicate that students who had PT in maths had higher KS4 scores than those who did not receive maths PT. The difference was greatest between those who had 2 or more terms maths PT compared to those who received no PT in maths. KS3 maths prior achievement scores exhibited little difference between tutored and non-tutored students.

In Model 1 any amount of PT in any subject was found to have a significant effect upon maths attainment at KS4 (see Table 6.5). Likewise, Model 2, which explored the impact of maths PT on achievement, also found a significant positive result. The effect sizes for these two models were the same (0.21 of a grade, Δ 0.13) reflecting the patterns of participation in PT. In the Y11 sample, the majority of students who reported participating in PT in any subject had received PT in maths which explains the similarities between these two results.

*Table 6.5 Estimates for KS4 maths Models 1-4[28] using different measures of PT participation*

| | KS4 MATHS MODEL 1 | | | | KS4 MATHS MODEL 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | B | *SE* | Sig. | ES |
| KS3 Maths | 1.07 | (0.02) | <.001 | 1.07 | 1.07 | (0.02) | <.001 | 1.07 |
| Any PT | **1.26** | **(0.32)** | **<.001** | **0.21** | | | | |
| Any Mat PT | | | | | **1.27** | **(0.35)** | **<.001** | **0.21** |
| Female | -0.29 | (0.28) | ns | -0.05 | -0.29 | (0.28) | ns | -0.05 |
| SEN | -0.50 | (0.48) | ns | -0.08 | -0.39 | (0.48) | ns | -0.06 |
| Black | 1.29 | (0.59) | .029 | 0.22 | 1.26 | (0.59) | .033 | 0.21 |
| Mixed (inc other) | -0.13 | (0.68) | ns | -0.02 | -0.22 | (0.68) | ns | -0.04 |
| Asian | 2.48 | (0.53) | <.001 | 0.41 | 2.48 | (0.53) | <.001 | 0.41 |
| HPI grp1 | -0.68 | (0.34) | .046 | -0.11 | -0.54 | (0.34) | ns | -0.09 |
| HPI grp3 | -0.32 | (0.31) | ns | -0.05 | -0.28 | (0.31) | ns | -0.05 |
| Parent | 0.97 | (0.29) | .00 | 0.16 | 1.02 | (0.29) | <.001 | 0.17 |
| Homework >1-<5 hrs pw | 1.46 | (0.39) | <.001 | 0.24 | 1.46 | (0.39) | <.001 | 0.24 |
| Homework >=5hrs pw | 2.93 | (0.49) | <.001 | 0.49 | 3.01 | (0.49) | <.001 | 0.50 |
| English class | 0.60 | (0.29) | .040 | 0.10 | 0.63 | (0.29) | .033 | 0.10 |
| Science class | 0.83 | (0.36) | .022 | 0.14 | 0.78 | (0.36) | .030 | 0.13 |
| Language class | 0.71 | (0.37) | .055 | 0.12 | 0.75 | (0.37) | .042 | 0.13 |
| College | -0.88 | (0.35) | .012 | -0.15 | -0.81 | (0.35) | .020 | -0.14 |
| Apprenticeship | -2.07 | (0.56) | <.001 | -0.35 | -1.96 | (0.57) | .001 | -0.33 |
| Leave School | -2.59 | (0.83) | .002 | -0.43 | -2.55 | (0.83) | .002 | -0.42 |
| Not sure/other | -1.99 | (0.48) | <.001 | -0.33 | -1.85 | (0.48) | <.001 | -0.31 |
| Total | 1019 | | | | 1010 | | | |
| $R^2$ | 0.70 | | | | 0.71 | | | |

| | KS4 MATHS MODEL 3 | | | | KS4 MATHS MODEL 4 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | B | *SE* | Sig. | ES |
| KS3 Maths | 1.07 | (0.02) | <.001 | 1.07 | 1.07 | (0.02) | <.001 | 1.07 |
| PT 1 term | **1.39** | **(0.52)** | **.008** | **0.23** | | | | |
| PT >1 term | **1.93** | **(0.46)** | **<.001** | **0.32** | | | | |
| Any PT before Y10 | 0.48 | (0.41) | ns | 0.08 | | | | |
| Mat PT 1 term | | | | | **1.55** | **(0.57)** | **.007** | **0.26** |
| Mat PT>1 term | | | | | **2.41** | **(0.50)** | **<.001** | **0.40** |
| Mat PT before Y10 | | | | | 0.11 | (0.48) | ns | 0.02 |
| Female | -0.31 | (0.28) | ns | -0.05 | -0.31 | (0.28) | ns | -0.05 |
| SEN | -0.53 | (0.48) | ns | -0.09 | -0.40 | (0.48) | ns | -0.07 |
| Black | 1.33 | (0.59) | .024 | 0.22 | 1.32 | (0.59) | .025 | 0.22 |
| Mixed (inc other) | -0.02 | (0.68) | ns | 0.00 | -0.04 | (0.68) | ns | -0.01 |
| Asian | 2.34 | (0.52) | <.001 | 0.39 | 2.26 | (0.52) | <.001 | 0.38 |
| HPI grp1 | -0.62 | (0.34) | .070 | -0.10 | -0.57 | (0.34) | .094 | -0.10 |
| HPI grp3 | -0.33 | (0.31) | ns | -0.06 | -0.31 | (0.31) | ns | -0.05 |
| Parent | 0.94 | (0.29) | .001 | 0.16 | 0.97 | (0.29) | .001 | 0.16 |
| Homework >1-<5 hrs pw | 1.45 | (0.39) | <.001 | 0.24 | 1.44 | (0.39) | <.001 | 0.24 |
| Homework >=5hrs pw | 2.95 | (0.49) | <.001 | 0.49 | 3.08 | (0.49) | <.001 | 0.51 |
| English class | 0.58 | (0.29) | .050 | 0.10 | 0.56 | (0.29) | .054 | 0.09 |
| Science class | 0.77 | (0.36) | .031 | 0.13 | 0.76 | (0.36) | .035 | 0.13 |
| Language class | 0.68 | (0.37) | .065 | 0.11 | 0.75 | (0.37) | .041 | 0.13 |
| College | -0.84 | (0.35) | .017 | -0.14 | -0.81 | (0.35) | .020 | -0.14 |
| Apprenticeship | -2.00 | (0.57) | <.001 | -0.33 | -2.00 | (0.56) | <.001 | -0.33 |
| Leave School | -2.48 | (0.83) | .003 | -0.41 | -2.48 | (0.82) | .003 | -0.41 |
| Not sure/other | -2.01 | (0.48) | <.001 | -0.33 | -1.90 | (0.48) | <.001 | -0.32 |
| Total | 1008 | | | | 1007 | | | |
| $R^2$ | 0.71 | | | | 0.71 | | | |

[28] See analysis sequence 6.1.2 for descriptions of models 1-4

Interaction effects were explored for Models 1 and 2 and a number of patterns were found in the data (see Table 6.6 and 6.7). In Model 1 the effect of PT on Asian students was higher relative to the PT estimate for white students; however this estimate was not significant at the 5% level and has not been reported in Table 6.6. Further research is required to establish the link between PT participation, ethnicity and attainment. There also appeared to be a larger effect of PT for students who planned to complete an apprenticeship relative to those who planned to attend sixth form; although this estimate was based on a small number of cases (*n*10) and was not significant at the 5% level.

Maths KS3 achievement score was grouped by high (group 1), average (group 2) and low achievement (group 3) and interaction terms with PT added to Model 1 (see section 5.1.3). This analysis found that students who had received PT with high (*n*46) and low (*n*50) prior achievement scores performed significantly less well than corresponding students with average prior attainment (group 2, *n*155) (see Table 6.6). It appears that the significant estimate of PT was driven by students who were represented in prior achievement group 2. These students scored 0.32 of a grade higher than average ability students who did not receive PT.

In maths Model 2 the same prior ability group interaction was evident. Students in group 2 who received PT in maths performed 0.35 of a grade higher than other students in the same ability group who did not have PT (see Table 6.7). Those who received PT with high (group 1, *n*30) or low (group 3, *n*35) prior achievement in maths performed significantly less well in comparison to average ability students (*n*120) who received PT. Both models suggest that there was no effect of PT in any subject (Model 1) or PT in maths (Model 2) on GCSE maths score for students in groups 1 and 3. These results should be interpreted with caution due to the large number of students included in average ability group 2 compared with groups 1 and 3.

*Table 6.6 Significant interaction effects for KS4 maths Models 1: PT in any subject with prior achievement KS3 maths grouped score*

| **PT and KS3 maths** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Any PT** | **1.91** | **(0.37)** | **<.001** | **0.32** |
| **Any PT*KS3 mat grp1** | **-1.82** | **(0.70)** | **.010** | **-0.30** |
| **Any PT*KS3 mat grp3** | **-1.52** | **(0.66)** | **.021** | **-0.25** |
| Maths KS3 | 1.08 | (0.02) | <.001 | 1.08 |

*Table 6.7 Significant interaction effects for KS4 maths Models 2: any PT in maths with prior achievement KS3 maths grouped score*

| PT and KS3 maths | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Any Mat PT** | **2.08** | **(0.41)** | **<.001** | **0.35** |
| **Any Mat PT*KS3 Mat grp1** | **-1.89** | **(0.84)** | **.025** | **-0.31** |
| **Any Mat PT*KS3 Mat grp3** | **-2.54** | **(0.78)** | **.001** | **-0.42** |
| Maths KS3 | 1.07 | (0.02) | <.001 | 1.07 |

A negative effect was found for students who attended extra language classes and received PT (*n*44), relative to students who received PT and did not participate in additional language classes (*n*141). Further research is required to determine the effect of PT on attainment relative to the impact of attendance in additional classes.

Maths Model 3 found a positive effect of PT in any subject on achievement in maths, for both short term and prolonged periods of tuition. Students who received PT for 1 term in year 10 or 11 achieved 0.23 of a grade higher than participants who did not receive PT during this time (Δ 0.15). The effect size for pupils who received prolonged periods of PT was greater than, although not significantly different from, the estimate for 1 term of PT. The students who had 2 or more terms of PT achieved 0.32 of a grade higher than those who did not receive PT during KS4 (Δ 0.20). No significant effect was found for the variable controlling for PT participation before year 10 in any of the maths models.

Model 4, which explored the impact of maths tuition by duration, found a similar pattern to Model 3 which considered PT in any subject. The effect size of PT in maths for 1 term was 0.26 of a grade (Δ 0.16); this increased to 0.40 for students who had participated in 2 or more terms PT in maths during years 10 and 11 (Δ 0.25). Interaction terms were explored in Models 3 and 4 and the effect of PT was found to differ across a number of control variables (see Tables 6.8 and 5.9). As explained in section 5.1.3, when PT was divided by duration there were a number of interactions that could not be pursued due to the limited number of cases.

As with Models 1 and 2, the effect of PT for 1 term and 2 or more terms during years 10 and 11 appeared to be higher for students in average prior ability group 2. In Model 3, students in lower ability group 3 who received 1 term tuition during years 10 or 11 (*n*13) achieved 0.45 of a grade less in comparison to participants in average ability group 2 who also engaged in PT for 1 term tuition (*n*45). This finding indicates there was no effect of PT for 1 term for students in prior ability group 3. There was no significant difference between the effect of PT for students in group 1 and 2 suggesting the effect was constant for both of these groups. Pupils who received extended periods of PT who were included in prior achievement group 2 (*n*60) achieved 0.47 of a GCSE maths grade higher than students who had received no PT. There was no significant difference between the effect for groups 2 and 3, suggesting there was a positive effect for both prior ability groups. However, there was no evidence of an effect of extended periods of PT for students in prior ability group 1 relative to students who did not receive PT (see Table 6.8).

*Table 6.8 Significant interaction effects for KS4 maths Model 3: PT in any subject for more than 1 term with prior achievement KS3 maths grouped score, SEN and the parental support indicator.*

| **PT and KS3 maths** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **PT 1 term** | **2.17** | **(0.62)** | **<.001** | **0.36** |
| PT 1 term*KS3 Mat grp1 | -1.01 | (1.54) | ns | -0.17 |
| **PT 1 term*KS3 Mat grp3** | **-2.70** | **(1.24)** | **.029** | **-0.45** |
| **PT >1 term** | **2.84** | **(0.55)** | **<.001** | **0.47** |
| **PT >1 term*KS3 Mat grp1** | **-2.63** | **(1.02)** | **.010** | **-0.44** |
| PT >1 term*KS3 Mat grp3 | -1.74 | (1.21) | ns | -0.29 |
| KS3 Maths | 1.07 | (0.02) | <.001 | 1.07 |
| **PT and SEN** | β | *SE* | Sig. | ES |
| **PT 1 term** | **1.29** | **(0.53)** | **.015** | **0.22** |
| PT 1 term*SEN | 2.56 | (2.91) | ns | 0.43 |
| **PT >1 term** | **2.24** | **(0.47)** | **<.001** | **0.37** |
| **PT >1 term*SEN** | **-4.09** | **(1.48)** | **.006** | **-0.68** |
| SEN | -0.28 | (0.51) | ns | -0.05 |
| **PT and Parent** | β | *SE* | Sig. | ES |
| PT 1 term | 0.90 | (0.62) | ns | 0.15 |
| PT 1 term*Parent | 1.49 | (1.08) | ns | 0.25 |
| **PT >1 term** | **2.78** | **(0.58)** | **<.001** | **0.46** |
| **PT >1 term*Parent** | **-1.85** | **(0.87)** | **.032** | **-0.31** |
| Parent | 1.03 | (0.32) | .001 | 0.17 |

Interestingly, there was a significant negative effect of PT for 2 of more terms and students with SEN (n9, this effect was also found in Model 4 but involved just 5 students and has therefore not been reported here). These participants achieved -0.68 of a grade below those who had extended periods of PT (during years 10 and 11) with no identified SEN.

Interaction effects in both Models 3 and 4 suggested that the effect of prolonged periods of PT in any subject and in maths PT differed by the HPI group. However, due to the inconsistent nature of the HPI variable in the maths models in comparison to the other subjects, the interaction effects have not been reported here.

In Models 3 and 4 there was a significant negative effect of extended periods of PT upon the parent questionnaire indicator (*n*42 Model 3, *n*33 Model 4). The nature of this interaction suggests that students, whose parents did not return a parent questionnaire, performed better with 2 or more terms of PT than those who had prolonged periods of PT and whose parents did return the questionnaire. More research on parental involvement in education, PT and the link between achievement is required.

Both Models 3 and 4 showed a positive significant effect of short term PT and participation in extra science classes; however these interactions included limited student numbers and have not been reported here. Again, more research is needed to explore the relationship of PT, extra classes and achievement.

The effect of PT in maths during years 10 and 11 (explored in Model 4) was found to vary by prior achievement as shown in Table 6.9. These reflect the findings from the previous maths models, showing the effect for PT appeared to be greater for students in average ability group 2. There was no statistical difference between the effect of the ability groups for 1 term of maths PT; however there was a negative effect of PT for students in group 3 compared to group 2, although this was based on a small number of cases (*n*11) and not significant at the 5% level. Participants in the high prior ability group who had 2 or more terms maths PT (*n*14) scored significantly lower than students who had extended periods of PT in average ability group 2 (*n*48). The effect of PT in maths for 2 or more terms did not have a significant effect for students in prior ability groups 1 and 3.

A significant estimate was found for the interaction with 1 term maths PT and participation in English classes. The nature of the interaction with extra English classes suggests that students who had short periods of maths tuition and attended additional English classes achieved significantly below students who had PT but did not attend English classes. This finding is puzzling and one that was only manifest in maths Model 4. It could be due to EAL pupils having difficulty reading the maths questions, although only 6 of the 27 students who had 1 term of PT and attended English classes spoke English as a second language. Significantly higher results were found for students who participated in either short term maths tuition or for students who attended extra English classes; however there was no additional benefit for students who participated in both activities in combination. As noted earlier, further research in this area is required.

*Table 6.9 Significant interaction effects for KS4 maths Model 4: PT in maths for more than 1 term with prior achievement KS3 maths grouped score, parental support indicator and English classes*

| **PT and KS3 maths** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Mat PT 1 term** | **2.07** | **(0.68)** | **.002** | **0.34** |
| Mat PT 1 term*KS3 Mat grp1 | 0.61 | (1.91) | ns | 0.10 |
| Mat PT 1 term*KS3 Mat grp3 | -2.36 | (1.33) | .078 | -0.39 |
| **Mat PT>1 term** | **3.53** | **(0.60)** | **<.001** | **0.59** |
| **Mat PT>1 term*KS3 Mat grp1** | **-3.24** | **(1.22)** | **.008** | **-0.54** |
| **Mat PT>1 term*KS3 Mat grp3** | **-3.65** | **(1.34)** | **.007** | **-0.61** |
| KS3 Maths | 1.07 | (0.02) | <.001 | 1.07 |

| **PT and Parent** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Mat PT 1 term** | **1.21** | **(0.70)** | **.085** | **0.20** |
| Mat PT 1 term*Parent | 1.01 | (1.17) | ns | 0.17 |
| **Mat PT>1 term** | **3.25** | **(0.66)** | **<.001** | **0.54** |
| **Mat PT>1 term*Parent** | **-1.88** | **(0.97)** | **.053** | **-0.31** |
| Parent | 1.07 | (0.31) | .001 | 0.18 |

| **PT and English classes** | β | *SE* | Sig. | ES |
|---|---|---|---|---|
| **Mat PT 1 term** | **2.44** | **(0.73)** | **.001** | **0.41** |
| **Mat PT 1 term*English class** | **-2.25** | **(1.14)** | **.048** | **-0.38** |
| **Mat PT>1 term** | **2.54** | **(0.62)** | **<.001** | **0.42** |
| Mat PT>1 term*English class | -0.48 | (0.99) | ns | -0.08 |
| English class | 0.74 | (0.32) | .018 | 0.12 |

All the interactions were entered together into the model as a robustness check; most of the variables remained significant with the exception of the estimate relating to the return of the parent questionnaire. The models using multiple interactions have not been presented due to the difficulties in interpreting the baseline group.

A further robustness test was undertaken changing the prior achievement indicator from maths KS3 prior achievement score to mean EMSKS3 achievement. This revealed changes in the estimates across all the models. The PT estimates were reduced and Model 2 (any maths PT at any point in schooling) no longer had a significant PT effect. In Models 3 and 4, 2 or more terms tuition in any subject and extended periods of maths PT were still significant predictors of achievement with effect sizes of 0.26 and 0.30 respectively. However PT for 1 term in any subject or in maths did not produce a significant positive effect consistent with the analysis which used the maths KS3 score.

## 6.4 KS4 science

The KS4 science models are presented in Table 6.10. The estimates show that in science females performed significantly lower than male students by 0.11 of a GCSE grade. After controlling for prior achievement, students with SEN did not perform significantly lower than students with no known SEN. As with the maths model, Asian students in the sample scored between 0.35-0.37 of a grade higher in science compared to white students. Participants in HPI group 3 achieved 0.16 of GCSE grade lower than students in HPI group 2. Those students who completed 5 hours or more homework per week attained 0.32-0.35 of a grade higher than students who completed less than 1 hour per week (baseline group). Student who completed between 1 and 5 hours homework per week also achieved 0.14-0.16 of a grade higher than those in the baseline group. The variables concerned with future plans revealed no significant difference between science achievement for students who planned to begin an apprenticeship following KS4 and those who planned to attend sixth form. This perhaps reflects the emphasis placed on gaining grade A*-C in English and maths with less focus on science, or possibly relates to the practical aspects of science and availability of engineering and manufacturing apprenticeships.

Students who attended extra science classes scored 0.13-0.14 of a grade higher than students who did not attend these classes. There was a significant effect of parental support upon GCSE science attainment, with an effect size of 0.11-0.13 of a grade. One level change in EMSKS3 score accounted for 1.2 grades in GCSE science performance. The $R^2$ shows the models account for 62% of the variability in GCSE science performance.

### 6.4.1 The impact of PT on science attainment at KS4

In comparison to the number of students involved in maths tuition, participation in science was considerably lower. A total of 60 students indicated they had received PT in science at some point during schooling, of which 43 had participated during years 10 an 11. During KS4 15 students had received 1 term and 28 students 2 or more terms PT.

The mean scores for students who had undertaken PT in science were comparable to students who did not receive science PT and those who did not receive PT in any subject. However, students who had 2 or more terms PT in science achieved higher KS4 scores than those who did not have PT in science (see Table 6.2).

*Table 6.10 Estimates for KS4 science Models 1-4[29] using different measures of PT participation*

| | KS4 SCIENCE MODEL 1 | | | | KS4 SCIENCE MODEL 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.20 | (0.04) | <.001 | 1.20 | 1.20 | (0.04) | <.001 | 1.20 |
| Any PT | **0.73** | **(0.38)** | **.055** | **0.12** | | | | |
| | | | | | 0.73 | (0.66) | ns | 0.12 |
| Female | -0.64 | (0.33) | .057 | -0.11 | -0.67 | (0.34) | .046 | -0.11 |
| SEN | 0.66 | (0.58) | ns | 0.11 | 0.97 | (0.59) | .099 | 0.16 |
| Black | 0.25 | (0.71) | ns | 0.04 | 0.30 | (0.71) | ns | 0.05 |
| Mixed (inc other) | 0.39 | (0.81) | ns | 0.06 | 0.37 | (0.81) | ns | 0.06 |
| Asian | 2.19 | (0.63) | .001 | 0.36 | 2.20 | (0.64) | .001 | 0.37 |
| HPI grp1 | 0.35 | (0.41) | ns | 0.06 | 0.46 | (0.41) | ns | 0.08 |
| HPI grp3 | -0.91 | (0.37) | .015 | -0.15 | -0.91 | (0.37) | .015 | -0.15 |
| Parent | 0.75 | (0.35) | .033 | 0.12 | 0.76 | (0.35) | .032 | 0.13 |
| Homework >1-<5hrs pw | 0.81 | (0.47) | .082 | 0.14 | 0.93 | (0.47) | .047 | 0.16 |
| Homework >=5hrs pw | 1.89 | (0.59) | .001 | 0.31 | 2.10 | (0.59) | <.001 | 0.35 |
| Science class | 0.84 | (0.43) | .052 | 0.14 | 0.76 | (0.43) | .079 | 0.13 |
| College | -1.09 | (0.42) | .010 | -0.18 | -0.98 | (0.43) | .021 | -0.16 |
| Apprenticeship | -0.66 | (0.67) | ns | -0.11 | -0.86 | (0.68) | ns | -0.14 |
| Leave School | -3.37 | (1.03) | .001 | -0.56 | -3.32 | (1.03) | .001 | -0.55 |
| Not sure/other | -1.86 | (0.59) | .002 | -0.31 | -1.77 | (0.59) | .003 | -0.29 |
| Total | 1003 | | | | 994 | | | |
| $R^2$ | 0.62 | | | | 0.62 | | | |

| | KS4 SCIENCE MODEL 3 | | | | KS4 SCIENCE MODEL 4 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.20 | (0.04) | <.001 | 1.20 | 1.20 | (0.04) | <.001 | 1.20 |
| PT 1 term | 0.45 | (0.63) | ns | 0.08 | | | | |
| PT >1 term | 0.69 | (0.55) | ns | 0.11 | | | | |
| Any PT before Y10 | 0.59 | (0.50) | ns | 0.10 | | | | |
| Sci PT 1 term | | | | | 0.51 | (1.27) | ns | 0.08 |
| Sci PT>1 term | | | | | 0.31 | (0.97) | ns | 0.05 |
| Sci PT before Y10 | | | | | 0.75 | (1.06) | ns | 0.13 |
| Female | -0.64 | (0.34) | .057 | -0.11 | -0.67 | (0.34) | .046 | -0.11 |
| SEN | 0.90 | (0.59) | ns | 0.15 | 0.96 | (0.60) | ns | 0.16 |
| Black | 0.21 | (0.71) | ns | 0.04 | 0.28 | (0.71) | ns | 0.05 |
| Mixed (inc other) | 0.35 | (0.82) | ns | 0.06 | 0.36 | (0.82) | ns | 0.06 |
| Asian | 2.11 | (0.63) | .001 | 0.35 | 2.20 | (0.64) | .001 | 0.37 |
| HPI grp1 | 0.41 | (0.42) | ns | 0.07 | 0.46 | (0.41) | ns | 0.08 |
| HPI grp3 | -0.94 | (0.37) | .012 | -0.16 | -0.93 | (0.38) | .013 | -0.16 |
| Parent | 0.66 | (0.35) | .062 | 0.11 | 0.75 | (0.35) | .034 | 0.13 |
| Homework >1-<5hrs pw | 0.84 | (0.47) | .076 | 0.14 | 0.95 | (0.47) | .045 | 0.16 |
| Homework >=5hrs pw | 1.90 | (0.59) | .001 | 0.32 | 2.12 | (0.59) | <.001 | 0.35 |
| Science class | 0.78 | (0.43) | .073 | 0.13 | 0.75 | (0.44) | .084 | 0.13 |
| College | -0.96 | (0.43) | .025 | -0.16 | -0.98 | (0.43) | .023 | -0.16 |
| Apprenticeship | -0.80 | (0.69) | ns | -0.13 | -0.87 | (0.69) | ns | -0.14 |
| Leave School | -3.31 | (1.03) | .001 | -0.55 | -3.33 | (1.04) | .001 | -0.55 |
| Not sure/other | -1.86 | (0.59) | .002 | -0.31 | -1.78 | (0.59) | .003 | -0.30 |
| Total | 992 | | | | 990 | | | |
| $R^2$ | 0.62 | | | | 0.62 | | | |

[29] See analysis sequence 6.1.2 for descriptions of models 1-4

Before adjusting for the outlying scores, the estimate using OLS with robust standard errors for PT participation on science achievement (Model 1) was highly significant. However when adjusted for outlying cases, the robust regression reduced the PT coefficient from 1.18 (*SE* 0.42 p<.01) to 0.73 (*SE* 0.38 p=.055). Although no students who received PT were given weights of less than 0.3, it is clear that the PT estimate was in some part being driven by outlying scores. The robust regression model showed that students who had received any PT performed 0.12 of a grade higher in science at GCSE (significant at the 6% level). Interaction effects were explored and a significant relationship was found between return of a parent questionnaire and PT (see Table 6.11).

*Table 6.11 Significant interaction effects for KS4 science Model 1: PT in any subject with the parental support indicator*

| **PT and Parent questionnaire** | | β | *SE* | Sig. | ES |
|---|---|---|---|---|---|
| Any PT | | 0.16 | (0.46) | ns | 0.03 |
| | Any PT*Parent | **1.60** | **(0.74)** | **.031** | **0.27** |
| Parent | | 0.30 | (0.41) | ns | 0.05 |

This interaction suggests that the students who benefitted significantly from PT were those who also had a level of parental support (measured through the return of a parent questionnaire (see section 4.2.6.1). These students achieved on average 0.27 of a GCSE science grade higher than comparable students who had PT but whose parents did not return the questionnaire. The nature of this interaction was contrary to that found in maths Model 4 which is somewhat confusing and difficult to explain. It should be noted that this interaction coefficient was smaller when using dummy variable adjustment for the missing data and was not significant at the 5% level.

The impact of PT in any subject was divided by duration during years 10 and 11 (Model 3). The coefficients in this model suggest that there was no significant difference between the scores of students who received PT during years 10 and 11 for any duration relative to students who did not participate in PT during this time. The same result was found for those receiving science PT during years 10 and 11. As noted earlier the participation rates for science tuition were substantially lower compared to the number of students who received English and maths PT. Perhaps, as a consequence of this, the estimates for science PT (Models 2 and 4) did not find a significant difference in the attainment of students who received science PT relative to those who did not. A larger sample of students who receive science PT is required to explore this relationship further.

A robustness test was completed by changing the prior achievement measure from mean KS3 performance to KS3 science performance. As with the English model, mean KS3 had been chosen as the prior achievement data due to its high correlation with KS4 science performance. This analysis showed differences in the beta coefficients, but the patterns in the findings remained the same. The PT estimates were smaller using science KS3 score as the prior achievement measure.

## 6.5 Mean EMSKS4

National statistics reflecting the number of students achieving 5 A*-C grades at GCSE (including maths and English) show that females outperform males by 8.3 percentage points (Department for Education and Skills, 2007b). However, in the current study, after controlling for other characteristics, no significant gender difference was found in EMSKS4 score (see Table 6.12). When homework participation was removed from the models the gender estimate revealed that females outperformed males in mean EMSKS4 score, this illustrates that including the measures for homework participation in part absorbs the gender effect.

Similar to the results found in the maths and science models, Asian students outperformed white students by 0.34-0.35 of a GCSE grade. Students in HPI group 3 performed significantly less well than students in HPI group 2 (ES -0.10). After controlling for prior achievement, there was no significant difference between SEN students and those with no identified SEN. Extra English classes had a significant positive effect upon mean EMSKS4 score, with an effect size of 0.09. Participation in extra classes in other subjects did not significantly impact on mean EMSKS4 score and were not included in the models.

Reflecting the results found in the English and maths models, students whose future plans involved sixth form (the baseline group) performed significantly better than students who planned to leave school, start an apprenticeship, attend college or had other future plans. Students who completed 5 hours or more homework per week achieved 0.35-0.36 of a grade higher than students who completed less than 1 hour. Likewise students who completed between 1 and 5 hours homework per week also achieved higher GCSE scores relative to the baseline group. The $R^2$ value for the mean EMSKS4 models was higher in comparison to the core subjects, indicating that the models explain 72% of the variance in the EMSKS4 score.

*Table 6.12 Estimates for KS4 mean EMSKS4 Models 1 and 3[30] using different measure of PT participation*

| | KS4 *M* EMSKS4 MODEL 1 | | | | KS4 *M* EMAKS4 MODEL 3 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | B | *SE* | Sig. | ES |
| EMSKS3 | 1.18 | (0.02) | <.001 | 1.18 | 1.19 | (0.02) | <.001 | 1.19 |
| Any PT | **0.91** | **(0.25)** | **<.001** | **0.15** | | | | |
| PT 1 term | | | | | **0.93** | **(0.43)** | **.030** | **0.15** |
| PT >1 term | | | | | **0.81** | **(0.37)** | **.029** | **0.14** |
| Any PT before Y10 | | | | | 0.58 | (0.34) | .085 | 0.10 |
| Female | 0.11 | (0.22) | ns | 0.02 | 0.14 | (0.23) | ns | 0.02 |
| SEN | -0.60 | (0.39) | ns | -0.10 | -0.53 | (0.40) | ns | -0.09 |
| Black | 0.23 | (0.47) | ns | 0.04 | 0.27 | (0.48) | ns | 0.05 |
| Mixed (inc other) | 0.60 | (0.54) | ns | 0.10 | 0.63 | (0.55) | ns | 0.11 |
| Asian | 2.09 | (0.42) | <.001 | 0.35 | 2.06 | (0.43) | <.001 | 0.34 |
| HPI grp1 | -0.24 | (0.27) | ns | -0.04 | -0.21 | (0.28) | ns | -0.03 |
| HPI grp3 | -0.58 | (0.25) | .021 | -0.10 | -0.60 | (0.25) | .017 | -0.10 |
| Parent | 0.76 | (0.23) | .001 | 0.13 | 0.74 | (0.24) | .002 | 0.12 |
| Homework >1-<5hrs pw | 1.21 | (0.31) | <.001 | 0.20 | 1.18 | (0.32) | <.001 | 0.20 |
| Homework >=5hrs pw | 2.14 | (0.40) | <.001 | 0.36 | 2.10 | (0.40) | <.001 | 0.35 |
| English class | 0.54 | (0.23) | .019 | 0.09 | 0.54 | (0.23) | .020 | 0.09 |
| College | -1.16 | (0.28) | <.001 | -0.19 | -1.12 | (0.29) | <.001 | -0.19 |
| Apprenticeship | -1.85 | (0.45) | <.001 | -0.31 | -1.78 | (0.46) | <.001 | -0.30 |
| Leave School | -2.88 | (0.69) | <.001 | -0.48 | -2.85 | (0.70) | <.001 | -0.48 |
| Not sure/other | -1.75 | (0.39) | <.001 | -0.29 | -1.76 | (0.39) | <.001 | -0.29 |
| Total | 1002 | | | | 991 | | | |
| $R^2$ | 0.72 | | | | 0.72 | | | |

### 6.5.1 The impact of PT on mean EMSKS4 attainment at KS4

The mean scores at KS3 show that students who participated in PT have similar scores to those who did not. However, KS4 mean scores indicate that students who received PT had higher GCSE grades than those who did not (*M* 40.25 compared to *M* 38.32) (see Table 6.2).

Model 1 shows that PT in any subject at any point in schooling had a positive impact on GCSE attainment (see Table 6.12). Students who had any amount of PT in any subject scored on average 0.15 of a grade higher than those who did not (Δ 0.11). No interaction terms were found to be significant suggesting that the effect of PT was constant across the sample. Model 3 showed a similar effect of PT by duration for both 1 term and 2 or more terms.

Significant interactions were found with 1 term PT, mixed (including other) race students and participants with SEN. These results have not been reported due to very small numbers

[30] See analysis sequence 6.1.2 for descriptions of models 1 and 3

involved; however these findings demonstrate the need for further research in this area. There was also an indication that the effect of 1 term of PT on achievement may also have varied by return of the parent questionnaire although this estimate was not significant at the 5% level.

## 6.6 KS4 results summary

Model 1 in each of the core subjects and mean EMSKS4 score found a significant positive effect for the combined PT indicator upon KS4 achievement. The effect size ranged from 0.12 of a science grade to 0.24 in of a grade in English.

Model 2 explored the effect of PT in English, maths and science upon performance in the respective subject. Only the estimate for maths was found to be significant. Students who had any maths PT during their schooling achieved 0.21 of a GCSE maths grade higher than students who received no maths PT.

Models 3 and 4 divided PT during years 10 and 11 by duration. Model 3 measured the combined effect of PT in any subject, whereas Model 4 focused on PT within the respective subject. KS4 English Model 3, found a positive significant effect for 1 term tuition in any subject upon English achievement (ES 0.33); however there was no effect for extended periods of tuition in any subject on English GCSE grade. PT participation prior to Y10 also had a significant effect upon English achievement.

Statistically significant effects were found in maths Models 3 and 4, indicating there was an effect of PT in maths and PT in any subject upon GCSE maths achievement. The estimates indicate that students who had prolonged periods of PT achieved higher maths scores than those who had 1 term of PT. Students who had PT in maths for 2 or more terms during KS4 achieved 0.4 of a GCSE grade higher than students who had no maths PT during years 10 and 11. The size of the effect on maths score was higher for targeted maths tuition than for the combined measure of PT in any subject.

Fewer students stated they had been tutored in science, as against English and maths and no significant differences were found between the achievement of students who did and did not receive PT in science. PT in any subject during years 10 and 11 also produced non-significant estimates in the science model.

Interaction effects were explored and revealed interesting and sometimes contradictory findings. Several interactions were based on very small numbers, and findings should be treated with caution. The most consistent finding indicated that there was variation in the effect of maths PT by ability group. The nature of this interaction suggested students in ability group 2 achieved significantly higher GCSE maths scores relative to students who also received PT from ability groups 1 and 3 (see section 6.3.1 for full details as this effect differed for ability groups 1 and 3 in maths models 3 and 4). The effect size of PT for ability group 2 ranged from 0.32 of a GCSE maths grade for any subject PT (Model 1) to 0.59 of a grade for students who received extended periods of PT in maths. Further research is needed to determine the effect of PT upon achievement by different background characteristics.

The two mean EMSKS4 models found that students who received any PT had significantly higher average performance compared to students who did not receive PT. The effect sizes ranged from 0.14 to 0.15 of a GCSE grade. This effect was constant across different model predictors.

# 7 Discussion – The Impact of Private Tuition on Attainment at KS2 and GCSE Level

## 7.1 Introduction

The focus of the analysis thus far has been an attempt to determine the impact of PT in maths, English, and science and a combined measure of PT participation upon achievement at KS2 and GCSE level (RQ1). This chapter will begin with a summary of the results from the Y6 and Y11 analyses. The key findings will be presented and compared to current literature. The chapter ends with a discussion on the limitations of the study and future plans to extend research in this area.

## 7.2 Summary of key findings

The key findings from the KS2 and KS4 analyses have been summarised below in Table 7.1. The average effect sizes have been included and marked with '†' to show that the effect was not constant for all tutored pupils. A summary of the variation in these effects by different explanatory variables is presented in section 7.2.1. Table 7.1 shows that PT in maths and PT in any subject had a significant effect on maths GCSE score in all the Y11 models. KS4 maths Model 4 found that the overall effect of extended periods of maths PT during years 10 and 11 represented two fifths of a GCSE grade; however, there was a higher proportion of non-significant findings and no evidence was found to suggest that PT in English or science made an impact on respective KS4 or KS2 achievement.

The majority of significant PT effects that were found in the analyses varied by different explanatory variables suggesting that participation in PT had a greater impact on certain groups of students and in certain subject areas. The effect sizes in a small proportion of models could be considered substantial representing more than half a GCSE grade and 0.48 of a KS2 level (which is equivalent to just over half a year of expected progress at KS2); however, it is important to note that the interactions are based on very small numbers of participants and should be treated with caution. These findings are summarised below.

*Table 7.1 Summary of KS2 and KS4 PT estimates using standardised effect sizes (Δ) and KS2 level (Level ES) and GCSE grade effect sizes (Grade ES)*

| **YEAR 6** | **KS2 English** | | **KS2 Maths** | | **KS2 Science** | | ***M* EMSKS2** | |
|---|---|---|---|---|---|---|---|---|
| | Δ | Level ES | Δ | Level ES | Δ | Level ES | Δ | Level ES |
| **PT in *any subject*** | | | | | | | | |
| MODEL 1 | | | | | | | | |
| PT Any subject | ns | ns | ns | ns | ns | ns | ns | ns |
| MODEL 2 | | | | | | | | |
| 1 term PT in any subject | ns | ns | ns | ns | ns | ns | ns | ns |
| 2 + terms PT in any subject | .11 | .07 (*9) | **.24** | **†.19**** | ns | ns | **.17** | **†.11*** |
| **PT in *respective subject*** | | | | | | | | |
| MODEL 3 | | | | | | | | |
| 1 term PT in respective subject | ns | ns | ns | ns | ns | ns | - | - |
| 2+ terms PT in respective subject | ns | ns | .16 | .13 (*) | ns | ns | - | - |
| MODEL 4 | | | | | | | | |
| PT in respective subject during yrs5 & 6 | ns | ns | | ns | -.20 | †-.13 (*) | .09 | †.06(*) |
| MODEL 5 | | | | | | | | |
| PTexam | ns | ns | **.12** | **.10*** | ns | ns | ns | ns |
| MODEL 6 | | | | | | | | |
| PTverbal | ns | ns | - | - | - | - | ns | ns |
| PTnon-verbal | - | - | ns | ns | - | - | ns | ns |

| **YEAR 11** | **KS4 English** | | **KS4 Maths** | | **KS4 Science** | | ***M* EMSKS4** | |
|---|---|---|---|---|---|---|---|---|
| | Δ | Grade ES | Δ | Grade ES | Δ | Grade ES | Δ | Grade ES |
| ***PT in any subject*** | | | | | | | | |
| MODEL 1 | | | | | | | | |
| PT Any subject | **.17** | **†.24**** | **.13** | **†.21**** | .08 | †.12 (*) | **.11** | **.15**** |
| MODEL 3 | | | | | | | | |
| 1 term PT in any subject (yrs 10 & 11) | **.24** | **.33**** | **.15** | **†.23**** | ns | ns | **.11** | **.15**** |
| 2 + terms PT in any subject (yrs 10 & 11) | ns | ns | **.20** | **†.32**** | ns | ns | **.10** | **.14**** |
| **PT in *respective subject*** | | | | | | | | |
| MODEL 2 | | | | | | | | |
| Any PT in respective subject | ns | ns | **.13** | **†.21**** | ns | ns | - | - |
| MODEL 4 | | | | | | | | |
| 1 term PT in respective subject (yrs 10 & 11) | ns | ns | **.16** | **†.26**** | ns | ns | - | - |
| 2+ terms PT in respective subject (yrs 10&11) | ns | ns | **.25** | **†.40**** | ns | ns | - | - |

† Significant interaction effects, the effect size of PT differed by explanatory variables
(*) p<.1 *p<.05 **p<.01

### 7.2.1 Interaction effects

The combined measure of PT in any subject received at any point during schooling had a positive significant effect upon English GCSE score. However, this effect was greater for mixed race students and those who had 'other' future plans (KS4 English Model 1 Table 6.4). Extended periods of PT in any subject had a significant positive effect on achievement in maths for all Y6 pupils (ES 0.19), especially for the 11 students with low KS1APS (ES 0.48 Table 5.5).

For Y11 any PT was found to have a significant effect on GCSE maths achievement, although in Model 1 and 2 the effect appeared to be limited to students with average prior KS3 achievement (see Table 6.6 and 6.7). When divided by duration the effect of 1 term PT in any subject was manifest for prior achievement groups 1 and 2 but there was no effect for students in group 3. The effect for extended periods of PT also varied by prior ability group; there was no significant effect for students in prior achievement group 1. There was also some evidence to suggest the effect of 1 term PT in any subject was associated with the return of a parent questionnaire and SEN (KS4 maths Model 3 Table 6.8). KS4 maths Model 4 found that 1 term of maths PT was constant across prior ability groups, whereas for 2 or more terms the effect was only manifest for students in ability group 2. The effect of 1 term maths PT also varied by participation in extra English classes and return of the parent questionnaire (see Table 6.9).

There was some evidence to suggest that science PT during years 5 and 6 had a negative effect on science performance for students with average KS1APS achievement. However, this finding should be treated with caution due to the small number of students involved and the instability of the estimates (see Table 5.7). In the Y11 sample there was an average effect of PT in any subject on science achievement at KS4 (ES 0.12), although the results presented in Table 6.11 suggest that this PT effect relates only to students whose parents had returned a questionnaire.

PT in any subject for extended periods had a significant positive effect on EMSKS2 score for students who had low KS1APS achievement (see Table 5.9). PT during years 5 and 6 also had a positive significant impact for students who scored below average at KS1, but not for students in HPI group 3 (see Table 5.10). There was also a significant effect for PT in any subject on mean EMSKS4 score; however this effect was constant for all pupils receiving PT.

These findings show that the effect of PT varied substantially across subjects, ability groups and a number of other background characteristics. Although these results show a number of effects of PT for certain groups of students on maths and mean performance, no effects were found for PT in English and science. These results are difficult to comprehend when a sizeable proportion of students in England receive PT (Beaton et al., 1996; Ipsos MORI, 2005; Ireson & Rushforth, 2005; Mullis et al., 2000; Peters et al., 2009) which is often undertaken to improve examination grades and enhance test performance (Ipsos MORI, 2009; Ireson & Rushforth, 2005).

Chapter 2 revealed that the outcomes of PT are very varied and complex. A study often cited (B. S. Bloom, 1984) showed that PT can have a sizeable positive effect on achievement (see Anania, 1981; Burke, 1983), however the literature shows that achievement gains of this size are rare, with the majority of studies reporting very modest or non-significant effect sizes (Cheo & Quah, 2005; Ireson & Rushforth, 2005; Smyth, 2008, 2009; Smyth et al., 2007). Smyth's (Smyth, 2008, 2009; Smyth et al., 2007) research (see section 2.2) did not find any benefit from tuition after controlling for social class, gender, prior achievement and educational aspirations. Smyth argues that students who participate in PT in Ireland do well regardless of whether or not they receive PT and this explains the non-significant results. It is interesting to note that the studies included in Cohen's meta-analysis using nationally standardised tests as the achievement measures showed much smaller effect sizes (P. A. Cohen et al., 1982). Therefore it appears that the results of the current study, using standardised national tests and finding only varied and limited achievement gains, are consistent with a number of studies in the current literature.

The year 11 analysis began by examining the combined effect of any amount of PT in any subject at any point in schooling on subsequent GCSE grade (Model 1). The estimates for this variable were significant in all the Y11 models. Students were asked if they had ever had a private tutor and all participants who provided an affirmative response were included in this PT variable. Therefore, this measure includes students who may have received short periods of PT at an earlier point in schooling. Although it is unlikely that a brief period of French tuition during year 9 had an impact on subsequent core subject GCSE grades, the models show a significant positive effect of the combined measure of PT on achievement at GCSE in all the models regardless of the amount or when the tuition took place. Research has shown that students who participate in PT are often from wealthy families (Ireson & Rushforth, 2005; Peters et al., 2009). Therefore, PT in these models may simply be another indicator of wealth not identified by the variable controlling for the HPI included in the models.

This result may also demonstrate high levels of parental involvement in education (see Desforges & Abouchaar, 2003). Parents who invest in education through employing tutors may place more value on education in the home which has a direct positive impact on achievement at all levels of schooling (West et al., 1998). Variation between the effect of PT and parental involvement (measured through the return of a parent questionnaire see section

4.2.6.1) was not found in the KS2 models; however the KS4 analysis produced contradictory results.

It is important to note that the apparent varied and non-significant effect of PT found in this analysis may not accurately reflect the learning gains that can be made when students receive PT. Pupils may have unidentified SEN or undiagnosed dyslexia and fall behind at school. Extra support through PT may help the recipient reach the expected level of progress, whereas without this assistance the student may have fallen further behind. The measures used in the current study, particularly KS1 tests taken 4 years prior to KS2, would not pick up this learning gain. It is therefore likely that the effect of PT has been understated in this analysis.

## 7.3 Subject differences

As outlined above, the results of the analysis found no significant effect of PT in science and English on KS2 and GCSE attainment. Although relatively similar, the mean achievement scores displayed in Tables 5.3 and 6.2 show that for some measures of PT participation, the mean scores were lower for pupils who received PT compared to those who did not receive PT. This may suggest that the tuition received may have been remedial in nature for students who had lower than average achievement. Ireson (2004) argues that remedial tutoring is likely to confer smaller gains in achievement in comparison to higher performing students who experience less difficulty with the curriculum. Perhaps this explains the lack of evidence for achievement gains found in English and science. This may also account for the significant negative estimate for SEN students who had extended periods of PT in KS4 maths Model 3 (see Table 6.8). However, this does not explain the results for KS2 maths and mean achievement for students who had prolonged periods of PT. Students with lower KS1 results who received 2 or more terms tuition in any subject, achieved 0.34 of a level higher than students with high and average KS1 achievement who also received PT. It should be noted that this group contained only 11 students and within the lower achievement group these participants had higher mean KS1 scores compared to non-tutored students in the same group ($M$ 10.21, $SD$ 1.78 compared to $M$ 9.36, $SD$ 2.72). Figure 4.6 also shows that the KS2 maths score has an element of negative skew perhaps creating ceiling effects for the higher ability students.

The year 6 questionnaire specifically referred to reading and writing tuition and this has been labelled as English tuition for consistency with the year 11 analysis, therefore it is possible that a substantial proportion of year 6 students were being tutored in reading. Smaller gains from reading tuition compared to tuition in other subjects are not uncommon in the literature (P. A.

Cohen et al., 1982; Shanahan, 1998). Greenwood et al. (1993) found the effect size of maths tutoring was .57 compared to .39 in reading. One explanation might be that tuition in maths emphasises computation, a relatively easy-to-learn basic skill; reading on the other hand may include more complex reasoning processes underlying comprehension and interpretation (Shanahan, 1998).

As noted earlier there were no differences in science achievement between students who did and did not receive PT in science. This finding was consistent for both the Y6 and Y11 samples. It should be noted however that the proportion of students receiving PT was very small, representing 7.6% of Y6 and 6.1% of the Y11 sample. It is possible that an average effect of science PT was not found due to the small number of students involved. Using a sample with a larger proportion of students participating in science PT might yield different results. This may also be the case for English PT in the Y11 sample where only 9.4% indicated they had been tutored in this subject. The most frequently tutored subject for both samples was maths in which the largest effect sizes were found. Due to the limited size of the treatment group it is perhaps surprising that any significant effects were found in the two samples.

As noted above the effect for maths and PT in any subject on GCSE maths achievement appeared to be focussed on students of average ability. Students with high maths attainment at KS3 are likely to be entered for the higher maths tier and/or included in top maths sets. Perhaps there is a ceiling effect for these students where there is less room for progression. Ireson, Hallam and Hurley (2005) found that average ability students were often included in low, average and high maths sets and have more variability in outcome. When the research took place, low ability students entered for the lower maths tier could score a maximum grade D (Qualifications and Curriculum Authority, 2006), so it is possible these students had less opportunity to achieve higher grades compared to students in the middle set. However it is important to note that the sample was divided into three by selecting the top and bottom 25% (see Table 4.6), therefore the majority of students were included in the middle group and this factor may be driving the results.

## 7.4 Duration

In this study there were clear benefits from extended periods of tuition. The Y6 results showed that only 1 term of PT in any subject did not have a significant effect on achievement. Apart from the effect of examination preparation PT on maths achievement and the small positive estimate for PT during year 5 and 6 on mean EMSKS2 score, the only significant PT effect in the Y6 analysis was found for students who received PT for 2 or more terms. In the Y11 sample, the effects comparing duration were less pronounced. Although not significantly different, the effect sizes for extended periods of PT on maths achievement were greater compared to those for 1 term. However, no effect for extended periods of PT was found on achievement in English. For mean EMSKS4 score there was no difference between the effect sizes of PT for 1 and 2 or more terms.

Findings from the literature on the duration of tuition are unclear. Cohen et al. (1982) suggested that the gains from one-to-one tuition decrease sharply the longer the tuition programme. This finding contradicts studies that suggest gains from tuition are not maintained after tutors are withdrawn (Greenwood et al., 1993; Shanahan & Barr, 1995). However, the majority of studies included in Cohen's meta-analysis involved peer tutoring; in comparison to adults, students may have limited knowledge which could create a ceiling effect. This effect could impede additional learning gains that might have arisen as a result of extended periods of tutoring with a qualified adult (Shanahan, 1998). Shanahan (1998) argues, with specific reference to reading tuition:

> *[The] amount of tutoring evidently matters, but the actual benefits are likely to be conditional with regard to amount of knowledge of the tutors and the supervision and management structures that are in place. With well-trained tutors working with a well-structured curriculum, it is possible to make longer tutoring programmes effective even with non-professionals such as college students (Shanahan, 1998, p. 229).*

Smyth also looked at duration and intensity of tutoring. Before adding controls to the models she found that students who had received less than 20 hours tutoring scored 1 grade point higher than non-participants, but those who had received more than 20 hours tuition scored 1.8 points higher than those who had no tuition (Smyth, 2008). The tutoring voucher scheme established in Australia (see section 1.5 and section 2.3) found that students who had reading tuition for longer periods made larger achievement gains (Commonwealth of Australia, 2006). Also Every Child a Reader and Every Child a Writer both showed larger achievement gains than the 10 hours of tuition provided through MGP (Every Child a Chance Trust, 2009a, 2009b). Both of these interventions provide intensive programmes of daily tuition which may account for the larger effect sizes.

In Bray's (1999) work, he considers that effective tutoring (in terms of gains in achievement) may be dependent on four factors one of which is "the intensity, duration and timing of tutoring" (p. 50). The estimates from the KS2 analysis clearly demonstrate that the duration of tutoring is an important issue for this sample of students. The intensity of tutoring was not investigated in this analysis. Further research is required to look at both duration and intensity of tutoring and the effect on achievement.

One reason for the limited number of significant effects of PT in the KS2 analysis may be related to when the data was collected. The analysis has focussed on the impact of PT on KS2 results; however the data was collected at the start of year 6 (Nov-Dev '03), several months before the KS2 tests (May '04). It is possible that children in year 6 may have opted to receive tutoring later in the school year in preparation for the tests. Children that had tuition primarily for the 11 plus examinations would have taken the tests in Oct-Nov of the year prior to the KS2 tests (in May). The results show that PT in preparation for an entry examination only had a significant effect upon achievement in maths (see Table 5.4). In contrast, data collection for Y11 took place in the spring and summer terms immediately before students took their GCSE examinations.

## 7.5 Other benefits from PT

It is likely there are benefits from PT which are not directly related to higher grades. In chapter 2 a number of studies were reviewed which reported significant gains in self-concept of ability, motivation, educational aspirations and student attitudes. The students involved in the current study may have made significant gains in these areas. However, it has been argued that all of these constructs have been deemed as significant predictors of school achievement (Helmke, 1992). Mischo and Haag (2002) measured test anxiety, self-concept of ability and learning motivation in their research and found all were highly significant predictors of achievement. They pointed out that it was unclear whether the grade increase itself improved motivation variables or if grades increased as a consequence of an increase in motivation. If grade increases have a positive impact on motivation then the limited effect of PT on achievement found in the current study would be unlikely to impact positively on these constructs. Likewise, if an increase in motivation or self-concept of ability leads to grade improvement, it appears this has had a limited impact on the pupils in this sample, or the gain has failed to manifest itself in the achievement measures used. Further research is needed to measure the benefits of tuition without an absolute focus on examination performance. The chapters addressing RQ2 and RQ3 include more information on some of these issues.

## 7.6 Quality of PT

The limited and sporadic gains in achievement from tutoring found in this study, particularly at KS2, call into question the quality of the tuition provided. As noted earlier, anyone can advertise their services as a tutor as there is no regulatory authority in the UK. Apart from requesting references, time consuming CRB checks and using a trial period, there is very little parent(s)/carer(s) can do to ensure the quality of a tutor. Ireson and Rushforth (2005) found that parents often rely on recommendations from other parents, teachers or friends before employing a private tutor. Interview data from a number of parents indicated that recommendations were essential due to the lack of regulation in the market (Ireson & Rushforth, 2005).

A number of studies have attributed the achievement gains from one-to-one tutoring to the tutors' training and pedagogic expertise (Chi et al., 2001; Collins & Stevens, 1982; Lepper et al., 1997; McArthur et al., 1990; Merrill et al., 1992). In the current quantitative study no data was collected from the tutors who taught the students, therefore there are no indications regarding experience, pedagogical techniques, qualifications or training.

Studies looking at achievement gains from tutoring tend to control for student differences. Research investigating tutoring techniques often takes into account the differences in tutors experience etc. It is rare that both tutor and student differences are controlled for. More research is required looking at the impact on achievement controlling for student *and* tutor differences.

It should also be noted that teaching techniques used by tutors may differ to those employed by the subject teacher in school and cause confusion (Ireson & Rushforth, 2005). This might lead to lower achievement gains than expected.

## 7.7 Methodological issues

The final part of this chapter extends the discussion contained in section 4.2.8. In that section the problem of excluding students with first language other than English and SEN were addressed. There was also an examination of the reliability of the PT data collected by comparing parent and student responses to the question regarding PT participation (see Appendix H). The following section includes a number of methodological issues relating to the sample, measuring achievement and the endogenous nature of PT.

One of the main challenges for this analysis was the size of the sample and treatment groups. Although the investigation included over 2000 students, the numbers participating in PT were small. This became more of an issue when PT was divided by subject and duration. Due to the limited numbers in the treatment group the estimates were sometimes sensitive to outlying cases and missing data. When the dummy variable adjustment method was used to include additional cases it was difficult to ascertain if the differences in the estimates were due to the inclusion of additional cases or the bias produced from using this method (see Allison, 2001; Jones, 1996 and section 4.2.8).

For a robustness check, the KS3 prior achievement indicator was changed between the average or subject specific score (see section 6.2.1, 6.3.1 and 6.4.1). Changing the control variable for prior achievement changed the PT estimates. The PT estimates for the science and maths models continued to follow the same pattern; however for English the effect of any subject PT found in Models 1 and 3 was no longer manifest. Therefore these findings should be treated with caution.

The issue of small treatment groups was challenging when interaction effects were considered. There were a number of variables that could not be considered due to the small numbers involved. However, the majority of interactions that have been reported contain only 10 to 20 students from which accurate conclusions cannot be drawn. Larger numbers were sometimes manifest when interaction effects were calculated for prior achievement groups, although these were not substantial. Care should also be taken in interpreting the interactions based on prior ability due to the differences produced in the overall models when the prior achievement indicator was changed.

PT is endogenous and therefore any attempts to measure the impact on achievement, without properly controlling for the decision to invest, will yield unreliable and inconsistent estimates (Dang & Rogers, 2008b). Results obtained from such an analysis would suffer from selection bias as students who receive PT are different from those that do not. Dang and Rogers (2008b) provide several suggestions for measuring the impact of PT to control for the endogeneity problem. These suggestions include using randomised control trials where participants are randomly assigned to receive PT. However, as noted by the authors, this creates problems as participants cannot randomly be assigned to pay for PT, instead they are assigned to receive free tutoring which may have important differences (Dang & Rogers, 2008b).

From the data available, the models in the current study controlled for school differences, home background and a number of other student characteristics including prior achievement. Although the model accounted for a large proportion of the variance, it is important to acknowledge that endogeneity may be biasing the results and the estimates should be treated with caution.

The models explored the effect of PT on attainment using NC tests and GCSE examinations as the indicators of achievement. There are a number of issues arising from the use of such measures. As mentioned above and in section 4.2.5, there were problems with the variables used to measure both prior achievement (KS1 and KS3) and performance at KS2 and KS4 exams. One of these problems was the negative skew of the data and the issue of ceiling effects. The fine grade point score was calculated to measure achievement at KS2 and KS3 instead of the arbitrary levels; however this score was still bounded by the KS levels and poor performing students were all awarded a 'compensatory' score of 15 (21 for KS3 English). Low achieving students at KS1 were also given the 'compensatory' score of 3. At GCSE the scores of the 6 point scale ranged from 16 (grade G) to 58 (A*, see section 4.2.5.1); however students could also score 0 points (grade U). The models were unable to predict zero scores and the robust regression excluded these cases as outliers. The KS1 tests were taken in Y2 (age 7) and used as prior achievement indicators for achievement at age 11, clearly these are not ideal indicators and may be biasing the PT estimates.

The American Education Research Association (AERA) is required to make a clear statement of the degree of measurement error associated with each test score used in the USA (1999). The same is not true for national examination scores in the UK. Black and Wiliam (2006) argue "the fact that, at least for public examinations in the UK, reliability is neither researched nor discussed is a serious weakness" (p. 130). If the reliability of the scores were known, a score of 45 for example, may have a true score of between 41-49. It is possible that a result of 45 will have given a child a level 4; however a score of 44 would not. Due to the lack of reliability measures Wiliam (2003) estimated that at least 30 per cent of national test classifications are misclassified either above or below their actual attainment. Such misclassifications would be balanced out country wide but would impact on the individual student and distort the results of any education intervention analysis. If the candidate's score had been previously exaggerated, results from a subsequent test may show limited gains in achievement. Likewise, if a previous test had exaggerated a candidate's score the ensuing test would show limited gains (Stobart, 2008). This perceived achievement gain would therefore be a result of problems with the examination scoring systems and could not be attributed to a change in teaching or failure of an educational intervention.

RQ1 considered the impact of PT using examination results; the following two chapters will address RQ2 and RQ3 and consider the impact of PT on attainment through tutors' and students' perceptions. Studies that question the validity and reliability of achievement measures (Berg & Smith, 1994; Black & Wiliam, 2006; Gauld, 1980; Linn, 1994; Linn, Graue, & Sanders, 1990; Stobart, 2008; Tamir, 1990; Tennent, Stainthorp, & Stuart, 2008; Wiliam, 1995) lend support for finding other measures of student outcomes, such as teacher (or tutor) assessment. Although several studies have noted a favourable consistency in teacher assessment in comparison to national tests (Hoge & Coladarci, 1989; Massey, Green, Dexter, & Hamnett, 2003), other research has questioned teacher assessment and reliability particularly for certain groups of students (Harlen, 2004; Hoge & Butcher, 1984; Newton, 2003; Parkes & Maughan, 2009; Spear, 1984; R. Wood, 1991). To accurately measure the impact of PT on achievement a combination of different styles of assessment may be required.

The models controlled for school differences, although data was not available at the classroom level. Vincent (1997) found that more variance in maths and English achievement was accounted for at the classroom level than the school level. Class level variation due to teacher effectiveness was found to significantly influence cognitive outcomes in the VITAE[31] project (Day et al., 2006). The impact of setting or streaming is also an important consideration (see Day et al., 2006; Ireson & Hallam, 1998; Sukhnandan & Lee, 1998). As classroom level data was not collected for either the Y6 or Y11 sample, it is possible these influential variables are impacting on achievement and biasing the results.

As mentioned in section 4.2.1, a stratified sampling strategy was employed selecting schools from urban, suburban and rural areas. However, there were a number of schools that chose not to participate in the study. It proved particularly difficult to involve grammar schools and only one was included in the sample. All such problems would be rectified if a fully representative sample of schools in England was achieved.

[31] Variations in Teachers' Work, Lives and Their Effects on Pupils (VITAE), a project commissioned by the DfES to investigate factors contributing to teachers' effectiveness at different phases of their careers.

SES is a known strong predictor of attainment. Unfortunately, the data on occupation was problematic with a high frequency of missing or unusable data (see Appendix F). Therefore the SES indicator used in this analysis was based on a possessions index (see section 4.2.6 and Appendix F). As noted earlier, the data on the level of parental education was unusable in this analysis (see section 4.2.6.1 and Appendix F). Parental education has been shown to make a significant impact on achievement (Sammons et al., 2008; West et al., 1998). It is unfortunate that this data could not be utilised as it is likely parental education level would have made a further impact on the analysis. Due to the relationship between PT participation and parental education and occupation shown in section 5.1.1 and in Ireson and Rushforth (2011) models were calculated and compared with and without these variables (using a reduced sample size). Full details of these comparisons are included in Appendix R. These models revealed that substantially reducing the sample size also decreased the size of the PT estimates in a number of cases. For the comparison of the mean EMSKS4 model, the PT estimates were fractionally larger when the occupation and education variables were removed. This suggests that a minimal part of the KS4 PT estimates may be reflecting parental education level and occupation (see Appendix R).

## 7.8 Further research

The results of this study have made a significant contribution to an area where little research has been completed. This study has also highlighted several areas that require further research. Due to the limitations of the sample used for this study, a reliable picture of the outcomes of PT requires a larger scale study using a nationally representative sample. More accurate indicators of SES are required in addition to parental education and parental support measures. As noted in section 4.2.8, research should be specifically designed to ensure that students with SEN and those who have difficulty with English can be adequately represented. The difficulties in defining PT and how this impacts on the reliability of the data was discussed in section 4.2.8. These are important considerations for further research in this area.

This study was limited in its scope using only indicators of achievement and no measures of motivation, self-efficacy, confidence and student attitudes. Perhaps greater gains would have been found in these areas rather than an absolute focus on national test results which have been shown to be unreliable (see section 7.7). This research did not include any details regarding the tutors who provided the tuition. The limited and patchy effect sizes found through this analysis question the quality of the tuition provided and the methods that were used in the PT sessions.

The following two chapters will address RQs 2 and 3 reporting the results from the tutor and student questionnaires.

# 8 Results: Tutor Questionnaire Responses

## 8.1 Introduction

This chapter reports the findings from the tutor questionnaire (see Appendix N). Each question is reported and discussed with comparisons made between different subjects tutored and levels taught. This chapter aims to address the RQs:

> RQ2 what pedagogic techniques do tutors believe to be important for achieving learning gains?
>
> RQ3 what do pupils and tutors consider to be effective tuition and how is this evaluated?

In this chapter the views of tutors will be presented in three parts; the first section describes the characteristics of the respondents, their backgrounds, tutoring experience and qualifications. The second section considers tutoring techniques and reports tutors' perspectives of effective pedagogical strategies. In the final section, skills and qualities used by tutors to define effective PT are outlined and views on how tutors evaluate their own effectiveness are examined.

## 8.2 Characteristics of the sample

To enable accurate comparisons between responses from tutors of different subjects and age groups, the first part of this chapter provides a full description of the sample. In addition to differences in subjects and levels taught, tutors' background characteristics will also be outlined including age, qualifications, training and experience. In the remainder of this chapter the differences in subjects and levels taught will be contrasted according to different responses and pedagogical strategies. As it is not possible to compare the sample with the national population of tutors (see section 4.3.5) where feasible it has been compared to other findings in the literature.

### 8.2.1 Age, gender and ethnicity

This study involved tutors from a wide age range (Table 8.1). Within the categories included on the questionnaire the majority of respondents (31.8%) were aged between 20-30 years, with 22.9% aged 51-60. It is not clear if these findings accurately reflect the age of tutors providing PT in England but the sample includes a representation of tutors from a wide age range.

*Table 8.1 Age of tutors included in the sample*

| Age | *n* | % |
|---|---|---|
| 16 years or below | 0 | 0 |
| 17-19 years | 2 | 1 |
| 20-25 years | 24 | 12.5 |
| 26-30 years | 37 | 19.3 |
| 31-40 years | 33 | 17.2 |
| 41-50 years | 25 | 13 |
| 51-60 years | 44 | 22.9 |
| over 60 years | 25 | 13 |
| I'd rather not specify | 2 | 1 |
| Total respondents | 192 | 100 |

There were a slightly higher number of female respondents (53%) in the sample, and the majority of tutors (80.4%) were of white European origin. A total of 9.8% were Asian and 5.2% black (see Appendix S Table S.1).

### 8.2.2 Qualifications

Tutors were asked if they had GCSEs (or equivalent) in English, maths and science at grade A*-C. A total of 75.1% stated they had English at grade A*-C, 79.1% maths and 69.7% science. These figures may not be accurate as several tutors included only details of their highest qualification without making reference to GCSEs. A total of 80.1% reported they had post-16 level qualifications, 5% were students currently completing their undergraduate degrees and 10.9% were studying at postgraduate level. Of the 201 tutors who answered this question, 85.6% stated they had achieved an undergraduate degree, 36.3% had received a Master's degree and 13.9% had an EdD, MPhil or PhD.

Notably, just over half of the tutors (50.2%) indicated they had a teaching qualification (PGCE, Cert Ed, BEd or equivalent). It is not possible to determine if this percentage is representative of all tutors operating in England. The DCSF study found that 36% of agencies surveyed required tutors to have qualified teacher status, 22% required a degree in the subject taught and 18% required a degree in any subject (Tanner et al., 2009).

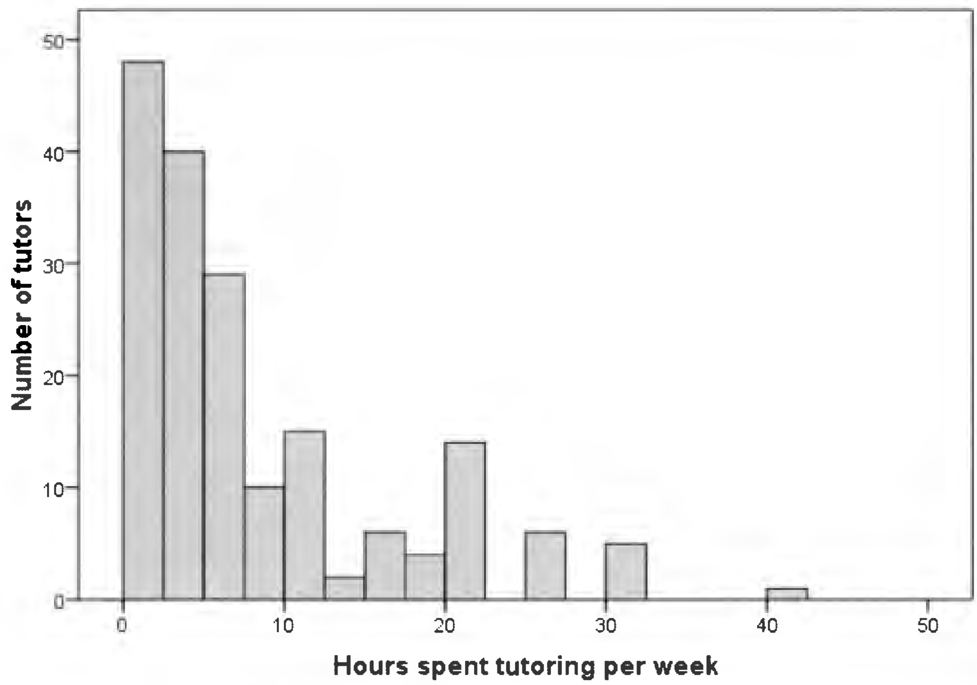
### 8.2.3 Training

A surprisingly small number of tutors reported having any one-to-one tuition training. Only 13.8% of the 196 respondents indicated that they had received training to work one-to-one with pupils, either through a tutoring agency, CPD within school or teacher training. Twenty tutors specified the number of hours they had spent training which ranged from 2 to 500 hours. One tutor referred to completion of 500 hours training through a National Vocational Qualification course in youth leadership and a further respondent included reference to a 152 hour course at the Hornsby International Dyslexia Centre. The majority of reported training was completed through a PT agency in preparation for working with children in LA care.

### 8.2.4 Experience

The average number of hours spent tutoring from 182 responses ranged from 0 (for those tutors who stated they were not currently tutoring, (*n* 9)) to a maximum of 40 hours (*M* 8, *SD* 7.9) (see Figure 8.1). These results show that for this sample tutoring took place far more often on a part-time basis, with only 1 respondent completing a 40 hour week. Almost half the respondents in the sample tutored for less than 5 hours per week. This is consistent with the DCSF report on PT in England which found that 79% of tutors worked on a part-time basis (Tanner et al., 2009). A large proportion of tutors (38.9%) indicated they had participated in home-schooling; these tutors were overrepresented in the number of tutors working 20 or more hours per week.

*Figure 8.1 Number of hours spent tutoring per week*




The majority of tutors (30.3%) stated that they had been tutoring for between 2-5 years. Only 9.7% of the sample had been tutoring for less than 1 year, contrasted with 14.1% between 10-20 years and 8.6% more than 20 years. Over half (51.9%) of the tutors included in this sample were highly experienced having tutored over 20 students. Only 16.9% of the sample had tutored between 1 to 5 students.

### 8.2.5 Subjects and levels

Each tutor had the option of including a maximum of five subjects and were instructed to indicate the level at which the subject was tutored. A total of 186 tutors indicated what subjects they taught (see Table 8.2). Some tutors indicated they had taught more than one science subject or both English literature and language. In Table 8.2, English combined was created by totalling the number of tutors who taught any form of English; science was calculated in the same manner combining counts of science, biology, chemistry and physics.

*Table 8.2 Frequency of subjects tutored reported by the tutors*

| Subjects | Tutors *n* | % (*N* 186) |
|---|---|---|
| English | 60 | 32.3 |
| English Literature | 19 | 10.2 |
| English Language | 17 | 9.1 |
| **English Combined** | **76** | **40.7** |
| Science | 30 | 16.1 |
| Biology | 22 | 11.8 |
| Chemistry | 22 | 11.8 |
| Physics | 29 | 15.6 |
| **Science Combined** | **62** | **33.3** |
| **Maths** | **107** | **57.5** |
| Art & Design | 1 | 0.5 |
| Business Studies | 10 | 5.4 |
| Classics | 1 | 0.5 |
| Economics | 11 | 5.9 |
| French | 17 | 9.1 |
| Geography | 6 | 3.2 |
| German | 6 | 3.2 |
| History | 15 | 8.1 |
| ICT | 6 | 3.2 |
| Psychology | 7 | 3.8 |
| Reading | 4 | 2.2 |
| Spanish | 11 | 5.9 |
| Study Skills | 9 | 4.8 |
| Urdu | 1 | 0.5 |
| Verbal Reasoning | 8 | 4.3 |
| Non Verbal Reasoning | 6 | 3.2 |
| All primary curriculum KS1 and KS2 | 7 | 3.8 |
| Other | 45 | 24.2 |

Responses to this question showed a large range of subjects were tutored by the participants. Tanner et al. (2009) found that many agencies covered most or all subjects in the school curriculum with a significant number specialising in maths and English tuition. As found in previous research (Ipsos MORI, 2009; Ireson & Rushforth, 2005; Peters et al., 2009; Tanner et al., 2009) maths was the most frequently tutored subject followed by English tuition and then a combination of science subjects.

A total of 18.8% of respondents to this question used all five subject boxes indicating that they tutored at least five subjects, 20.4% tutored just one subject.

A significant difference was found between gender and tutors who taught English and maths (see Table 8.3), $\chi^2$ (2) = 27.81, $p$ < .001 with the Cramer's V Value .44). When comparing subjects tutored, the majority of male tutors taught maths (and not English), whereas a higher proportion of female tutors taught maths and English.

*Table 8.3 Frequency of subjects tutored (maths and English) by gender of the tutor*

| | | Gender of tutor | | |
|---|---|---|---|---|
| | | Male | Female | Total |
| Maths (not English) | *n* | 46 | 19 | 65 |
| | % within gender | 69.7 | 25.3 | 46.1 |
| English (not maths) | *n* | 9 | 25 | 34 |
| | % within gender | 13.6 | 33.3 | 24.1 |
| Maths & English | *n* | 11 | 31 | 42 |
| | % within gender | 16.7 | 41.3 | 29.8 |
| | Total | 66 | 75 | 141 |
| | % within gender | 100 | 100 | 100 |

A significant relationship was also found between gender and the number of tutors teaching science ($\chi^2$ (1) = 8.45, $p$ < .01 with the Phi Value -.22). A total of 62.7% of science tutors were male.

The level at which subjects were tutored was examined independently of the subject. In Table 8.4 the percentages were calculated by determining the number of respondents tutoring at each level, it is clear from these results that the tutors often taught at more than one level. From the 182 responses, the results show that tutoring at secondary level is the most common in this sample (78%). This was closely followed by post-16 level (69.2%) with a smaller proportion tutoring at primary level (43.4%). These findings do not reflect patterns of participation of PT found in the Cost of Schooling report (Peters et al., 2009), which found that more tutoring occurred at primary school level.

In the tutor sample, a higher proportion of females tutored at primary level ($\chi^2$ (1) = 9.6, $p < .01$ with the Phi Value .23) (see Table 8.4).

*Table 8.4 Number and percentage of tutors tutoring at each level of schooling*

| Level | *n* | % of tutors (*N* 182) | % Female (*N* 91) |
|---|---|---|---|
| Primary | 79 | 43.4 | 64.9* |
| Secondary to GCSE (or equivalent) | 142 | 78 | 54.7 |
| A-level (or equivalent) | 126 | 69.2 | 50 |
| Undergraduate | 65 | 35.7 | 46 |

**p<.01*

The responses were combined to reflect the full age range of students tutored by each tutor regardless of subject. This analysis aimed to demonstrate the number of tutors who worked with a specific or wide age range of students. A total of 19.5% of respondents tutored from secondary to post-16 level, 15.1% from secondary to undergraduate and 14.4% primary to undergraduate level. Smaller proportions focussed only on primary (7.2%), secondary (7.7%) and post-16 level (7.7%) (see Appendix S Table S.2).

The data on subjects and levels was analysed for English, maths and science (see Appendix S Table S.3-Table S.5). The majority of maths tutors (72.4%) taught at secondary school level, however similar numbers were reported tutoring English at both primary and secondary level. As with maths, the majority of science tutoring was reported to occur at the secondary level, however over half of science tutors reported tutoring science at post-16 level (see Appendix S Table S.2). It is important to note however that tutors who taught English, maths and science were represented at primary, secondary and post-16 level.

### 8.2.6 Student example - Student 1

In an attempt to establish tutors' perspectives concerning effective tutoring techniques, it was decided that not all data could be collected from a general perspective. Therefore tutors were asked to consider a student they were currently tutoring or had recently tutored (Student 1).

In total 152 tutors answered questions about Student 1. The majority of the example students were male (62.5%) with the largest proportion aged 14-16 (39.9%). Most of the students (54.6%) chosen for the example attended a state maintained primary or secondary school, and a small proportion (5.3%) were home schooled; 97.4% were tutored on a one-to-one face-to-face basis. The majority of tutors indicated they taught Student 1 for 1 hour per week (54.7%) although 10% stated that they tutored Student 1 for 3 or more hours per week. Just over a third of the sample indicated they had tutored Student 1 for 1 term or less and 19.9% of respondents had been working with Student 1 for more than 18 months.

In line with earlier findings and current research, the majority of students (51%) chosen for this example were being tutored in maths (for a full list of subjects see Appendix S Table S.6). A total of 65.6% were tutoring Student 1 in one subject, with 22.5% indicating they tutored Student 1 in two subjects. The respondents were asked to indicate the reasons for tutoring Student 1; the most common reason provided was to improve understanding of the subject, followed by increasing the student's self confidence. When all the examination related reasons were combined it showed that the majority of tutors (63.3%) had stated that tutoring had been undertaken by Student 1 due to forthcoming examinations and a desire to improve performance (see Appendix S Table S.7). It was challenging to differentiate between tutoring Student 1 for remedial or extension purposes due to the large number of tutors who included 'to improve understanding of the subject' and combined this with reasons that could be considered as both remedial and extension. However, a total of 16.3% noted Student 1 was receiving PT as 'the student was struggling to keep up in this subject at school' and 8.2% specifically referred to SEN. These reasons were cited more often by tutors teaching maths or English to Student 1 as against science and significantly less frequently for post-16 students (for maths, $\chi^2$ (1) = 6.38, $p = .02$ with the Phi Value .21; for English $\chi^2$ (1) = 5.9, $p = .02$ with the Phi Value .2).

### 8.2.7 Summary: Characteristics of the sample

The majority of the tutors had between 2-5 years experience, 8.6% indicated they had been providing PT for more than 20 years. A total of 51.9% of the sample had tutored over 20 students. In line with previous research findings, the majority of respondents (57.5%) reported tutoring maths, 40.7% of the sample taught English, and 33.3% tutored students in science subjects. Almost 20% reported tutoring at least five subjects and just over 20% taught one subject. In this sample 78.6% indicated they tutored at secondary school level, 71.4% at post-16 level and 43.3% tutored primary level students. A total of 152 tutors included a student example (Student 1); the majority were males, aged between 14-16 years with just over half receiving PT in maths. Over 60% of example students were being tutored for examination related reasons.

The analysis that follows aims to establish similarities and differences in the responses from tutors who teach different subjects and levels. Tutors were asked to reflect generally on their tutoring experience and comparisons have been made between tutors who teach at primary, secondary and post 16 level. When referring to Student 1 more specific level comparisons have been made. It is important to note the patterns and differences in the sample between subjects and levels. Tutoring in maths most frequently occurred at secondary level (72.4% of maths tutors); this was also true for English subjects although this was closely followed by primary level tutoring in English reported by 54.2% of English tutors. Tuition in science subjects was also most common at secondary school level (71.7% of science tutors) although 63.3% also indicated they taught post-16 science. Significant gender differences were found in both the subjects and levels taught.

For each question analysed below, the five most frequent themes to arise have been compared for tutors teaching different subjects and levels. When significant differences were found they have been reported.

Due to the higher proportion of English and maths tutors, there were sufficient numbers to allow a direct comparison between tutors teaching these two subjects. To test for clear differences the sample was divided into tutors who taught English (and not maths), maths (and not English) and tutors who taught both. In the next section comparisons have been made between English, maths and science tutors by comparing each subject in turn against tutors who do not teach that subject. Levels of tutoring have also been compared; tutors who taught at primary level were compared to tutors who did not teach at this level, the same comparisons were made for secondary and post-16 level. It is important to acknowledge however that most tutors taught more than one level and 14.4% taught from primary through to undergraduate level (see Appendix S Table S.2). To compare differences for the example student (Student 1) KS1 and KS2 pupils were combined due to the small number of example students in KS1 (*n*2).

## 8.3 Tutoring techniques: The tutoring session

Tutors were asked about their general tutoring practice, this section included questions on methods for ascertaining a student's level of understanding, increasing student confidence and helping students gain and recall new information (see section 4.3.4).

### 8.3.1 Effective strategies for helping students gain and recall new information

In an attempt to prompt respondents to reflect on their effective strategies for helping students make learning gains, tutors were asked how they help students gain and recall new information (see section 4.3.4). There were 120 responses to this question and 8 responded by stating their methods varied dependant on the student; however 6 of these indicated usual strategies they draw on for helping students gain and recall new information.

Revising and reviewing work was provided as the most common strategy for helping students to gain and recall new information. As analysis for this question progressed, the boundary between revising and reviewing work and practice became increasingly more blurred so the two themes were combined. With these two strategies combined, a total of 36.7% of respondents identified revising and reviewing work as an effective approach of helping students gain and recall new information. Some examples include:

> *For information there is nothing better than repetition. To reinforce the bits he/she can't understand, then simple rote learning from a crib that the student has written. (11[32])*
>
> *Revisiting topics at later dates. (205)*

To help students to gain and recall new information, 15.8% of tutors referred to the use of memorising strategies, including the use of mnemonics. Examples are included below:

> *Teaching them study skills such as the use of mnemonics, mind-maps, chunking information. (18)*
>
> *Mnemonics that are individual to the child. (127)*

Another important strategy for helping students gain and recall new information was the theme of creativity which included using a range of resources such as handouts, diagrams, flash cards, story boards and other materials.

The use of questions was another frequently considered strategy which was often stated in conjunction with other techniques. Tutors described question and answer sessions, quick-fire style questions and questions to reinforce understanding as shown in the following examples:

> *Repetition, quick fire questions verbally, use of diagrams where possible. (60)*
>
> *I generally use gapped handouts, followed by a series of questions to consolidate the learning and to test understanding, the learning is further consolidated with homework which often contains some more challenging questions. (202)*

---

[32] All quotes from the questionnaire have been numbered and details have been included for each respondent in Appendix S Table S.9. When Tutors referred to Student 1, the details of Student 1 have been included in Appendix S Table S.10

The method of task management also featured as a strategy for helping students gain and recall new information reported by 9.2% of tutors. Task management was used to describe references to selecting, adapting, developing or managing tasks to correctly match the child's ability and to assist in promoting learning gains. It is important to highlight that task management is likely to refer to more than the single action of task choice in the tutorial, but rather a continual structuring process used throughout the tutoring session. Ireson (2000) argues this process is constantly reviewed and changed in accordance with tutors' pedagogical beliefs, the perceptions of task purpose, interactions between the student and tutor and the students level of understanding (see section 3.3.4).

Other strategies that were referred to on several occasions included clear explanations (7.5%) and general comments on learning strategies (6.7%). Self explaining was also a topic that arose in response this question:

> *Getting them to explain new concepts to me. With a bit of help most students are able to do this whether they think they can or not. (113)*

Tutors also highlighted the importance of homework (5.8%), and giving the student quizzes, tests and past papers in order to reinforce new material and test for understanding and recall (5.8%). A small number of participants also considered using games and making work fun as important ways to help students gain and recall new information mentioned by 4.7% and 3.3% of tutors respectively.

### 8.3.2 Ascertaining a student's level of understanding

The tutors were asked to consider how they usually ascertain a student's level of knowledge and understanding (see Appendix N question 4.2 and 4.3). Research has shown how tutors often lack skills in this area (Chi, 1996; Graesser et al., 1995; Putnam, 1987 see section 3.3.4). This question aimed to determine commonalities and differences in responses between subjects and levels taught.

The respondents were given a number of options to indicate how often they used each specified method (often, sometimes, rarely or never) (see section 4.3.4). The options are presented in Table 8.5 along with the frequency of responses. Following this question the tutors were asked to include other methods employed to ascertain the level of understanding.

*Table 8.5 Methods used to ascertain a student's level of understanding*

| Ascertaining a student's level of understanding | Often % | Sometimes % | Rarely % | Never % | N/A % | Total Response count |
|---|---|---|---|---|---|---|
| Ask questions and discuss verbally with the student | 93.2 | 6.1 | 0 | 0 | 0.8 | 132 |
| Work through a problem with the student | 87.6 | 12.4 | 0 | 0 | 0 | 129 |
| Look at work previously completed by the student | 58 | 31.3 | 9.9 | 0.8 | 0 | 131 |
| Set the student homework | 47.6 | 28.6 | 19 | 4.8 | 0 | 126 |
| Set the student a test | 26.4 | 45 | 17.8 | 10.9 | 0 | 129 |

Almost all respondents (93.2%) stated they 'often' asked questions and discussed with the student during tutoring sessions. The next method most commonly used by 87.6% of tutors was working through a problem with the student. Assigning homework and particularly setting tests were used less often than the other methods. Over 10% of respondents stated that they never set tests and 4.8% never used homework to ascertain understanding.

The question was analysed by subject (comparing maths with English tutors, excluding those who taught both subjects). A significant difference was found between maths and English tutors in the frequency of looking at previous work to ascertain a student's level of understanding ($\chi^2$ (1) = 4.2, $p$ <.05, with the Phi value -0.25, categories were collapsed to often and sometimes/rarely). The odds ratio suggests that English tutors were 3.3 times more likely to use this method often, compared to maths tutors who used this method sometimes or rarely. An unexpected difference was found when comparing tutors who taught English with tutors of subjects other than English. More English tutors used tests as a method to gauge understanding, compared to respondents who tutor other subjects ($\chi^2$ (2) = 9.27, $p$ <.01, with the Cramer's V value of .27). No other subject differences were found. When examining the different levels of tutoring and the association between methods for ascertaining a student's level of understanding, far fewer respondents tutoring post-16 level were found to use testing as a method of measuring understanding ($\chi^2$(2) = 8.02, $p$ <.01, with the Cramer's V value of .25). Perhaps tests are used more frequently to assess knowledge of basic skills, spelling and grammar.

The different methods of ascertaining a student's level of understanding were correlated to establish any patterns in the responses (see Appendix S Table S.8). Kendall's tau was used as a non-parametric correlation measure for small samples with tied ranks (see Howell, 1997). The strongest correlation was found between asking questions and discussing with the student and working through a problem ($\tau$ = .29, $p$ < .01). These two actions are clearly related as working through a problem with a student is likely to involve asking questions and discussing with the student. Setting the student a test and setting homework were also significantly related ($\tau$ = .28, $p$ < .01). It is quite likely that homework set by the tutor could take the form of a test, or the results of a test might lead the tutor to set homework to further verify that the student fully understands the subject. Setting homework and looking at work previously completed by the student was also marginally correlated, indicating that tutors are likely to check homework they have previously assigned or set homework as a result of responses to a task already completed.

Additional methods used to determine a student's level of understanding included discussion with parents (reported by 10 tutors), which was linked to communication with the school referred to by 7 tutors. Ten respondents mentioned using school reports or school performance and 8 tutors reported explaining to self and/or tutor as methods used to ascertain a student's level of understanding. Self explanation could be considered as an extension of asking questions and discussing with the student, which was the most common method used by tutors in response to this question. A small number of tutors mentioned the use of specific worksheets, diagrams (including mind maps) and games in addition to the methods included above to ascertain a student's level of understanding.

### 8.3.3 Effective strategies for increasing students' confidence levels

Due to the focus on examination results and PT in the first half of this research, it was considered important to include other perceived benefits of PT. As noted in section 4.3.4 motivational deficits and low self efficacy can make employment of appropriate learning strategies less likely (Bandura, 1997; Klauer & Lauth, 1997; Pintrich, 1999, 2000). Due to the links with achievement and the particular importance placed on gains in confidence from the perspective of the parent (see Ireson & Rushforth, 2011), tutors were asked to reflect on their effective strategies for building student confidence (see section 4.3.4). The respondents were given an open text box in which to include an answer. The contributions were coded and analysed by exploring the most common themes to emerge. There was a 60.8% response rate, and 79% of valid responses included more than one strategy for building confidence.

The common theme emerging from the responses to this question was the concept termed as 'task management'. A total of 38.7% of tutors included this skill as an effective strategy for increasing student confidence levels. Examples of this are included below:

> *Start below the student's level of understanding, come up gently until you find it, and then work from there extending their knowledge at their pace. (138)*
>
> *Generally starting at an achievable level, evaluating students' abilities and then lots of practice in problem areas. (149)*

Task management was mentioned more frequently by English tutors than by tutors of other subjects ($\chi^2$ (1) = 3.88, $p$ =.05 with the Phi Value .18). It also appeared to be significantly less important to tutors teaching post-16 students ($\chi^2$ (1) = 4.94, $p < .05$ with the Phi Value -.2). It was interesting to find the different perspectives tutors had on effective task management. The majority of tutors stated that they teach to the required level without giving any further details. However a few mentioned different techniques such as aiming slightly above the child's level of understanding and others who start below and gradually increase the difficulty of the task.

Task management was often referred to in conjunction with supporting the student through praise and encouragement. The use of praise and encouragement was the second most common theme to emerge, identified by 31.5% of respondents, and was considered an important strategy in building confidence. Using praise and encouragement with the skill of task management was included in combination by 15.3% of tutors in response to this question. Typical examples have been included below:

> *Assessing the students' level of existing knowledge and competence. Pitching teaching just above. Frequent little tests in which they can do well. Praise and encourage. (160)*
>
> *Starting them off on a level below their knowledge and then working slowly up so they can always answer most (if not all) the questions set. Then to praise and make them feel confident. (7)*

It was interesting to note that significantly more English tutors compared to those tutoring science indicated that they used praise as a strategy for helping to raise confidence levels (for English $\chi^2(1) = 7.48$, $p < .01$ with the Phi Value .25; science $\chi^2(1) = 9.35$, $p < .01$ with the Phi Value -.28). This may be reflected in the nature of the subject or the age group tutored. This conclusion is supported by the finding that significantly more tutors teaching primary age students use praise to increase confidence levels, (48.1% compared to 16.7% of tutors teaching other age groups, $\chi^2(1) = 14.64$, $p < .001$ with the Phi Value .35).

Other strategies frequently mentioned for increasing a student's confidence included providing clear explanations, mentioned by 16.9% of tutors. Responses encompassing this theme are included in the examples below:

> *Ensuring that subject matter is fully explained and understood - going back to basics / background even if this latter is not necessary to passing examinations. Encourage questions. (172)*
>
> *Explain basics and ensure understanding of these before move [sic] onto more in-depth and complex areas. (68)*
>
> *Practice and re-enforcement -explaining the same thing in different ways until it is clear. (21)*

Significantly fewer English tutors incorporated clear explanations in their response to the question concerning raising student confidence levels compared to tutors of other subjects (7.8% compared to 23.3% respectively; $\chi^2(1) = 5.09$, $p < .05$ with the Phi Value -.2). Providing clear explanations is evidently considered as a more effective strategy for raising confidence in other subjects such as maths and science.

Revising and reviewing work referred to in one of the quotes above, was another important strategy mentioned by 15.3% of tutors and was often used in conjunction with other approaches. A further example is provided below:

> *1) Ensure sound knowledge of basic skills, especially number skills - mentally and on paper. 2) Revisit topics frequently (e.g. for 10 mins at start of lesson) to ensure knowledge and skills are retained. 3) Tackle mixed and problem solving questions so that students can practise putting skills to use. (78)*

There were also a number of tutors (10.5%) who recognised the crucial role of the student–tutor relationship and the importance of showing empathy, understanding and establishing rapport to facilitate confidence building. An example has been included below:

> *Get to know the student / Don't be stiff! Have a sense of humour / Find time to talk about other subjects / sport / hobby etc. (159)*

Other important strategies mentioned by tutors as effective for building student confidence included being flexible to the needs of the learner (9.7%), discussion between student and tutor (7.3%) and having a sense of humour (6.5%).

### 8.3.4 Effective strategies for helping students to think for themselves

A total of 119 tutors (58.1% of the entire sample) provided answers to the question regarding effective strategies for helping students think for themselves (see Appendix N question 4.5). Over 50% of the respondents were coded as providing more than one strategy.

The most frequent theme to arise was the use of questions to encourage and empower the student to think for themselves, mentioned by over a quarter of the sample. A number of tutors reported the importance of verbally discussing and questioning the student, often rephrasing and changing the question to guide the student to think through the answer. A variety of responses are included below to reflect an array of questioning strategies:

> *Questioning - not allowing them to hide their lack of understanding from me and, of course, themselves. (40)*
>
> *Questions and more questions. If they can't answer a question, I'll rephrase it. If they can't answer that, I'll make the question easier. If they can't answer that, I'll pose the question in the form of a set of choices of yes/no answers. (29)*
>
> *Use of Socratic discourse. Asking structured questions that lend the student to the correct answers. (161)*

Closely linked with this theme, 16% of respondents reported explaining to self and tutor. These strategies were often used jointly and three different examples of this strategy are outlined below:

> *Let them work on their own, explain their problems to me when they have one and how they had tackled it and why that way. Often by talking it through with me, they would realise themselves how they should have gone about it. (180)*
>
> *Set them new work which they haven't seen and get them to try and teach it to me the following week. (103)*
>
> *Firstly, having them be the teacher - they must explain a topic in such a way that it is understood. Secondly, having the student ask themselves questions all the time - why is this so, what does this mean, what does this tell me about that, and so on - making them aware of when they learn a fact without understanding it. (134)*

It was interesting to find that significantly more maths tutors (22.4%) included self explaining as an effective strategy of helping students think for themselves, compared to just 7.7% of those tutoring other subjects ($\chi^2(1) = 4.71$, $p < .001$ with the Phi Value .2).

Again, task management was included as an effective strategy in response to this question. Tutors mentioned relating new ideas to those already understood by the learner and building on from there. Other responses included provision of increasingly more complex tasks to build on previously gained knowledge and encourage independent thinking. As with self-explanation, significantly higher numbers of maths tutors included task management in response to this question ($\chi^2$ (1) = 6.3, $p$ = .01 with the Phi Value .23).

A total of 10.1% of the sample considered building the student's confidence levels an important factor in assisting independent thinking. In the first example below this tutor considered confidence to be a prerequisite to independent thinking:

> *This is difficult, but once they have confidence in a topic, then you can get them to start to think - so they must understand and have confidence before this can happen. (179)*
>
> *Encouragement. If the tutor encourages the student to come to them with their ideas and questions, then they will gain confidence in the subject and confidence in themselves. (108)*

As demonstrated in the response above a number of tutors mentioned praise and encouragement linked to building confidence; praise and encouragement was referred to by 6.7% of respondents.

A number of responses highlighted the importance of setting and observing a task and then letting the student proceed with little or no intervention (8.4% of responses). This was also closely linked to the theme of self-correction (4.2% of responses), which occurs when tutors provide limited but targeted feedback to the student to allow them to find their own mistakes and self-correct. Again this was closely linked to independent problem solving, allowing the student to complete a task alone, with limited support from the tutor. Examples that demonstrate these practices have been included below:

> *Silence of [sic] my part - not too extended but to refrain from jumping in quickly to guide or correct can be of benefit in getting the student to initiate and amend their own work. (197)*
>
> *Letting them get on with a particularly [sic] task and intervening only when they need help, confidence boosting support etc. Use of leading questions to point them in the right direction etc. (204)*

Other themes that became evident in response to this question included the importance of homework (6.7%) and discussion between student and tutor (6.7%). A small number of respondents noted the use of real life examples to help the students see the relevance of the subject (5.9%). Simplifying problems to aid with understanding and prompt students to think for themselves was also included (5.9%).

### 8.3.5 Summary: Tutoring techniques

This section aimed to reflect tutors views on effective pedagogic strategies for helping students to make learning gains. In addition to the information in Table 8.5 reporting the findings from the question regarding ascertaining a student's level of understanding, Table 8.6 summarises the top ten most frequently mentioned themes common across the questions asking for effective techniques to gain and recall new information, increase confidence and help students think for themselves.

*Table 8.6 Summary of the most common themes to arise in response to questions on effective tutoring techniques*

| | Effective techniques to gain and recall new information | | Effective techniques for Increasing confidence | | Effective techniques for helping students think for themselves | |
|---|---|---|---|---|---|---|
| Themes | *n* | % of tutors | *n* | % of tutors | *n* | % of tutors |
| Task Management (Determining level of knowledge) | 11 | 9.2 | 48 | 38.7 | 18 | 15.1 |
| Revise / Review | 44 | 36.7 | 19 | 15.3 | 4 | 3.4 |
| Praise / Encouragement | 3 | 2.5 | 39 | 31.5 | 8 | 6.7 |
| Use of questions | 11 | 9.2 | 5 | 4 | 31 | 26.1 |
| Explaining to self or tutor | 7 | 5.8 | 7 | 5.6 | 19 | 16 |
| Clear explanations | 9 | 7.5 | 21 | 16.9 | 2 | 1.7 |
| Confidence | 4 | 3.3 | 7 | 5.6 | 12 | 10.1 |
| Discussion | 6 | 5 | 9 | 7.3 | 8 | 6.7 |
| Learning strategies | 8 | 6.7 | 8 | 6.5 | 5 | 4.2 |
| memorising strategies | 19 | 15.8 | 0 | 0 | 1 | 0.8 |
| **TOTAL number of tutors who answered the question** | **120** | | **124** | | **119** | |

So far in the analysis the common recurring themes have placed emphasis on the role of task management (see Table 8.6). The importance of this aspect was reinforced by repeated references made in relation to building confidence but was also cited in response to the other questions asked. Task management was often referred to in conjunction with praise and encouragement to assist in building student confidence.

Tutors also referred to questioning, discussing topics and prompting students to self explain as effective strategies to help students to think for themselves. Questioning and discussing with the student was also frequently used for ascertaining a student's level of understanding. Reviewing and revising work was often mentioned as a way of helping students gain and recall new information.

Although the majority of themes to arise were common across subjects and levels, there were some important differences. The use of praise and encouragement to build confidence was used more often by tutors of younger students and those being taught in English. Likewise, the use of careful task management to increase confidence levels was also noted more frequently by tutors of English subjects and less often by those tutoring post-16 students. Further subject differences were manifest in the importance of clear explanations; with smaller numbers of English tutors including this theme in their responses. Self-explanation was discussed more frequently by maths tutors in order to encourage students to think for themselves.

There were also differences in the techniques used for ascertaining a student's level of understanding. Reviewing previously completed work was a method regularly utilised by English tutors when compared with maths tutors, and somewhat surprisingly, findings showed that English tutors were more likely to use tests to determine understanding.

## 8.4 Effective tutoring

This section examines what tutors consider as effective practice and explores how tutors evaluate their own effectiveness.

### 8.4.1 Do you feel you are an effective tutor?

In the first section of the questionnaire tutors were given an open text box to respond to the question 'Do you feel you are an effective tutor? Please explain your answer' (see Appendix N question 2.6). Of the 173 responses all, with the exception of 13, answered with a direct yes and gave reasons for their effectiveness. Some respondents described their tutoring methods as evidence of effective practice. Only 2 respondents gave a negative reply to this question: "Not completely I do not have enough spare time" (18) and "Not as effective as I could be, if there were more call for my subjects and I weren't spread so thinly trying to do 10 different jobs!!"*(164).* Both tutors perceived lack of time led to ineffective tutoring. There were 11 other tutors who were less sure about their performance and a number of these felt that their effectiveness was dependent on the student. The response included below summarises this sentiment:

> *Not always. It also depends on how motivated the student is. It is hard to be an effective tutor when the student has been forced into tuition by parents etc. If they see the relevance and can help me identify their needs then yes, I think I am effective. (50)*

All of the 160 tutors who answered positively to this question and provided an explanation were coded to determine opinions on effective tutoring. The responses were interesting in terms of gauging how tutors measure their own effectiveness and what indicators are used to denote effective tutoring.

The most common sentiment expressed by 21.3% of the tutors was the performance of the student in terms of an improvement in school or grade increase. Significantly more tutors who teach primary age students referred to grade increases in response to this question ($\chi^2(1) = 5.08$, $p < .05$ with the Phi Value .17). A further 18.5% of respondents directly referred to exam results. There were a number of tutors who were solely concerned with grade increases or examination performance:

> *yes - high success rates in 2007 most pupils gained As and Bs - I had l0xA (including 3 A*). One dyslexic had A in Eng Lan, A* in Project, B in Eng. Lit, C in French, . I had A Eng Language French, B Eng. Lit. (191)*

> *Yes. I see my job as being able to raise achievement in my pupils in their exams and to help them create impressive coursework. My tutees achieve VERY highly. (40)*

Although a number of tutors completed this question referring to exam results or increases in grades, it was surprising to note how many made no mention of these indicators. When all tutors who made statements concerning exam results, grade improvements, school reports, passing an exam, set movement and exam techniques were excluded, over 50% of the respondents who answered this question remained. For these tutors a wide variety of measures of effectiveness were expressed, one of the most common themes was the pedagogical skill of being flexible to the needs of the learner. Two examples have been included below:

> *Yes - a 1:1 session gives me the chance to explain concepts in an individual way depending on students' need - it is differentiated learning at its best! (140)*

> *Yes. I would consider I am good at identifying individual needs by asking the right questions. I aim to give tutees confidence in their own abilities where it might be lacking. (128)*

The quote above also refers to increasing confidence and was another common response made by tutors regarding their own effectiveness. This sentiment is illustrated below:

> *Very much so. Almost all of my students achieve their aims and more besides. In tutoring a student my main objective is usually to boost their confidence which has been destroyed at school (for one reason or another). Showing care and understanding plus using a flexible teaching method is the best means for success and it works. (142)*

> *I am good at inspiring confidence in children who have very little when they come to me. I can explain things clearly. (116)*

Another pedagogical skill mentioned by a large proportion of the tutors was the ability to determine a student's level of understanding and select appropriate tasks for the tutoring session – task management. This is also closely linked to the tutor's ability to be flexible to the needs of the learner (see above). Responses demonstrating the theme of task management are included below:

> *I am patient and kind. The child never fails in my lessons as work is tailored specifically to that child's ability. (181)*

> *I use a variety of teaching resources and methods and can tailor sessions to individuals depending on their learning styles and any learning difficulties the student may have. (24)*

In addition to including flexibility to the needs of the student and determining the student's level of understanding, the rapport built up between tutor and tutee was mentioned by a considerable proportion of tutors (14.5%). A rather surprising trend in the responses found that significantly more maths tutors mentioned rapport in their answer to this question ($\chi^2$ (1) = 7.14, $p$ < .01 with the Phi Value .2). There were a number of tutors who considered that relating to the student was an essential part of effective tutoring. An example of such a response is included below:

> *Yes. I feel that some students really benefit from one to one learning and developing a personal rapport with these students really helps to make them enthusiastic about learning, even if it is difficult for them. (72)*

The majority of tutors (69.9%) included more than one reason why they considered themselves to be effective. The examples below show tutors who provided a substantial range of various measures of effectiveness. In the first example, enthusiasm of the student was considered to be very important, as well as feedback from parents and improvement in student performance at school.

> *Parents show me good reports and seem to think it's down to me. Children who hate maths rush to the door when I arrive even though I say "you do know we are going to do an hour of maths!" Apparently parents recommend me to their friends and [tutoring agency] keep offering me work! Mainly I teach techniques for reading, spelling and maths - you don't need to know why at Primary age - it's just a fact - x 10 means add a '0' to the numbers!! - most Primary pupils are confused by explanation given at school. From me they need "tricks of the trade". (203)*

> *I have a good rapport with people. I empathise. I am a good listener. I build confidence. I 'defuse' over anxious and/or 'pushy' parents. I can explain subject in simple terms. I can recognise potential in students. (167)*

Feedback from the student was considered an important indicator of effectiveness being mentioned by 15.6% of tutors, expressing sentiments such as "The children say they enjoy my lecturing" and "spontaneous thanks of the students before and after exams". Feedback from students was expressed far more often than feedback from parent(s)/carer(s) (9.8%). Recommendations to teach other students were included by 7.5% of respondents as an indicator of effectiveness as well as extended tutoring relationships mentioned by 4%.

Other important aspects of effectiveness cited by a small number of tutors in the sample included providing the student with greater understanding, being able to provide clear explanations and teaching effective learning strategies. In addition to this, a thorough subject knowledge and familiarity with exam board requirements was considered important as well as enthusiasm during the tutoring sessions.

### 8.4.2 Impact on attainment

There were 144 responses to this question concerning the performance of Student 1. Tutors were asked first to include the predicted or actual grade for Student 1 in the subject(s) they taught before commencing tutoring. They were then asked 'do you think your efforts as a tutor have made an impact on this student's achievement?' (see Appendix N questions 3.10 and 3.11). A total of 93.1% answered this question with a positive response, 2 tutors replied negatively and 5 stated it was too early to tell. Three tutors provided unusable data. This question illustrates that almost every tutor included in this sample felt confident they had made a positive impact on the achievement of Student 1.

Of the tutors that responded negatively, one was primarily concerned about the lack of time they had to spend with the child, the other tutor was unsure due to pressure from parents wanting immediate results. As mentioned in section 8.2.6 a number of tutors had been tutoring Student 1 for less than 1 term. Of the five responses suggesting it was too early to discern if their efforts had made an impact on achievement, 4 had been working with Student 1 for half a term or less, and 1 for half to 1 term.

The majority of tutors answered this question by giving an example of improvements in school or grade increases (36.1%) and examination results (17.4%). These statements were often coupled with sentiments expressing an increase in confidence referred to by 26.4% of respondents. A variety of examples are included below.

> *The student rang me to say that he was delighted to be awarded A* for both subjects. (202)*
>
> *The student has gained in self confidence from being bottom of the class when I first started with her she improved, reaching middle level. She has also made noticeable improvements in creative writing. (190)*
>
> *Yes: I built his self-confidence in French and identified grammatical structures that confound comprehension during listening and speaking. Yes: the pupil felt more advanced in relation to classroom level: he was no longer catching up on school syllabus. Yes: Pupil jumped from D to A in his AS result: not needing me for tutoring testifies he has learnt (through me) skills to progress independently. (166)*

There was a significant difference between the reference to exam results and the age of Student 1. Only 3.8% of tutors who used example students from the KS1 and KS2 age groups referred to examination results, whereas 26.3% of tutors who used example students from the 14-16 age groups and 22.9% from the 17-19 age groups made reference to results. This difference was found to be significant ($\chi^2$ (2) = 9.25, $p$ = .01 with the Crammer's V value .26, KS1-KS3 were combined due to low expected counts in the chi-square). These results reflect the current schooling system where examinations are taken at these important transition points in education. On the other hand, significantly lower number of tutors who were teaching post-16 level students included improvements at school or grade increases in response to this question ($\chi^2$(1) = 6.39, $p$ = .05 with the Phi Value -.21). These findings may indicate that improvements within school are a more important indicator of successful tutoring for younger students, whereas for older students actual exam results are of greater importance.

Tutors who used a male student as Student 1 were significantly more likely to mention a gain in confidence in response to this question compared to tutors who included a female student (34.1% compared to 13.5% $\chi^2(1) = 7.2$, $p < .01$ with the Phi Value -.22). From the tutors' perspective, these results suggest that more male students gained in confidence as a result of tuition. Significant differences were also found between confidence and English tuition ($\chi^2$ (1) = 5.59, $p < .05$ with the Phi Value .2). A total of 36.7% of tutors teaching English to Student 1 mentioned a gain in confidence compared to 19% of tutors teaching other subjects. When explaining their impact on Student 1's achievement, a number of tutors also referred to their role in helping the student to gain a greater understanding of the subject (23.6%).

In addition to the themes that arose in response to this question, several tutors mentioned a change in attitude of the student (5.6%), teaching exam techniques (4.7%) and providing learning strategies (4.2%). All of which were used to demonstrate their impact on Student 1's achievement and their effectiveness as a tutor.

All the responses from tutors who specifically noted Student 1 was being tutored for remedial reasons were investigated. Although a marginally higher proportion of these tutors indicated that Student 1 had gained in confidence, no significant differences were found in the tutors perceptions of their own effectiveness and comments used to justify their responses.

### 8.4.3 Three skills/qualities/attributes of effective tutoring

There were 118 responses (57.6% of the full sample) to the question 'Please can you state three skills/qualities/attributes that you think make an effective tutor' (see Appendix N question 5.4). Although the tutors were asked to provide three specific reasons, a number of tutors combined attributes and included more than one skill per answer box, making a total of 376 responses to this question. Table 8.7 presents the top 15 most frequently included skills and attributes required for effective tutoring.

As can be seen from Table 8.7 there were three qualities and attributes mentioned far more often than the others; these included subject knowledge of the tutor, patience and rapport/understanding/empathy between the tutor and student. Subject knowledge was referred to 65 times in response to this question and is clearly a skill tutors consider essential for effective tutoring; however, significantly fewer English tutors included this skill in their responses compared to those teaching other subjects (42% compared to 64.7% $\chi^2$ (1) = 6, $p <$

.05 with the Phi Value -.23). This finding suggests that English tutors may not consider a thorough knowledge of the subject to be as important as tutors teaching other subjects.

Patience, mentioned in over 50% of responses was also regarded as a key factor in effective tutoring. However, it should be noted that in all other responses regarding effectiveness patience had been almost entirely absent. Significantly higher numbers of maths tutors included patience in their responses compared to respondents tutoring other subjects ($\chi^2$ (1) = 5.77, $p$ = .01 with the Phi Value .22). As noted in section 8.2.6 a small proportion of tutors could be identified for tutoring Student 1 for remedial purposes. The question regarding skills, qualities and attributes required tutors to reflect generally about their tutoring experience and in this instance not specifically about Student 1; however, it should be noted that a marginally higher proportion of tutors who indicated that Student 1 had received remedial support also referred to patience in their responses.

*Table 8.7 Tutors 15 most frequently mentioned skills/qualities/attributes for effective tutoring*

| Skill/quality/attribute | $n$ | % of tutors (N118) |
|---|---|---|
| Subject knowledge | 65 | 55.1 |
| Patience | 60 | 50.8 |
| Rapport/understanding/empathy | 46 | 39 |
| Clear explanations | 23 | 19.5 |
| Communication skills | 18 | 15.3 |
| Enthusiasm | 17 | 14.4 |
| Flexible to the needs of the student | 17 | 14.4 |
| Sense of humour | 13 | 11 |
| Task management (determining the correct level of knowledge) | 12 | 10.2 |
| Listening skills | 10 | 8.5 |
| Kind, friendly manner | 10 | 8.5 |
| Motivation | 10 | 8.5 |
| Experience/qualifications/lifelong learning | 9 | 7.6 |
| Knowledge of exam boards | 8 | 6.8 |
| Praise/encouragement | 6 | 5.1 |

Rapport/understanding/empathy was considered as the third most important skill of effective tutoring, mentioned by just under half of all respondents. This demonstrates how important tutors consider the relationship between themselves and the tutee. This attribute was referred to consistently throughout the sample by different groups of tutors.

The pedagogical skill of providing clear explanations was mentioned by almost 20% of the sample followed by communication skills. Although these respondents did not specifically mention pedagogical communication skills, it is likely that effectively communicating the material to be taught was implied in these responses. On the other hand these skills could also be referring to the relationship between the tutor and tutee and the importance of high level communication skills to enable rapport and understanding to develop.

### 8.4.4 A successful tutoring session

The respondents were asked to reflect on a successful tutoring session (see Appendix N question 5.1). These answers provided additional information on perceptions of effectiveness as well as indications on how tutors evaluate their performance on a session by session basis.

Statements in response to this question often included examples of occasions when tutees had demonstrated greater understanding of the subject as a result of a tuition session. Of the 115 responses to this question, 47.4% included evidence of a beneficial learning experience where students had gained a greater understanding of the topic. Two examples have been provided below:

> *Realisation that they know more than they think they did. A lot of my students have been made to believe they are useless and it's not too difficult to convince them otherwise. If you can help them to understand something which has, up until that time, been a mystery then you have their attention and can boost their interest in the subject. (142)*

> *What I love is when I have taken them through a problem and I know they have understood it - the light has come on! The phrase I like to hear the most is, "That's the first time anyone has explained that to me." I'm lucky - I get to hear it quite a lot! That's when I know I have helped someone and that is my inspiration to carry on tutoring. (110)*

A substantial number of tutors included an example of a beneficial learning experience by mentioning the student's level of interest or change in attitude towards the subject. This was also mentioned in combination with confidence and improved motivation:

> *They enjoyed it. they realise they COULD do it. Self-esteem increased, desire to work increased. (185)*

> *the [sic] came with an attitude of 'can't do' and we worked through it to see that it was just in fact not learnt well, or there was something else blocking. that there rarely is something that can be described as 'can't do' . (148)*

A number of tutors felt that beneficial learning experiences occurred when students were happy and enthusiastic about learning. Again, enthusiasm was mentioned in combination with motivation and confidence levels.

> *they enjoyed the session and came away with a sense of achievement . (170)*
>
> *The student's success. Everything else follows from this: confidence, laughter, the willingness to 'have a go'. (143)*
>
> *sessions are best when I feel that I have learnt something as well as the student, that makes the relationship less hierarchical. I usually find that my own interests and enthusiasm generates the same from my student so I really have to enjoy myself too. (106)*

Several tutors mentioned managing the task to ensure the tutoring session was a beneficial learning experience:

> *Work at right level and relevant to child. Supplementary material for level above and below available. (138)*
>
> *Good rapport between student and tutor. Making session fun. Set at correct level- not too easy not too hard. Student being successful at the end. (24)*

In relation to greater understanding, a smaller number of tutors also mentioned providing clear explanations as conditional for providing beneficial learning experiences. Other techniques used to provide successful tutorials included the use of questions, using creative methods and resources and making work fun, some of these sentiments have been expressed in the quotes included above.

### 8.4.5 An unsuccessful tutoring experience

Tutors were asked to reflect on an experience which didn't work out as well as expected (see Appendix N question 5.5). Again this question provided more evidence of what tutors considered as effective practice, by reflecting on what was missing or less successful.

In total there were 112 responses to this question which represents a 54.9% response rate. It is possible that the low rate of response to this question may indicate that a number of tutors did not have, or were unwilling to share, details of an unsuccessful experience. Of the 112 responses, 6 tutors indicated the question was not applicable, 2 responses were unusable and 2 tutors stated they were unsure. The remaining 102 tutors related an experience when a tutoring session had not worked out as intended, with some tutors outlining strategies they commonly used when sessions do not progress as originally planned.

Lack of student motivation was the reason most frequently cited for unsuccessful tutoring experiences (42.2%). Tutors referred to students who were not prepared to put in the effort, not interested in learning, expected the tutor to do the work for them or just did not want to be tutored and would not cooperate. Some example responses are shown below:

> *Student didn't want tutoring. The tutoring was set up almost as a "punishment" for bad behaviour at secondary school (Year 7). Basically a nice kid had solved bullying by joining the naughty group and messing about in lessons. Tutoring was not the solution and though some progress was made and some communication established we ceased when he didn't turn up for a session. (195)*

> *I had one student who expected me to dictate the contents of her GCSE coursework. She wanted me to basically do it for her and I refused, instead asking her to tell me what she thought about the coursework. It ended up being quite frustrating as she was unwilling to put in the effort to complete the coursework. (21)*

The part played by the parent was the second most frequently cited reason for an unsuccessful tutoring experience (35.3% of responses). Tutors stated that parents often expected too much and applied undue pressure on their children. Two different examples are included below:

> *Parent thinking one-to-one was a passport to success coupled with the student expecting results overnight without effort. (142)*

> *Constant interruptions from the parents mainly - it's a bit difficult to tell a parent to butt out when it's their home! (54)*

A lack of rapport between the tutor and student was mentioned in 16.7% of responses, demonstrating the importance of establishing a successful working relationship between tutor and student. These sentiments were expressed in statements such as the following: 'there was no rapport or common ground on which to base a relationship', 'Not able to get completely on wavelength of student', 'no relationship could be formed: no relationship, no learning'.

The vast majority of tutors related unsuccessful experiences of PT to problems outside of their control. However there were a small number of tutors who felt they were somewhat or entirely responsible for the session not going as planned. A total of (7.8%) admitted to mistakes when judging the students level of understanding and providing a task that was too easy or too difficult for the tutee:

> *Assured that because Maths levels were low, English would be too, so aimed too low. (198)*

In addition, there were several tutors who related experiences where they felt they had been unprepared for the session (7.8%):

> *If this happens, it's usually due to my own state, for example, I'm tired, rushed, unprepared, and so on. (134)*

> *My lack of preparation and / or knowledge. We all have to learn our trade. It is a little bit tragic that it's the pupils and not we teachers who pay the price for that. (40)*

The reasons for unsuccessful tutoring experiences given in response to this question demonstrate that at times one-to-one tuition does not work out as well as expected. From the examples drawn on above, it is clear that tutors often considered the student to be at fault. In some situations the problems stemmed from the actions of the parent; however some unsuccessful sessions were as a result of lack of preparation, knowledge or skill of the tutor.

### 8.4.6 Evaluating effective tutoring

Tutors were asked to think about how they evaluate their performance. They were asked to rank their three most important evaluation indicators from a list of statements in order of priority, with the option of including additional indicators (see Appendix N question 5.2 and 5.3). A total of 119 tutors provided one evaluation measure, 118 provided two and 117 included three evaluation measures. The final column gives the total number of times each measure was selected. Examination related evaluation indicators were combined (examination results achieved, grade increases, passing the 11 plus, entrance exam or obtaining a place at university), this combined measure is shown in bold in Table 8.8.

The most frequent choice for rank 1 and rank 2 was 'when faced with a difficulty the student is less likely to give up'. 'Being recommended to teach another student' was the most frequent choice for rank 3 (See Table 8.8). It was surprising to find that examination results were not chosen as the most important self-evaluation measure for tutors; however there were a number of categories that could be selected which reflected some aspect of examination results. When these categories were collapsed to create an overall measure of results, it was found to be the most frequently selected evaluation measure for tutors to assess their performance (see Table 8.8).

In an attempt to determine if evaluation indicators differed by subject and level, the ranks were combined and each measure was examined in term. This enquiry found a number of differences were manifest in the responses. More tutors teaching maths (and not English) selected 'when faced with a difficulty the student is less likely to give up' than English (and not maths) tutors ($\chi^2$ (1) = 5.2, $p$ <.05, with the Phi value -.29). In addition, significantly less tutors teaching at primary level included the combined results indicator as an important evaluation measure, compared to those tutoring students at other levels ($\chi^2(1)$ = 8.82, $p$ < .01 with the Phi Value -.28). Likewise, significantly more tutors teaching students at post-16 level included results as an important evaluation indicator ($\chi^2$ (1) = 7.02, $p$ < .01 with the Phi Value .25). Doing well in an examination appears to be more important to tutors teaching older students in comparison to tutors teaching primary age children. In addition, using feedback from parents as an evaluation measure appeared to be significantly less important to tutors teaching post-16 level compared to other age groups ($\chi^2(1)$ = 9.81, $p$ < .01 with the Phi Value -.29).

*Table 8.8 Frequency and percentage of evaluation measures used by tutors*

| Evaluation Measures | Rank 1 | | Rank 2 | | Rank 3 | | **Total number of tutors†** | **% of tutors** |
|---|---|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | *n* | % | | |
| When faced with a difficulty the student is less likely to give up | 27 | 22.7 | 26 | 22 | 14 | 12 | 67 | 56.3 |
| Feedback from student | 21 | 17.6 | 18 | 15.3 | 20 | 17.1 | 59 | 49.6 |
| This student is more willing to tackle new work | 19 | 16 | 17 | 14.4 | 14 | 12 | 50 | 42 |
| Being recommended to teach another student | 5 | 4.2 | 11 | 9.3 | 29 | 24.8 | 45 | 37.8 |
| Examination results achieved‡ | 14 | 11.8 | 16 | 13.6 | 12 | 10.3 | 42 | 35.3 |
| The grade increase from predicted to actual examination results‡ | 20 | 16.8 | 11 | 9.3 | 10 | 8.5 | 41 | 34.5 |
| Feedback from parent | 7 | 5.9 | 14 | 11.9 | 13 | 11.1 | 34 | 28.6 |
| Other | 4 | 3.4 | 2 | 1.7 | 3 | 2.6 | 9 | 7.6 |
| Passing an entrance exam‡ | 2 | 1.7 | 2 | 1.7 | 0 | 0 | 4 | 3.4 |
| Obtaining a place at university‡ | 0 | 0 | 1 | 0.8 | 1 | 0.9 | 2 | 1.7 |
| Passing the 11plus‡ | 0 | 0 | 0 | 0 | 1 | 0.9 | 1 | 0.8 |
| **‡COMBINATION Examination results achieved, grade increase, entrance exam, 11-plus, obtaining a place at university** | **36** | **30.3** | **30** | **25.4** | **24** | **20.5** | **81** | **68.1** |
| **TOTAL** | **119** | **100** | **118** | **100** | **117** | **100** | **119** | - |

†Some tutors used more than one examination indicator. This explains the discrepancy between the total number of tutors and the total number of responses for each rank.

Tutors were asked to explain their answer to the ranking question and include any additional evaluation measures used. Confidence was not specifically included in the list of evaluation measures; however it was mentioned as an additional indicator by over a third of respondents. Several examples are included below:

> *The most important job a tutor can do, in my opinion, is to help produce a self-confident, effective, organised learner who appreciates the significance of their learning achievement, and is happy to continue to learn in the long term. (200)*

> *Any student who can confidently tackle a problem in Mathematics is better positioned to solve a problem compared to a student who lacks confidence in their ability. (196)*

In addition to including confidence as an important evaluation measure of effective PT, several tutors highlighted the value of gaining a greater understanding of the topic, which could be associated with a number of evaluation indicators included on the questionnaire.

### 8.4.7 Summary: Effective tutoring

This section explored views on effective tuition and how tutors evaluate their own performance. When asked to consider if they felt they were effective tutors, a total of 92.5% responded positively and provided examples of their tutoring effectiveness. Although a large proportion of tutors mentioned improvements in school performance, grade increases and examination results as evidence of effectiveness, more than half the responses provided different reasons. These focussed on increased levels of confidence and the skill of careful task management.

Respondents were also asked about their effectiveness with regards to Student 1; 93.1% indicated they had made an impact on Student 1's achievement. Again school and grade increases and exam results were frequently provided as supporting evidence; however a substantial proportion of respondents also mentioned an increase in confidence. Grade increases were cited by a higher proportion of tutors teaching at primary level, whereas examination results were highlighted as important evaluation indicators for older students.

Tutors identified three skills/qualities/attributes that define an effective tutor. Subject knowledge, patience, and rapport were the three most recurring themes. Rapport was also included by a number of tutors as an indicator of their own effectiveness and as a contributor to successful tutoring sessions. Although these skills and qualities were highlighted by a substantial proportion of all tutors, there were some important subject differences. Knowledge of the subject was referred to significantly less frequently by English tutors. Conversely, maths tutors cited the attributes of patience and rapport more frequently than those teaching other subjects.

Tutors considered beneficial learning experiences to occur when tutees gained a greater understanding of the subject, changed their attitude, became more confident or more motivated to learn. Respondents also indicated that unsuccessful sessions were often caused by the negative attitude of the student.

Although there were some differences between subjects and levels in the themes that arose from perceptions of effectiveness, the majority were common across different groups of tutors. The analysis will be extended further by considering students views discussed in chapter 9.

# 9 Results: Student Questionnaire Responses

## 9.1 Introduction

This chapter presents an analysis of student opinions of effective PT. The student questionnaire was designed to map closely with the tutor responses (analysed in chapter 8), therefore the results are presented in a similar fashion to the previous chapter. The student responses were examined by age group and by subject tutored to determine both the differences and the similarities in tutoring methods and student preferences. This chapter will address RQ3: What do pupils [and tutors] consider to be effective tuition and how is this evaluated?

This chapter opens with a description of the students who completed the questionnaire and their patterns of participation in PT. Students were asked about their current tutor, 'Tutor 1'; perceptions of effective tuition have been presented in relation to this tutor. The final section of the questionnaire asked respondents to reflect on PT in general and to consider how effective tutoring is evaluated.

## 9.2 Characteristics of the sample

### 9.2.1 Age, gender and ethnicity

The questionnaire was aimed at school and college aged students, although 2 participants who returned a questionnaire were above this age range. To explore the differences in responses by levels of tutoring the students were divided up by Key Stages (see Table 9.1). The majority of respondents were in KS4 (35.2%) and no participants were under 7 years of age (KS1). This is perhaps due to the complexity of the questionnaire and the need to involve parents (see section 4.3.6), or lower PT participation rates amongst KS1 students (Tanner et al., 2009). The two older participants have been excluded from the level comparisons.

It is unclear how closely this sample represents the age of students receiving PT in England. The Cost of Schooling Study found the highest proportion of tutoring took place during KS2 (see section 1.4 Peters et al., 2009), whereas the Sutton Trust report (including students in KS3 to KS4) found year 11 students were more likely to receive PT (Ipsos MORI, 2009).

*Table 9.1 Number and percentage of students included in the sample by Key Stage*

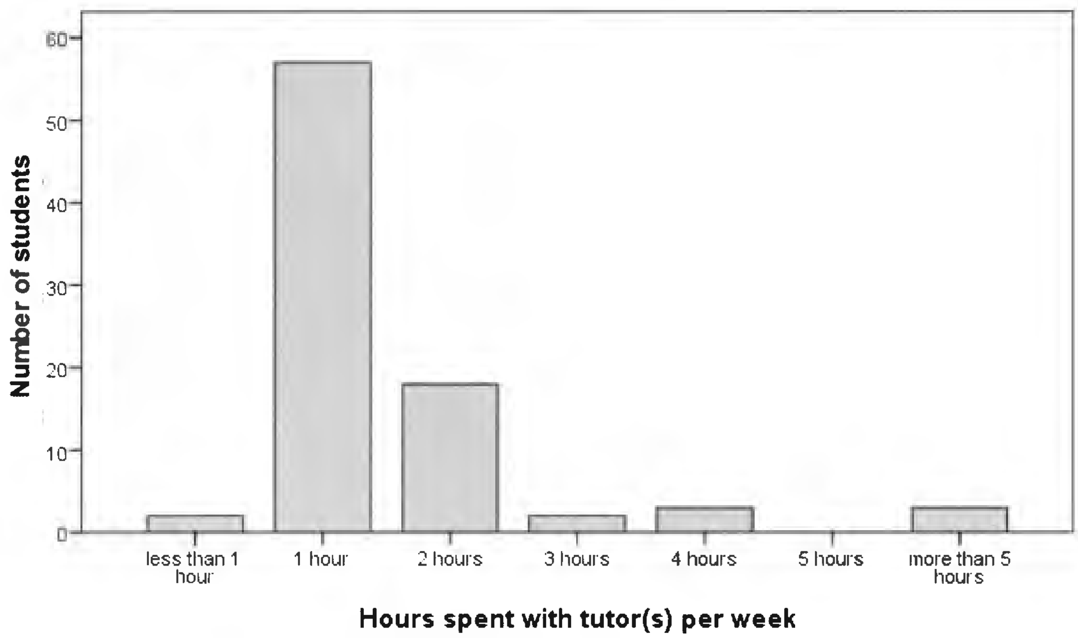
| Key Stage | *n* | % |
|---|---|---|
| Key Stage 2 | 21 | 23.9 |
| Key Stage 3 | 14 | 15.9 |
| Key Stage 4 | 31 | 35.2 |
| Key Stage 5 | 22 | 25 |
| **TOTAL** | **88** | **100** |

Slightly more females (53.5%) completed the questionnaire and no significant differences were found between gender and Key Stage. The sample comprised 77.8% white European students, 6.6% black and 7.7% Asian (see Appendix T Table T.1 for more details). The majority of students in this sample attended state maintained primary and secondary schools, colleges and sixth forms. Pupils from the private education sector made up 17.7% of the sample. Only 1 student indicated they were home-schooled at the time of completing the questionnaire.

### 9.2.2 Average hours tutored

Figure 9.1 shows the vast majority of the students in the sample were tutored for an average of 1 hour per week.

*Figure 9.1 Average hours per week spent with tutor(s)*



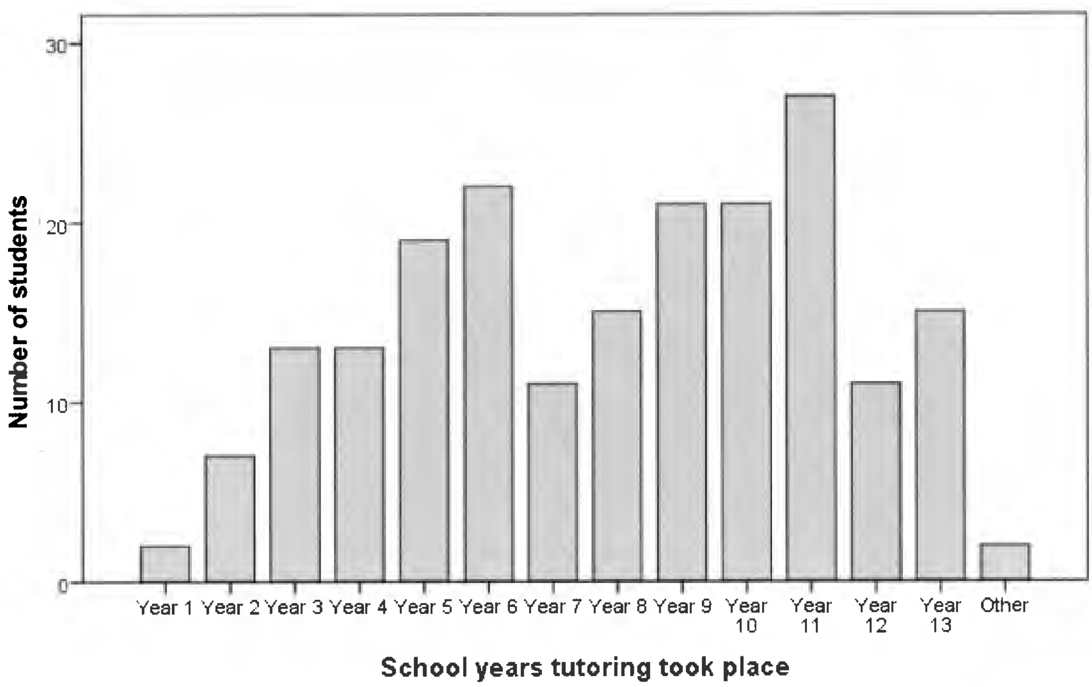
The number of hours the students had been tutored per week was divided into 2 periods (up to an hour and over an hour) and examined against KS; significantly more students in KS4 and KS5 received PT for over 1 hour per week compared with younger students ($\chi^2(3) = 9.79$, $p$ <.05, with the Cramer's V value 0.34).

### 9.2.3 When tuition took place

Students were asked to record all the school years during which they had received tutoring and Figure 9.2 shows the combined responses of all the students. From these results it is apparent most tutoring took place during years 6 and 11. However, as the students were from a wide age range this graph is difficult to interpret correctly.

To establish a clearer picture, responses from students in KS5 were examined (*n* 20) to determine the pattern of PT participation from Years 1-11 and similar findings emerged. Data from this sample found that the students had often received PT in more than 1 school year. A total of 31.4% of the younger students in the sample (KS2 and KS3 *N*35) indicated they had already received PT in 3 or more school years at the time of completing the questionnaire.

*Figure 9.2 School years when tutoring took place*



The students were asked to state the total number of tutors they had worked with during their schooling. It was interesting to find that although the majority of students had indicated they received PT for more than 1 year, almost 50% stated that they had only worked with 1 tutor. This was not reflected in the example students (Student 1) included in the tutor questionnaire, where only 19.9% had been working with Student 1 for over 18 months.

### 9.2.4 Tutored subjects

Table 9.2 shows that students had received PT in a wide range of subjects. These findings mirror the results from the tutor questionnaire and previous findings regarding the subjects which are more frequently tutored (Ipsos MORI, 2009; Ireson & Rushforth, 2005; Peters et al., 2009; Tanner et al., 2009). Over three quarters of the sample stated they had been tutored in maths.

An analysis was completed on the three core subjects of English, maths and science. The majority of students in KS2 had received PT in English compared to only 14.3% of KS5 students ($\chi^2$ (3) = 17.84, $p < .001$ with the Crammer's V value .46). The opposite was found in science with a significantly higher proportion of KS5 students participating in science PT ($\chi^2$ (3) = 13.57, $p < .01$ with the Crammer's V value .4). Maths tutoring was constant for all Key Stages. No significant relationship was found between subjects tutored and gender for English and science; however, females were overrepresented in the total number who received PT in maths ($\chi^2$ (1) = 6.36, $p < .05$ with the Phi Value .28).

As previously outlined, the students were given the opportunity to select up to five subjects. The majority of students (60.8%) indicated they had been tutored in more than one subject, 10.3% had received PT in five subjects.

Of the 44 students that had received PT in English (English, English literature or English language), 75% of these had also been tutored in maths. Likewise, over 50% of the students who had received PT in science (biology, physics, chemistry and science) had also been tutored in maths. The most common combinations were maths and English, maths and science, and maths, English and science. These have been examined in detail in Appendix T Table T.2.

*Table 9.2 Frequency of subjects tutored reported by the students*

| Subject | *n* | % of students (*N* 87) |
|---|---|---|
| English | 40 | 46 |
| English language | 2 | 2.3 |
| English Literature | 2 | 2.3 |
| **English combined** | **(44)** | **50.6** |
| Science | 12 | 13.8 |
| Biology | 10 | 11.5 |
| Chemistry | 14 | 16.1 |
| Physics | 9 | 10.3 |
| **Science combined** | **(45)** | **51.7** |
| **Maths** | **66** | **75.9** |
| Business Studies | 2 | 2.3 |
| French | 8 | 9.2 |
| Geography | 2 | 2.3 |
| German | 1 | 1.2 |
| History | 1 | 1.2 |
| ICT | 4 | 4.6 |
| Psychology | 1 | 1.2 |
| Reading | 3 | 3.5 |
| Spanish | 1 | 1.2 |
| Study skills | 1 | 1.2 |
| Non Verbal reasoning | 1 | 1.2 |
| Verbal reasoning | 3 | 3.5 |
| All Primary curriculum KS1 | 1 | 1.2 |
| Other | 2 | 2.3 |

### 9.2.5 Tutor example - Tutor 1

A section of the questionnaire was devoted to finding out information concerning the students' current tutor at the time of completing the questionnaire (Tutor 1). If a student was receiving PT from more than one tutor they were asked to select only one and answer questions relating to that tutor.

There were almost equal numbers of male and female tutors selected by students as Tutor 1. Most students in the sample (70.1%) were tutored by Tutor 1 for 1 hour per week, although 4 students were tutored for 3 or more hours per week. There was a mixed response in the data regarding the duration of the relationship with Tutor 1. A surprising 21.8% of the sample had been tutored by Tutor 1 for less than 1 school term, just under half the sample had been tutored by Tutor 1 for over a year (43.7%) and 9.2% for more than 3 years. Students who were being tutored in English by Tutor 1 had received tuition for a longer period than those being tutored in other subjects ($\chi^2$ (2) = 9.1, $p$ = .01, Cramer's V .32). Table T.3 in Appendix T lists the subjects tutored by Tutor 1. A total of 64% were receiving PT in maths, 36.1% in English and 39.5% in science.

The most frequently selected reason for seeking PT from Tutor 1 was 'to improve understanding of the subject'. This was closely followed by 'to help me achieve top examination grades' and 'to increase my confidence in the subject'. When all examination related reasons were combined, this was given most frequently by 78.6% of the respondents (see Appendix T Table T.4). There was a significant difference in KS level and the numbers of students receiving PT for help with examinations. Compared to KS2, high numbers of KS4 and KS5 students required tutoring for examination related purposes ($\chi^2$ (2) = 9.72, $p$ < .01, Cramer's V .38. KS2 and KS3 were combined to ensure there were sufficient numbers for the chi-square). This trend was also found in the Young People Omnibus report (Ipsos MORI, 2009). The results from this question indicated that students were receiving PT for a variety of reasons, often for both remedial and extension purposes. For example, 1 student stated he was receiving PT because he was dyslexic, but also to help him obtain top examination grades.

### 9.2.6 Summary: Characteristics of the sample

To enable accurate comparisons between students who received PT in different subjects and at different levels, the details of the sample have been described in full.

The majority of students in the sample were in KS4 (35.2%), numbers in KS5 (25%) and KS2 (23.9%) were similar, with fewer students in KS3 (15.9%). No students in KS1 completed a questionnaire. Responses from students in different Key Stages were contrasted for popular themes where there were sufficient numbers to allow accurate comparisons.

Maths was the most frequently tutored subject followed by science and English. A greater proportion of KS2 students had received PT in English as against those in KS5 but a higher percentage of older students had been tutored in science. The majority of participants had been tutored in more than one subject.

## 9.3 Effective tutoring

Students were asked to evaluate the performance of Tutor 1 (see Appendix P questions 2.10, 2.10 and 2.12). These questions aimed to determine if the student felt Tutor 1 had made an impact on their performance in the subjects(s) taught and also to gauge perceptions of effectiveness through the methods used by this tutor. Firstly, students were asked to include their predicted grade or level in the subject(s) Tutor 1 had been employed to help them with before PT commenced. Although not requested, a number of students also provided their predicted or actual grade as a result of tutoring. Comparison of grades before and after tutoring indicated a number of substantial (predicted and actual) achievement gains. Examples have been included below:

> *Maths C - achieved B, science C achieved AA (for GCSE). (42[33])*
>
> *Before D, Now B. (68)*
>
> *Chemistry prediction before B, after A/B. (67)*
>
> *6A I think, I already have moved to a 7C in the end of Year 8. (70)*
>
> *Before tutoring D after tutoring predicted B. (61)*

The students were then asked 'Do you think you will do better in this subject as a result of having tutoring?' Of the 87 students who responded to this question, only two responded negatively. One of these students responded with: "I don't have confidence that I will do better, because I still feel I have to do the work" (38). A further 6 students replied by stating that they "hoped" they would do better. The remaining 90.8% of respondents answered yes. A number of these students wrote an extended response to this question explaining their achievement gains, these students echoed the responses noted earlier:

> *Yes. Before I was tutored I was on a B+ now with good tuoring [sic] I am hoping I get a A*/A (54)*
>
> *Yes, I am predicted a high B/A now (83)*
>
> *Without doubt (65)*
>
> *yes she helps me keep up with the hard work I get in class (53)*
>
> *Yes I am now predicted an A grade (44)*

Replicating statements made by the tutors, a number of students mentioned other benefits as a result of tutoring without referring to grades or achievement levels. The most frequently mentioned gain was in confidence as expressed in the following responses:

---

[33] All quotes included in this chapter have been numbered and details have been included for each respondent in Appendix T Table T.5.

> *Yes, I now have a much better understanding of the subject and I have found that I'm a lot more confident with my writing and ideas now. (49)*
>
> *Yes, he ensured that I am understanding every part of the subject as I am going through the second year as well as going over areas I didn't understand from AS. He has increased my confidence. (90)*

A KS4 student being tutored in several subjects made the following statement:

> *Yes, even if it doesn't show in exam [sic], because I freeze in exam [sic]. I feel inside me that I have improved. (73)*

This is a particularly interesting statement with reference to the results of RQ1 outlined in chapters 5 and 6. Clearly this respondent felt she had made learning gains, but she was not confident this would be manifest in her examination results.

The students were asked if they considered Tutor 1 to be a 'good tutor' and to explain their answer. Again there were 87 responses to this question. One student was unsure about their opinion of Tutor 1, 2 students answered negatively, one of whom had also answered negatively to the previous question. Although 1 student had already indicated that they would perform better in the subject as a result of PT, this student did not consider Tutor 1 to be a 'good tutor': "No because I set the work I need help on" (55). This student clearly felt that it was the role of the tutor to set work for which help was required during the session.

The other student who had provided a negative response to this question gave an ambiguous answer: "Yes she is friendly, but I think this might be her downfall" (38). In a later question requesting characteristics of effective tutors, this same student included: "know how to handle your student if they don't do their work", "can communicate with his student" and "know when its *[sic]* right to be firm". These comments suggest that this student needed a firmer more disciplined approach to tutoring.

The remaining 95.4% answered positively, confirming that they felt Tutor 1 was a 'good tutor', 70 respondents provided reasons. The most frequent themes to arise in response to this question are summarised in Table 9.3.

*Table 9.3 Themes used in response to the question asking students if they considered Tutor 1 to be a "good tutor"*

| Themes | Evidence for Tutor 1 being "a good tutor" | |
|---|---|---|
| | *n* | % of tutors (*N* 87) |
| Subject knowledge of tutor | 16 | 18.4 |
| Rapport/understanding/empathy | 15 | 17.2 |
| Provides greater understanding | 13 | 14.9 |
| Uses clear explanations | 13 | 14.9 |
| Makes work fun | 6 | 6.9 |
| Boosts confidence | 5 | 5.7 |
| Helpful | 5 | 5.7 |
| handouts/diagrams/creativity/resources | 4 | 4.6 |
| Patience | 4 | 4.6 |
| Enthusiastic tutor | 4 | 4.6 |

The most common recurring theme was subject knowledge of the tutor.

> *He is great. He knows everything! (21)*
>
> *He is brillant [sic]. He's the smartest person I have ever met. He is teaching me algebra and geometry which I have not done in school. (20)*

Rapport, empathy and understanding were reasons provided as evidence of the tutoring skills of Tutor 1, demonstrating the importance of the relationship between the pupil and student. A total of 17.2% referred to this area in their responses, with the majority mentioning that they 'get on well' with the tutor:

> *Yes, she understand [sic] me and we get on well. (59)*
>
> *Yes, she knows the subject well, and knows me well, knows when I need help etc. (42)*

This was followed by the tutors' ability to provide clear explanations and sentiments expressed by the students that demonstrated they had gained a greater understanding of the subject as a result of working with Tutor 1.

> *Yes, she helps to explain things in a straight forward way and gives me understanding in more complex areas I now struggle in. (44)*
>
> *Brillinat [sic] he's excellent at explaining things, make [sic] things simple to understand. And tells you interesting facts to keep your enhusiasm [sic] in this subject. (26)*

*Yes because he explains everything, very clearly. (82)*

The level of subject knowledge of Tutor 1 appeared to be less important for students who received English PT. Only 7.1% of these students mentioned subject knowledge compared to 23.7% of students who received PT in other subjects ($\chi^2$ (1) = 3.48, $p$ = .06). Likewise, a total of 21.7% of female respondents considered their tutor to be 'a good tutor' due to clear explanations, compared to just 5.1% of male students who responded to this question ($\chi^2$ (1) = 4.8, $p$ < .05 with the Phi Value .24). Students who received science PT were also overrepresented in the numbers who made reference to the importance of clear explanations ($\chi^2$ (1) = 8.4, $p$ < .01 with the Phi Value .32). This was reflected in the greater proportion of post-16 students who considered clear explanations to be an element of effective tuition, the majority of whom were receiving tuition in science.

Making work fun and increasing confidence were also cited as evidence of Tutor 1 being a good tutor mentioned by 6.9% and 5.7% respectively. A smaller number of students commented that Tutor 1 was helpful, had a sense of humour and was enthusiastic.

### 9.3.1 What helps most?

Firstly, students were asked to reflect how often Tutor 1 used various actions and techniques during sessions (see section 4.3.4). This question aimed to prompt students to think about the different teaching methods employed. Students were then asked to consider which techniques or actions used by Tutor 1 helped the most. The list of actions are included in Table 9.4 and include: checking work, providing resources, explaining work not understood at school and providing memorising strategies (see Appendix P, question 2.8 and 2.9).

Almost the entire student sample (80.7%) indicated that their tutor checked work during every session. The preparation performed by tutors is reflected in the number of respondents that stated 'my tutor always has work ready for me to do in tutoring sessions' and 'my tutor brings books/resources for me to work with' for every tutoring session (70.1% and 65.1% respectively). Fewer than half of the respondents noted homework exercises were given during every session. Practice tests and past examination papers were completed less frequently, and were most likely to be undertaken during 'some sessions'. Only 6.8% of the students stated that their tutor provided more difficult work that was not on the syllabus, during every session, and 33% noted their tutor never provides work not included on the syllabus (see Table 9.4).

*Table 9.4 Content of tutoring sessions*

| Content of Tutoring session | Every session % | Most sessions % | Some sessions % | A few sessions % | We never do this % | N/A % | Response count *N* |
|---|---|---|---|---|---|---|---|
| My tutor checks my work | 80.7 | 10.2 | 6.8 | 1.1 | 1.1 | 0 | 88 |
| My tutor always has work ready for me to do in tutoring sessions | 70.1 | 16.1 | 6.9 | 3.4 | 3.4 | 0 | 87 |
| My tutor brings books/resources for me to work with | 65.1 | 17.4 | 5.8 | 7 | 3.5 | 1.2 | 86 |
| My tutor sets homework exercises for me to complete after the tutoring session | 46.6 | 11.4 | 15.9 | 14.8 | 10.2 | 1.1 | 88 |
| My tutor helps me to use strategies for memorising work | 39.5 | 19.8 | 15.1 | 9.3 | 15.1 | 1.2 | 86 |
| My tutor introduces new material | 32.2 | 20.7 | 23 | 12.6 | 9.2 | 2.3 | 87 |
| My tutor explains school work that I do not understand | 19.8 | 31.4 | 25.6 | 11.6 | 5.8 | 5.8 | 86 |
| My tutor helps me organise work/revision/notes/time | 25 | 21.6 | 11.4 | 14.8 | 21.6 | 5.7 | 88 |
| We go through past examination papers | 8 | 23.9 | 37.5 | 13.6 | 8 | 9.1 | 88 |
| My tutor sets practice tests | 9.1 | 19.3 | 28.4 | 12.5 | 28.4 | 2.3 | 88 |
| My tutor sometimes gives me more difficult work that is not on the syllabus | 6.8 | 8 | 27.3 | 19.3 | 33 | 5.7 | 88 |

The section below considers what students perceived to help them most from the list summarised in Table 9.4 and from any other tutoring techniques they could identify. There were 76 responses to this question although one response was unusable, 19 mentioned two or more actions or techniques they considered to be most helpful. The majority of students noted techniques from the list provided and did not add additional strategies. The ten most frequent themes to arise in response to the question 'From the list of tutors actions included in question 7 and others you can think of, which one do you think helps most?' are summarised in Table 9.5.

Over a quarter of respondents stated that having work explained to them not previously understood at school was the most helpful action Tutor 1 performed during tuition sessions.

> *Explaining things which I have not grasped in my maths lessons at school (68)*
>
> *Going over work I have already done at school to make sure I understand it clearly, and help revision (44)*
>
> *Helping with work I don't understand (36)*

Significantly more female students (38.5%) included this compared to only 17.6% of male respondents ($\chi^2$ (1) = 3.8, $p < .05$ with the Phi Value .23).

*Table 9.5 Frequency and percentage of themes for what students considered "helped most" during tutoring sessions*

| Themes | What helps most | |
|---|---|---|
| | *n* | % of students (*N* 76) |
| My tutor explains school work that I don't understand at school | 21 | 27.6 |
| Past exam papers | 18 | 23.7 |
| My tutor checks my work | 7 | 9.2 |
| Organisation | 5 | 6.6 |
| Set practice tests | 5 | 6.6 |
| Boosts confidence | 4 | 5.3 |
| handouts/diagrams/creativity/resources | 4 | 5.3 |
| Task management (determining level of knowledge) | 4 | 5.3 |
| memorising strategies | 4 | 5.3 |
| Preparation / preparation for next session | 3 | 3.9 |

A total of 23.7% mentioned going through past papers as the most helpful action performed by Tutor 1; although as expected, this was proportionally more important to the older students in the sample. None of the KS2 students referred to going through past papers, compared to 52.6% of KS5 students; however only 20.7% of students in KS4 mentioned this as the most helpful action during sessions with Tutor 1.

> *My tuor [sic] uses practice questions and does questions with me (70)*
>
> *Past examination papers/questions at the beginning of each session - helps me to understand the structure of the questions (51)*
>
> *We go through past examination papers - you get to see what sort of questions they ask an [sic] it helps you in the real exam (7)*

Although students indicated 'my tutor checks my work' as the action that occurred most frequently during the tutoring session (see Table 9.4), this was only considered as 'most helpful' by 9.2% of respondents. A small number of students referred to additional actions or techniques used by Tutor 1 which they considered to be particularly helpful. A total of 5.3% of responses to this question mentioned increasing confidence levels, as shown in the following examples:

*He helps build my confidence in this subject and makes me feel good. (34)*

*My tutor is very patient and increases my confidence. (87)*

There were also a number of actions mentioned by individual students which echoed responses to the previous question such as:

*Tutor is always happy which makes it fun. (89)*

Two students mentioned strategies that encouraged independent learning (see examples below). One of these students also noted how she felt able to learn from her mistakes through guidance provided by the tutor.

*Setting tasks for me to do alone. The [sic] checking over them. (57)*

*My tutor helps me to learn from my mistakes giving me pointers when I get lost, but otherwise letting me do the work and not spoon feeding me. (9)*

The remaining questions analysed in this section refer to tutoring in general and do not specifically relate to the students' experience with Tutor 1.

### 9.3.2 The 'best thing' about having a tutor

The students were asked to list the best things about having a tutor (see Appendix P question 3.2). The ten most frequently cited themes to arise in response to this question are summarised in Table 9.6.

There were 86 responses to this question, over a quarter made references to the benefits of working in a one-to-one situation. This was mentioned far more often than any other perceived benefit, although this encompassed a wide range of components. A number of respondents mentioned having the confidence and freedom to ask any questions. Examples of this are included below:

*Being able to ask any question, no matter how stupid I might think they are, without feeling ashamed as I would in a class. (64)*

*Being able to tell them when you don't understand something and get them to explain it again. (43)*

Benefits of the one-to-one working situation were also expressed in terms of being able to work at the required pace and the appropriate level for the student. Examples of these responses highlighting areas of task management are included below:

> *It allaws me ta wark at my awn pace, rather than at the set pace within a classroom. (31)*

> *They can teach you on a one to one bases [sic] and can help you tackle the subject in a specific method of working based upon what bests suits the pupil. (79)*

*Table 9.6 Themes used in response to the question asking students to consider the 'best thing about having a tutar'*

| Themes | 'best thing about having a tutor' | |
|---|---|---|
| | *n* | % |
| Benefits from a 1:1 situation | 22 | 25.6 |
| Learn more | 13 | 15.1 |
| Provides greater understanding | 12 | 14.0 |
| My tutor explains school work that I don't understand at school | 9 | 10.5 |
| Improvement in school / Grade increase | 8 | 9.3 |
| Boosts confidence | 7 | 8.1 |
| Helpful | 7 | 8.1 |
| General Improvement | 7 | 8.1 |
| Introduce new material | 3 | 3.5 |
| Task management (determining level of knowledge) | 2 | 2.3 |

Students also expressed preference to working in a one-to-one situation compared to an impersonal and sometimes distracting classroom environment:

> *Having someone who can help you understand a tapic if you do not and is mare personal than being in a classroom with lots of other students. (24)*

> *Having one to one lesson, so really understanding topics without distraction. (50)*

The one-to-one working situation was also preferred as this enables attention to be focussed on the student:

> *Because all the time is spent on me. And I have faith in him that he can help me. (19)*

> *The best thing about having one to one tutoring is your education is set about you as an individual and focusing on your academic achievement. Also you*

*have a much better relationship than in a class you have time to discuss each subject. (26)*

Interestingly, female students appeared to appreciate the one-to-one learning environment more than male students. A total of 44.2% of female students compared to 17.5% of male students considered the benefits of one-to-one learning as the 'best thing' about having a tutor ($\chi^2$ (1) = 6.86, $p < .01$ with the Phi Value .29).

There were a number of other themes that were considered the 'best thing' about having a tutor. Just over 15% of respondents mentioned the benefit of being able to learn more as a result of PT. Interestingly 25% of students being tutored in English mentioned the benefit of learning more, compared to only 7% of students being tutored in other subjects ($\chi^2$ (1) = 5.1, $p < .05$ with the Phi Value .25). Responses included sentiments such as "speed of going through chapters" (4), "Gaining more knowledge and improving" (56) and "you learn more" (74) (77) (82).

Several students mentioned achieving greater understanding in the subject and the benefit of having a tutor to explain school work that was not understood at school:

*You can learn new stuff and they can go over what you done [sic] in school so you really know what your[sic] doing. (63)*

*Having someone who can help you understand a topic if you do not. (24)*

*Gaining the understanding for the subject, that you didn't really have before. (65)*

There were two further main themes to arise in response to this question. Students indicated that the 'best thing' about having a tutor was the subsequent school and grade improvements; 9.3% specifically mentioned grade or level improvements and a further 8.1% referred to a general improvement in performance. Some examples have been included below:

*The best thing about having a tutor is they can explain the subject more clearly so hopefully achieve a better result. (14)*

*You can achieve good grades. (52)*

*It increases my understanding of the subject and boosts my levels. (70)*

Another theme to be included as the 'best thing' about PT was increased confidence, mentioned by 8.1% of respondents.

### 9.3.3 Bad or unpleasant experiences of tutoring

Students were asked to relate a bad experience they may have had with a tutor (see Appendix P question 3.1). A total of 10 students provided an example of a negative tutoring experience; the remainder did not answer the question (18%) or answered with N/A or no (71%). Of these 10 students, 5 stated the tutor had shouted at them, called them "lazy" or "stupid", and 2 students mentioned the tutors' lack of patience:

> *I was shouted at by a tutor. They didn't believe I didn't understand the question that was being asked and got impatient. (32)*

> *My bad experience was I had this tutor who was telling me how stupid I was in a lesson. She was saying I was stupid and dyslexic. This really didn't help, it just made me less confident in the particular subject. (73)*

Another student mentioned how a tutor had been "hard to talk to" and "unreliable" (34). One student explained that the tutor was unprepared and had insufficient knowledge of exam board requirements. A student also stated that the tutor had been "overly friendly" and as a result the student had not learnt as much as they had expected to (64).

Although the majority of respondents did not relate a bad experience, these findings suggest that 1 in 10 students in this sample had encountered a negative experience during PT.

### 9.3.4 Three skills/qualities/attributes that make a good tutor

In a similar manner to the tutor questionnaire, students were asked to state three qualities, skills or attributes required for good tutoring (Appendix P question 3.5). There were 80 responses to this question with a total of 238 coded skills, qualities and attributes. Table 9.7 shows the 15 most frequently cited attributes required for good tutoring suggested by tutees. These have been compared with responses to the same question from the tutors' perspective.

It should be noted that the three most frequently cited skills, qualities or attributes for good or effective tuition were the same for both tutors and tutees; however subject knowledge appears to be proportionally more important to students in comparison to tutors. Fewer students considered building aspects of the relationship (rapport, understanding etc) to be important although the statements helpful, being kind and friendly as well as being approachable were all qualities students felt contributed to good tutoring. Having a sense of humour and making sessions fun were both mentioned more frequently by the students, however a higher proportion of tutors included enthusiasm (14.4% compared to only 2.5% of students).

*Table 9.7 Students and Tutors 15 most frequently mentioned skills/qualities/attributes of effective tutoring*

| Skill/quality/attribute | Students (N 80) | | Tutors (N 118) | |
|---|---|---|---|---|
| | *n* | % (of students) | *n* | % (of tutors) |
| Subject knowledge | 51 | 63.8 | 65 | 55.1 |
| Patience | 39 | 48.8 | 60 | 50.9 |
| Rapport/understanding/empathy | 22 | 27.5 | 46 | 39 |
| Kind, friendly manner | 20 | 25 | 10 | 8.5 |
| Sense of humour | 14 | 17.5 | 13 | 11 |
| Clear explanations | 13 | 16.3 | 23 | 19.5 |
| Helpful | 12 | 15 | 0 | 0 |
| Communication skills | 6 | 7.5 | 18 | 15.3 |
| Flexible to the needs of the learner | 6 | 7.5 | 17 | 14.4 |
| Approachability | 5 | 6.3 | 5 | 4.2 |
| Organisation | 5 | 6.3 | 1 | 0.8 |
| Knowledge of exam boards | 4 | 5 | 8 | 6.8 |
| Level of discipline/firmness | 4 | 5 | 1 | 0.8 |
| Preparation/planning | 4 | 5 | 5 | 4.2 |
| Makes work fun | 4 | 5 | 4 | 3.4 |

Through examining patterns in the responses to this question, it was found that more female students considered patience to be an important characteristic of a good tutor. A total of 64.3% of all females who answered this question mentioned patience compared to 34.3% of males ($\chi^2$ (1) = 6.87, $p < .01$ with the Phi Value .3). Following the pattern of responses to the question concerning Tutor 1, significantly more students tutored in science subjects mentioned providing clear explanations as a skill essential for good tuition ($\chi^2$ (1) = 4.46, $p < .05$ with the Phi Value .24).

### 9.3.5 Disadvantages of tutoring

In contrast to the previous questions and to continue to establish the perceptions of effective tuition, respondents were asked to report any disadvantages of having a PT (see Appendix P question 3.3). There were 82 responses to this question and just over 50% indicated there were disadvantages in working with a private tutor. Two main reasons were given in response to this question. A total of 39.5% of the respondents noted that participating in PT meant they had less time for other activities and 23.3% made reference to the cost.

Very few students referred to aspects of pedagogy in their responses. Two students expressed concerns with regard to limiting independent learning:

*Relying on tutor too much and not doing much independent work. (67)*

*Feel spoonfed. (38)*

One student referred to an element of task management by expressing that tutoring was 'hard' as the tutor taught material "hard to understand" (47). A further 2 students expressed unease due to conflicting methods used by the tutor and subject teacher. Only 1 student stated tutoring was "sometimes boring" (84).

These comments demonstrate the negative elements of PT expressed by students; however the vast majority of responses did not correspond to aspects of pedagogy. In relation to having less time for other activities, 2 students mentioned being tired or experiencing difficulty concentrating. These disadvantages might have impacted on the effectiveness of PT and could also have affected levels of motivation. However, despite some disadvantages, the majority of students remained positive about PT and a number referred to advantages that outweighed the negative comments they had expressed.

## 9.4 Evaluating effective tutoring

Students were asked how they evaluate the performance of their tutor(s) (see Appendix P question 3.4). They were provided with a list of evaluation indicators and asked to number the three most important in order of priority. Table 9.8 lists the options that were provided, prioritised to reflect the total frequency of selection. A total of 71 students provided one evaluation measure, 67 provided two and 65 indicated three evaluation measures. The final column indicates the percentage of students who selected each reason. Examination related evaluation indicators were combined (Better exam results, pass exams, passing the 11 plus, entrance exam or obtaining a place at university); this grouped measure is shown in bold in Table 9.8.

The evaluation indicators considered the most important (rank 1), included: 'I feel more willing to tackle new work as a result of having a tutor', 'my grades in class have increased' and 'when faced with a difficulty I am less likely to give up'. A total of 31% of the sample included examination related evaluation indicators as their primary indicator, making exam related concerns the most frequently chosen evaluation measure for rank 1.

*Table 9.8 Frequency and percentage of evaluation measures used by students*

| Evaluation measures | Rank 1 | | Rank 2 | | Rank 3 | | Total number of students† | % of students |
|---|---|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | *n* | % | | |
| When faced with a difficulty I am less likely to give up | 13 | 18.3 | 19 | 28.4 | 22 | 33.9 | 53 | 74.6 |
| My grades in class have increased in the subject(s) | 16 | 22.5 | 14 | 20.9 | 21 | 32.3 | 51 | 71.8 |
| I feel more willing to tackle new work as a result of having a tutor | 19 | 26.8 | 17 | 25.4 | 9 | 13.9 | 45 | 63.4 |
| I now have better exam results‡ | 11 | 15.5 | 15 | 22.4 | 2 | 3.1 | 28 | 39.4 |
| My tutor helped me pass my exams in this subject(s)‡ | 3 | 4.2 | 1 | 1.5 | 6 | 9.2 | 10 | 14.1 |
| Other | 1 | 1.4 | 1 | 1.5 | 3 | 4.6 | 3 | 4.2 |
| My tutor helped me pass the 11 plus‡ | 2 | 2.8 | 0 | 0 | 2 | 3.1 | 4 | 5.6 |
| My tutor helped me obtain a place at university‡ | 4 | 5.6 | 0 | 0 | 0 | 0 | 4 | 5.6 |
| My tutor helped me pass an entrance exam‡ | 2 | 2.8 | 0 | 0 | 0 | 0 | 2 | 2.8 |
| **‡COMBINED: Better exam results, help to pass exam, pass the 11 plus, obtained a place at university, pass an entrance exam** | **22** | **31** | **16** | **23.9** | **10** | **15.4** | **34** | **47.9** |
| **Total** | **71** | **100** | **67** | **100** | **65** | **100** | **71** | - |

†Some students used the same measure more than once. This explains the few discrepancies between the total number of students and the total number of responses for each rank.

Each indicator was then taken in turn and choices were counted equally to reflect the total number of students who had selected each option. This showed that 74.6% of the students selected 'when faced with a difficulty I am less likely to give up' compared to 47.9% who referred to examination performance. A total of 71.8% of students referred to an increase in grades in class as a result of tutoring in their top three evaluation indicators.

A significant difference was found for students tutored in science who used the reason 'I feel more willing to tackle new work as a result of having a tutor' as an evaluation indicator less frequently, compared to students being tutored in other subjects ($\chi^2$ (1) = 4.05, $p$ < .05 Phi value -.24). Similarly, students tutored in science were more likely than expected to give examination grade increases as an evaluation measure for effective tuition than students tutored in other subjects ($\chi^2(1)$ = 4.49, $p$ < .05 Phi value .25). No other significant differences were found between evaluation indicators and different groups of students included in the sample.

To further explore student perceptions of effective tutoring the participants were asked how much they agreed with the statement 'any tutor can help raise my achievement'. The results are shown below in Table 9.9. Although the majority of students disagreed with this statement, 34.9% appeared to believe that tutors are infallibly effective in their ability to raise achievement. This may reflect a belief in the ability of all tutors; however it may also relate to the degree of effort the student was willing to exert. Students were then asked if they agreed with the statement: 'If a student isn't willing to learn/make an effort, there is no point in tutoring'. This question aimed to determine how the student viewed their role in effective PT.

*Table 9.9 Distribution of responses to questions on effort and tutor ability*

| | Strongly agree % | Agree % | Neutral % | Disagree % | Strongly Disagree % | Don't know / NA % | TOTAL (*N*) |
|---|---|---|---|---|---|---|---|
| Any tutor can help raise my achievement | 15.1 | 19.8 | 15.1 | 36.1 | 12.8 | 1.2 | 86 |
| If a student isn't willing to learn/make an effort, there is no point in tutoring | 33.7 | 39.5 | 4.7 | 18.6 | 3.5 | 0 | 86 |

The responses to this question clearly demonstrate that the majority of students recognise the important role they played in the tutoring process. However over 20% of the sample disagreed with the statement and indicated that tutoring was a worthwhile pursuit regardless of the level of student effort. These responses may further indicate a view of the infallibility of tutors, with a number of students indicating that tutoring was still worthwhile regardless of student effort and attitude. The answers were collapsed and the variation between groups of students was investigated, no significant differences were found.

## 9.5 Chapter summary

The student responses were brief and often included very general statements which allowed only surface level analysis; however there were a number of themes that arose which highlight student perceptions of effective tutoring.

As with the tutor questionnaire, students were asked to outline three skills or qualities essential for good tutoring. The same three characteristics emerged most frequently from responses given by both tutors and students. These included subject knowledge, patience and rapport between student and tutor. The importance of subject knowledge was highlighted more frequently by the students in comparison to the tutor responses. The perceived significance of clear explanations and having work explained not previously understood was frequently cited as the most helpful element of effective tutoring sessions.

Notably the vast majority of students believed Tutor 1 was a good tutor and felt they would do better in the subject(s) taught as a result of PT. A number of substantial grade improvements were listed together with responses that suggested gains in confidence as a result of PT.

Statements describing the 'best thing' about PT were focussed on the benefits of learning in a one-to-one environment where there were no classroom disruptions. In this situation a number of students felt able to ask questions and acknowledge a lack of understanding. Aspects of task management were also identified with reference to the one-to-one situation where the tutor could work at the appropriate pace and level for the student. A number of students also mentioned that having a tutor enabled them to learn more and afforded a greater understanding of work already covered at school.

Where there were sufficient numbers, comparisons were made between students in different KS levels. A higher proportion of older students mentioned clear explanations as an important aspect of effective tuition; more pupils in KS5 also indicated that going through past papers was one of the most helpful elements of the tuition session. There was little overall evidence to suggest that student perceptions of effective tutoring varied by KS level. A small number of gender differences were also noted; more female students referred to the benefits that arise from working in a one-to-one learning environment. Although a high proportion of both male and female students mentioned patience as an important attribute for tutoring, this was considerably more important to female students.

Variations in responses were found for students receiving PT in different subjects. The importance of subject knowledge was less frequently referred to by students who had been tutored in English. Students who received PT in science noted the benefits of clear explanations more frequently than those tutored in other subjects. Examination related evaluation indicators were also of greater importance to students receiving tuition in science. In addition to the differences already outlined, significantly more students who had been tutored in English felt PT enabled them to 'learn more'.

In the following chapter the students and tutors perceptions of effective PT will be compared and contrasted to findings in the literature.

# 10 Discussion – Effective Tutoring Practice

## 10.1 Introduction

This section will review the results outlined in chapters 8 and 9 addressing the views of tutors and students in response to RQ2 and RQ3. The discussion will be presented thematically, analysing the topics that arose in the questionnaire responses and contrasting these with findings in the literature. This chapter will provide further integrative analysis exploring the interrelationships and underlying dimensions of the characteristics of effective tutoring from the perspective of the tutors and students. Tutors' and students' perceptions of effective tutoring will be discussed in relation to Lepper's INSPIRE model (see section 3.3): intelligent, nurturant, Socratic, progressive, indirect, reflective and encouraging.

This study has a broad remit, involving tutors from a wide range of backgrounds teaching students in a variety of subjects at different levels. As the vast majority of tutors considered themselves effective pedagogues, the purpose of this section is to identify the commonalities and differences in responses and to ascertain perspectives of effective practice shared across subjects and levels. One important consideration will be how students and tutors evaluate effective tutoring.

## 10.2 Pedagogical expertise for one-to-one tutoring

### 10.2.1 Intelligent

The most striking finding with regard to the importance of subject knowledge came in response to the question asking tutors and students to include three skills/qualities/attributes that comprise an effective tutor. Knowledge of the subject was the most frequently cited skill from the perspective of both the students (63.8%) and the tutors (55.1%). In addition to this, students who gave an extended response as to the reason why they considered Tutor 1 to be a good tutor referred most frequently to their tutor's subject knowledge.

Literature on the importance of subject knowledge in effective tutoring reveals a complex mixed picture (Grossman et al., 1989; Lampert, 1985, see section 3.3.1). Some studies have shown that subject knowledge is key to effective tutoring practice, whereas other studies concerning subject knowledge in teaching have not found a significant relationship. The literature on the importance of pedagogical content knowledge is less disputed (see section 3.3.1). VanLehn (2003) contests the importance of in-depth knowledge of the subject, by arguing that students learn by reaching an impasse and deep explanations of the subject material do not provide learning gains. Interestingly, students in the current study who gave an extended response to the question asking for reasons why they considered Tutor 1 to be a good tutor, cited firstly subject knowledge followed by the tutors' ability to provide clear explanations; although a significantly higher proportion of older students were represented in this group.

Expert tutors in the 'intelligent' part of Lepper's INSPIRE model had strong subject-matter knowledge, subject-specific pedagogical knowledge as well as general pedagogical knowledge. It is possible that by noting the importance of subject knowledge the participants in the current study were also implying the ability to teach and communicate this knowledge. This is demonstrated in the number of tutors and students in the current study who emphasised the importance of providing clear explanations as a key skill in effective tutoring practice. Knowing which problems will be difficult, where errors are most likely to occur and knowing which problems may appear to be more or less difficult for students to complete are all associated with pedagogical content knowledge in Lepper's model. These skills are closely linked with task management and in the current study they were often demonstrated in responses that highlighted the importance of selecting the appropriate task for the student.

It should be noted however that significantly fewer tutors and students studying or teaching English, emphasised the importance of subject knowledge compared to tuition in other subjects. In addition to this, significantly less English tutors considered clear explanations to be an important aspect of effective tutoring compared to tutors teaching other subjects. Lepper's model included only maths tutors and less emphasis may have been given to the importance of subject knowledge if English teachers had been included in the study.

It should also be noted that when asked to evaluate their effectiveness at the beginning of the questionnaire, only 6.5% of tutors specifically included their subject knowledge as an example or indicator of their own effectiveness. Instead the importance of subject knowledge came up in response to the other questions included in the questionnaire.

Unlike the current study where data was collected through questionnaires recording the perceptions of effective tutoring, Lepper's model was formed through observing tutoring sessions. As sessions were not observed and the participants were not questioned at length in the current study, it is not possible to determine which elements of subject knowledge were considered to be particularly important. One thing is certain however that the majority of both students and tutors in this study considered subject knowledge to be a crucial element of effective PT practice.

### 10.2.2 Nurturant

Participants were asked to define the three most important skills, qualities or attributes of effective tutoring. Rapport (which included empathy and understanding) was the third most frequently cited attribute of effective PT by both tutors and students after subject knowledge and patience. This is a very significant finding considering the lack of literature on this dimension of tutoring.

The importance of the one-to-one relationship was also identified with reference to both successful and unsuccessful tutoring sessions. This again emphasises the central role the relationship plays in effective tutoring sessions. When the tutors felt they had a good rapport with their students the sessions were more successful. In response to the question about an unsuccessful session, one tutor described being unable to establish a relationship with their student and stated: "no relationship, no learning" (25). A small proportion of tutors recognised the importance of establishing rapport with the student specifically to facilitate building confidence levels.

Aspects of the relationship were also important from the students' perspective. When asked to consider if Tutor 1 was 'a good tutor', 12.6% of the students made specific reference to the relationship, with the majority stating they "got on well".

Lepper et al. found that their expert tutors maintained cognitive and motivational models of their students simultaneously, which were continuously updated and modified during each tutorial. The importance given to rapport and understanding in the current study, as well as boosting confidence and motivation levels (see below), appears to support this hypothesis. Interestingly, in the current study, significantly more maths tutors referred to rapport in their responses than those teaching other subjects.

As noted in chapter 3, the importance of the one-to-one relationship is hard to explain when learning gains are achieved using ITS. However, it has been suggested that using computer tutors that are emotionally intelligent could lead to further learning gains. Several ITS have been developed that can be sensitive to a student's affective state and have adopted a number of motivational techniques used by human tutors (see Woolf et al., 2009). It is unclear how relationships described as necessary for learning in this study, can be achieved through ITS, and if they could be simulated, would such a relationship be plausible? (see du Boulay, Luckin, & del Soldato, 1999).

As with the Lepper model, data collected from a number of tutors in the current study included reference to time spent participating on off-topic conversation to build a relationship with the student. Recent research by Lehman, Cade and Olney (2010) has shown that off topic conversation can serve both motivational and rapport building purposes, but can also include pedagogically relevant talk which can assist in the teaching and learning process.

It should be noted that two students described a tutor as being "too friendly". These examples highlight the danger of tutors trying too hard to be friendly in an attempt to establish rapport as this can have a damaging effect on learning and on the student-tutor relationship.

The characteristics of an effective tutor-tutee relationship are difficult to ascertain. Certainly both students and tutors consider rapport and understanding as important aspects; however there are likely to be many other dimensions such as flexibility and patience (discussed below). Perhaps the tutor-student relationship has a threshold which requires particular characteristics at a certain level in order to establish an effective-working relationship. The tutor-tutee relationship is certainly an area that requires further research to identify characteristics required for effective tutoring.

#### *10.2.2.1 Patience*

The findings relating to patience were particularly interesting. Patience is missing from Lepper's INSPIRE model but has been included here within the nurturant aspect of effective tutoring practice. In response to the question asking tutors and students to identify skills/qualities/attributes of effective tutoring, just over half of all tutors and 48.8% of the students in the current study included patience as being a requisite for effective tutoring. Apart from these answers, very little reference was made to patience in other parts of the questionnaire responses. Perhaps this is because patience is a skill, quality or attribute easily defined in response to this question. On the other hand, perhaps patience is a skill required in all areas of one-to-one learning, and might not be used in response to a specific part of tutoring; for example helping students think for themselves, build confidence, or evaluate effectiveness.

As noted above, patience was not specifically mentioned in the INSPIRE model of effective tuition, this is quite surprising when in the current study a significantly higher proportion of maths tutors included patience in their responses regarding effective tutoring compared to tutors teaching other subjects. It should also be noted that almost twice as many female students considered patience to be an aspect of good tutoring.

There is remarkably little information specifically about patience in the tutoring literature. Advocates for the "Pause, Prompt, Praise" method of teaching reading , indicate that teachers can respond too quickly to errors and do not allow sufficient time for students to recall information and use strategies for decoding (Wheldall & Metten, 1985). However it is unlikely that all the respondents were referring to error correction, it is more probable respondents were alluding to patience generally required to teach, re-teach or review concepts not previously understood. Patience by this definition is also closely linked to aspects of the relationship between the tutor and the student. The important aspects of the tutor-tutee relationship and the impact this has on effectiveness is a crucial area for future research.

The particular emphasis on the importance of patience in this study highlights the potential role ITS could play in this aspect of PT. In their research comparing human and computer tutors, Du Boulay and Luckin (2001) highlight the benefits of working with ITS that will always act in a "patient and *consistent* manner" (p. 252).

### 10.2.3 Socratic

Lepper et al.'s study found that the most effective tutors used more Socratic rather than didactic approaches to tutoring, particularly for remedial students. This was most apparent in the tutors' continual use of questions and hints for feedback rather than giving specific directions or answers. Due to the differences in data collection for the current study, in comparison to observation used by Lepper, it was not possible to examine if questions were employed instead of directions, how questions and hints were used and the role of questioning in error correction. However, the results from the current study show tutors perspectives on the importance of asking questions in effective tutoring practice.

In response to the question asking tutors to discuss the most effective strategies for assisting students to think for themselves, the use of questions to encourage and empower the students was the most frequently cited response. Tutors noted how they often rephrase and change the question to guide the student to come to the correct answer. This was also closely linked to self-explanation and getting the students to reflect on the thinking process they used to arrive at the correct answer. The use of quick-fire style questions to reinforce understanding was also mentioned as an effective strategy for helping students to gain and recall new information.

When asked how tutors determine a student's level of understanding, 93.2% of respondents indicated they 'often' ask questions and discuss with the student. The literature demonstrates that questioning is a common method used in tutoring sessions (see section 3.3.3); however research has shown that tutors comprehension gauging questions are not effective in accurately determining students' understanding (Chi et al., 2004; Graesser et al., 1997). Chi et al. (2004), argued that comprehension gauging questions are predominantly dealing with the normative level of understanding, instead of diagnosing students' misconceptions in their alternative knowledge. Tutors in the current study frequently used questioning to determine a student's level of understanding but this was also correlated to working through a problem with the student. It is not possible to determine if these techniques were effective in ascertaining understanding, but a high proportion of tutors considered them to be of value when attempting to gauge levels of comprehension.

### 10.2.4 Progressive

Task management explained in section 3.3.4 was the most frequently coded pedagogical skill across all the questions in the survey and is linked to the "progressive" part of the INSPIRE model. Task management was used to code responses that mentioned the tutors' choice of task in ensuring understanding and to gauge student comprehension.

Careful task management was the most commonly used method for effective confidence building, and responses were often combined with reference to praise and encouragement. Interestingly, task management for confidence building was mentioned more frequently by English tutors and significantly less often by tutors of students aged over 16. The link between task management concerns and building confidence are consistent with findings in the literature (Lepper et al., 1997; Lepper & Woolverton, 2002; McArthur et al., 1990).

Task management was also considered an effective strategy for helping students think for themselves, to promote active student learning. Tutors referred to a number of different strategies related to task management; these included giving the student increasingly more complex tasks, building on previously gained knowledge and encouraging independent thinking. Significantly higher numbers of maths tutors included task management as an effective strategy for helping students think for themselves, perhaps linked to the nature of the subject. On the other hand, as outlined above, the use of task management to build student confidence was noted more frequently by tutors teaching English. Fewer respondents mentioned task management as one of the three skills, qualities or attributes of effective tutors (3.8% of students and 10% of the tutor sample). This may be due to the fact the nature of task management is less easy to define and more of a subtle process that is observed rather than specifically stated.

Apart from the few cases cited previously, there was almost no mention of task management skills from the perspective of the students, perhaps not surprising as this skill may not be visible to them.

The importance of skilful task management is also featured in the literature (Ireson, 2000; Lepper et al., 1997; Lepper & Woolverton, 2002; McArthur et al., 1990). Of the 44 tutoring techniques identified by McArthur, Stasz & Zmuidzinas (1990) 45% could be used for task management purposes (see section 3.3.4). Lepper et al. (1997, 2002) highlight the close link between task management and affective concerns and also how task management can be influenced by both the effort and motivation of the student. VanLehn et al.'s (2003) findings could be seen to contrast the use of task management to match a student's level of understanding. This research found that learning gains were more common when students reach an impasse, suggesting that tutors should present students with difficult tasks at the limits of their current competence to "encourage impasses" (2003, p. 244). In relation to learning gains, tutors in the current study were asked to reflect on effective strategies to help students gain and recall information. The most common response made reference to the importance of reviewing and revising topics to ensure students obtained a full understanding of the subject.

Being flexible to the needs of the student was a theme rarely included in isolation but almost always associated with aspects of effective task management. It should also be noted that in response to the series of questions regarding effective strategies for learning, a small proportion of tutors responded by stating that their approach would depend on the individual student. These sentiments reflect the fact that students of differing characteristics respond differently to teaching methods (see Cronbach & Snow, 1977). However, in addition to expressing this opinion, a number of these tutors also included general stratagems in their responses. These more general perceptions comprise the aim of this section in attempting to establish a "family resemblance" of effective practice from the perspective of both tutors and students.

Task management is closely linked with the ability to ascertain a student's level of understanding. This was reflected by the number of tutors who listed these together when reflecting on their own effectiveness. For example: "Yes. I gauge the standard of my students and make sure the pace at which we proceed and the depth of material we cover is appropriate to the standard of each individual" (76).

Rather than being a small part of a framework of effective tuition practice, task management in the current study seemed to be central to many aspects of the tutorial and an integral dimension of the teaching and learning process, interrelated to confidence and motivational concerns.

### 10.2.5 Indirect

The indirect part of the Lepper model refers to the way expert tutors provide both positive and negative feedback, closely linked to error correction. Due to the chosen methodology of data collection, questions on error correction were not specifically asked of the participants in this study. It is possible that tutors may not be aware of their own use of these strategies in their tutoring practice.

Lepper found that the expert tutors in his study did not explicitly praise their students. Lepper and Woolverton (2002) argued that using too much direct praise turned the tutoring session into a highly evaluative situation which had a negative impact on students. This was inconsistent with the findings in the current study where tutors perceived the use of praise to be a key factor in effective tutoring practice.

The use of praise and encouragement was a theme that arose frequently in the tutor questionnaire, and was often associated with increased confidence levels. Several tutors mentioned how they selected specific tasks to match the students' level of ability and these were partnered with praise and encouragement in an attempt to boost confidence levels.

As one might expect, significantly more tutors of primary age students used praise to boost confidence. Significantly less science tutors indicated that they used praise as a strategy for helping to raise confidence levels, although this could be linked to the age of the students.

Responses to the question asking for effective strategies to help the student think for themselves often included praise in combination with raising confidence to assist independent thinking.

Very few students made mention of praise or encouragement in their responses; instead a small number included opposing statements when describing a bad experience with a tutor, these referred to instances when the tutors had been very strict and called them lazy or stupid (see section 9.3.3). These responses appear to be consistent with findings in the literature. In her research on classroom teaching, Wentzel (2002) found that negative feedback was the most consistent predictor of poor academic performance and anti-social behaviour. It appears little benefit can arise from a tutoring (or teaching) situation when tutors use negative language and discourage learners.

Although it appears negative feedback is associated with unsuccessful tutoring sessions, some literature indicates that excessive use of praise is not helpful for learning. It is unclear how much praise is related to confidence building, but Lepper's research (outlined above) found that the less effective tutors used praise more frequently, turning the tutoring session into a highly evaluative situation (Lepper & Woolverton, 2002). However, these findings are not supported in reading tuition, particularly by advocates of the "Pause, Prompt and Praise" method (McNaughton & Glynn, 1981; Wheldall & Metten, 1985) or in Cameron and Pierce's (1994) meta analysis on reinforcement and reward. Using praise and encouragement to complete the task is incorporated in the small motivational element in McArthur, Stasz and Zmuidzinas' (1990) work. Boyer's (2009) research discussed the trade off that appears to exist when time is spent on affective rather than cognitive concerns. In the current study there is no data to indicate that frequent use of praise has a negative impact on the session; however a substantial number of tutors felt using praise was an important aspect of effective tutoring, particularly to boost confidence levels. Perhaps it is not the frequency of use that is the issue, but rather how a tutor uses praise - sincerely and strategically tailored to the needs of the individual.

### 10.2.6 Reflective

The reflective part of the INSPIRE model includes asking students to explain their answers and procedures, which has often been termed self-explanation. Explaining to self and tutor was mentioned by 16% of tutors in the current study as an effective strategy for helping students think for themselves to encourage active learning. Self-explaining was often mentioned alongside questioning as a joint means of helping students to think for themselves.

Both the tutors and students were not specifically questioned about self-explanation and no students referred to this technique in any of their responses to describe effective practice. In a similar vein as task management it is quite possible that this technique is less visible to students.

It is interesting to note that significantly more maths tutors considered self explanation to be an integral element of effective tutoring practice compared to tutors teaching other subjects. It is likely that in maths self-explanation is used in an attempt to encourage tutees to articulate how they obtained a certain answer. As the INSPIRE model was based only on observations of maths tutorials, it is possible that self-explanation was given more importance than if the model had been based on English tuition or had included a number of English tuition sessions.

Chi et al. (2008) suggest that learning gains arise only when tutees are given an opportunity to construct rather than through any particular skill of the tutor. In contrast to Chi's claims, relatively few tutors made specific reference to the use of self-explanation as a key part of effective tutoring sessions.

### 10.2.7 Encouraging

The encouraging part of the Lepper model includes five aspects that are discussed in section 3.3.7, the level of detail included in this aspect of the framework goes beyond the level of detail available from questionnaire responses. However, there were certainly elements of the model that relate to the questionnaire responses from both tutors and students in the current study.

In addition to grade improvements and exam results, an increase in confidence was also a theme that regularly emerged as a positive outcome from PT participation. In total over a quarter of tutors referring to their own effectiveness mentioned that they raise or build confidence in their students. When asked if they had made an impact on Student 1's achievement 28.4% mentioned confidence in their response. When students were asked if they considered Tutor 1 to be an effective tutor, after grades or achievement levels, the most frequently mentioned theme was a rise in confidence levels. This was also manifest in the evaluation measures where 63.4% of students and just under half of all tutors selected '[This student/I] feel(s) more willing to tackle new work as a result of having a tutor' as one of their top three evaluation measures of effective tuition. The responses to these questions revealed that confidence building was considered to be a central construct of effective tutoring practice and was used as an important indicator of successful tuition by both tutors and students involved in the study.

Despite the limited evidence that MGP one-to-one tuition had a significant impact on achievement (PricewaterhouseCoopers LLP, 2010), the pilot evaluation found sizeable perceived gains in confidence as a result of 10 hours of one-to-one tuition (PricewaterhouseCoopers LLP, 2010). One HT stated: "There has been a phenomenal increase in confidence in the tutored students and the impact has been significant" (p. 120).

The expert tutors included in Lepper's study aimed to boost feelings of confidence by placing emphasis on the difficulty of the task. In the current study, the tutors were specifically asked to indicate their effective strategies for boosting student confidence levels. The results are reported in section 8.3.3, as noted above, effective task management was the most common theme emerging from the responses followed by an emphasis on praise and encouragement which was often cited in conjunction with task management. As noted earlier, Lepper stated that the expert tutors in his research avoided any direct use of praise. Results from the current study show that the use of careful task management, confidence, praise and encouragement are interrelated dimensions of effective tuition.

Other strategies frequently mentioned for increasing a student's confidence included providing clear explanations, although this was mentioned significantly less by tutors of English. As outlined in section 8.3.3 revising and reviewing work were also important factors in confidence building together with a number of responses that emphasised the importance of the tutor-tutee relationship and establishing rapport and understanding.

Aside from increased confidence being an important outcome of tuition for tutors and students, one in ten tutors considered confidence to be the key factor in facilitating students to think for themselves and develop skills of independent learning.

Although motivation was not recurrently referred to throughout the questionnaire, lack of motivation was cited in almost half of the examples provided as the cause of unsuccessful tutoring sessions. Tutors included details of students unprepared to put in the necessary effort, not interested in learning and with no desire to be tutored. This question revealed more than any other the key role played by the student in effective tutoring. Responses from the students to the statement 'If a student isn't willing to learn/make an effort, there is no point in tutoring' revealed that although the vast majority agreed with this statement, 20% did not consider their effort to be an important element of tutoring. The literature on one-to-one learning has not always acknowledged the key role of student effort in the learning process and on learning outcomes.

One very interesting finding is the data on evaluation indicators. Over half the tutors and almost three quarters of all students in the sample included 'when faced with a difficulty [the student is]/[I am] less likely to give up' as one of their three most important evaluation indicators of effective tutoring. This shows an increase in a desire to learn, enthusiasm for the subject and motivation to be an integral outcome of effective tutoring practice.

A total of 14.4% of the tutors mentioned enthusiasm as one of the three important skills, qualities of attributes of an effective tutor. Similar sentiments were echoed by Lepper and his colleagues who stated the expert tutors "enjoy this sort of work, and it shows" (Lepper et al., 1997, p. 132). Not only was enthusiasm considered an important quality of a tutor, it was also considered as an important evaluator of effectiveness with a number of tutors emphasising the importance of enhancing student enthusiasm for the topic. A total of 18.3% included sentiments such as a change in attitude towards the subject and 21.7% of tutors mentioned the student was happier or more enthusiastic when they described a successful tutorial.

Although students did not often make specific reference to enthusiasm, an important element of tutoring for a number of students referred to making work enjoyable. In the three skills and qualities of a good tutor 17.5% mentioned a sense of humour and a further 5% highlighted the importance of making work fun. The need for a sense of humour was also referred to by 11% of tutors.

### 10.2.8 Additions to the INSPIRE model

There were a number of themes that arose in the current study which were not specifically addressed in the INSPIRE model. One of these is the importance of patience which has been referred to previously and included in the nurturant part of the INSPIRE model. Another important theme omitted from the INSPIRE model was the technique of revising and reviewing work.

The tutors in the current study considered revising and reviewing work to be the most effective strategy to help students gain and recall new information. This was also linked to memorising strategies for revision, including the use of mnemonics. Revising and reviewing work also appeared to be an effective method in helping students to gain increased confidence. Tutors discussed revisiting topics to ensure the student felt confident about tackling the subject. Students were asked to consider which actions performed by the tutor 'help most' during the tutoring session. Almost a quarter of students included reference to revising and practising by going through past examination papers.

The tutors stated that they often reviewed material at the end of the session or during the following session to solidify understanding and build confidence. Revising and reviewing was also always stated in combination with other methods for building student confidence.

## 10.3 Summary: Pedagogical expertise, comparing INSPIRE to the current study

A framework of effective tutoring techniques common across subjects and levels has not been identified in literature. Lepper et al.'s (1997, 2002) INSPIRE model provides a comprehensive structure of effective one-to-one pedagogical techniques; although the model was developed from research using only maths tutors and remedial students in years 1-6. The current study expands Lepper's work to include views from tutors and students across a variety of subjects and levels in an attempt to find a "family resemblance" of effective tutoring characteristics. The qualitative findings demonstrate commonalities in perceptions of effective aspects of PT across the two samples. However, the results of the current study also found a number of significant differences in perceptions of effectiveness between varied subjects and levels. These differences highlight variations in what is perceived as effective tutoring and question the generalisability of the INSPIRE model.

The INSPIRE model was based on commonalities Lepper and his team observed in expert tutors who taught elementary maths to primarily remedial students in grades 1 to 6. This model, as with the current research, found commonalities in tutoring practice but Lepper's work was based on a sample limited to include only maths tutors teaching at a basic level.

The results from the current study suggest that rapport (which was discussed in relation to the "nurturing" part of the INSPIRE model) is an extremely important element of effective tutoring. This was reinforced by a large proportion of participants, including significantly more maths tutors who emphasised this aspect of effective tutoring. Although considered essential by some respondents, rapport between students and tutors remains largely neglected in the current literature. Patience was not specifically included in the INSPIRE model but was perceived as an important aspect of tuition by a large proportion of tutors and students in the current study. Significant subject and gender differences were found in the number of participants who referred to this component of effective tuition.

Students involved in Lepper's research were selected based on the results of a pre-test; therefore the initial process of assessing a student's level of understanding was absent from the INSPIRE model. In the current study, tutors were specifically questioned about this crucial part of tutoring practice and additional significant subject and level differences were found. This has been discussed in detail in section 8.3.2.

## 10.4 Effective tutoring practice: Tutors' and students' perspectives

In the previous section the interrelationships and underlying dimensions of effective tutoring were explored and contrasted with findings in the literature. In this section two models of effective practice are presented summarising the key features and impacts of effective tutoring from the tutors' and students' perspectives.

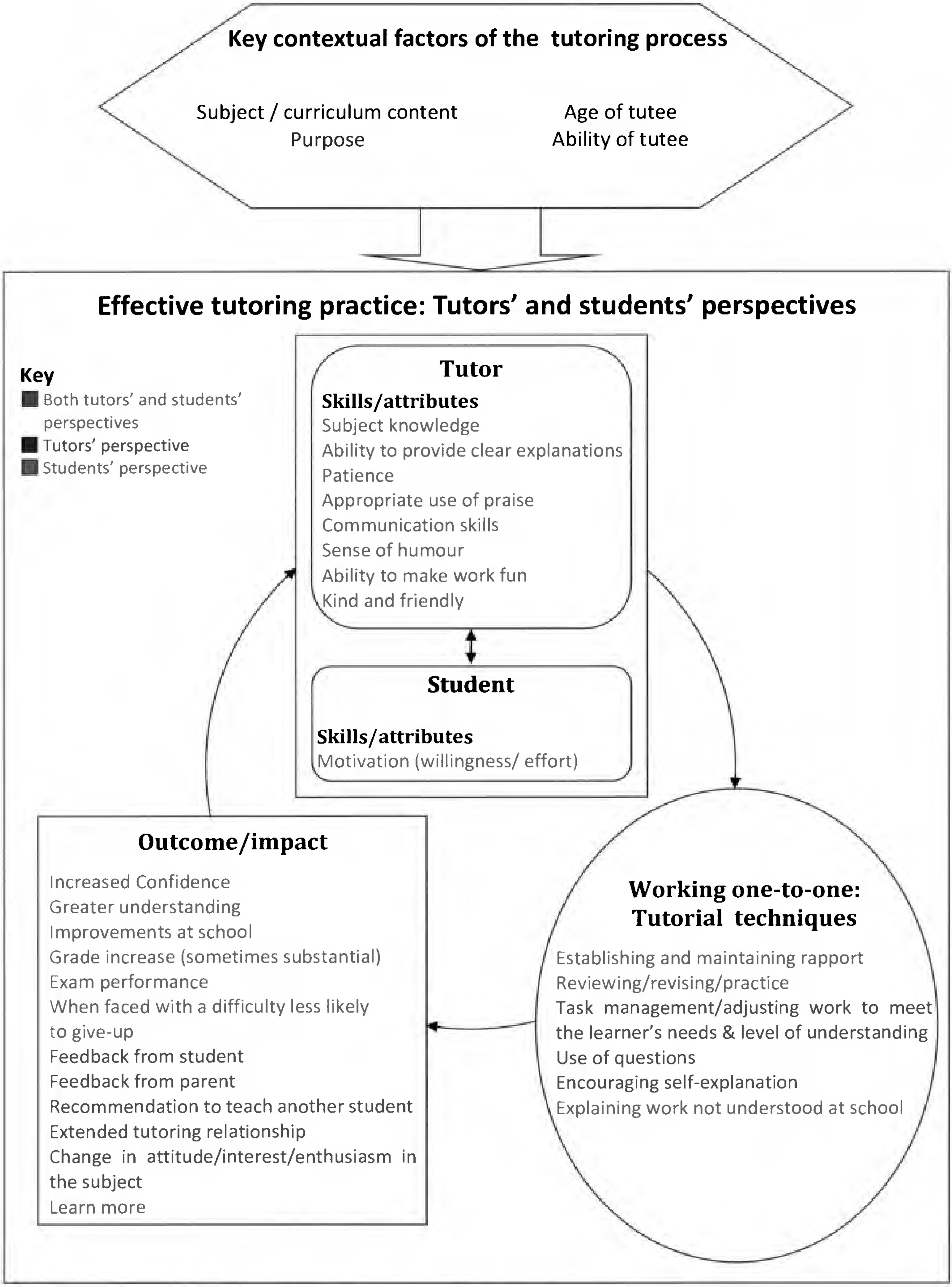
The literature review contained in chapter 3, highlighted the lack of research on perceptions of effective tutoring from both tutors and students across different subjects and levels. In this thesis perceptions of effective tutoring were investigated to determine if a "family resemblance" of effective tutoring practice could be established that was common across subjects and levels of tutoring (see section 3.6.1). Effective PT was conceptualised by tutors when they were asked to provide effective strategies for different aspects of the tutoring process and to consider their own effectiveness. Students were also asked to conceptualise effective tutoring when they were requested to reflect on their own experience of tutoring and were questioned about techniques which were most beneficial to their learning. Frequent themes that arose in the responses were examined by subject and level to determine the commonalities and differences. Several subject and level variations were found and these have been presented in this chapter and throughout the tutor and student results (see chapters 8 and 9).

Figure 10.1 outlines these findings and presents a model (Model 1) of effective tutoring practice based on tutors' and students' perspectives. The results show that although there were several common themes of effective tutoring, the frequency of responses that included these themes sometimes differed by both subject and level. For example, the technique of self-explanation was mentioned significantly more often by maths tutors when the participants were asked to reflect on effective strategies to encourage students to think for themselves (see section 8.3.4). Different techniques were also considered more important than others when tutors were questioned about various aspects or aims of the tutoring process e.g. building student confidence or helping students gain and recall new information. In Figure 10.1 the box at the top of the model, contains fundamental contextual factors of the tutoring process which impacted on the participants responses concerning effective tutoring techniques. Lepper's INSPIRE model was based on maths tutoring of students in years 1-6 who required remedial support. The results from the current study suggest that perceptions of effective tutoring sometimes differ by subject and level. This challenges the generalisability of Lepper's model, to subjects other than maths and for tutoring higher ability or older students.

The main part of Model 1 outlines the skills, attributes and pedagogic techniques that comprise effective tutoring from the tutors' and students' perspectives. These themes consist of the most common responses from all the questions on effectiveness across both questionnaires. This model addresses both RQ2 and RQ3 by highlighting tutors' and students' perceptions of effective tuition and how this is evaluated through the outcomes and impacts of tutoring. The model also presents the pedagogic techniques tutors believe to be important for achieving learning gains. The pedagogical techniques, skills and attributes shown in blue, represent the perceptions common to both tutors and students. Those in green were primarily included in the tutors' responses, and in red, are the themes cited predominantly by the students.

The tutor and student box in Model 1, shows the continual interaction that takes place between the student and tutor which was highlighted in a number of tutoring strategies. This part of the model contains the skills and attributes required for effective tuition from the perspective of both tutors and students. These skills and attributes were primarily gleaned from the question on skills, qualities and attributes for effective tutoring contained in both questionnaires. The contents of this box were also taken from responses to the question asking tutors to reflect on their own effectiveness, and from student descriptions of a 'good tutor'.

*Figure 10.1 Effective tutoring practice: Tutors' and students' perspectives*

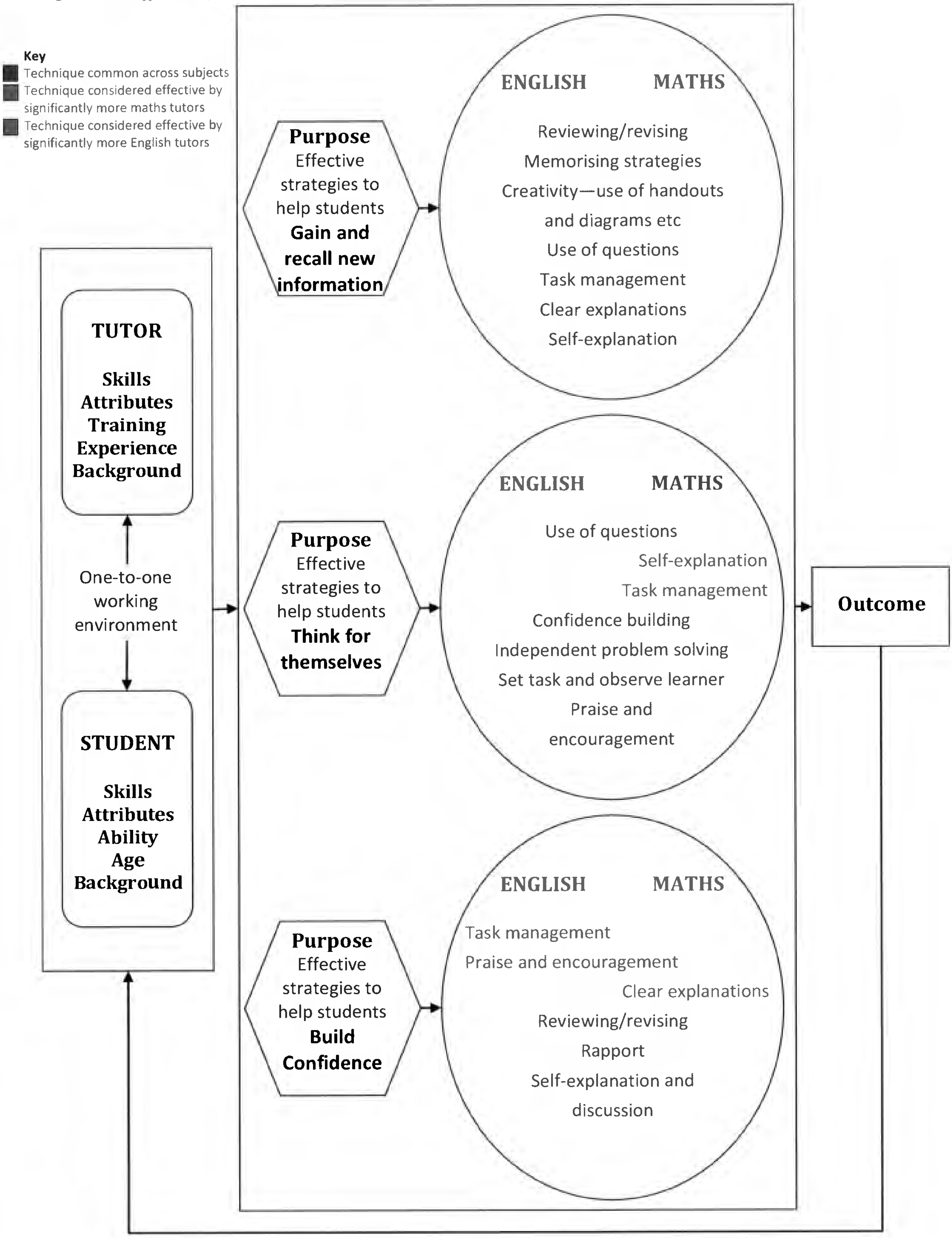


The participants were not asked specifically about the skills and attributes required of the tutee, which explains the shorter list in this box. One important aspect of successful tutoring highlighted by both students and tutors, was the willingness of the student to make an effort during the tutoring session. Lack of student effort was the most common reason cited for unsuccessful tutoring sessions from the perspective of the tutors.

The next box in the model contains techniques required for effective tutoring in a one-to-one working environment. The techniques listed were the most frequent themes to arise across all the questions on effective tutoring in both the tutor and student questionnaire. The model presented later in this chapter shows how these vary by subject, aim and purpose. From the student responses one of the aspects cited most frequently as the 'best thing' about having a tutor, was working in a one-to-one environment. These benefits included the confidence to ask questions in a one-to-one situation and the focussed attention of the tutor. This has been captured in the title and in a number of techniques included within this part of the model. The 'outcomes and impacts' part of the model includes tutors and students evaluation measures used to assess effective tutoring. These are discussed in more detail in the next section.

A further model developed from the tutor and student responses is presented in Figure 10.2. This model (Model 2), primarily addresses RQ2 and highlights the pedagogic techniques tutors believe to be important for achieving specific learning gains. This model also deconstructs the top part of Model 1 and shows how two of the key contextual factors of the tutoring process, the curriculum subject and aim of tuition, impact on the perceptions of effective pedagogic techniques. Model 2 includes different pedagogic techniques that were highlighted as being effective from the tutors' perspectives to address different aims in the tutoring session. These three aspects of tutoring were specifically addressed in the tutor questionnaire (see section 4.3.4.1 and Appendix N) and include effective strategies to gain and recall new information (see section 8.3.1), help students think for themselves (see section 8.3.4) and boost student confidence (see section 8.3.3).

*Figure 10.2 Effective pedagogic techniques for aspects of the tutoring process: Tutors' perspectives*



This model deconstructs the pedagogical techniques used in teaching different subjects, and shows the differences in perceptions of effective techniques for tutors who teach maths and English. In Model 2 the ovals contain effective pedagogical techniques ordered by the frequency each theme/technique was included in the responses to the questionnaire. Where the themes have been displayed centrally in green, this shows there were no significant differences in the frequency of response by subject taught. When the techniques are coloured red and have been aligned to the left this demonstrates that significantly more English tutors included this technique in their responses compared to tutors teaching other subjects. Likewise, if the technique has been coloured blue and aligned to the right, this indicates that the response was included significantly more frequently by tutors teaching maths compared to tutors of other subjects.

The tutor and student box on the left hand side incorporates the other key contextual factors of the tutoring process, in addition to the skills and attributes of both tutors and students that were included in the questionnaire responses. As was demonstrated in Model 1, these fundamental aspects impact on the aim of the tutoring session, the techniques utilised and the outcome of the student and tutor interaction.

Although not specifically investigated in the current study it is likely that these three aims or purposes of tuition are closely interrelated and regularly undertaken within one tutoring session. This was demonstrated in the responses that listed effective strategies for helping students to think for themselves (see section 8.3.4). The importance of building student confidence to allow students to be sufficiently confident to utilise independent learning skills was a theme that came up regularly in response to this question. In a similar manner to Model 1 the tutoring process is presented in a cyclical arrangement, which is consistent with the literature on the structure of the tutoring process discussed in section 3.4.

## 10.5 Evaluating effective tutoring

RQ1 investigated the impact of PT in English, maths and science by examining subsequent achievement at KS2 and GCSE level. This section considers whether tutors and students evaluate the impact of PT through examination results or use other measures to assess the outcomes and effectiveness of tuition. This section also provides more details concerning the outcome/impact part of models previously presented.

The results found that over 30% of tutors used examination results as their primary evaluation measure, with an overrepresentation of those teaching older students. When the tutors' first second and third choice evaluation indicators were combined, 68.1% of tutors made reference to examination results as measures of effective tuition. However, the results also showed that over half of the tutors referred to an aspect of motivation, selecting the indicator 'when faced with a difficulty the student is less likely to give up'. A further 42% of the tutors selected 'this student is more willing to tackle new work' as an evaluation indicator of effective tutoring. Another interesting finding was that 49.6% of tutors used 'feedback from the student' as a measure of effective tutoring practice. It should also be noted that over a third of the tutor sample selected 'being recommended to teach another student' in their top three evaluation indicators. Tutors were also encouraged to specify other evaluation measures not included in the list provided. Over a third of these responses made additional reference to an increase in confidence as a further indicator.

As with the tutor results, the combined examination performance measure was included most frequently as the primary indicator of effective tuition. However, when the first, second and third ranked evaluation measures were combined, the indicator used most often was 'when faced with a difficulty I am less likely to give up', included by 74.61% of students in their top three evaluation measures. This can be compared to 47.9% of the sample who cited an examination related evaluation measure in their top three indicators. Improvements in grades within class was also considered very important by 71.8% of students in their three evaluation measures. This analysis showed that although examination and grade improvements are central in evaluating tutoring, there are other important outcomes such as increased confidence and motivation with students less likely to give up when faced with a difficulty and more willing to tackle new work.

The other outcomes and impacts of tutoring included in the models were taken from the questions that required tutors to evaluate their own effectiveness. In these responses the tutors listed different outcomes of tutoring as evidence of their own effectiveness. These included an increase in confidence or providing the student with greater understanding. Students were also asked to reflect on the 'best thing' about having a tutor. Some of these responses discussed outcomes of tutoring, particularly grade improvement and gains in confidence, a number of students also noted being able to learn more in a one-to-one tutoring situation.

The effectiveness of PT is almost always measured by subsequent exam grade improvements to determine the effectiveness of the investment. However these findings show that from the perspective of both students and tutors there are other important benefits of effective tutoring that do not include examination results. These should be given greater focus in future research.

## 10.6 Limitations of the study

This section examines the limitations of the second study, the methodological strengths and weaknesses used to address RQ2 and RQ3 have been discussed earlier in section 4.3.10.

To obtain data on perceptions of effective tutoring techniques, questionnaires were chosen over interviews to include a greater number of participants. The aim of the study was to determine views common across subjects and levels which would have been difficult to obtain by interviewing a smaller sample of participants; however the decision to use questionnaires posed a number of challenges. Responses from several participants included strategies which were difficult to accurately classify; an example being the use of the word "patience". It is unclear if tutors and students were using this with regards to error correction (not jumping in too soon when correcting a mistake), or more generally describing perseverance without acting in annoyance when the student failed to understand a principle or explanation. In an interview situation such ambiguities could be explored and clarified.

Reasons for participation in PT were requested from both tutors and students. These responses often included statements that could be considered as both extension and remedial tutoring. Due to the variety of reasons provided, it was difficult to make any accurate comparisons between perceptions of effectiveness and techniques used in extension or remedial tutoring. However, it is unlikely that the level of remediation would have been fully clarified in an interview situation, as shown in the literature tutors are often ineffective at determining a student's level of understanding (Chi et al., 2004; Graesser et al., 1995). More research is needed to disentangle this complex area and to determine differences in aspects of PT dependent on the degree of learning need.

In the student, and to a lesser extent in the tutor responses, broad statements were sometimes used in answer to open ended questions, for example, "he is very helpful" (36). Responses such as these made exploring perceptions of effectiveness from the pupils' perspective very superficial, preventing deeper analysis to deconstruct what the student meant by the term "helpful". It is possible that more structured questions could have been employed to reduce ambiguity in responses; however such questions were used minimally to avoid influencing responses and to reduce the length of the questionnaire following the pilot. Despite these issues, themes of effectiveness were obtained through the responses and comparisons could be made across subjects and age groups.

## 10.7 Summary

Instead of focussing on a rule based list of "best" (see section 3.6.1), this thesis has found there is a "family resemblance" of effective tutoring practice which have some important differences between subjects and levels. Perceptions of effective pedagogical techniques for one-to-one tutoring have been compared and contrasted with findings in the literature. The responses have been explored to show the interrelationships and underlying dimensions of effective tutoring from the students' and tutors' perspectives. Two models have been presented that summarise the key features and impacts of effective tutoring from the results presented in chapters 8 and 9.

# 11 General discussion, implications and conclusions

## 11.1 Introduction

This thesis has focussed on the impact of PT on achievement and factors that may explain the variability in its effectiveness. The RQs have explored the impact of PT on achievement in English, mathematics and science and investigated both tutors' and students' views of effective pedagogy. The final chapter will summarise and integrate the findings from the three RQs addressed throughout this thesis.

## 11.2 Comparing tutor and student perceptions with measured achievement gains

One of the main aims of this thesis has been to explore the impact of PT on attainment. This was addressed in RQ1 where complex statistical analysis explored data on PT participation rates and outcome measures of KS2 and GCSE grades. Results presented in chapters 5 and 6 and then discussed and summarised in chapter 7, show PT in maths had a significant positive effect on maths achievement at GCSE, though the size of the effects varied substantially for different groups of students. The results found that on average students who received any PT in maths at any point in schooling achieved just over one fifth of a grade (Δ 0.13) higher than students who did not receive PT in maths, whereas students who received 2 or more terms PT in maths during years 10 and 11 scored two fifths of a GCSE maths grade (Δ 0.25) higher than those not tutored in maths. For the Y6 sample, PT in maths had a negligible effect on KS2 maths performance. No evidence was found to suggest that PT in English or science made a significant impact on achievement in the respective subjects at KS2 or GCSE level.

For Y6 pupils, a combined measure of PT in any subject for extended periods had a small impact on maths and mean EMSKS2 score. On average, students who had 2 or more terms of PT in any subject scored just under one fifth of a level (Δ 0.24) higher in KS2 maths than non-tutored students, and just over one tenth of a level (Δ 0.17) higher in mean EMSKS2 score. For KS4 pupils, the combined measure of PT in any subject was found to impact on each of the core subjects and mean EMSKS4 achievement although there was considerable variation in the effect for different groups of students.

The qualitative study also collected data on the impact of PT on attainment; tutors were asked to reflect on their own effectiveness and if they believed they had made an impact on Student 1's achievement. Students were asked if they felt they had done better in the subject as a result of receiving PT. The findings from the tutors and students contradict the results found in the quantitative study. This section discusses the reasons for these discrepancies.

Almost all the tutors in the sample (91%) considered themselves effective. Improved performance, grade increases and examination results were most frequently cited as evidence to substantiate these responses. Tutors were asked to include the predicted or actual grade in the subject(s) they tutored before PT commenced with Student 1; then they were asked if their efforts as a tutor had made an impact on the student's achievement. A total of 93% answered positively, with the majority of tutors justifying their responses by providing examples of Student 1's improvements in school or grade increases (36.1%) and examination results (17%).

The students were asked to indicate predicted grades in their tutored subject(s) before tutoring commenced, and although not requested, a number of students chose to provide details of their predicted grade before tutoring began and their predicted or actual grade as a result of PT. These comparisons revealed substantial (predicted and actual) gains in achievement for some students (see section 9.3). Almost all (92%) of them felt that they had performed better in the subject as a result of receiving PT, and several students described their achievement gains. The overwhelming positive response to these questions revealed a large discrepancy between the quantitative analysis and tutors' and pupils' perspectives on achievement gains. Although these samples are unrelated, the vast difference in findings is difficult to account for.

Research into the perceptions of achievement gains from PT is limited. A study measuring perceptions of PT from 26,000 parents in Germany found 54% believed that PT had a positive impact on achievement (Kramer & Werner, 1998; cited in Lee et al., 2009). The MGPP evaluation found relatively high levels of perceived progression in achievement from one-to-one tuition (PricewaterhouseCoopers LLP, 2010). However the proportion of teachers and students who believed the MGPP tuition would lead to learning gains (see section 2.3) was not as high as the proportion of students and tutors who outlined achievement gains from PT in the current study.

The positive perceptions of achievement from the MGPP can be contrasted with data presented in the same evaluation showing very modest achievement gains in reading and writing with no gains in mathematics (see section 2.3, PricewaterhouseCoopers LLP, 2010). It is interesting to note that perceptions of achievement gains from HTs and pilot leaders were greater in maths compared to English, whereas the actual data showed no significant improvement in maths performance (PricewaterhouseCoopers LLP, 2010).

Lee, Park and Lee (2009) linked Vroom's expectancy theory and Porter and Lawler's (1968) extension of this theory to explain participation in PT. Lee, Park and Lee argue "It can be explained that the subjective recognition of a result of participation in private tutoring (such as improvement in academic ability)... can influence the determination of participation in private tutoring" (p. 911). Involvement in PT comes as a result of a rational calculation that is considered as an "investment in studying" (Lee et al., 2009). Apart from parents who pay for PT as a result of peer pressure (see Sung, 1999), parents do not make the decision to invest in private tutoring and students do not request tuition, unless they expect some benefit as a result. Ongoing investment in PT reflects a continuous belief that this expenditure is providing some benefit towards a desired goal. When the initial objective is not met, instead of ceasing the investment, this may conceivably lead to further expenditure to ensure the initial outgoings become a worthwhile venture.

Perhaps the perceived achievement benefits of PT are inflated by the substantial outlay of time and effort by both tutors and students. From the few studies that have looked at the perception of achievement gains from parents and students, the research has tended to show that parents demonstrate slightly higher levels of trust in the effects of PT in comparison to their children (Paik, 1999; Yun, 1997; cited in Lee et al., 2009). As parents invest financially in PT rather than the students, this may impact on the perceptions of the benefits.

It is important to note that tutors were asked to respond to certain questions regarding a student they were currently tutoring or had recently tutored (Student 1). It could be argued that tutors would be more likely to choose a student for which tutoring had been successful and this may have led to an exaggeration in achievement gains. In Lesh and Kelly's (1997) study, the teachers were asked to evaluate their tutoring performance at the end of each week. The researchers found that following inferior tuition sessions, tutors often provided vague and barren descriptions of what took place and distorted the predictions regarding subsequent student achievement. Equally, for sessions where students achieved highly in post-tutorial evaluations, teachers tended to recognise and recall detailed and accurate information about the session. As demonstrated in Lesh and Kelly's research, there is a danger in asking tutors to retrospectively evaluate their performance. Tutors may remember more clearly positive tutoring experiences where the students' performance and understanding was enhanced. Thus it is possible that the benefits of tutoring have been exaggerated in the questionnaire responses.

The tutees may also have overstated the benefits of PT. When the students answered questions regarding Tutor 1, it is possible that they may have felt that responses would be seen by their tutors. As a result the students may have exaggerated their own achievement gains, the positive aspects of Tutor 1 and the benefits of PT in general. In the majority of cases, questionnaires were given to the students by their tutor. It is possible tutors would have refrained from giving their student a questionnaire if they felt the tutee had a negative opinion of PT. As discussed in section 4.3.10, such selection procedures could bias the results.

It is important to note the methodological limitations of the first empirical study (see section 7.7). It is possible that the difficulty of measuring participation in PT, the small number of tutored students involved and the unreliability of attainment measures have biased the results and do not accurately reflect the effect of PT on achievement. If the same study was repeated with a much larger sample and better indicators of performance, perhaps the analysis would show substantial effect sizes from PT to match those described by the tutors and students in the qualitative study.

To assist in explaining the discrepancy in findings between the perceived achievement gains from PT and the actual results achieved, reference could be made to the question that required tutors to discuss an unsuccessful tutoring experience. Lack of motivation on the part of the student was the reason most frequently cited (42.2%) as the cause of an unproductive session. The tutors described occasions where the tutee was not prepared to put in the effort and had no interest in learning. These findings support Chi et al.'s (2008) argument that learning gains from tutoring do not stem from the tutors' contributions alone. Tutors also mentioned how parents' expectations were too high and they exerted too much pressure on their children. Other reasons for unsuccessful tutoring experiences included a lack of rapport between the tutor and student. These findings demonstrate that at times one-to-one tuition does not work out as well as expected. If these issues are not addressed promptly, the problems are inevitably reflected in the lack of subsequent grade increase.

Students were asked to relate a bad or unpleasant experience they may have had with a tutor. Although only a few students responded to this question and provided an example, in effect approximately 1 in 10 students in this study had experienced a negative incidence of tutoring. It is possible that bad tutoring experiences described in the student questionnaire may in some way assist in explaining the limited gains in achievement found in the quantitative analysis. Students were also asked to outline any disadvantages from PT participation. The vast majority of these responses indicated a reduction of social time, increased homework and the costs of tutoring. However 2 students felt that tutoring limited their independent learning and 2 additional students referred to the contradictions between differing styles and methods of teaching in school compared to those used by the tutor.

The limited effect of short term tuition highlighted in the quantitative analysis, may simply reflect an unsuccessful or negative tutoring experience similar to those described above, or possibly due to a student's lack of motivation. In the quantitative study the participants may have indicated they were tutored during 1 term; however, the actual duration of this tuition may only have been for one or two sessions, after which tuition was terminated due to problems experienced between the tutor and tutee. It could be argued that the quantitative findings do not accurately reflect the progress that can be made with several months of quality tutoring between a student and tutor who have established an effective working relationship.

When the outcomes of PT do not match the achievement gains expected, the quality of the tuition provided is called into question. Although some tutoring agencies require CRB checks, references and undertake interviews (Tanner et al., 2009), these regulations in the PT market do not apply to all tutoring agencies and individual tutors who independently solicit for business. At least 50% of the tutors included in the sample used to address RQ2 and 3 appear to be highly experienced; the majority of tutors (51%) had tutored over 20 students, and 53% had tutored for 2 or more years (16% had experience of PT for more than 20 years). All these tutors chose to respond to the questionnaire, perhaps indicating a certain level of confidence in their tutoring abilities. It is possible the achievement gains reported in the second study, reflect the benefits that can be achieved when quality tuition is provided by experienced professionals. It is unclear how far this sample of tutors, with relatively high levels of experience, represents the wider population of tutors in the PT industry in England.

In the first study, no information on experience, training and qualifications was available on the tutors who provided PT. These analyses are comprised of two entirely different samples of tutors and students. Perhaps the lack of quality assurance of the tutors used to address RQ1 maybe a reason for the limited evidence of achievement gains found in the first sample. This can be contrasted with the apparently highly experienced tutors that participated in the second study. The difference between the two samples may also explain the discrepancy between the perceived benefits of PT provided by experienced and effective tutors and the limited actual effects on achievement outlined in response to RQ1.

In summary, this thesis has examined the impact of private tuition on attainment and the findings from the two studies used to answer the research questions revealed contradictory results. Although the quantitative analysis did yield a small number of significant results mainly in the Y11 analysis, the findings discussed in chapters 5 and 6 found limited significant evidence that PT impacts on achievement at both KS2 and KS4. The qualitative data collected from a different sample of tutor and students included responses that described substantial predicted and actual achievement gains. This section has discussed possible reasons for this discrepancy. Amongst a variety of other reasons, the quality of PT provided has been considered as a possible explanation for this inconsistency. Research questions 2 and 3 aimed to collect data on the perceptions of effective tutoring strategies from both tutors and students. These findings are summarised in the following section.

## 11.3 Tutors' and students' views of effective pedagogy for one-to-one tuition

The contrast in effect sizes of PT for some pupils and not others, and in some subjects and not others found in the results addressing RQ1, calls into question the quality of PT provision and the pedagogic strategies employed. RQ2 and RQ3 were designed to determine the pedagogical techniques tutors believe to be important for achieving learning gains and to establish what both tutors and students consider to be effective tuition. It is important to carefully consider and understand the aspects of effective tuition from the perspective of tutors and students as this provides a greater appreciation of how these key players define 'effectiveness' in the tutoring process.

The literature in the field of effective pedagogic practice in the one-to-one situation is limited to specific subjects and levels and has rarely addressed the views of tutors and their students. This thesis has made a unique contribution in highlighting pedagogical techniques considered important for effective one-to-one tuition by both tutors and students across a variety of subjects and levels. The results presented in chapters 8 and 9 and discussed in chapter 10 show that subject knowledge, patience and rapport between the student and tutor were considered to be the three most important skills and attributes required for effective tutoring in both the tutor and student samples.

There were a number of techniques and skills that were frequently mentioned in response to questions on effectiveness in the tutor and student questionnaires. In addition to those already outlined, these included task management which comprises adjusting and tailoring work to meet the learner's needs, the ability to provide clear explanations, the appropriate use of praise, reviewing/revising and encouraging self-explanation. Increased confidence was a key aspect of effective tuition cited by tutors and students. Grade increases and examination results were important outcomes of PT in addition to motivation with students less likely to give-up on any given task.

Although there were a substantial number of commonalities in responses, there were some important differences between various subjects, levels and the desired goal for tutoring. These key contextual factors in the tutoring process impact on the perceptions of effective pedagogic techniques; some of the differences have been shown in Model 2 (Figure 10.2). These findings demonstrate that research which examines effective practice and focuses on tuition in one curriculum area or within a single age range, may not be easily generalised to reflect effective practice for another subject or age group.

## 11.4 Duration of PT

An important element of PT highlighted in both empirical studies was the duration of tuition, this aspect of PT is often omitted in experimental studies but forms an integral part of naturalistic tutoring. The duration of PT was addressed in response to RQ1, where the Y6 findings suggested that extended periods of PT were necessary for achievement gains. Apart from the effect of examination preparation PT on maths score, and the estimate for PT during year 5 and 6 on mean EMSKS2 score, the only significant PT effect was manifest for students who received 2 or more terms tuition. Although duration was not directly addressed in RQ2 and RQ3 it was an important issue that was included by a small proportion of respondents. Three tutors contradicted the findings from RQ1 and stated that benefits from tutoring were evident after only a short period of tuition. Another tutor no longer felt effective as the recipient had been tutored for too long and had become "bored". All other references to duration highlighted the benefits of longer periods of tuition or the limitations that arise when the tutoring period is too short and too much is expected within the time available.

There were minimal references to duration in the student responses, however a small proportion mentioned that one of the best things about having a tutor was experiencing extra time focussed on their personal needs. The majority of references to duration from tutors came in response to questions explaining their own effectiveness or the gains that Student 1 had made. Duration was also mentioned in relation to successful and unsuccessful tutoring sessions. Two examples have been included below:

> *Definitely; student was at about E grade and in 4th set in school; now in second set, to which he was promoted in May last year. Now a C is in sight, and could even get to a B if we work together for the whole of the next two years bewfore [sic] his GCSE exams. (133)*

> *The parents/student left it too late to get extra help before GCSE's. The student was dyslexic and had needed help for years but I only had three months to help to try to get her to a grade C or above GCSE English - just not possible in the time. She was predicted E and that's what she got. (24)*

It is important to note however that 34% of the tutors had been tutoring Student 1 for 1 term or less. Despite this short period, 93% of all respondents felt that they had made an impact on Student 1's achievement. In the evaluation of the MGPP one LA pilot leader made this comment:

> *100% say it has had a positive impact in confidence and performance in other subjects is also impacted. Not academically; it is only 10 weeks...in terms of sub-levels it is hard to say in 10 weeks, but there are more soft impacts. (PricewaterhouseCoopers LLP, 2010, p. 89)*

This statement supports the findings in the current study where tutors and students reported a gain in confidence as a result of tuition. However, this also highlights the limited grade improvements that can be expected from short periods of tuition.

Literature on the duration of tutoring programmes reveals contradictory findings (see section 2.2). Some studies have indicated extended periods are necessary to raise achievement and others have found greater achievement gains from short intensive programmes of tuition. In his theory of instruction Carroll (1963) highlights the importance of learning time. He argued that the amount of time required to master a topic is a function of the student's ability, the nature of the task and the *quality* of the teaching.

As noted above duration is an important aspect of PT which is often omitted in experimental studies which have rigid experimental designs. The decision to continue or terminate PT and the duration of the tutor-tutee relationship forms an integral part of naturalistic tutoring. This necessitates further consideration when measuring outcomes of PT in future research.

## 11.5 Implications for policy and practice

Due to the recent policy interest in one-to-one tuition and the nature of the data collected for this thesis, the findings have important implications for both policy and practice in this area. The following section explores these implications and provides both guidelines and suggestions which should be given careful consideration by policy makers, one-to-one tuition course providers, as well as PT practitioners.

Results from the tutor questionnaire found that only 13.8% of tutors had received training in one-to-one methods, the vast majority of this was not associated with CPD in the school setting. The general lack of training for tutors is an interesting finding when viewed with research which suggests that achievement gains for students are greater when they are taught by trained tutors. Programmes that employ teachers as tutors have often involved substantial training (e.g. Reading Recovery). However in Wasik and Slavin's (1993) study, one programme involved only 3 days training and was among the least effective interventions they reviewed. Studies on Reading Recovery and other reading tuition programmes have shown the difference in effectiveness, behaviour and conceptions of reading teaching following training (Leach & Siddall, 1990; Pinnell, Lyons, DeFord, Bryck, & Selzer, 1994; Pinnell & McCarrier, 1990; Stephens, Gaffney, Weinzierl, Shelton, & Clark, 1991; Wheldall & Metten, 1985).

Different skills are needed for working in a one-to-one situation compared to teaching in a classroom (see Lesh & Kelly, 1997). At this stage MGP is committed to using only qualified teachers for one-to-one tuition, excluding experienced private tutors without teaching certificates. With no regulation in the PT market place, the government have used teaching certification as a means of providing quality assurance for potential MGP tutors; however this regulation presumes that qualified teachers will make effective tutors. This assumption was raised as an issue in the MGP evaluation (PricewaterhouseCoopers LLP, 2010). The MGP SEN Steering Group highlighted some instances where well experienced teachers of science were being used to tutor maths:

> *Although these teachers were described as very strong, the [SEN Steering] group felt they were not necessarily experienced in using a range of techniques to teach specific aspects of mathematics using a multi-disciplinary approach, which they felt is critical to teaching pupils with SEN (PricewaterhouseCoopers LLP, 2010, p. 91).*

In his research looking at the differences between face-to-face and online tutoring, Martinovic (2009) emphasised the importance of context on expertise and noted that skills may not be easily transferred to even closely related fields. Assumptions should not be made that because a teacher possesses a teaching certificate and has experience in teaching secondary level science, they will make effective English tutors for KS2 pupils. Similarly, an experienced KS2 English tutor without a teaching certificate may be much more effective in helping the student make learning gains. The following quote from a HT at a MGPP school includes similar sentiments:

> *Whilst I appreciate the DCSF want teachers I have Teaching Assistants who could have made more impact than one of my tutors. (PricewaterhouseCoopers LLP, 2008, p. 87).*

The results of the current study have highlighted the importance of quality control in the PT market place. As noted above in the MGP consultation, the government committed to providing tuition through qualified teachers (Department for Children, Schools and Families, 2007b). However, in the evaluation of the MGPP interim report, recruitment of tutors was highlighted as a significant challenge for the schools and LAs involved: "My concern is if the tuition element becomes national...there will not be enough tutors of quality to cover all the eligible children" (HT MGPP school PricewaterhouseCoopers LLP, 2008, p. 87). In light of these recruitment issues, it is unclear what strategy will be adopted if schools are unable to employ sufficient numbers of qualified teachers as one-to-one tutors.

In 2009-2010 the Teaching Development Agency (TDA) piloted a number of tutor training courses to train graduates (without teaching certificates) in one-to-one tutoring methods (Teacher Development Agency, 2009). Some of these courses recruited graduates with degrees in maths and English or related subjects, whilst others enrolled graduates with English or maths A-level qualifications. The courses were compared and contrasted by the Institute of Education who provided recommendations for course organisation, form and content (P. Brown, Ireson, Shepherd, Bassett, & Rushforth, 2010). It is not yet known if this pilot has been considered successful by the government, but it is possible that the commitment to provide one-to-one tuition through qualified teachers may be extended to include graduates who have successfully completed one-to-one tuition training.

During the TDA pilot a number of course providers struggled to determine the best way to evaluate tutoring performance (P. Brown et al., 2010). Clear guidance for teaching standards is available from the government, but there are no such standards for tutors. As part of the pilot, one course provider adapted the guidance on teaching standards to evaluate the performance of the trainee tutors. If a definitive set of standards for tutors were to be developed, the results from this thesis would add insight and would indicate features of effective tuition from the perspective of both tutors and students. Undoubtedly skills such as task management, subject knowledge, the importance of establishing rapport and exercising patience would be included, but there would also be an awareness that skills of effective tuition can vary for different subjects and levels and for different goals and aims of tuition.

Due to the importance of rapport and caring in the tutor-tutee relationship, in her research Kaiden (1994) argues "Clearly workshops that only teach tutors to enhance academic skills are missing an important component. There is an apparent need for the peer helper and professional alike to possess counselling skills as well as academic expertise" (p. 52). Amongst others, findings from the current study have highlighted the need for tutors to develop the skills required to establish effective working relationships with their students. Both tutors and students in the current study have demonstrated the consequences of ignoring important aspects of the relationship and have also shown the benefits that can arise when an effective relationship is established.

One-to-one tuition training programmes are likely to grow in popularity if the government allow graduates (who have completed a training course) to become tutors for the MGP initiative. However, literature reviewed for this thesis and a number of findings in the MGP evaluation suggest that qualified teachers may also benefit from training in effective one-to-one tuition practice.

Research has recently been completed exploring the expertise of online tutoring (Martinovic, 2009). Online tutoring is an umbrella term that encompasses a plethora of programmes and communication mediums, and as discussed previously, expertise in one area may not be easily transferred to another. However, live online tutoring (where tutors and students interact in real time) has close parallels to face-to-face tuition and the results from the current study possess the potential to aid in informing aspects of effective online tutoring. Characteristics of effective tuition, particularly from the perspective of the students, should be incorporated into online tutoring practice as far as this is possible. Interaction between the student and tutor may be very different in online tutoring in comparison to face-to-face tutorial sessions, but important aspects of the relationship between the tutor and tutee should not be ignored.

A large proportion of the research exploring the expertise of one-to-one tuition has been used to inform the development of ITS. Although this thesis has not involved a fine grained observational study of tutor and student interactions, the findings on the perceptions of effective tutoring from both tutors and students can be utilised in the future development of ITS. The results show that elements of the tutor-tutee relationship were particularly influential in the teaching and learning process. Throughout the student responses, emphasis was placed on the importance of rapport, sense of humour, being kind and friendly and making work fun, which are all elements of the tutorial not usually associated with ITS. All of these elements of effective PT require serious consideration in designing a successful ITS. Advances in technology have seen the development of ITS that can be sensitive to a student's affective state and utilise motivational techniques (see Woolf et al., 2009). It is unclear if this technology will succeed at facilitating effective tutor-tutee relationships and if such a relationship would be credible or plausible (see du Boulay et al., 1999). On the other hand the importance of patience highlighted by both tutors and students in the current study demonstrates the potential role ITS could play in this aspect of PT. One principal characteristic of ITS is the constancy of behaviour, Du Boulay and Luckin (2001) point out that ITS will always act in a "patient and *consistent* manner" (p. 252).

Duration of tuition played a key role in both empirical studies included in this thesis. These findings have important implications for both policy and practice. PT consumers need to be aware that tuition sought shortly before an examination is unlikely to yield substantial grade improvements. Results from the current study question the decision made by the DCSF to prescribe a rigid 10 hours of one-to-one tuition for struggling pupils. It is imperative that duration of tuition is considered more fully in future research.

A recent report from the World Bank encouraged governments who consider the PT market to be outside of their sphere of responsibility (including the UK and Canada) to "devote more attention to it" (Dang & Rogers, 2008a, p. 188). The authors argue that by ignoring the phenomenon the governments "may be missing opportunities to use tutoring to address imbalances between education supply and demand" (p. 188). By funding one-to-one tuition within schools the government may find this fuels growth of the PT industry; parents might decide to invest in tuition if their child falls outside of the 10 hour programme remit. The government may also have to address other problems that could arise in response to MGP which could include the impact on after school activities including revision sessions etc. If some teachers are receiving remuneration for providing tuition after school, other teachers might be less willing to run after school sessions on a voluntary basis, or may choose to tutor instead of offering out-of-hours help or activities.

## 11.6 Further research

There are several limitations to the studies included in this thesis. The methodological challenges have been discussed in sections 4.2.8 and 4.3.10, and the limitations of the findings have been outlined in the two discussion chapters (see sections 7.7 and 10.6). This section considers areas for future research which address these methodological challenges.

Initially RQ2 and RQ3 were designed to link to data on achievement (analysed in chapters 5 and 6) used to address RQ1. This would have involved using the same sample of tutors and students for both the quantitative and qualitative analysis. Several benefits could result from such an analysis: the quantitative data on achievement could be used to identify students who had made substantial value added learning gains, these findings could then be triangulated with data on techniques utilised during the tutoring sessions and tutors' and students' views on effective tutoring. This is an area for future research.

Bray noted that gains in achievement as a result of PT are likely to be dependent on the "mode of delivery", "motivation" of the tutors and tutees, "intensity, duration and timing" of PT and the "types" of pupils who receive tutoring (Bray, 1999, p. 26 see section 3.5). Although a number of these elements have been explored in this analysis, all of these aspects should be comprehensively investigated to accurately measure the relationship between PT and achievement. This would require a complex mixed method design possibly adapted from the Variations in Teachers' Work and Lives and Their Effects on Pupils (VITAE) study (see Day, Sammons, & Gu, 2008) and would have the added benefit of being longitudinal in nature. Although the quantitative analysis controlled for some background characteristics, there were some omissions that may have impacted on the results. Future research would benefit from obtaining accurate parental education and employment data, as well as in depth home learning environment information - similar to the measure used in the EPPE project (Melhuish et al., 2008) (see section 7.7). Another very important aspect to consider is endogeneity; however using randomised control trials to fully control for this problem have serious ethical and practical issues. Drawing on results from a randomised selection experiment would not be representative of the self-selecting nature of PT.

One of the main challenges encountered in this study was the size of the sample and treatment groups used to address RQ1. Although the investigation included over 2000 students, the numbers participating in PT were relatively small and this became challenging when PT was divided by subject and duration. Future research in this area would benefit from a larger sample, which is representative of the student population.

When tutors and students were asked about effectiveness in tutoring, responses often referred to benefits from PT that did not include higher examination results. This was also true when students and tutors were asked how they evaluate tutoring. This thesis has shown that effective tutoring from the perspective of tutors and students does not always denote better grades or examination results, but rather an increase in confidence, a greater understanding of the subject and motivational gains where students felt they were less likely to give up on any given task. Evaluating outcomes from PT with reduced emphasis on formal performance indicators would be an important extension of this research.

Highlighted throughout this study has been the significance of the tutor-tutee relationship. Further research is needed to unpack the component parts to establish the nature of a productive relationship for one-to-one tutoring.

VanLehn et al. (2003) argued "just as there are many different kinds of classroom teaching, so too are there many kinds of tutoring" (p. 210), this statement is perhaps even more true today, with ever increasing facility for online tutoring. More work is required to expand the concept of quality and effectiveness for online tuition, building on work started by Martinovic (2009).

The discrepancies that were discovered between parent and student responses in the first study of this thesis (see section 4.2.8 and Appendix H) demonstrate the difficulties in defining and measuring participation in PT. Before further work is completed in this area, qualitative research needs to be completed to consider how students and parents define PT.

## 11.7 Concluding remarks

Despite research that demonstrates PT is undertaken by a substantial proportion of school age children in England, very limited information is available on the subsequent impact on achievement. This thesis has made a significant contribution to knowledge in this area. The overall results presented in chapters 5 and 6 revealed some small significant findings for maths tuition and a combined measure of PT in any subject, but no significant effects for PT in either English or science were found. Effects of PT were more apparent at KS4 in comparison to KS2.

At KS2 only the combined impact of PT in any subject had a significant effect on performance, when prior achievement and background characteristics were controlled for.

Views of the effectiveness of PT were collected from a different sample of tutors and pupils. In contradiction to the non-significant and varied effect sizes from the quantitative study, PT was perceived to have a substantial impact on student achievement and levels of confidence. Both tutors and students reported large predicted and actual grade improvements as a result of PT. These findings show that PT can be very effective at raising achievement for some students.

The literature in the field of one-to-one pedagogy has focussed on specific subjects and levels; this thesis has made a contribution to this area, by highlighting strategies that both tutors and students perceived as effective in achieving learning gains and the commonalities and differences between subjects and levels. Thorough subject knowledge, patience and rapport between the student and tutor were highlighted by both tutors and students as the three most important skills and attributes of an effective tutor. Although there were some important differences between subjects, level and goals of tutoring, pedagogic techniques considered to be particularly effective included the skill of task management and adapting to the needs of the learner, providing clear explanations, revising and reviewing and the appropriate use of praise. The data collected can help to inform and influence the design of training courses, particularly with reference to those proposed by the TDA for the future of MGP.

Although steps have been taken to regulate tuition providers for the MGP, there remains a largely laissez-faire attitude from the government towards the PT market in England. The results from this study suggest that quality assurance is an important issue for successful positive outcomes from PT. Regulation of the PT industry does not appear to be on the government's agenda; the responsibility is therefore left to the parent/carer to ensure a tutor is employed that can work effectively with their child. Findings from this study may assist parents and future PT participants to make more informed choices on aspects of effective tutoring. As one-to-one tuition is now being provided for all struggling pupils in KS1-KS3 and for national challenge schools at KS4, focussed training for these tutors needs to incorporate the pedagogic strategies considered by both the tutors and tutees as important and essential for effective tuition.

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# Appendix A: Year 6 Questionnaire

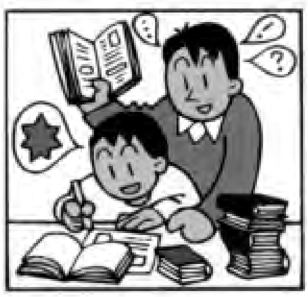
The following questions were taken from the Y6 questionnaire and used in the analysis.

**5a) At home, who checks on or gives you most help with your schoolwork?**

________________________________

**5b) How often do they do each of these things?**

| | Never | Once a month or less | 2 or 3 times a month | Every week | Most days |
|---|---|---|---|---|---|
| They try to explain things that I do not understand | ☐ | ☐ | ☐ | ☐ | ☐ |
| If I ask them, they help me | ☐ | ☐ | ☐ | ☐ | ☐ |

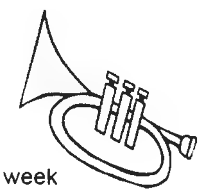


**6a) How helpful is it when your parent(s)/carer(s) try to explain schoolwork to you?**

- Always helpful ☐
- It is usually helpful ☐
- It is helpful about half of the time ☐
- It is not usually helpful ☐
- It is never helpful ☐
- They don't explain things to me ☐

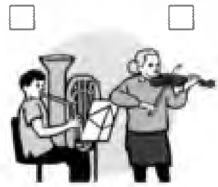
**8) How often do you usually take part in sports or exercise activities? (E.g. football, tennis, hockey, gymnastics etc.)**

- ☐ Never
- ☐ A few times a year
- ☐ 2 to 4 times a month
- ☐ Once a week or more



**9) How often do you usually take part in musical activities?**

| | Never | A few times a year | 2 to 4 times a month | Once a week or more |
|---|---|---|---|---|
| Have individual lessons | ☐ | ☐ | ☐ | ☐ |
| Play in a band or orchestra | ☐ | ☐ | ☐ | ☐ |
| Sing in a chior | ☐ | ☐ | ☐ | ☐ |
| Other *(Please state)* ____________ | ☐ | ☐ | ☐ | ☐ |



## ABOUT PRIVATE TUITION OUT OF SCHOOL

10) Have you ever had a private tutor, i.e. someone who teaches you alone or with one or two others out of school? (E.g. to help you with school subjects, learning a language etc.)

- ☐ No — **Go to question 10b**
- ☐ Don't know ⇨ **Go to question 17**
- ☐ Yes — **Go to question 10a**

**11)** **Fill in the grid below to show when you've had private tuition in each subject. E.g. If you had a private tutor for maths since the begining of year 6, tick the first column in the second row.** *(Please tick all the boxes that apply)*

| | **In year 6** Autumn term | **In year 5** Autumn term | Spring term | Summer term | **Before Year 5** |
|---|---|---|---|---|---|
| Reading & writing | ☐ | ☐ | ☐ | ☐ | ☐ |
| Maths | ☐ | ☐ | ☐ | ☐ | ☐ |
| Science | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other subject? *(Please write the name of the subject below)* ______ | ☐ | ☐ | ☐ | ☐ | ☐ |

**14) If you have had a private tutor in year 6, how much time do you usually spend with your tutor(s) for each subject?**

| | 3 or more hours a week | 1-2 hours a week | Up to 1 hour a week | 2 hours or less per month |
|---|---|---|---|---|
| Reading & writing | ☐ | ☐ | ☐ | ☐ |
| Maths | ☐ | ☐ | ☐ | ☐ |
| Science | ☐ | ☐ | ☐ | ☐ |
| Any other subjects? *(please write them in)* ______ | ☐ | ☐ | ☐ | ☐ |
| ______ | ☐ | ☐ | ☐ | ☐ |

## ACTIVITIES IN & OUT OF SCHOOL

**17)** **Excluding sports and music activities covered in questions 8 & 9, since year 5 have you regularly done any of these activities outside of normal lesson time, during lunchtime, after school or in the holidays?**

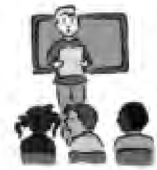
| | Yes | No |
|---|---|---|
| Homework club | ☐ | ☐ |
| Library of book club | ☐ | ☐ |
| Reading or writing group | ☐ | ☐ |
| Maths or number club | ☐ | ☐ |
| Computer club | ☐ | ☐ |
| Science, environment or wildlife club | ☐ | ☐ |
| Art or craft | ☐ | ☐ |
| Dance or drama | ☐ | ☐ |
| Sports or exercise activities | ☐ | ☐ |
| Board games and other games | ☐ | ☐ |
| History or geography | ☐ | ☐ |
| Religious or cultural classes | ☐ | ☐ |
| Other *(please write the name of the club/activity)* ______ | ☐ | ☐ |

## MORE ABOUT EXTRA CLASSES OUT OF SCHOOL

18) **Are you going to or have you been to any other classes in the evening, at the weekend or in school holidays? E.g. any religious classes, revision classes**

No ☐
Don't know ☐ **Go to question 20**

Yes ☐ **Go to question 19**



19) ***If yes*** **which classes do or have you attended?**

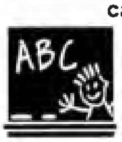
*(please write in the name of the class(es) you attended and the subjects covered. then tick one box in each row to show how long you have been attending)*

*The first row is filled in as an example*

| Name of the class | Subjects covered in the class | I have been going to the classes in these subjects for: More than 1 year | Less than 6 months | 6 to 12 months |
|---|---|---|---|---|
| *English* | *English language* | ☑ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ |

32) **What level of education has your father or carer completed?**

☐ Attended primary school
☐ Attended secondary school
☐ Went to college
☐ Went to university
☐ Apprenticeship/vocational qualification
☐ Don't know
☐ Don't have a father/guardian




33) **What level of education has your mother or carer completed?**

☐ Attended pimary school
☐ Attended secondary school
☐ Went to college
☐ Went to university
☐ Apprenticeship/vocational qualification
☐ Don't know
☐ Don't have a mother/guardian

34) **In your home which of these things do you have?**

| | Yes | No |
|---|---|---|
| A room of you own | ☐ | ☐ |
| A quiet place to study | ☐ | ☐ |
| A desk for study | ☐ | ☐ |
| A computer you can use for work | ☐ | ☐ |
| A link to the internet | ☐ | ☐ |
| Educational computer programmes | ☐ | ☐ |
| A dictionary | ☐ | ☐ |
| An encyclopaedia | ☐ | ☐ |
| Classic literature (e.g.Shakespeare. Dickens) | ☐ | ☐ |
| Calculator | ☐ | ☐ |

35) **How many of these are there at home?**

| | None | 1 or 2 | 3 or more |
|---|---|---|---|
| Television | ☐ | ☐ | ☐ |
| Musical instrument (e.g. piano, drums) | ☐ | ☐ | ☐ |
| Car | ☐ | ☐ | ☐ |
| Bathroom | ☐ | ☐ | ☐ |
| Dishwasher | ☐ | ☐ | |

# Appendix B: Year 11 Questionnaire

The following questions were taken from the Y11 questionnaire and used in the analysis.

**5) At home, who checks on or gives you most help with your schoolwork?**

___________________________________________

**5a) How often do they do each of these things?**
*(Please tick one box in each row)*

| | Never | Once a month or less | 2 or 3 times a month | Every week | Most days |
|---|---|---|---|---|---|
| They try to explain things that I do not understand | ☐ | ☐ | ☐ | ☐ | ☐ |
| They help me with my homework | ☐ | ☐ | ☐ | ☐ | ☐ |

**6) How helpful is it when your parent(s)/carer(s) try to explain schoolwork to you?**

- Always helpful ☐
- It is usually helpful ☐
- It is helpful about half of the time ☐
- It is not usually helpful ☐
- It is never helpful ☐
- They don't explain things to me ☐

**8) How often do you take part in sports or exercise activities? DO NOT INCLUDE exercise done during PE lesson time.** *(Please tick one box in each row)*

| | Never | A few times a year | 2 to 3 times a month | Once a week | Twice a week or more |
|---|---|---|---|---|---|
| Field sports (e.g. hockey, football) | ☐ | ☐ | ☐ | ☐ | ☐ |
| Racket sports (e.g. tennis, squash) | ☐ | ☐ | ☐ | ☐ | ☐ |
| Athletics | ☐ | ☐ | ☐ | ☐ | ☐ |
| Dance, exercise class or gym | ☐ | ☐ | ☐ | ☐ | ☐ |
| Martial arts (e.g. judo, karate) | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other *(please state)* ______________ | | ☐ | ☐ | ☐ | ☐ |

**9) How often do you take part in musical activities?**
*(Please tick one box in each row)*

| | Never | A few times a year | 2 to 3 times a month | Once a week | Twice a week or more |
|---|---|---|---|---|---|
| Have individual lessons | ☐ | ☐ | ☐ | ☐ | ☐ |
| Have group lessons | ☐ | ☐ | ☐ | ☐ | ☐ |
| Play in a band or orchestra | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sing in a choir | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other *(Please state)* ______________ | | ☐ | ☐ | ☐ | ☐ |

## About Private Tuition Out Of School

10) Have you ever had a private tutor, i.e. someone who teaches you alone or with one or two others out of school? (E.g. to help you with school subjects, learning a language etc).

- ☐ No — **Go to question 10b**
- ☐ Don't know ⇨ **Go to question 17** on page 7
- ☐ Yes — **Go to question 10a**

**11) Fill in the grid below to show when you've had private tuition in each subject.**
**E.g. If you had a private tutor for maths since the beginning of year 11, tick the first two columns in the second row.** *(Please tick all the boxes that apply)*

| | In year 11 Autumn Term | In year 11 Spring Term | In year 10 Autumn Term | In year 10 Spring Term | In year 10 Summer Term | Before Year 10 |
|---|---|---|---|---|---|---|
| English | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Maths | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Science | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| History | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Geography | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other subjects *(Please write them in)* | | | | | | |
| ____________ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ____________ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**14) If you currently have a tutor how much time do you usually spend with your tutor(s) for each subject?**

| | 3 or more hours a week | 1-2 hours a week | Up to 1 hour a week | 2 hours or less a month |
|---|---|---|---|---|
| English | ☐ | ☐ | ☐ | ☐ |
| Maths | ☐ | ☐ | ☐ | ☐ |
| Science | ☐ | ☐ | ☐ | ☐ |
| Other subject *(please write them in)* | | | | |
| ____________ | ☐ | ☐ | ☐ | ☐ |
| ____________ | ☐ | ☐ | ☐ | ☐ |
| ____________ | ☐ | ☐ | ☐ | ☐ |

## Activities In & Out of School

**17)** Excluding sport and music activities (covered in questions 8 and 9), since year 10 have you regularly participated in any of the following classes or activities OUTSIDE OF NORMAL LESSON TIME? (E.g. during lunch times, after school, evenings, weekends or school holidays?) *(Please tick one box in each row)*

| | Yes | No |
|---|---|---|
| Study skills, homework club, mentoring | ☐ | ☐ |
| Library or book club | ☐ | ☐ |
| Creative writing, school newspaper or magazine | ☐ | ☐ |
| English language and/or literacy | ☐ | ☐ |
| Foreign language or mother tongue | ☐ | ☐ |
| Maths or number club or class | ☐ | ☐ |
| Computer club or class | ☐ | ☐ |
| Science, environment or wildlife club or class | ☐ | ☐ |
| Art, craft, textile, cookery or design technology | ☐ | ☐ |
| Dance or drama | ☐ | ☐ |
| Community or voluntary work | ☐ | ☐ |
| Board games and/or other games | ☐ | ☐ |
| History, archaeology, geography or geology | ☐ | ☐ |
| Revision classes/club | ☐ | ☐ |
| Religion or culture classes | ☐ | ☐ |
| Personal or social classes/activities | ☐ | ☐ |
| Extra classes in school subjects | ☐ | ☐ |

Other *(please write the names of any other clubs/activities you attend/attended)*

______________________________

**18)** We would like to know more details about the classes/activities/revision classes you have attended since year 10, the first two entries have been completed as an example. Please *do not include* activities in sport and music covered in questions 8 and 9.

| Name and details of class/activity | Was the class organised by the school/ subject teacher? Yes | No | Was the class held in school? Yes | No | When do/did you attend the class (e.g. lunchtimes, evenings, weekends, holidays) | Paid for (P) or free of charge (F) | Approximately: How many times have you attended the class? | How long did it last for? | How many people attended the class/activity? Just you (U), small group (up to 5) (G) or class (C)? |
|---|---|---|---|---|---|---|---|---|---|
| Chemistry revision class | ☑ | ☐ | ☐ | ☑ | during half term | F | Once | 1 full day | C |
| drama club | ☐ | ☑ | ☐ | ☑ | evenings | P | 30 times | 1 hr per wk | G |
| | ☐ | ☐ | ☐ | ☐ | | | | | |
| | ☐ | ☐ | ☐ | ☐ | | | | | |
| | ☐ | ☐ | ☐ | ☐ | | | | | |
| | ☐ | ☐ | ☐ | ☐ | | | | | |
| | ☐ | ☐ | ☐ | ☐ | | | | | |
| | ☐ | ☐ | ☐ | ☐ | | | | | |

**35) What level of education has your father/stepfather/carer completed?**

- ☐ Attended primary school
- ☐ Attended secondary school
- ☐ Went to college
- ☐ Went to university
- ☐ Apprenticeship/vocatonal qualification
- ☐ Don't know
- ☐ Don't have a father/stepfather/carer

**36) What level of education has your mother/stepmother/carer completed?**

- ☐ Attended primary school
- ☐ Attended secondary school
- ☐ Went to college
- ☐ Went to university
- ☐ Apprenticeship/vocational qualification
- ☐ Don't know
- ☐ Don't have a mother/stepmother/carer

**37) In your home which of these things do you have?**

| | Yes | No |
|---|---|---|
| A room of your own | ☐ | ☐ |
| A quiet place to study | ☐ | ☐ |
| A desk for study | ☐ | ☐ |
| A computer you can use for work | ☐ | ☐ |
| A link to the internet | ☐ | ☐ |
| Educational software | ☐ | ☐ |
| A dictionary | ☐ | ☐ |
| A thesaurus | ☐ | ☐ |
| Classic literature (e.g.Shakespeare, Dickens) | ☐ | ☐ |
| Calculator | ☐ | ☐ |

**38) How many of these are there at home?**

| | None | 1 or 2 | 3 or more |
|---|---|---|---|
| Television | ☐ | ☐ | ☐ |
| Musical instrument (e.g. piano, drums) | ☐ | ☐ | ☐ |
| Car | ☐ | ☐ | ☐ |
| Bathroom | ☐ | ☐ | ☐ |
| Dishwasher | ☐ | ☐ | |

**39) What do you plan to do next year?**

- ☐ Go into sixth form
- ☐ Go to college
- ☐ Start an apprenticeship
- ☐ Leave school and start work
- ☐ Not sure
- ☐ Other *(please state)*

______________________________

# Appendix C: Null Multilevel Models

Table C.1 below illustrates the partitioning of the variance of the null multilevel models. The level 2 (school level) variance is significant, however it is small and similar to findings from other studies (Leckie, 2009; Melhuish et al., 2008). The variance partition coefficient (VPC) shows that schools account for between 13-18% of the variance in outcome score at KS2 and between 18-23% of the variance in GCSE score. In the final analysis fixed effects models were used due to problems with the multilevel models outlined in 4.7.

*Table C.1 Null multilevel models illustrating the partitioning of the variance*

| | Level 1 (pupil level) variance | | VPC | Level 2 (school level) variance | | VPC |
|---|---|---|---|---|---|---|
| **YEAR 6** | | | | | | |
| English | 13.49 | (0.64) | 0.86 | 2.22 | (0.701)* | 0.14 |
| Maths | 20.38 | (0.96) | 0.87 | 2.93 | (0.948)* | 0.13 |
| Science | 11.78 | (0.56) | 0.82 | 2.52 | (0.76)* | 0.18 |
| EMSKS2 | 12.58 | (0.60) | 0.85 | 2.28 | (0.707)* | 0.15 |
| **YEAR 11** | | | | | | |
| English | 56.68 | (2.57) | 0.80 | 14.19 | (4.248)* | 0.20 |
| Maths | 74.36 | (3.36) | 0.82 | 16.49 | (4.997)* | 0.18 |
| Science | 68.81 | (3.13) | 0.77 | 20.69 | (6.07)* | 0.23 |
| EMSKS4 | 56.52 | (2.57) | 0.78 | 15.97 | (4.72)* | 0.22 |

**p<.001*

# Appendix D: Model Comparisons

As explained in section 4.2.4 the analysis was repeated using several regression techniques. Table D.1 compares the results using OLS, OLS with robust standard errors and robust regression for KS2 English Model 1. The lower part of the table compares the final model reported in chapter 5 with and without using missing dummy adjustment (including 107 additional cases, see section 4.2.8). As can be seen from Table D.1 the results are very similar in all four models.

*Table D.1 Estimates for KS2 English Model 1 using any PT participation repeated using OLS, OLS with robust standard errors, robust regression with dummy variable adjustment and robust regression.*

| | OLS | | | | OLS ROBUST *SE* | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | (R)*SE* | Sig. | ES |
| KS1 APS | 0.71 | (0.03) | <.001 | 0.71 | 0.71 | (0.03) | <.001 | 0.71 |
| Any PT | -0.07 | (0.17) | ns | -0.01 | -0.07 | (0.17) | ns | -0.01 |
| Female | 0.55 | (0.15) | <.001 | 0.09 | 0.55 | (0.14) | <.001 | 0.09 |
| SEN | -1.91 | (0.24) | <.001 | -0.32 | -1.91 | (0.29) | <.001 | -0.32 |
| Black | -0.24 | (0.29) | ns | -0.04 | -0.24 | (0.35) | ns | -0.04 |
| Mixed | -0.04 | (0.29) | ns | -0.01 | -0.04 | (0.31) | ns | -0.01 |
| Asian (exc) | -0.35 | (0.33) | ns | -0.06 | -0.35 | (0.33) | ns | -0.06 |
| Pakistani | -0.45 | (0.41) | ns | -0.08 | -0.45 | (0.40) | ns | -0.08 |
| HPI grp1 | 0.04 | (0.18) | ns | 0.01 | 0.04 | (0.19) | ns | 0.01 |
| HPI grp3 | -0.28 | (0.18) | ns | -0.05 | -0.28 | (0.20) | ns | -0.05 |
| Music | 0.42 | (0.17) | .012 | 0.07 | 0.42 | (0.18) | .018 | 0.07 |
| Total | 938 | | | | 938 | | | |
| $R^2$ | 0.72 | | | | 0.72 | | | |
| | ROBUST REGRESSION MISSING DUMMY ADJUSTMENT | | | | ROBUST REGRESSION (final model) | | | |
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1 APS | 0.73 | (0.02) | <.001 | 0.73 | 0.75 | (0.02) | <.001 | 0.75 |
| Any PT | 0.10 | (0.16) | ns | 0.02 | 0.00 | (0.16) | ns | 0.00 |
| Female | 0.50 | (0.13) | <.001 | 0.08 | 0.56 | (0.14) | <.001 | 0.09 |
| SEN | -1.76 | (0.21) | <.001 | -0.29 | -1.59 | (0.23) | <.001 | -0.27 |
| Black | -0.75 | (0.26) | .004 | -0.13 | -0.65 | (0.27) | .018 | -0.11 |
| Mixed | -0.33 | (0.26) | ns | -0.06 | -0.19 | (0.28) | ns | -0.03 |
| Asian (exc) | -0.22 | (0.31) | ns | -0.04 | -0.25 | (0.31) | ns | -0.04 |
| Pakistani | -0.53 | (0.38) | ns | -0.09 | -0.40 | (0.39) | ns | -0.07 |
| HPI grp1 | 0.08 | (0.17) | ns | 0.01 | 0.14 | (0.17) | ns | 0.02 |
| HPI grp3 | -0.18 | (0.17) | ns | -0.03 | -0.17 | (0.17) | ns | -0.03 |
| Music | 0.25 | (0.15) | .098 | 0.04 | 0.26 | (0.16) | .092 | 0.04 |
| Missing HPI | -0.49 | (0.30) | .096 | -0.08 | | | | |
| Missing Music | 0.45 | (0.36) | ns | 0.07 | | | | |
| Total | 1045 | | | | 938 | | | |
| $R^2$ | 0.57 | | | | 0.58 | | | |

Figure D.1 shows the standardised regression residuals calculated using OLS for KS2 English Model 1, plotted against the standardised predicted values. This plot reveals a small number of outlying scores. Upon closer examination there was no specific pattern in the scores of these responses although two of the four very large standardised residual scores were students with SEN. One of these students scored very low at KS1 and very high at KS2, the other scored very high at KS1 and low at KS2.

*Figure D.1 Standardised residual and predicted value scatter plot for estimates from KS2 Model 1 using any participation in PT*

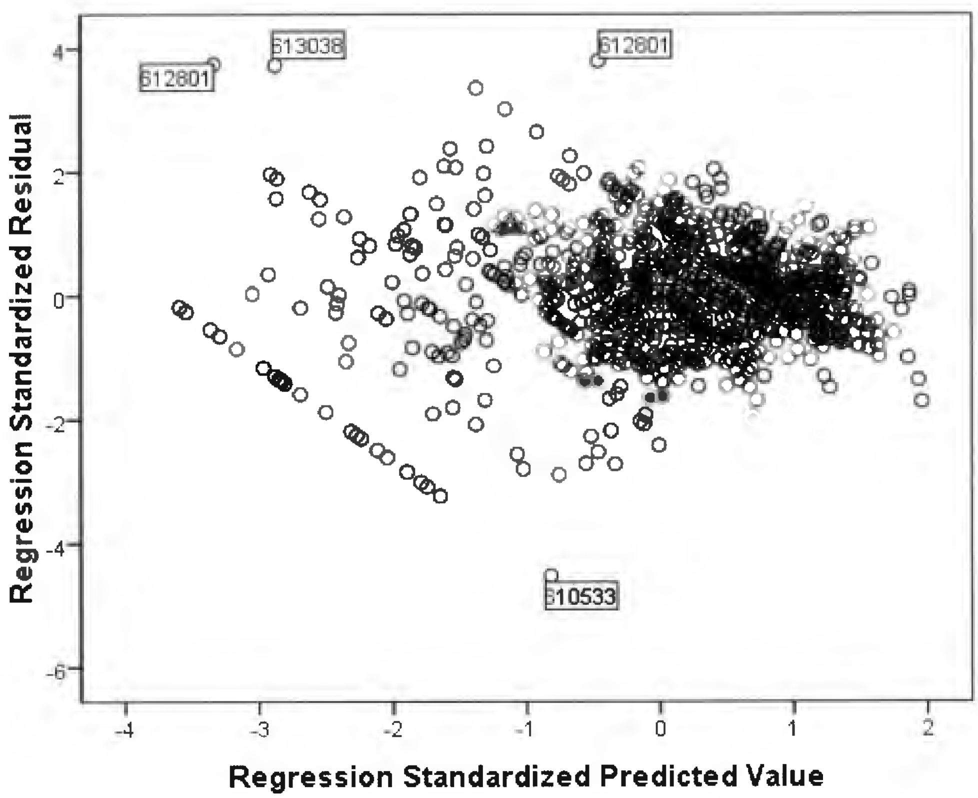



Table D.2 shows the lowest 20 weights given to outlying cases in KS2 English Model 1 using robust regression. The second column indicates participation in PT. In this model four students were given no weight so were therefore excluded from the analysis. As seen in Figure D.1 these four students were outlying scores in the OLS model.

*Table D.2 Robust regression weights for KS2 English Model 1*

| Case Number | PT | Robust regression weight |
|---|---|---|
| 613038 | 0 | 0.000 |
| 610533 | 0 | 0.000 |
| 612607 | 1 | 0.000 |
| 612801 | 0 | 0.000 |
| 610144 | 0 | 0.026 |
| 612312 | 0 | 0.057 |
| 612330 | 0 | 0.091 |
| 610311 | 0 | 0.156 |
| 612106 | 0 | 0.157 |
| 610610 | 0 | 0.172 |
| 611752 | 1 | 0.216 |
| 611717 | 0 | 0.222 |
| 610323 | 1 | 0.226 |
| 610509 | 0 | 0.234 |
| 611920 | 0 | 0.237 |
| 610142 | 0 | 0.275 |
| 610712 | 0 | 0.280 |
| 612030 | 0 | 0.285 |
| 610414 | 1 | 0.293 |
| 612342 | 0 | 0.342 |

# Appendix E: Fine Grade Point Score Calculation

As the data used in this analysis was provided by the DCSF before FGPS data was made available, the FGPS was calculated based on instructions received by the DCSF. FGPS is obtained through a complex calculation based on the final (total) test score, adjusted for the paper tier thresholds (1 tier for English, 4 tiers for maths and 2 tiers for science) and the NC level achieved. It also includes allowances for students who take extension level papers. The grade threshold points change each year so students who took their GCSEs in 2003 (and KS3 tests in 2001) were calculated using different threshold formulas to those in the remainder of the sample.

The details outlined below were provided by the DCSF (2007a).

## E.1 FGPS calculation for KS3 and KS2

- **(2.1)** Assign these pupils the middle mark of the compensatory 2 range and then apply the algorithm in note (2.3).
- **(2.2)** (i) If the mark is lower than the minimum mark for the compensatory level 2 range then assign the minimum mark of the compensatory level 2 range then apply the algorithm in note (2.3).
  (ii) If the mark is higher than the maximum mark of the compensatory level 2 range then assign the maximum mark of the compensatory level 2 range then apply the algorithm in note (2.3).
- **(2.3)** The difference in fine grade of one mark is extended from level 3 range.

$$\text{Fine grade} = 3.0 - \left\{ \frac{\text{min lev 3 mark} - \text{mark}}{\text{max lev 3 mark} - \text{min lev 3 mark} + 1} \right\}$$

**Key Stage 3 Fine Grades - Compensatory levels additional notes:**

- **(3.1)** If the tier is missing, fine grade is midpoint of level; e.g. compensatory level 2 would be 2.5. If level is inconsistent with tier or the main test mark is missing or the main test mark is outside of the mark range of the paper and tier, then:

<u>For English:</u>

- For compensatory level 3s - assign the middle mark in the compensatory level 3 range on the main paper.

For mathematics:

- For compensatory level 2s - assign the middle mark in the compensatory level 2 range on tier 3–5.
- For compensatory level 3s - assign the middle mark in the compensatory level 3 range on tier 4–6
- For compensatory level 4s - assign the middle mark in the compensatory level 4 range on tier 5–7
- For compensatory level 5s - assign the middle mark in the compensatory level 5 range on tier 6–8

For science

- For compensatory level 2s - assign the middle mark in the compensatory level 2 range on tier 3–6.
- For compensatory level 4s - assign the middle mark in the compensatory level 4 range on tier 5–7
- **(3.2)** (i) If the mark is lower than the minimum mark for the compensatory level range then assign the minimum mark of the compensatory level range then apply the algorithm in note (3.3).

  (ii) If the mark is higher than the maximum mark of the compensatory level range then assign the maximum mark of the compensatory level range then apply the algorithm in note (3.3).
- **(3.3)** The following applies:

English compensatory level 3

The difference in fine grade of one mark is extended from level 4 range.

$$\text{Fine grade} = 4.0 - \left\{ \frac{\text{min lev 4 mark} - \text{mark}}{\text{max lev 4 mark} - \text{min lev 4 mark} + 1} \right\}$$

Mathematics compensatory level 2 on tier 3-5

The difference in fine grade of one mark is extended from level 3 range.

$$\text{Fine grade} = 3.0 - \left\{ \frac{\text{min lev 3 mark} - \text{mark}}{\text{max lev 3 mark} - \text{min lev 3 mark} + 1} \right\}$$

Mathematics compensatory level 3 on tier 4-6

The difference in fine grade of one mark is extended from level 4 range.

$$\text{Fine grade} = 4.0 - \left\{ \frac{\text{min lev 4 mark} - \text{mark}}{\text{max lev 4 mark} - \text{min lev 4 mark} + 1} \right\}$$

Mathematics compensatory level 4 on tier 5-7

The difference in fine grade of one mark is extended from level 5 range.

$$\text{Fine grade} = 5.0 - \left\{ \frac{\text{min lev 5 mark} - \text{mark}}{\text{max lev 5 mark} - \text{min lev 5 mark} + 1} \right\}$$

Mathematics compensatory level 5 on tier 6-8

The difference in fine grade of one mark is extended from level 6 range.

$$\text{Fine grade} = 6.0 - \left\{ \frac{\text{min lev 6 mark} - \text{mark}}{\text{max lev 6 mark} - \text{min lev 6 mark} + 1} \right\}$$

Science compensatory level 2 on tier 3-6

The difference in fine grade of one mark is extended from level 3 range.

$$\text{Fine grade} = 3.0 - \left\{ \frac{\text{min lev 3 mark} - \text{mark}}{\text{max lev 3 mark} - \text{min lev 3 mark} + 1} \right\}$$

Science compensatory level 4 on tier 5-7

The difference in fine grade of one mark is extended from level 5 range.

$$\text{Fine grade} = 5.0 - \left\{ \frac{\text{min lev 5 mark} - \text{mark}}{\text{max lev 5 mark} - \text{min lev 5 mark} + 1} \right\}$$

*Figure E.1 Flow diagram: Calculating FGPS at KS2*

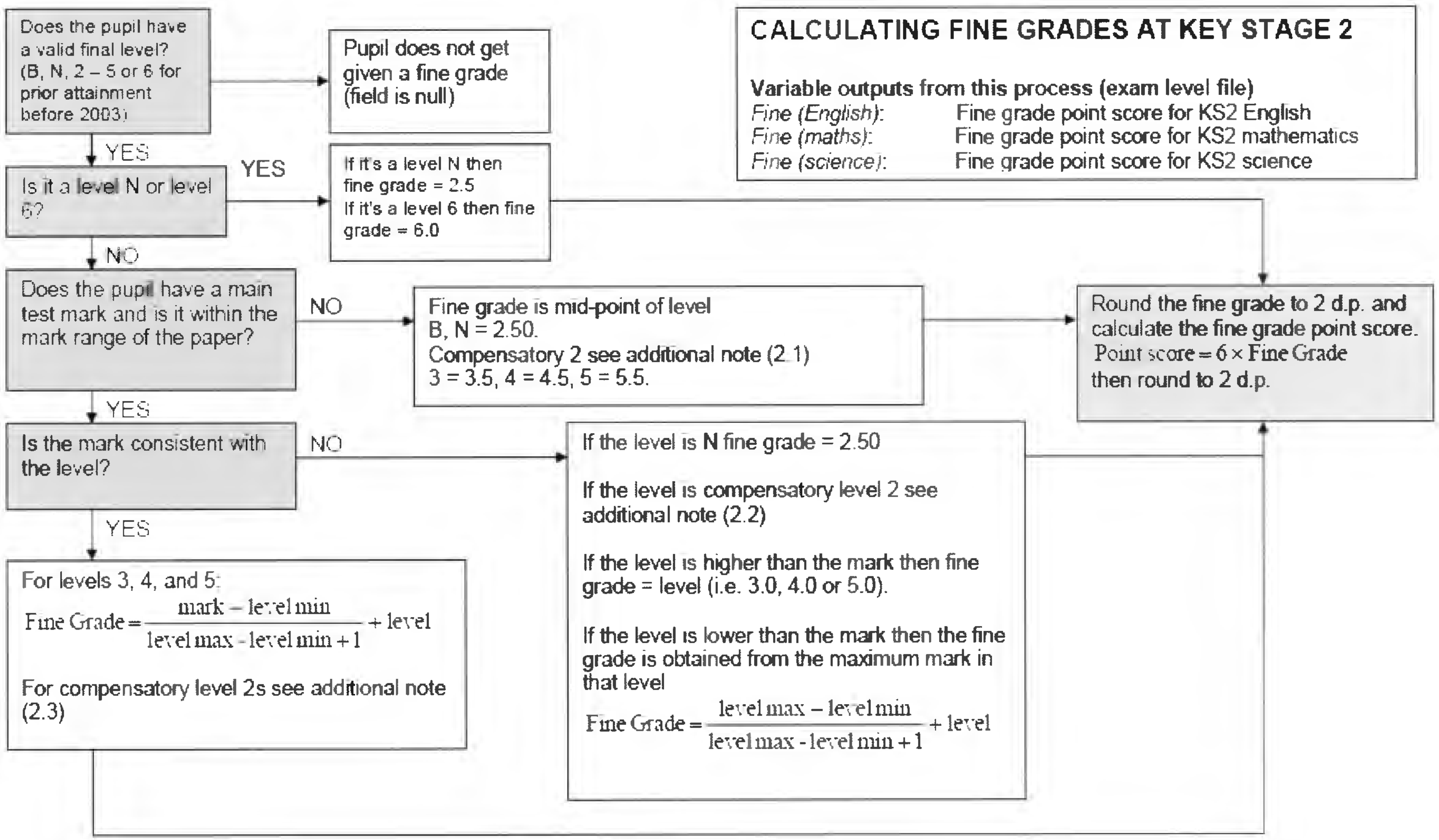
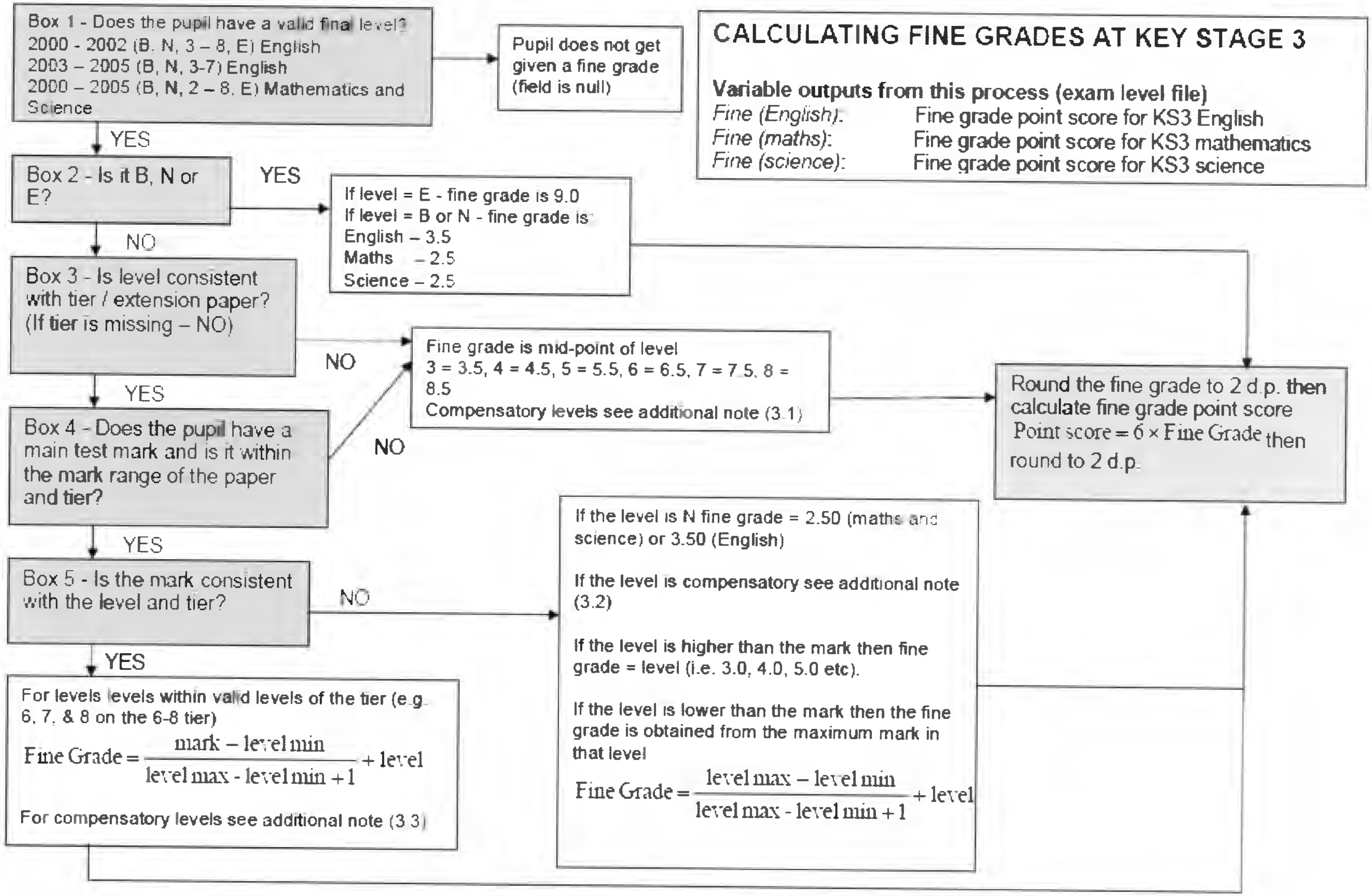


*Figure E.2 Flow diagram: Calculating FGPS at KS3*



## E.2 KS3 test score boundaries

*Table E.1 KS3 English test score boundaries for 2001 and 2002*

| **Final English Level** | | |
|---|---|---|
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-15 | 0 – 14 |
| 3 | 16-20 | 15 – 19 |
| 4 | 21-35 | 20 – 34 |
| 5 | 36-52 | 35 – 52 |
| 6 | 53-69 | 53 – 68 |
| 7 | 70-99 | 69 – 99 |
| **English: Extension Paper** | | |
| Level | Mark range 2001 | Mark range 2002 |
| 8 | 16-25 | 16 – 25 |
| EP | 26-36 | 26 – 36 |

A compensatory Level 3 will be awarded to pupils scoring up to 5 marks below the Level 4 threshold.

*Table E.2 KS3 maths test score boundaries for 2001 and 2002*

| **Final Mathematics Tier 3-5** | | |
|---|---|---|
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-25 | 0 – 25 |
| 2 | 26-31 | 26 – 31 |
| 3 | 32-66 | 32 – 65 |
| 4 | 67-103 | 66 – 101 |
| 5 | 104-150 | 102 – 150 |
| **Final Mathematics Tier 4-6** | | |
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-25 | 0 – 26 |
| 3 | 26-31 | 27 – 32 |
| 4 | 32-57 | 33 – 58 |
| 5 | 58-88 | 59 – 87 |
| 6 | 89-150 | 88 – 150 |
| **Final Mathematics Tier 5-7** | | |
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-30 | 0 – 30 |
| 4 | 31-36 | 31 – 36 |
| 5 | 37-60 | 37 – 58 |
| 6 | 61-92 | 59 – 88 |
| 7 | 93-150 | 89 – 151 |
| **Final Mathematics Tier 6-8** | | |
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-34 | 0 – 31 |
| 5 | 35-40 | 32 – 37 |
| 6 | 41-65 | 38 – 57 |
| 7 | 66-106 | 58 – 93 |
| 8 | 107-150 | 94 – 150 |
| **Mathematics: Extension Paper** | | |
| Level | Mark range 2001 | Mark range 2002 |
| EP | 22-42 | 23-42 |

Compensatory levels will be awarded on each tier to pupils scoring up to 6 marks below the threshold for the lowest target level for the tier.

*Table E.3 KS3 science test score boundaries for 2001 and 2002*

| **Final Science Tier 3-6** | | |
|---|---|---|
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-32 | 0 – 36 |
| 2 | 33-39 | 37 – 43 |
| 3 | 40-69 | 44 – 72 |
| 4 | 70-101 | 73 – 102 |
| 5 | 102-130 | 103 – 131 |
| 6 | 131-180 | 132 – 180 |
| **Final Science Tier 5-7** | | |
| Level | Mark range 2001 | Mark range 2002 |
| N | 0-36 | 0 – 42 |
| 4 | 37-42 | 43 – 48 |
| 5 | 43-70 | 49 – 78 |
| 6 | 71-100 | 79 – 103 |
| 7 | 101-150 | 104 – 150 |
| **Science: Extension Paper** | | |
| Level | Mark range 2001 | Mark range 2002 |
| 8 | 31-42 | 32 – 44 |
| EP | 43-60 | 45 – 60 |

Compensatory levels will be awarded on the main tier test to pupils scoring up to 7 marks (for tier 3–6) or 6 marks (for tier 5–7) below the threshold for the lowest target level for the tier.

## E.3 KS2 test score boundaries

*Table E.4 KS2 English test score boundaries for 2004*

| **Reading** | |
|---|---|
| Level | Mark range 2004 |
| N | 0-11 |
| 3 | 12-17 |
| 4 | 18-30 |
| 5 | 31-50 |
| **Writing** | |
| Level | Mark range 2004 |
| N | 0-11 |
| 3 | 12-22 |
| 4 | 23-33 |
| 5 | 34-50 |
| **English Overall** | |
| Level | Mark range 2004 |
| N | 0-20 |
| 2 | 21-23 |
| 3 | 24-40 |
| 4 | 41-64 |
| 5 | 65-100 |

*Table E.5 KS2 maths test score boundaries for 2004*

| Level | Mark range 2004 |
|---|---|
| N | 0-16 |
| 2 | 17-19 |
| 3 | 20-47 |
| 4 | 48-78 |
| 5 | 79-100 |

*Table E.6 KS2 science test score boundaries for 2004*

| Level | Mark range 2004 |
|---|---|
| N | 0-17 |
| 2 | 18-20 |
| 3 | 21-38 |
| 4 | 39-60 |
| 5 | 61-80 |

# Appendix F: Detailed Variable Descriptions

## F.1 KS1 equivalent point score

*Table F.1 KS1 point scores for Key Stage levels*

| Key Stage 1 Task/Test Level | Point score equivalent | | | |
|---|---|---|---|---|
| | Reading | Writing | Maths | Science |
| W/N/B – Working towards level 1 | 3 | 3 | 3 | 3 |
| 1 | 9 | 9 | 9 | 9 |
| 2C | 13 | 13 | 13 | |
| 2B | 15 | 15 | 15 | 15 |
| 2A | 17 | 17 | 17 | |
| 3 | 21 | 21 | 21 | 21 |
| 4+ | 27 | 27 | 27 | |

The reading measure for English was calculated by combining the variable measuring reading and comprehension (readcomp). The reading test enables pupils to score up to a level 2A; if pupils were already achieving a level 3 or above they were not required to take the test. For the readcomp variable, the reading score was used for all pupils scoring level B to 2A, for those scoring level 3 or above the comprehension score was used.

## F.2 Socio-economic status (SES)

Free School Meal (FSM) data, used as an indicator of socio-economic status, was provided by the DCSF. FSM indicates that the students' parent(s)/carer(s) are likely to be in receipt of income support (Department for Children, Schools and Families, 2007c). Information was available on the proportion of students eligible to receive FSM and the numbers who were receiving FSM. For the project sample 23.5% of pupils in Y6 were eligible for FSM compared to 18.2% of the national average in 2004 for maintained primary school pupils aged 10. For Y11 12.4% were in receipt of FSM compared to 13.5% of maintained secondary school pupils (aged 15) (Department for Education and Skills, 2004b).

Postcode data was also provided by the DCSF for all students involved in the study. The possibility of using ACORN (a Classification of Residential Neighbourhoods) as an indicator of SES was investigated due to the known problems with using FSM (Kounali, Robinson, Goldstein, & Lauder, 2008). ACORN is a geodemographic tool which categorises all UK postcodes using 125 demographic classifications and 287 lifestyle variables (CACI, 2003). Information for ACORN is obtained from census data, house prices and lifestyle surveys; the measure consists of 5 major groupings divided into 17 intermediate groups and 57 smaller categories (CACI, 2003). This seemed an ideal tool to provide accurate SES data for every child involved in the study. However, upon closer examination most classifications are made at the macro postcode level, which means pupils from a similar geographic area who attend the same school are likely to have the same classification. This meant that using a postcode analysis would not be able to differentiate between pupils. There was also the possibility of using the Mosaic postcode classification system (Experian, 2009) as an alternative to ACORN. Mosaic is very similar to ACORN, having 61 groupings and 11 broader groupings, however using mosaic would present the same problems included above.

In the questionnaire students were asked to provide information on their parents' occupations, which could be used as another useful measure of SES. However, this data was extremely problematic due to the difficulty in classifying the occupations described in the questionnaire with over a quarter of the sample having missing or unclassifiable data. Data on parental occupation could therefore not be utilised as an SES indicator for the analysis.

There were several questions concerning home background included in both the Y6 and Y11 questionnaires (see Appendix A and B). These questions were taken from the PISA study (Organisation for Economic Co-operation and Development (OECD), 2000) and form a home possessions index (HPI). Amongst other things, students were asked if they had a room of their own, a quiet place to study, a computer to use for work, a link to the internet etc. Students were also asked how many bathrooms, televisions, cars and musical instruments were available in their home.

A reliability analysis was carried out on these variables and a 15 point scale ($\alpha = 0.7$) was created from the items included in the questionnaire. The variable measuring the number of televisions at home decreased the reliability of the scale so was not included. The questions indicating home background were at the end of the questionnaire and there were relatively high numbers of missing data, principally in the Y6 sample (18.7%), with proportionally less missing from the Y11 sample (7.2%). Further analysis of the missing data revealed that significantly higher proportions of lower ability students (SEN) failed to complete the questionnaire and in the Y6 sample significantly more students with English as a second language. SEN is significantly correlated with males and black students, which meant proportionally more male and black students did not complete these questions.

A large proportion of students had failed to answer the last group of five questions concerning cars, musical instruments, bathrooms, dishwasher and televisions. For students who missed this whole group of questions nothing accurately could be done to these values. Schafer and Graham (2002) argue "ad hoc edits may do more harm than good, producing answers that are biased, inefficient (lacking in power), and unreliable" (p. 147). To prevent making "ad hoc edits" data was examined for all the variables on the 15 point scale and it was decided that a missing value analysis would only be appropriate for students who missed up to a maximum of four items of the 15. The number of missing cases were then reduced to 8.4% in the Y6 sample and 4.6% of Y11. Missing data was replaced using EM (expectation-maximization) algorithm to estimate the means, covariances, and the Pearson Correlations of the other variables included from the 15 point scale (Newman, 2003). The first step of this process involves computing the expected values based on the observed data. The second part involves calculating the maximum likelihood of the parameters based on the values calculated in the first step (SPSS for Windows, 2006). The new mean score for each of the variables were the same or very close to the original scores.

The HPI scale was created by adding up the responses to the 15 variables including the computed values from the MVA.

*Table F.2 Descriptive statistics for the HPI variable*

| | *N* | min | Max | M | *SD* | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| HPI Y6 | 1019 | 1 | 15 | 9.64 | 2.86 | -0.41 (0.08) | -0.40 (0.15) |
| HPI Y6 after MVA | 1149 | 1 | 15 | 9.56 | 2.86 | -0.37 (0.07) | -0.44 (0.14) |
| HPI Y11 | 1127 | 0 | 15 | 10.52 | 2.45 | -0.73 (0.07) | 0.69 (0.15) |
| HPI Y11 after MVA | 1158 | 0 | 15 | 10.52 | 2.44 | -0.71 (0.07) | 0.66 (0.14) |

As can be seen from the skewness and kurtosis scores in Table F.2, the HPI scale was significantly different from normal distribution and was substantially negatively skewed particularly for the Y11 sample.

Transformations were attempted and square root transformations were successful at marginally reducing the negative skew, but this significantly impacted on the kurtosis score. Due to the non-normality of the data and possibility of bias introduced by the MVA it was decided to group the 15 point scale into three groups, representing high, medium and low HPI. The groupings are shown in Table F.3.

*Table F.3 HPI groupings (high, average and low) in Y6 and Y11*

| | Year 6 | | | | Year 11 | | | |
|---|---|---|---|---|---|---|---|---|
| | *n* | % | *M* (from original variable) | *SD* | *n* | % | *M* (from original variable) | *SD* |
| HPI 1 high | 331 | 26.4 | 12.85 | 0.92 | 244 | 20.1 | 13.51 | 0.69 |
| HPI 2 | 441 | 35.2 | 9.96 | 0.83 | 556 | 45.8 | 11.08 | 0.81 |
| HPI 3 low | 377 | 30.1 | 6.21 | 1.59 | 358 | 29.5 | 7.60 | 1.69 |
| Missing | 105 | 8.4 | | | 56 | 4.6 | | |
| TOTAL | 1254 | 100 | 9.56 | 2.86 | 1214 | 100 | 10.51 | 2.44 |

In the preliminary analysis both FSM and the HPI grouping variables were entered into the models. When both variables were utilised FSM was not found to be a significant predictor of attainment. Due to more information being provided by the HPI grouping variable, it was decided that this could be used as a measure of SES instead of FSM. The variable used in the final models was composed of two dummy variables for both the Y6 and Y11 models, HPI group 2 was used as the baseline group being closest to the dependent variable mean.

Correlation coefficients for the FSM indicator and the HPI grouped variable are shown in Table F.4. These results reveal that the HPI is significantly correlated to the indicator for FSM which is a measure of SES.

*Table F.4 Correlation coefficients for HPI grouped variable and FSM*

| | Year 6 | | | Year 11 | | |
|---|---|---|---|---|---|---|
| | Grp1 | Grp2 | Grp3 | Grp1 | Grp2 | Grp3 |
| FSM | -.23** | -.02 | .24** | -.14** | -.05 | .19** |

*p<.05**p<.01

As noted earlier, the data on parental occupation could not be utilised due to the extent of missing data and the problems of classifying occupations included in the questionnaire. To ensure that the HPI groupings were an indicator of SES, they were compared to the data available on parental occupations. The employment data was classified using the International Standard Classification of Occupations (ISCO) (International Labour Organization (ILO), 2004) and is presented in Tables F.5 and F.6 with the HPI groupings.

*Table F.5 Parental occupation of the Y6 sample explored in relation to the home possessions index (HPI) groups 1-3*

| | Mother's Occupation | | | | | Father's Occupation | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *n* | % of total | HPI grp1 % | HPI grp2 % | HPI grp3 % | *n* | % of total | HPI grp1 % | HPI grp2 % | HPI grp3 % |
| Major group 1 legislators, senior officials and managers | 27 | 2.9 | 3.7 | 3.9 | 1 | 90 | 10.9 | 15.6 | 11.4 | 5.6 |
| Major group 2 professionals | 159 | 17.3 | 28.8 | 16.9 | 7.5 | 152 | 18.4 | 31.6 | 16.4 | 7.5 |
| Major group 3 technicians and associate professionals | 76 | 8.3 | 12.4 | 8.2 | 4.7 | 87 | 10.5 | 17.2 | 9.5 | 5.2 |
| Major group 4 clerks | 49 | 5.3 | 8.6 | 5.1 | 2.7 | 19 | 2.3 | 1.6 | 3.2 | 2 |
| Major group 5 service workers and shop and market sales work | 145 | 15.8 | 10.1 | 18.9 | 17.3 | 84 | 10.2 | 8.2 | 10.4 | 11.9 |
| Major group 6 skilled agricultural and fishery workers | 4 | 0.4 | 0.7 | 0.3 | 0.3 | 12 | 1.5 | 1.6 | 1.6 | 1.2 |
| Major group 7 craft and related trades workers | 4 | 0.4 | 0.7 | 0.3 | 0.3 | 140 | 17 | 12.5 | 17.4 | 21 |
| Major group 8 plant and machine operators and assemblers | 10 | 1.1 | 0.4 | 1.1 | 1.7 | 108 | 13.1 | 3.5 | 13.6 | 22.2 |
| Major group 9 elementary occupations | 20 | 2.2 | 0.4 | 2.8 | 3.1 | 20 | 2.4 | 0.8 | 3.2 | 3.2 |
| Major group 0 Armed Forces | 2 | 0.2 | 0 | 0.6 | 0 | 8 | 1 | 1.2 | 1.6 | 0 |
| Domestic engineer, cares for children/partner | 375 | 40.9 | 30.7 | 37.5 | 54.2 | 4 | 0.5 | 0.4 | 0.6 | 0.4 |
| Unemployed | 10 | 1.1 | 1.1 | 0.8 | 1.4 | 85 | 10.3 | 3.9 | 9.5 | 17.9 |
| Cannot work due to ill health | 9 | 1 | 1.1 | 0.6 | 1.4 | 7 | 0.8 | 0.8 | 1.3 | 0.4 |
| Retired | 1 | 0.1 | 0 | 0 | 0.3 | 4 | 0.5 | 0.4 | 0 | 1.2 |
| Full-time student | 26 | 2.8 | 1.1 | 3.1 | 4.1 | 5 | 0.6 | 0.8 | 0.6 | 0.4 |
| TOTAL | 917 | 100 | 267 | 355 | 295 | 825 | 100 | 256 | 317 | 252 |

*Table F.6 Parental occupation of the Y11 sample explored in relation to the home possessions index (HPI) groups 1-3*

| | Mother's Occupation | | | | | Father's Occupation | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | HPI | HPI | HPI | | | HPI | HPI | HPI |
| | *n* | % of total | grp1 % | grp2 % | grp3 % | *n* | % of total | grp1 % | grp2 % | grp3 % |
| Major group 1 legislators, senior officials and managers | 71 | 8.1 | 7 | 9.3 | 6.9 | 173 | 19.2 | 24.3 | 21.4 | 10.1 |
| Major group 2 professionals | 186 | 21.2 | 35.8 | 18.9 | 12.2 | 163 | 18.0 | 33.3 | 16.2 | 7.1 |
| Major group 3 technicians and associate professionals | 150 | 17.1 | 20 | 18.4 | 12.2 | 117 | 12.9 | 16.7 | 13.3 | 8.8 |
| Major group 4 clerks | 150 | 17.1 | 20 | 17.7 | 13.5 | 25 | 2.8 | 1.4 | 2.5 | 4.6 |
| Major group 5 service workers and shop and market sales work | 194 | 22.1 | 11.2 | 23.4 | 29.4 | 56 | 6.2 | 3.6 | 7.4 | 6.3 |
| Major group 6 skilled agricultural and fishery workers | 2 | 0.2 | 0 | 0.2 | 0.4 | 9 | 1.0 | 1.4 | 0.9 | 0.8 |
| Major group 7 craft and related trades workers | 5 | 0.6 | 0 | 0.5 | 1.2 | 201 | 22.2 | 9.5 | 21.8 | 34.9 |
| Major group 8 plant and machine operators and assemblers | 20 | 2.3 | 0.5 | 2.9 | 2.9 | 116 | 12.8 | 7.7 | 11.7 | 19.7 |
| Major group 9 elementary occupations | 35 | 4.0 | 1.4 | 3.1 | 7.8 | 35 | 3.9 | 1.8 | 3.4 | 6.7 |
| Major group 0 armed forces | 1 | 0.1 | 0 | 0.2 | 0 | 3 | 0.3 | 0.5 | 0.5 | 0 |
| Domestic engineer, cares for children/partner | 55 | 6.3 | 3.7 | 4.5 | 11.4 | 1 | 0.1 | 0 | 0.2 | 0 |
| Unemployed | 2 | 0.2 | 0 | 0 | 0.8 | 2 | 0.2 | 0 | 0.2 | 0.4 |
| Cannot work due to ill health | 3 | 0.3 | 0 | 0.5 | 0.4 | 1 | 0.1 | 0 | 0.2 | 0 |
| Retired | 0 | 0.0 | 0 | 0 | 0 | 1 | 0.1 | 0 | 0 | 0.4 |
| Full-time student | 4 | 0.5 | 0.5 | 0.2 | 0.8 | 1 | 0.1 | 0 | 0.2 | 0 |
| Total | 878 | 100 | 215 | 418 | 245 | 904 | 100 | 222 | 444 | 238 |

These tables clearly demonstrate that the students in HPI group 1 (high HPI score) are most likely to have parents employed in occupations classified in major groups 1-3 (managers and professionals). Students in HPI group 3 were most likely to have parents employed in major groups 5 (shop and service workers) and major group 8 (plant and machine operators). Section 5.1.1 and 6.1.1 includes a discussion on the relationship between participation in PT and parental occupation with more detail in Ireson and Rushforth (2005).

## F.3 Parental level of education

Students were also asked to report on the education level of both their mother and father (or carer, see Appendix A and B). There were large disparities between the two year groups. For the Y11 sample far more mothers and fathers indicated their highest qualification level as primary/secondary level education compared with university level, the opposite was true in the Y6 sample. Due to the link between parental education and the decision to invest in PT (Davies, 2004; Ireson & Rushforth, 2011) it was considered important to include this variable in the models. However, in addition to the missing data for this question, a substantial number of both Y6 and Y11 students indicated 'don't know' in response to the question regarding their mother or father education level. A total of 27% of the students did not know their father's and 25.4% did not know their mother's education level. Due to the high proportion of missing and don't know responses these variables were combined to create one variable representing highest parental level of education. However, the proportion of missing data was still over a quarter for the Y11 sample and almost one third in the Y6 data. For this reason parental information was not included in the models.

To determine if the HPI could be an indicator of parental education, the limited information available on education level was compared to the HPI data and presented in Tables F.7 and F.8. Table F.7 shows that almost half of the parents of Y6 students in HPI group 1 had a university level qualification. This difference was found to be significant (mother's education $\chi^2$ (4) = 37.1, $p$ = .001, Cramer's V .16, father's education $\chi^2$ (4) = 55.1, $p$ = .001, Cramer's V .2). Table F.8 also shows the association between HPI group 1 and university level qualification in the Y11 sample (mother's education $\chi^2$ (4) = 71.2, $p$ = .001, Cramer's V .21, father's education $\chi^2$ (4) = 89.5, $p$ = .001, Cramer's V .24). Section 5.1.1 and 6.1.1 discusses the relationship between education level and participation in PT with more detail included in Ireson and Rushforth (2005, 2011).

*Table F.7 Parental education of the Y6 sample explored in relation to the home possessions index (HI) groups 1-3*

| | Mother's Education | | | | | Father's Education | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *n* | % of total | HPI grp1 % | HPI grp2 % | HPI grp3 % | *n* | % of total | HPI grp1 % | HPI grp2 % | HPI grp3 % |
| Compulsory school education | 167 | 15.2 | 10.6 | 15.8 | 18.8 | 181 | 16.4 | 10.2 | 17.5 | 21 |
| College/vocational qualification | 254 | 23.1 | 23.9 | 24.9 | 20.2 | 203 | 18.4 | 21 | 20.7 | 13.2 |
| University level qualification | 343 | 31.2 | 46.9 | 28.8 | 19.7 | 323 | 29.3 | 47.5 | 25.6 | 17 |
| N/A | 6 | 0.5 | 0.3 | 0.2 | 1.2 | 29 | 2.6 | 1.5 | 2.1 | 4.3 |
| Don't know | 328 | 29.9 | 18.3 | 30.2 | 40.2 | 365 | 33.2 | 19.8 | 34 | 44.5 |
| Total | 1098 | 100 | 322 | 430 | 346 | 1101 | 100 | 324 | 429 | 348 |

*Table F.8 Parental education of the Y11 sample explored in relation to the home possessions index (HPI) groups 1-3*

| | Mother's Education | | | | | Father's Education | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *n* | % of total | HPI grp1 % | HPI grp2 % | HPI grp3 % | *n* | % of total | HPI grp1 % | HPI grp2 % | HPI grp3 % |
| Compulsory school education | 370 | 33.3 | 21.3 | 33.8 | 41.2 | 317 | 28.8 | 18.0 | 28.2 | 37.6 |
| College/vocational qualification | 279 | 25.2 | 26.4 | 27.5 | 20.6 | 257 | 23.3 | 19.2 | 27.5 | 19.6 |
| University level qualifications | 185 | 16.7 | 33.1 | 14.8 | 8.1 | 229 | 20.8 | 41.4 | 17.9 | 10.4 |
| N/A | 4 | 0.4 | 0 | 0.6 | 0.3 | 25 | 2.3 | 0.4 | 1.9 | 4.3 |
| Don't know | 271 | 24.4 | 19.2 | 23.4 | 29.9 | 273 | 24.8 | 20.9 | 24.5 | 28.1 |
| Total | 1109 | 100 | 239 | 535 | 335 | 1101 | 100 | 239 | 535 | 327 |

## F.4 Parental involvement

It was decided that the best indicators of parental involvement included in the questionnaire were associated with homework help and explaining work not understood by the student (see appendix A and B). The questions regarding help with school work were answered on a five point scale. It was decided to create two dichotomous variables indicative of regular and irregular parental involvement; the first representing regular help with homework and the second regular help explaining work.

As expected, there was considerably more parental involvement reported for Y6 than for Y11. Due to the high level of parental support reported in the Y6 sample, using any variable to measure parental involvement was problematic. Other answers from the questionnaire were considered, but none gave an appropriate distribution of responses to be a useful distinctive indicator of parental support. For this reason the variables measuring parental involvement were not included in the KS2 analysis. From a preliminary analysis of Y11 data the two dichotomous variables outlined above were included in the analysis. However, these variables persistently came up as non-significant predictors of achievement and the inconsistent estimates indicated that these variables were not accurate indicators of parental involvement. Due to these inconsistencies and the number of missing values for these variables, it was decided to exclude them from the KS4 analysis.

## F.5 Comparison of tutored and non-tutored students

Table F.9 contains the mean KS2 scores for English, maths, science and mean EMSKS2 comparing the achievement data for both tutored and non-tutored students by all the background characteristics included in the models. The measure for PT was any participation within the respective subject compared to no PT within that subject. In the final three columns the PT indicator was any participation in PT in any subject at any point in schooling compared to no PT participation.

A similar table contains mean KS4 scores comparing the achievement of both tutored and non-tutored students (see Table F.10). The measure of PT in this table is PT within the respective subject during years 10 and 11 contrasted with students who did not participate in PT in the respective subject during years 10 and 11. In the final three columns, the PT indicator is any participation in PT in any subject during years 10 and 11.

*Table F.9 KS2 mean scores for tutored and non-tutored students by different background characteristics*

| | English KS2 FGPS | | | Maths KS2 FGPS | | | Science KS2 FGPS | | | Mean EMSKS2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Eng PT | Eng PT | All | No Mat PT | Mat PT | All | No Sci PT | Sci PT | All | No PT | PT | All |
| | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* |
| **KS2** | | | | | | | | | | | | |
| *M* | 27.48(3.93) | 27.17(3.94) | 27.44(3.93) | 27.86(4.77) | 28.18(4.83) | 27.94(4.76) | 29.22(3.68) | 28.60(3.96) | 29.22(3.68) | 28.07(3.83) | 28.73(3.65) | 28.23(3.80) |
| APS grp 1 | 30.61(1.94) | 30.80(1.80) | 30.65(1.91) | 32.03(2.61) | 33.11(1.88) | 32.21(2.53) | 31.93(2.03) | 32.55(2.09) | 31.93(2.03) | 31.42(1.84) | 32.25(1.45) | 31.61(1.79) |
| APS grp 2 | 27.44(2.69) | 27.41(2.76) | 27.43(2.70) | 27.49(3.57) | 27.60(3.76) | 27.52(3.60) | 29.01(2.82) | 28.43(2.68) | 29.03(2.79) | 27.91(2.54) | 28.27(2.65) | 28.00(2.57) |
| APS grp 3 | 21.48(4.10) | 22.46(3.70) | 21.70(4.02) | 21.47(4.77) | 23.30(4.70) | 21.86(4.78) | 24.70(4.50) | 25.65(4.63) | 24.70(4.50) | 22.34(3.83) | 24.12(3.65) | 22.79(3.84) |
| **KS1APS†** | | | | | | | | | | | | |
| *M* | 15.99(3.71) | 15.56(3.79) | 15.93(3.73) | 15.94(3.80) | 15.74(3.61) | 15.92(3.77) | 16.00(3.74) | 14.91(4.13) | 16.00(3.74) | 15.92(3.77) | 16.16(3.62) | 15.98(3.73) |
| APS grp 1 | 20.10(0.94) | 20.14(0.84) | 20.12(0.94) | 20.12(0.94) | 20.10(0.84) | 20.13(0.94) | 20.10(0.94) | 20.29(0.82) | 20.13(0.94) | 20.08(0.96) | 20.27(0.88) | 20.13(0.94) |
| APS grp 2 | 15.61(1.66) | 15.80(1.64) | 15.65(1.66) | 15.63(1.68) | 15.66(1.62) | 15.65(1.67) | 15.67(1.66) | 15.43(1.67) | 15.66(1.66) | 15.59(1.65) | 15.88(1.67) | 15.66(1.66) |
| APS grp 3 | 09.45(2.77) | 09.79(2.00) | 09.53(2.61) | 09.29(2.78) | 10.02(2.01) | 09.44(2.65) | 09.39(2.75) | 09.41(1.90) | 09.39(2.65) | 09.33(2.78) | 09.88(1.98) | 09.47(2.61) |
| **Gender** | | | | | | | | | | | | |
| Male | 26.75(4.27) | 26.66(4.16) | 26.74(4.24) | 27.87(5.09) | 28.38(4.95) | 27.98(5.10) | 29.25(3.86) | 29.28(3.42) | 29.25(3.86) | 27.85(4.16) | 28.72(3.64) | 28.08(4.05) |
| Female | 28.18(3.44) | 27.78(3.58) | 28.14(3.46) | 27.86(4.43) | 27.96(4.71) | 27.90(4.47) | 29.16(3.51) | 27.90(4.40) | 29.18(3.49) | 28.28(3.49) | 28.74(3.68) | 28.39(3.53) |
| **SEN** | | | | | | | | | | | | |
| No SEN | 28.42(2.95) | 28.12(3.12) | 28.38(2.99) | 28.92(4.00) | 29.01(4.34) | 28.96(4.05) | 29.98(2.97) | 29.03(3.52) | 29.99(2.94) | 29.02(2.93) | 29.41(3.12) | 29.11(2.98) |
| SEN | 22.60(4.72) | 22.73(4.38) | 22.62(4.65) | 22.69(4.90) | 22.96(4.49) | 22.73(4.82) | 25.46(4.51) | 24.09(5.75) | 25.46(4.51) | 23.39(4.34) | 24.51(3.89) | 23.63(4.26) |
| **Ethnic origin** | | | | | | | | | | | | |
| White | 27.87(3.70) | 27.59(3.66) | 27.85(3.70) | 28.30(4.53) | 28.57(4.50) | 28.36(4.52) | 29.66(3.37) | 29.75(3.60) | 29.66(3.34) | 28.49(3.60) | 29.24(3.31) | 28.67(3.55) |
| Black | 26.25(4.07) | 26.46(5.71) | 26.34(4.26) | 26.78(4.82) | 26.02(5.08) | 26.74(4.83) | 27.43(3.72) | 29.47(5.42) | 27.43(3.72) | 26.96(3.65) | 26.77(4.48) | 26.92(3.79) |
| Mixed | 27.87(3.95) | 27.53(4.61) | 27.79(4.07) | 27.97(5.15) | 30.65(3.50) | 28.51(4.96) | 29.60(3.64) | 27.67(2.65) | 29.60(3.64) | 28.46(3.62) | 29.25(3.91) | 28.65(3.68) |
| Asian (exc) | 27.22(4.28) | 29.00(2.22) | 27.51(4.01) | 28.45(4.59) | 30.61(2.96) | 28.93(4.34) | 29.60(3.22) | 30.43(1.94) | 29.60(3.22) | 28.30(3.82) | 29.90(2.26) | 28.71(3.54) |
| Pakistani | 25.35(4.47) | 24.62(3.64) | 25.14(4.24) | 24.83(5.24) | 24.25(5.49) | 24.68(5.28) | 26.32(4.96) | 26.26(4.49) | 26.32(4.96) | 25.40(4.68) | 25.44(3.91) | 25.41(4.45) |
| **HPI** | | | | | | | | | | | | |
| Grp 1 High | 28.83(3.38) | 28.51(2.93) | 28.79(3.27) | 29.49(4.59) | 29.47(4.12) | 27.21(4.74) | 30.23(3.20) | 30.24(2.88) | 30.27(3.14) | 29.37(3.60) | 29.83(2.87) | 29.54(3.35) |
| Grp 2 | 27.54(3.79) | 26.80(4.31) | 27.42(3.88) | 27.94(4.63) | 28.03(4.95) | 27.96(4.67) | 29.30(3.47) | 28.77(3.92) | 29.30(3.47) | 28.23(3.60) | 28.36(3.95) | 28.25(3.67) |
| Grp 3 Low | 26.11(4.16) | 24.82(4.03) | 25.96(4.16) | 26.20(4.58) | 25.57(5.10) | 26.12(4.64) | 27.97(4.12) | 25.73(4.15) | 27.97(4.12) | 26.78(3.93) | 26.20(3.74) | 26.70(3.90) |

| | English KS2 FGPS | | | Maths KS2 FGPS | | | Science KS2 FGPS | | | Mean EMSKS2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Eng PT | Eng PT | All | No Mat PT | Mat PT | All | No Sci PT | Sci PT | All | No PT | PT | All |
| | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* |
| **Parent Q'aire** | | | | | | | | | | | | |
| No | 26.91(4.10) | 26.54(4.12) | 26.85(4.10) | 27.20(4.78) | 26.90(5.13) | 27.16(4.83) | 28.63(3.80) | 27.72(4.10) | 28.63(3.80) | 27.49(3.91) | 27.85(3.87) | 27.57(3.90) |
| Yes | 28.40(3.46) | 28.06(3.51) | 28.37(3.47) | 28.97(4.56) | 29.83(3.85) | 29.17(4.42) | 30.12(3.32) | 30.05(3.32) | 30.15(3.27) | 29.05(3.50) | 29.84(3.02) | 29.27(3.39) |
| **Music** | | | | | | | | | | | | |
| No | 26.40(4.25) | 25.02(4.13) | 26.23(4.25) | 26.92(4.79) | 26.17(5.26) | 26.82(4.86) | 28.39(3.92) | 27.04(3.69 | 28.39(3.92) | 27.18(3.99) | 27.10(4.03) | 27.16(3.99) |
| Yes | 28.17(3.55) | 28.05(3.51) | 28.16(3.54) | 28.47(4.66) | 29.02(4.40) | 28.61(4.60) | 29.69(3.46) | 29.32(3.91) | 29.71(3.43) | 28.67(3.61) | 29.34(3.31) | 28.86(3.54) |
| **Sport** | | | | | | | | | | | | |
| No | 26.30(4.82) | 24.04(5.70) | 25.88(5.03) | 25.78(5.65) | 24.96(7.12) | 25.66(5.83) | 27.64(4.40) | 24.26(5.07) | 27.64(4.40) | 26.81(4.51) | 24.68(5.50) | 26.40(4.74) |
| Yes | 27.57(3.86) | 27.41(3.71) | 27.56(3.83) | 28.01(4.67) | 28.36(4.63) | 27.10(4.66) | 29.33(3.59) | 28.76(3.86) | 29.34(3.59) | 28.18(3.75) | 28.93(3.42) | 28.36(3.69) |
| **Homework** | | | | | | | | | | | | |
| <5 hrs | 27.53(3.93) | 27.02(4.00) | 27.46(3.94) | 27.93(4.73) | 27.85(4.76) | 27.93(4.73) | 29.17(3.71) | 28.35(3.98) | 29.17(3.69) | 28.06(3.84) | 28.57(3.68) | 28.18(3.80) |
| >=5 hrs | 27.46(3.91) | 29.40(2.96) | 28.00(3.75) | 28.22(5.03) | 32.25(2.43) | 29.23(4.80) | 29.94(3.37) | 30.795(3.25 | 29.94(3.37) | 28.32(3.81) | 31.11(2.15) | 29.09(3.63) |

† Mean KS1APS scores

*Table F.10 KS4 mean scores for tutored and non-tutored students by different background characteristics*

| KS4 Models | GCSE English | | | GCSE Maths | | | GCSE Science | | | Mean EMSKS4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Eng PT in yrs 10 & yrs 11 | Eng PT in yrs 10 & 11 | All | No mat PT in yrs 10 & yrs 11 | Mat PT in yrs 10 & 11 | All | No sci PT in yrs 10 & yrs 11 | Sci PT in yrs 10 & 11 | All | No PT in yrs 10 & yrs 11 | PT in yrs 10 & 11 | All |
| | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* | *M* *(SD)* |
| **KS4** | | | | | | | | | | | | |
| *M* EMSKS4 | 40.05(8.37) | 39.36(8.66) | 39.97(8.39) | 38.03(9.61) | 40.71(8.20) | 38.31(9.49) | 38.33(9.39) | 40.28(8.17) | 38.34(9.36) | 38.39(8.60) | 41.22(7.19) | 38.80(8.45) |
| *M*EMSKS3 gr1 | 47.86(4.91) | 48.33(4.44) | 47.88(4.87) | 48.20(5.38) | 50.11(5.31) | 48.34(5.38) | 47.53(6.08) | 50.50(5.32) | 47.62(6.06) | 47.57(4.60) | 48.28(5.18) | 47.68(4)69 |
| *M*EMSKS3 gr2 | 39.74(6.20) | 41.23(5.76) | 39.83(6.18) | 38.00(5.91) | 41.84(5.07) | 38.57(5.97) | 37.82(6.18) | 40.69(4.59) | 37.98(6.12) | 38.26(4.97) | 40.94(4.74) | 38.76(5.02) |
| *M*EMSKS3 gr3 | 31.15(6.77) | 30.64(6.69) | 31.12(6.73) | 25.54(5.32) | 28.27(5.06) | 25.85(5.30) | 27.93(7.47) | 30.00(6.00) | 28.02(7.39) | 27.86(5.82) | 31.80(4.66) | 28.38(5.78) |
| **KS3†** | | | | | | | | | | | | |
| *M* EMSKS3 | 34.41(5.87) | 33.21(5.96) | 34.31(5.89) | 36.15(7.29) | 35.45(5.86) | 36.01(7.15) | 34.73(5.96) | 34.17(4.71) | 34.65(5.91) | 34.96(5.77) | 35.48(4.89) | 35.00(5.65) |
| *M*EMSKS3 gr1 | 40.45(4.03) | 40.07(5.02) | 40.44(4.06) | 44.91(2.60) | 44.65(2.35) | 44.89(2.57) | 41.27(3.16) | 40.61(2.61) | 41.25(3.14) | 41.88(2.54) | 41.45(2.67) | 41.82(2.56) |
| *M*EMSKS3 gr2 | 33.93(4.07) | 34.11(3.76) | 33.95(4.03) | 36.06(3.12) | 35.69(2.96) | 36.00(3.09) | 34.53(2.97) | 34.15(2.91) | 34.51(2.96) | 34.83(2.37) | 35.08(2.06) | 34.89(2.32) |
| *M*EMSKS3 gr3 | 28.11(3.74) | 27.38(3.37) | 28.02(3.71) | 25.56(3.15) | 26.59(2.29) | 25.62(3.07) | 26.96(4.06) | 28.50(2.54) | 27.06(3.98) | 27.09(2.62) | 28.03(1.93) | 27.19(2.54) |
| **Gender** | | | | | | | | | | | | |
| Male | 38.72(8.38) | 36.83(8.95) | 38.57(8.42) | 37.94(9.59) | 40.96(8.27) | 38.24(9.48) | 38.43(8.96) | 38.85(9.60) | 38.34(8.98) | 38.02(8.33) | 40.76(7.61) | 38.41(8.25) |
| Female | 41.51(8.14) | 44.20(6.09) | 41.56(8.10) | 38.13(9.63) | 40.42(8.17) | 38.38(9.49) | 38.29(9.82) | 42.47(4.77) | 38.40(9.75) | 38.83(8.85) | 42.07(6.32) | 39.31(8.59) |
| **SEN** | | | | | | | | | | | | |
| No SEN | 40.84(7.82) | 40.26(8.67) | 40.78(7.87) | 38.96(9.17) | 40.86(7.78) | 39.17(9.02) | 39.12(8.79) | 40.30(7.68) | 39.14(8.73) | 39.32(7.96) | 41.43(6.89) | 39.65(7.81) |
| SEN | 31.58(9.39) | 33.50(6.41) | 31.69(9.08) | 28.62(8.95) | 38.50(13.51) | 29.42(9.66) | 29.83(11.29) | 40.00(15.87) | 29.95(11.39) | 28.93(9.25) | 38.45(10.50) | 30.03(9.77) |
| **Ethnic origin** | | | | | | | | | | | | |
| White | 40.09(8.38) | 41.39(7.77) | 40.07(8.37) | 38.01(9.53) | 41.00(8.21) | 38.26(9.44) | 38.49(9.39) | 41.83(7.33) | 38.49(9.36) | 38.51(8.45) | 41.68(7.32) | 38.92(8.37) |
| Black | 38.94(7.91) | 34.00(9.25) | 38.47(8.08) | 37.86(9.45) | 34.55(7.80) | 37.17(9.16) | 36.68(8.13) | 32.00(7.27) | 36.15(8.11) | 37.45(7.93) | 36.56(6.90) | 37.26(7.68) |
| Mixed | 41.83(8.73) | 43.00( ) | 41.86(8.61) | 39.29(8.32) | 48.00(3.46) | 40.00(8.37) | 39.06(8.11) | 46.00( ) | 39.44(8.04) | 39.52(8.39) | 44.75(1.71) | 40.08(8.09) |
| Asian | 39.43(8.31) | 36.27(9.76) | 38.99(8.53) | 37.68(11.55) | 41.64(7.45) | 38.78(10.67) | 37.23(10.83) | 40.50(8.66) | 37.74(10.54) | 36.85(10.95) | 40.53(6.57) | 38.02(9.89) |

| KS4 Models | GCSE English | | | GCSE Maths | | | GCSE Science | | | Mean EMSKS4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Eng PT in yrs 10 & yrs 11 | Eng PT in yrs 10 & 11 | All | No mat PT in yrs 10 & yrs 11 | Mat PT in yrs 10 & 11 | All | No sci PT in yrs 10 & yrs 11 | Sci PT in yrs 10 & 11 | All | No PT in yrs 10 & yrs 11 | PT in yrs 10 & 11 | All |
| | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* |
| **HPI** | | | | | | | | | | | | |
| Grp 1 High | 43.25(7.25) | 40.75(8.30) | 43.02(7.33) | 41.72(8.96) | 42.40(8.13) | 41.69(8.85) | 42.95(7.54) | 43.00(7.27) | 42.76(7.52) | 42.34(7.54) | 43.12(6.38) | 42.44(7.25) |
| Grp 2 | 40.90(8.11) | 40.24(7.50) | 40.77(8.11) | 39.20(9.13) | 39.91(8.25) | 39.23(9.02) | 39.37(8.66) | 39.74(7.78) | 39.30(8.64) | 39.60(8.01) | 40.55(7.45) | 39.70(7.93) |
| Grp 3 Low | 36.51(8.28) | 34.50(11.72) | 36.42(8.37) | 34.11(9.38) | 39.25(7.86) | 34.34(9.38) | 33.63(9.62) | 32.50(10.25) | 33.55(9.65) | 34.36(8.46) | 38.51(7.35) | 34.65(8.46) |
| **Parent q'naire** | | | | | | | | | | | | |
| No | 38.94(8.47) | 36.31(8.23) | 38.79(8.48) | 36.57(9.59) | 38.86(7.48) | 36.77(9.39) | 36.69(9.26) | 38.40(6.86) | 36.69(9.18) | 37.05(8.61) | 39.03(6.69) | 37.29(8.38) |
| Yes | 42.65(7.51) | 44.88(6.56) | 42.71(7.50) | 41.65(8.69) | 43.35(8.52) | 41.83(8.75) | 42.09(8.59) | 44.62(9.54) | 42.15(8.63) | 41.77(7.64) | 44.59(6.65) | 42.29(7.55) |
| **Homework** | | | | | | | | | | | | |
| <1 hr pw | 33.98(8.62) | 36.00(9.03) | 33.98(8.58) | 31.57(8.87) | 34.00(7.35) | 31.63(8.77) | 32.61(9.57) | 34.00( ) | 32.59(9.41) | 32.33(8.24) | 35.21(7.69) | 32.51(8.18) |
| >1-5 hrs pw | 40.04(7.70) | 38.59(9.18) | 39.93(7.79) | 37.92(8.86) | 39.66(8.05) | 38.08(8.78) | 37.98(8.64) | 39.59(9.06) | 37.98(8.68) | 38.38(7.78) | 40.23(7.18) | 38.62(7.71) |
| >=5 hrs pw | 45.02(7.09) | 43.60(5.44) | 44.88(7.00) | 44.10(8.99) | 45.80(6.20) | 44.38(8.59) | 44.07(8.63) | 43.82(4.85) | 44.03(8.43) | 44.07(8.13) | 45.00(5.03) | 44.29(7.46) |
| **English classes** | | | | | | | | | | | | |
| No | 39.70(8.35) | 41.35(9.70) | 39.70(8.41) | 37.91(9.56) | 41.01(7.63) | 38.19(9.41) | 38.29(9.25) | 41.83(6.63) | 38.34(9.18) | 38.27(8.38) | 41.71(6.84) | 38.72(8.26) |
| Yes | 40.89(8.37) | 37.27(7.05) | 40.57(8.32) | 38.34(9.74) | 40.24(9.10) | 38.58(9.67) | 38.42(9.74) | 38.50(9.51) | 38.32(9.77) | 38.68(9.14) | 40.47(7.69) | 38.98(8.90) |
| **Science classes** | | | | | | | | | | | | |
| No | 39.70(8.36) | 38.86(9.12) | 39.61(8.41) | 37.76(9.64) | 40.06(8.59) | 37.95(9.55) | 38.07(9.30) | 38.55(8.43) | 38.00(9.29) | 38.15(8.46) | 41.00(7.31) | 38.53(8.36) |
| Yes | 41.71(8.22) | 41.33(6.56) | 41.68(8.11) | 39.39(9.39) | 43.11(6.08) | 40.00(9.03) | 39.58(9.74) | 43.86(6.49) | 39.90(9.53) | 39.56(9.22) | 41.99(6.81) | 40.07(8.79) |
| **Language classes** | | | | | | | | | | | | |
| No | 39.56(8.34) | 38.53(8.54) | 39.47(8.36) | 37.41(9.64) | 40.32(8.37) | 37.67(9.55) | 37.80(9.43) | 39.59(7.34) | 37.77(9.38) | 37.86(8.61) | 40.75(7.29) | 38.29(8.49) |
| Yes | 42.79(7.99) | 41.91(8.93) | 42.65(8.01) | 41.50(8.69) | 41.94(7.65) | 41.57(8.46) | 41.44(8.44) | 41.71(9.82) | 41.45(8.51) | 41.68(7.76) | 42.65(6.77) | 41.90(7.50) |
| **Future Plans** | | | | | | | | | | | | |
| Sixth form | 43.10(7.08) | 43.32(6.34) | 43.10(7.03) | 41.31(8.58) | 42.73(7.05) | 41.46(8.40) | 41.51(8.32) | 42.20(6.96) | 41.52(8.24) | 41.58(7.57) | 43.16(6.44) | 41.85(7.38) |
| College | 36.92(8.01) | 32.50(7.86) | 36.71(8.07) | 34.65(9.38) | 38.60(9.28) | 35.08(9.43) | 34.93(9.16) | 36.57(11.41) | 34.81(9.25) | 35.07(8.13)) | 38.67(7.44) | 35.50(8.14) |
| Apprent'ship | 33.02(7.83) | 35.00(6.93) | 33.05(7.64) | 30.74(7.86) | 40.00( ) | 31.14(7.91) | 32.68(8.04) | 34.00( ) | 32.76(7.78) | 31.70(7.12) | 36.00(3.46) | 32.06(6.85) |
| Leave School | 31.45(9.52) | 46.00( ) | 32.09(9.78) | 28.00(8.49) | 46.00( ) | 28.75(9.08) | 27.24(9.89) | 46.00( ) | 28.09(10.45) | 29.53(7.86) | 46.00( ) | 30.32(8.46) |
| Unsure/other | 36.01(7.95) | 29.40(8.26) | 35.62(8.07) | 34.89(8.75) | 32.50(8.14) | 34.56(8.66) | 33.88(8.38) | 32.00(6.93) | 33.81(8.30) | 34.79(8.00) | 33.79(6.29) | 34.63(7.73) |

† Mean EMSKS3 scores

## Appendix G: Educational Aspirations: Model Comparisons

The decision to include educational aspirations in the models could be questioned, as the resolve to continue education might be viewed as a function of prior and current attainment rather than a predictor of future performance. Due to the concerns of including education aspirations in the analysis, models were completed with and without this variable and compared. These model comparisons are presented below. Using the measure if PT in any subject during any point in schooling, KS4 Model 1 was calculated for each subject (English, maths, science and mean EMSKS4) including and then excluding the educational aspiration variable. In Tables G.1-G.4, the model is presented first in full and then repeated using the same number of cases but excluding the educational aspiration measure. KS4 English Model 1 is presented below in Table G.1 followed by the maths, science and mean EMSKS4 models in Tables G.2-G.4.

*Table G.1 Estimates for KS4 English Model 1 using PT participation in any subject, including and excluding educational aspirations*

| | KS4 ENGLISH MODEL 1 | | | | KS4 ENGLISH MODEL 1 excluding aspirations | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.03 | (0.03) | <.001 | 1.03 | 1.09 | (0.03) | <.001 | 1.09 |
| Any PT | 1.42 | (0.35) | <.001 | 0.24 | 1.49 | (0.36) | <.001 | 0.25 |
| Female | 1.96 | (0.31) | <.001 | 0.33 | 2.08 | (0.31) | <.001 | 0.35 |
| SEN | -0.96 | (0.54) | .077 | -0.16 | -0.92 | (0.55) | .092 | -0.15 |
| Black | 0.04 | (0.66) | ns | 0.01 | -0.05 | (0.66) | ns | -0.01 |
| Mixed | 0.80 | (0.75) | ns | 0.13 | 1.18 | (0.76) | ns | 0.20 |
| Asian | 0.99 | (0.59) | .091 | 0.17 | 1.48 | (0.59) | .013 | 0.25 |
| SES grp1 | -0.24 | (0.38) | ns | -0.04 | -0.20 | (0.39) | ns | -0.03 |
| SES grp3 | -0.71 | (0.35) | .040 | -0.12 | -0.81 | (0.35) | .021 | -0.14 |
| Homework >1-<5hrs pw | 1.11 | (0.44) | .011 | 0.18 | 1.23 | (0.44) | .005 | 0.20 |
| Homework >=5hrs pw | 1.37 | (0.55) | .013 | 0.23 | 1.69 | (0.56) | .002 | 0.28 |
| English class | 0.62 | (0.32) | .053 | 0.10 | 0.72 | (0.32) | .026 | 0.12 |
| College | -1.65 | (0.39) | <.001 | -0.28 | | | | |
| Apprenticeship | -2.22 | (0.63) | <.001 | -0.37 | | | | |
| Leave School | -3.28 | (0.96) | .001 | -0.55 | | | | |
| Not sure/other | -2.51 | (0.54) | <.001 | -0.42 | | | | |
| Total | 1005 | | | | 1005 | | | |
| $R^2$ | .625 | | | | .617 | | | |

The two models presented in Table G.1 show that including or excluding educational aspirations does not have a substantial impact on the model; the PT estimate is fractionally larger in the model excluding educational aspirations but only by 0.01 of a GCSE grade. For all the other subject models the effect size for PT is the same regardless of including or excluding the educational aspirations variable (see Tables G.2-G.4). In all the other models (apart from maths, Table G.2) the $R^2$ value is larger when educational aspirations are included. The comparison displayed in Table G.2, shows that $R^2$ value fractionally increases when the variables measuring education aspirations are excluded. In this model the estimate for the parent variable increased when educational aspirations were removed. In all the models, the estimate for five or more hours homework per week increased when educational aspirations were removed from the model.

Despite the concerns surrounding the use of this variable, the overall results show that there are no substantial differences between the models. As the data on aspirations was measured prior to the outcome score, and prior attainment has been controlled for in the models, reverse causality is not a serious issue for this analysis. It was therefore decided to include the variables measuring educational aspirations in the final models presented in the results chapters.

*Table G.2 Estimates for KS4 maths Model 1 using PT participation in any subject, including and excluding educational aspirations*

| | KS4 MATHS MODEL 1 | | | | KS4 MATHS MODEL 1 excluding aspirations | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS3 Maths | 1.07 | (0.02) | <.001 | 1.07 | 1.09 | (0.02) | <.001 | 1.09 |
| Any PT | 1.26 | (0.32) | <.001 | 0.21 | 1.27 | (0.32) | <.001 | 0.21 |
| Female | -0.29 | (0.28) | ns | -0.05 | -0.12 | (0.28) | ns | -0.02 |
| SEN | -0.50 | (0.48) | ns | -0.08 | -0.65 | (0.48) | ns | -0.11 |
| Black | 1.29 | (0.59) | .029 | 0.22 | 1.26 | (0.60) | .035 | 0.21 |
| Mixed | -0.13 | (0.68) | ns | -0.02 | 0.04 | (0.69) | ns | 0.01 |
| Asian | 2.48 | (0.53) | <.001 | 0.41 | 2.74 | (0.53) | <.001 | 0.46 |
| SES grp1 | -0.68 | (0.34) | .046 | -0.11 | -0.61 | (0.35) | .078 | -0.10 |
| SES grp3 | -0.32 | (0.31) | ns | -0.05 | -0.47 | (0.31) | ns | -0.08 |
| Parent | 0.97 | (0.29) | .001 | 0.16 | 1.16 | (0.29) | <.001 | 0.19 |
| Homework >1-<5hrs pw | 1.46 | (0.39) | <.001 | 0.24 | 1.52 | (0.39) | <.001 | 0.25 |
| Homework >=5hrs pw | 2.93 | (0.49) | <.001 | 0.49 | 3.11 | (0.49) | <.001 | 0.52 |
| English class | 0.60 | (0.29) | .040 | 0.10 | 0.62 | (0.30) | .037 | 0.10 |
| Science class | 0.83 | (0.36) | .022 | 0.14 | 0.89 | (0.36) | .015 | 0.15 |
| Language class | 0.71 | (0.37) | .055 | 0.12 | 0.83 | (0.37) | .027 | 0.14 |
| College | -0.88 | (0.35) | .012 | -0.15 | | | | |
| Apprenticeship | -2.07 | (0.56) | <.001 | -0.35 | | | | |
| Leave School | -2.59 | (0.83) | .002 | -0.43 | | | | |
| Not sure/other | -1.99 | (0.48) | <.001 | -0.33 | | | | |
| Total | 1019 | | | | 1019 | | | |
| $R^2$ | .699 | | | | .704 | | | |

*Table G.3 Estimates for KS4 science Model 1 using PT participation in any subject, including and excluding educational aspirations*

| | KS4 SCIENCE MODEL 1 | | | | KS4 SCIENCE MODEL 1 excluding aspirations | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.20 | (0.04) | <.001 | 1.20 | 1.23 | (0.03) | <.001 | 1.23 |
| Any PT | 0.73 | (0.38) | .055 | 0.12 | 0.69 | (0.38) | .068 | 0.12 |
| Female | -0.64 | (0.33) | .057 | -0.11 | -0.61 | (0.33) | .064 | -0.10 |
| SEN | 0.66 | (0.58) | ns | 0.11 | 0.76 | (0.58) | ns | 0.13 |
| Black | 0.25 | (0.71) | ns | 0.04 | 0.12 | (0.71) | ns | 0.02 |
| Mixed | 0.39 | (0.81) | ns | 0.06 | 0.61 | (0.81) | ns | 0.10 |
| Asian | 2.19 | (0.63) | .001 | 0.36 | 2.46 | (0.63) | <.001 | 0.41 |
| SES grp1 | 0.35 | (0.41) | ns | 0.06 | 0.42 | (0.41) | ns | 0.07 |
| SES grp3 | -0.91 | (0.37) | .015 | -0.15 | -1.03 | (0.37) | .006 | -0.17 |
| Parent | 0.75 | (0.35) | .033 | 0.12 | 0.88 | (0.35) | .012 | 0.15 |
| Homework >1-<5hrs pw | 0.81 | (0.47) | .082 | 0.14 | 0.95 | (0.47) | .042 | 0.16 |
| Homework >=5hrs pw | 1.89 | (0.59) | .001 | 0.31 | 2.15 | (0.59) | <.001 | 0.36 |
| Science class | 0.84 | (0.43) | .052 | 0.14 | 0.88 | (0.43) | .043 | 0.15 |
| College | -1.09 | (0.42) | .010 | -0.18 | | | | |
| Apprenticeship | -0.66 | (0.67) | ns | -0.11 | | | | |
| Leave School | -3.37 | (1.03) | .001 | -0.56 | | | | |
| Not sure/other | -1.86 | (0.59) | .002 | -0.31 | | | | |
| Total | 1003 | | | | 1003 | | | |
| $R^2$ | .621 | | | | .612 | | | |

*Table G.4 Estimates for mean EMSKS4 Model 1 using PT participation in any subject, including and excluding educational aspirations*

| | M EMSKS4 MODEL 1 | | | | M EMSKS4 MODEL 1 excluding aspirations | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.18 | (0.02) | <.001 | 1.18 | 1.23 | (0.02) | <.001 | 1.23 |
| Any PT | 0.91 | (0.25) | <.001 | 0.15 | 0.89 | (0.26) | .001 | 0.15 |
| Female | 0.11 | (0.22) | ns | 0.02 | 0.20 | (0.22) | ns | 0.03 |
| SEN | -0.60 | (0.39) | ns | -0.10 | -0.55 | (0.40) | ns | -0.09 |
| Black | 0.23 | (0.47) | ns | 0.04 | 0.24 | (0.48) | ns | 0.04 |
| Mixed | 0.60 | (0.54) | ns | 0.10 | 0.79 | (0.56) | ns | 0.13 |
| Asian | 2.09 | (0.42) | <.001 | 0.35 | 2.39 | (0.43) | <.001 | 0.40 |
| SES grp1 | -0.24 | (0.27) | ns | -0.04 | -0.19 | (0.28) | ns | -0.03 |
| SES grp3 | -0.58 | (0.25) | .021 | -0.10 | -0.74 | (0.26) | .004 | -0.12 |
| Parent | 0.76 | (0.23) | .001 | 0.13 | 0.90 | (0.24) | <.001 | 0.15 |
| Homework >1-<5hrs pw | 1.21 | (0.31) | <.001 | 0.20 | 1.40 | (0.32) | <.001 | 0.23 |
| Homework >=5hrs pw | 2.14 | (0.40) | <.001 | 0.36 | 2.45 | (0.40) | <.001 | 0.41 |
| English class | 0.54 | (0.23) | .019 | 0.09 | 0.59 | (0.24) | .012 | 0.10 |
| College | -1.16 | (0.28) | <.001 | -0.19 | | | | |
| Apprenticeship | -1.85 | (0.45) | <.001 | -0.31 | | | | |
| Leave School | -2.88 | (0.69) | <.001 | -0.48 | | | | |
| Not sure/other | -1.75 | (0.39) | <.001 | -0.29 | | | | |
| Total | 1002 | | | | 1002 | | | |
| $R^2$ | .718 | | | | .716 | | | |

# Appendix H: Parent/Student Comparison

Due to the problematic and sometimes unreliable nature of collecting data on PT, responses regarding PT participation from parents and students were compared. Table H.1 and H.2 show the discrepancies between the responses. In Table H.1 the student responses to the question asking about any PT participation are compared against the responses provided by the parents. However, in the parent questionnaire, participants were specifically asked about PT during years 10-11 (for the Y11 sample) and years 5-6 (for Y6). To make a more accurate comparison Table H.2 compared the responses of students indicating participation during years 10 and 11 and 5 and 6 with the parent responses. For around 80% of responses there was no discrepancy between the parent and student; however the largest discrepancy existed between students who stated they had received PT and parents who indicated the student had not.

*Table H.1 Discrepancies between parent and student responses on PT participation*

| | | Y6 | | Y11 | |
|---|---|---|---|---|---|
| | | *n* | % | *n* | % |
| No Discrepancy | | 386 | 83.9 | 280 | 80 |
| Parent: Yes PT | Student No PT | 11 | 2.4 | 5 | 1.4 |
| | Student don't know | 0 | 0 | 1 | 0.3 |
| | Student missing | 1 | 0.2 | 3 | 0.9 |
| Parent: No PT | Student Yes to PT | 36 | 7.8 | 45 | 12.9 |
| | Student don't know | 8 | 1.7 | 4 | 1.1 |
| | Student missing | 17 | 3.7 | 10 | 2.9 |
| Parent Q returned but PT missing & student no | | 1 | 0.2 | 2 | 0.6 |
| Total | | 460 | 100 | 350 | 100 |

Due to the number of discrepancies in the sample, an additional analysis was run to compare the effect of PT on achievement according to the response of the student and parent. The models included only students who had valid PT information and valid parent information. Mean EMSKS2 and EMSKS4 score was modelled with the student response to PT participation during years 5 and 6 (for Y6) and years 10 and 11 (for Y11). These models were then repeated replacing the PT variable with the parent response to the same question (see Table H.3). The results found that the estimates for PT were smaller for the parent response in both the Y6 and Y11 samples. However, for these students the effect of PT during years 5 and 6 (or 10 and 11 for Y11) was not significant in any of the models in this comparison.

*Table H.2 Discrepancies between parent and student responses on PT in past 2 years*

| | Y6<br>n | Y6<br>% | Y11<br>n | Y11<br>% |
|---|---|---|---|---|
| No discrepancy | 366 | 79.6 | 277 | 79.1 |
| | | | | |
| Parent: Yes PT | | | | |
| Student No to PT during years 5 & 6/10 & 11 | 11 | 2.4 | 5 | 1.4 |
| Student don't know | 0 | 0 | 1 | 0.3 |
| Student yes to PT but missing duration info | 7 | 1.5 | 2 | 0.6 |
| Student yes but to PT only before yr 5/yr 10 | 13 | 2.8 | 1 | 0.3 |
| Student PT info missing | 1 | 0.2 | 3 | 0.9 |
| Parent: No PT | | | | |
| Student Yes to PT during years 5 & 6/10 & 11 | 19 | 4.1 | 15 | 4.3 |
| Student don't know | 8 | 1.7 | 4 | 1.1 |
| Student yes to PT but missing duration info | 4 | 0.9 | 1 | 0.3 |
| Student yes but to PT only before yr 5/yr 10 | 13 | 2.8 | 29 | 8.3 |
| Student PT info missing | 17 | 3.7 | 10 | 2.9 |
| Parent PT missing, student answered no to PT | 1 | 0.2 | 2 | 0.6 |
| Total (Total of full sample) | 460 | 100<br>(36.7) | 350 | 100<br>(28.8) |

*Table H.3 Estimates for mean EMSKS2 Model 4 measuring PT participation during yrs 5 and 6, comparing the parent and student response on PT participation*

| | KS2 MEAN STUDENT RESPONSE | | | | KS2 MEAN PARENT RESPONSE | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1 APS | 0.77 | (0.04) | <.001 | 0.13 | 0.77 | (0.04) | <.001 | 0.13 |
| **PT yrs5 & 6** | **0.35** | **(0.26)** | **ns** | **0.06** | **0.23** | **(0.26)** | **ns** | **0.04** |
| Female | -0.47 | (0.20) | .019 | -0.08 | -0.46 | (0.20) | .021 | -0.08 |
| SEN | -0.35 | (0.40) | ns | -0.06 | -0.37 | (0.40) | ns | -0.06 |
| Black | -0.27 | (0.57) | ns | -0.05 | -0.27 | (0.57) | ns | -0.04 |
| Mixed | 0.30 | (0.45) | ns | 0.05 | 0.35 | (0.45) | ns | 0.06 |
| Asian (exc) | 1.00 | (0.61) | .100 | 0.17 | 1.04 | (0.61) | .089 | 0.17 |
| Pakistani | -0.03 | (0.61) | ns | -0.01 | -0.04 | (0.61) | ns | -0.01 |
| HPI grp1 | 0.33 | (0.25) | ns | 0.05 | 0.38 | (0.24) | ns | 0.06 |
| HPI grp3 | -0.42 | (0.29) | ns | -0.07 | -0.41 | (0.29) | ns | -0.07 |
| Music | 0.59 | (0.23) | .010 | 0.10 | 0.60 | (0.23) | .009 | 0.10 |
| Homework>5 hrs | 0.26 | (0.41) | ns | 0.04 | 0.26 | (0.41) | ns | 0.04 |
| | | | | | | | | |
| Total | 350 | | | | 350 | | | |
| $R^2$ | 0.63 | | | | 0.63 | | | |

| | KS4 MEAN STUDENT RESPONSE | | | | KS4 MEAN PARENT RESPONSE | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.20 | (0.05) | <.001 | 0.20 | 1.19 | (0.05) | <.001 | 0.20 |
| **PT yrs 10 & 11** | **0.81** | **(0.52)** | **ns** | **0.13** | **0.44** | **(0.55)** | **ns** | **0.07** |
| Female | 0.78 | (0.42) | .066 | 0.13 | 0.75 | (0.42) | .079 | 0.12 |
| SEN | 0.36 | (0.80) | ns | 0.06 | 0.32 | (0.80) | ns | 0.05 |
| Black | 1.47 | (1.03) | ns | 0.24 | 1.50 | (1.03) | ns | 0.25 |
| Mixed | 0.24 | (1.43) | ns | 0.04 | -0.02 | (1.42) | ns | 0.00 |
| Asian | 0.75 | (0.99) | ns | 0.13 | 0.90 | (0.99) | ns | 0.15 |
| HPI grp1 | 0.23 | (0.47) | ns | 0.04 | 0.29 | (0.47) | ns | 0.05 |
| HPI grp3 | -0.24 | (0.54) | ns | -0.04 | -0.22 | (0.54) | ns | -0.04 |
| Homework >1-5 hrs pw | 0.41 | (0.72) | ns | 0.07 | 0.38 | (0.72) | ns | 0.06 |
| Homework >=5hrs pw | 1.09 | (0.82) | ns | 0.18 | 1.10 | (0.82) | ns | 0.18 |
| English class | 0.64 | (0.45) | ns | 0.11 | 0.74 | (0.45) | .099 | 0.12 |
| College | -0.59 | (0.58) | ns | -0.10 | -0.60 | (0.58) | ns | -0.10 |
| Apprenticeship | -2.57 | (1.14) | .025 | -0.43 | -2.54 | (1.14) | .027 | -0.42 |
| Leave School | -3.65 | (2.46) | ns | -0.61 | -3.68 | (2.46) | ns | -0.61 |
| Not sure/other | -2.83 | (0.91) | .002 | -0.47 | -2.77 | (0.91) | .003 | -0.46 |
| | | | | | | | | |
| Total | 297 | | | | 297 | | | |
| $R^2$ | 0.73 | | | | 0.73 | | | |

# Appendix J: Focus Group Card Ranking Activities

This section includes the activities incorporated into the tutor focus groups.

Think about the three most effective techniques used by tutors, please can you give examples within your tutoring experience.

a) My tutor goes through test papers
b) My tutor repeats things so I can remember them
c) Having a tutor makes learning more fun
d) Tutors explain things that I do not understand at school in more detail and at my level
e) My tutor adapts to my needs
f) You can ask them any questions
g) You get more work done and learn at a quicker pace than at school
h) Having a tutor gives me someone to talk to
i) Having a tutor helps me plan and prioritise my work
j) My tutor cares about my learning
k) My tutor helps me see the relevance of the subject

How do you think effective tutoring can be measured? Please rank these evaluation measures in order of importance. Can you think of any additional evaluation strategies?

a) Exam results (GCSE, KS3, KS2, 11 plus, A level, obtaining places in school/university)
b) Feedback from parent
c) Number of hours tuition per client (sustained relationship)
d) Number/variety of different clients / amount of experience
e) Tutors' knowledge of subject
f) Tutors' knowledge of exam board syllabus', curriculum targets & school entry exam requirements
g) Tutors' qualifications
h) Personal attributes of tutor (enthusiasm for the subject, dynamism)
i) Level of tutees' confidence with the subject
j) Adaptability to the needs of the student
k) Interpersonal skills, relationship with pupils (& parents)
l) Feedback from student
m) Ability to show the relevance of the subject

# Appendix K: Focus Group Questions

INTRODUCTION: Discussion about focus group aims. Introductions from each tutor (name, subject(s) tutored, years and experience of tutoring, age of tutees).

*NOTE: it is important that I hear from a range of experiences and would like to hear all of your opinions, however if you disagree with a voiced viewpoint, then it is important for you to make your disagreement known*

*Acknowledge at this point that we will be discussing the effectiveness of tutoring and different styles etc. Clearly the subject, age and reason for seeking tutoring determines certain styles and methods, but the things that are consistent is what we will be focussing on.*

*******************************************************************

ACTIVITY
You have all been given five pieces of card. I would like you to take a few minutes to think about the top 5 things that you think make an effective tutor.

Show OHP and layout statements (see Appendix J)

Some of these statements have been taken from a questionnaire given to students about private tuition. I would like you to think about what are the three most effective practices used by tutors; please can you give examples within your tutoring experience.

You can try and come up with a consensus, but if you have different opinions, please feel free to voice them and choose those you feel are most appropriate.
*******************************************************************

CONTENT
Do you determine the work covered in the tutoring session or does the tutee bring work to the session which you explain? (Preparing tasks, past papers etc)
Which do you prefer?
In your opinion what is the most effective way of introducing a new topic?

MOTIVATION
Does the reason behind seeking tutoring determine the tutoring style/methods?
PARENTS
How much of a role do parents play in the tutoring process?
How much do parents determine the material covered?

SELF EXPLAINING
Do you ask children to explain their thinking processes to you when they are working out a problem?
Do you see this as an important part of the tutoring process?

ERROR CORRECTION/SCAFFOLDING
Are you aware of responding differently to different kinds of errors?
When is it important to correct errors and when is it important to delay the correction? – can you provide examples of this
How much effort is put into finding out the level of a child's understanding?

How is diagnosis attempted?
How successful would you consider yourself to be at detecting error in students' understanding?

AGE
To what extent does the age of the child determine the style and methods used in the tutoring session?

STYLE
Do you adapt different styles for different tutees and their preferred learning style?
How much does your teaching style differ/stay the same for different tasks and different students?

***TIMING start this activity at 2:45 at the latest!***

How do you think effective practice can be evaluated?
******************************************************************
ACTIVITY

Switch on OHP and lay out statements (see Appendix J).
Ask Participants to rank statements according to what they consider the most effective mode of evaluation
******************************************************************

# Appendix L: Pilot Focus Group Coding

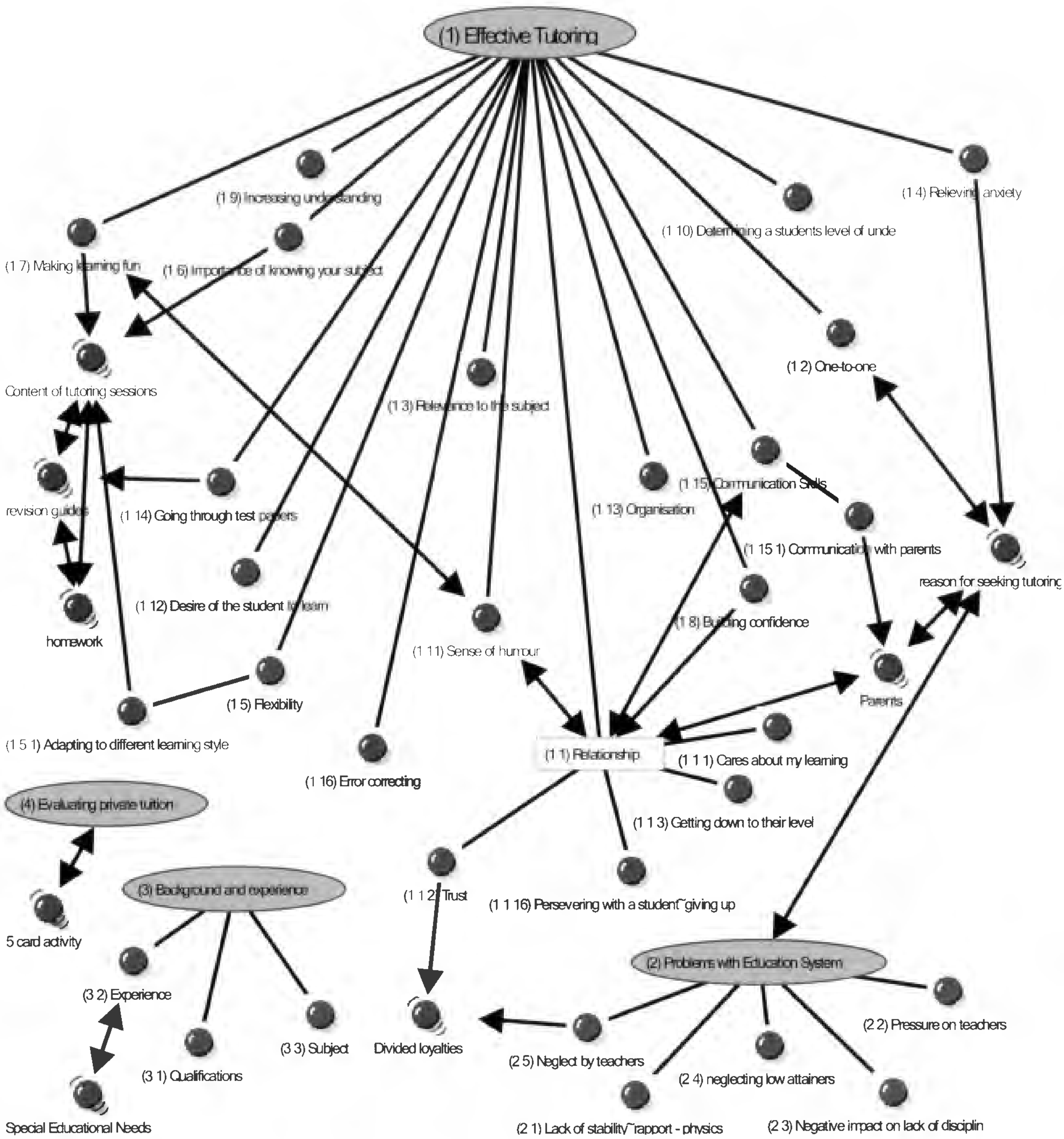
The following list was produced as a result of coding the pilot focus group:

(1) /Effective Tutoring
(1,1) /Effective Tutoring/Relationship
(1,1,1) /Effective Tutoring/Relationship/Cares about my learning
(1,1,2) /Effective Tutoring/Relationship/Trust
(1,1,3) /Effective Tutoring/Relationship/Getting down to their level
(1,1,4) /Effective Tutoring/Relationship/Persevering with a student versus giving up
(1,2) /Effective Tutoring/One-to-one
(1,3) /Effective Tutoring/Relevance to the subject
(1,4) /Effective Tutoring/Relieving anxiety
(1,5) /Effective Tutoring/Importance of knowing your subject
(1,6) /Effective Tutoring/Flexibility
(1,6,1) /Effective Tutoring/Flexibility/Adapting to different learning style
(1,7) /Effective Tutoring/Making learning fun
(1,8) /Effective Tutoring/Building confidence
(1,9) /Effective Tutoring/Increasing understanding
(1,10) /Effective Tutoring/Task management -Determining students level of understanding
(1,11) /Effective Tutoring/Sense of humour
(1,12) /Effective Tutoring/Motivation- desire of the student to learn
(1,13) /Effective Tutoring/Organisation
(1,14) /Effective Tutoring/Going through test papers
(1,15) /Effective Tutoring/Communication Skills
(1,15,1) /Effective Tutoring/Communication Skills/Communication with parents
(1,16) /Effective Tutoring/Error correcting
(2) /Problems with Education System
(2,1) /Problems with Education System/Lack of stability - physics
(2,2) /Problems with Education System/Pressure on teachers
(2,3) /Problems with Education System/Negative impact of lack of discipline
(2,4) /Problems with Education System/neglecting low attainers
(2,5) /Problems with Education System/Neglect by teachers
(3) /Background and experience
(3,1) /Background and experience/Qualifications
(3,2) /Background and experience/Experience
(3,3) /Background and experience/Subject
(4) /Evaluating private tuition

Additional free nodes

1 5 card activity
2 Content of tutoring sessions
3 Divided loyalties
4 Homework
5 Parents
6 reason for seeking tutoring
7 revision guides
8 Special Educational Needs
9 Things to change/be aware of for next focus group

*Figure L.1 Pilot focus group themes*



# Appendix M: Fieldwork Letters

Dear [Tutor]

**REF: Focus group [Date]**

I am contacting you regarding the above mentioned focus group. I would like to take this opportunity to thank you for agreeing to participate. The discussion will be invaluable to my doctoral research at the Institute of Education and I hope an interesting experience for all those involved.

The focus group will be held in the function room at the Basingstoke Canal Authority Canal Centre. Address:

Please see the enclosed for map and directions. Travel expense claim forms will be available at the focus group for you to claim any expenses incurred. Please keep any travel receipts and tickets, or if you are travelling by car, please keep a record of your mileage. Tea, coffee and a sandwich lunch will be provided and available on arrival at 12:45. The focus group will start at 1pm and will finish by 3pm at the latest.

Discussion will focus on your experience of tutoring. The questions will ask you to reflect on your practice as a tutor and what you have learnt about making tutoring effective. Discussion will also cover how effective tutoring can be measured. The focus group will be recorded to aid transcription.

If you require any more information, have any questions or unable to attend, please contact me on [] or via email [ ]. If you need to contact me on the day of the focus group (for directions or if you are delayed) please call me on [].

Thank you again for agreeing to participate, I look forward to meeting you.

Yours sincerely

Katie Rushforth
Doctoral Student

Dear Focus group participants,

Apologies for the delay, please click on the link below to view the online questionnaire:

[ ]

I realise you are all very busy and may not have time to look through the questionnaire. The focus group will concentrate on Sections 4, 8 and 9 so if you are pressed for time please just review these sections. To move through the sections scroll to the bottom and click on next. I am particularly interested to find out what you think about Section 8 questions 3, 4 and 5, Do these questions make sense to you as tutors? Are they difficult to answer? If you do manage to find some time to review the questionnaire, please keep the questions below in mind and bring your thoughts with you to the focus group on Friday.

You don't need to worry about answering the questionnaire I would like you to think about how you would answer the questions. However, please feel free to complete the questionnaire if it helps you to evaluate the questions.

In your opinion do the questions cover what happens during a tutoring session?
Do you think the questions give ample opportunity to measure different types of tutoring for different learning needs?
Do you think the questionnaire adequately covers the different skills required for effective tutoring?
Does the questionnaire give you opportunity to express the things you do which you think are effective in raising achievement?
Is it too long/short?
Are the questions easy to understand?

Section 5 and Section 6 repeat the questions in Section 4 asking each tutor to include up to 3 examples of students they tutor.

Thank you for your help. I'm looking forward to meeting you all on Friday. Please enter Thomas Coram Research Unit at number 27 where reception staff will be able to help you gain entry to the building. If anyone has any problems or questions please email me, or call me on [].

Best wishes

Katie Rushforth

[ ]
[ ]

Dear [Tutor]

I am currently collecting information for the **Private Tuition Project**, a doctoral research project being completed at the **Institute of Education** and funded by the **ESRC** (Economic and Social Research Council). The main focus of the research is looking at different aspects of tutoring from both tutors' and pupils' perspectives.

My research was recently mentioned on Radio 4's Learning Curve programme and as a result several tutors and agencies have contacted me wanting to participate in the study. I am anxious to get more tutors involved as this will enable me to draw more powerful and valid conclusions.

At a time when 27% of students in years 6, 11 and 13 reported having a private tutor, there is very little research on effectiveness and quality issues surrounding private tuition within the unregulated UK market, (Ireson and Rushforth, 2005). I propose to explore what transpires in the tutoring relationship that is effective in raising achievement from both the tutors' and pupils' perspectives.

If you would like to be part of this study please complete the tutor questionnaire by clicking on the link below. Research of this kind has never been completed in the UK and your participation would be greatly appreciated.
[SurveyLink]
The questionnaire will take approximately 20 mins and can be completed in stages by clicking 'exit the survey' at the top right hand side of the screen, all your answers will be saved. To return to the questionnaire click again on the link and you will return to the place where you exited.

Please see the project website for more details [ ] and contact me if you have any questions or require further information.

I hope that you will take the time to complete the questionnaire providing an invaluable contribution to my doctoral research. I would like to take this opportunity to wish you a Merry Christmas and Happy New Year.

Best wishes,

Katie Rushforth
Please Note: If you would prefer not to make a contribution to this research project please click here [RemoveLink]

Dear [Tutor]

**REF: Private Tuition Project**

Thank you for completing the questionnaire as part of the Private Tuition Project, your answers were very interesting and have made an invaluable contribution to my research. I would also like to thank you for agreeing to distribute the student questionnaire to your tutees.

Enclosed are X envelopes. Each envelope contains an explanation sheet, questionnaire and freepost envelope for the student to return the completed document to the Institute of Education.

If it would be more convenient there is an online version of the questionnaire on the student page of the project website: [ ]. If you think your student(s) would prefer to complete an online version please forward this link.

Thank you very much for your participation in the project thus far.

Best wishes for the new school year.

Katie Rushforth

# Appendix N: Tutor Questionnaire

The following questions were taken from the tutor questionnaire and used in the analysis



Private Tuition Project

Gathering tutors' and students' views

## Private Tuition Questionnaire

I am currently collecting information for a doctoral research project being completed at the **Institute of Education, University of London** and funded by the ESRC. The main focus of the research is looking at different aspects of tutoring exploring what transpires in the tutoring relationship that is effective in raising achievement from both the tutors' and pupils' perspectives.

Research of this kind has never been completed in the UK and your participation would be greatly appreciated. To encourage a high response rate, all tutors who complete and return this questionnaire will be entered into a **free prize draw** for a chance to win 1 of 5 £15 vouchers of your choice (HMV, Amazon, Sainsbury's, VUE etc). There are 9 sections that should not take longer than 20 mins to complete. A freepost envelope has been included for you to return the completed questionnaire. If you would prefer to complete the questionnaire online please visit the project website www.privatetuition.org.uk and select the tutor questionnaire tab. The questionnaire is aimed at tutors who work with school and college age children for which tutoring is supplementary to schooling. For more information please visit the project website.

**All Information provided will be treated as strictly confidential and will be used solely for the purpose of this research project conforming to all aspects of the 1998 Data Protection Act.** At the end of the questionnaire space has been provided for any comments and additional information you wish to include about the questions asked. Thank you for your participation.

Katie Rushforth

## 1 You and your qualifications

**1.1 Please can you tick all the qualifications you have:**

- ☐ GCSE maths A*-C or equivalent
- ☐ GCSE English A*-C or equivalent
- ☐ GCSE science A*-C or equivalent
- ☐ A level(s)/equivalent
- ☐ *Currently studying at undergraduate level*
- ☐ University undergraduate degree (BSc, BA etc)
- ☐ PGCE, Cert Ed, BEd or equivalent
- ☐ *Currently studying at postgraduate level*
- ☐ Masters Degree (MA, MSc etc)
- ☐ Postgraduate Degree (EdD, MPhil, PhD)
- ☐ Other (please specify)

**1.2 Have you received specific training to work one-to-one with pupils e.g. provided by a tutoring agency, INSET etc.?**

- ☐ No **- Please move on to question 1.5**
- ☐ Yes - Please answer the next question

**1.3 If yes, please indicate the total number of hours spent training.**

Approx no. of hours:

**1.4 If yes,please briefly summarise the content of the training session(s) you have participated in.**

**1.5 How old are you?**

| 16 years or below | 17-19 years | 20-25 years | 26-30 years | 31-40 years | 41-50 years | 51-60 years | Over 60 years | I'd rather not specify |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**1.6 Are you male or female?**

Male ☐ Female ☐

**1.7 Which of these groups do you consider you belong to?**

- ☐ WHITE: of any European origin
- ☐ WHITE: of other origin (please specify below)
- ☐ BLACK: of African origin
- ☐ BLACK: of Caribbean origin
- ☐ BLACK: of other origin (please specify below)
- ☐ ASIAN: of Indian origin
- ☐ ASIAN: of Pakistani origin
- ☐ ASIAN: of Bangladeshi origin
- ☐ ASIAN: of Chinese origin
- ☐ ASIAN: of other origin (please specify below)
- ☐ MIXED ORIGIN (please specify below)
- ☐ OTHER (please specify below)
- ☐ I'd rather not specify

**Please specify:** ____________________

## 2 Your tutoring experience

These questions ask about your tutoring experience

**2.1 During term time how many hours per week do you usually spend tutoring?**

Average no of hours per week: ☐

**2.2 Excluding times when you have not been actively tutoring, approximately how many years have you been a tutor?**

| Less than 1 yr | Between 1 yr to 2 yrs | Between 2 yrs to 5 yrs | Between 5 yrs to 10 yrs | Between 10 yrs to 20 yrs | More than 20 yrs |
|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**2.3 Please can you state approximately how many students you have tutored.**

1-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ More than 20 ☐

**2.4 Do you currently, or have you ever been involved in tutoring a student who is home-schooled?**

Yes ☐ No ☐

**2.5 Please list the subject(s) that you tutor and the level at which you teach.**

E.g.; Biology at Secondary to GCSE (or equivalent)

| | **Subject (e.g. Biology)** | **Level (e.g. Secondary to GCSE, or equivalent)** |
|---|---|---|
| **Subject 1** | | |
| **Subject 2** | | |
| **Subject 3** | | |
| **Subject 4** | | |
| **Subject 5** | | |

**2.6 Do you feel you are an effective tutor? Please explain your answer.**

## 3 Example: Student 1

This section asks questions concerning one specific student you are currently tutoring or have recently tutored. If you have recently begun tutoring a new student, if possible please select a student you worked with in the 2006-2007 academic year. As this research is focussing on school age children who have tutoring on a supplementary basis to schooling, please select one of your pupils who falls into this category.

**3.1 Please indicate the gender of Student 1**

Male ☐ Female ☐

**3.2 Please indicate the age of student 1**

| 4-6 years | 7-10 years | 11-13 years | 14-16 years | 17-19 years | 20-25 years | 26-30 years | 31-40 years | 41-50 years | 51-60 years | 60+ years |
|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**3.3 Does this student attend a:**

- ☐ State maintained Primary or Secondary School,
- ☐ Private Primary or Secondary School,
- ☐ State maintained College/Sixth Form/FE College,
- ☐ Private College/Sixth Form/FE College
- ☐ Special school or unit,
- ☐ University,
- ☐ Student has been excluded from school,
- ☐ Student is home schooled,
- ☐ or other (please specify)?

**3.4 Please indicate how this student is tutored**

- ☐ On a one-to-one basis face to face
- ☐ On a one-to-one basis electronically
- ☐ In a small group
- ☐ Other (please specify)

**3.5 During term time how many hours do you usually spend tutoring Student 1?**

Average no of hours per week with Student 1:

3.6 **Approximately how long have you tutored Student 1?**

- ☐ **Half a term** or less
- ☐ **Half a term** to **1 term**
- ☐ More than **1 term** to **2 terms**
- ☐ more than **2 terms** to **3 terms**
- ☐ more than **1 year** to **18 months**
- ☐ more than **18 months** to **2 years**
- ☐ more than **2 years** to **3 years**
- ☐ more than **3 years**

3.7 **Please list the subjects you tutor for student 1 and the level at which you teach.**

| | Subject (e.g. Biology) | Level (e.g. Secondary to GCSE, or equivalent) |
|---|---|---|
| **Subject 1** | | |
| **Subject 2** | | |
| **Subject 3** | | |
| **Subject 4** | | |
| **Subject 5** | | |

3.8 **Please indicate the main 3 reasons why you were employed to tutor this student. Please number your reasons in order of priority (1 being the highest – 3 being the lowest. If there were less than 3 reasons please leave the remainder blank.)**

| Reasons | Priority |
|---|---|
| To improve understanding of the subject | |
| To increase the students self confidence | |
| To help the student achieve the top examination grades | |
| To stretch the student beyond school requirements | |
| The student requested it | |
| The parent(s) requested it | |
| The school did not provide the subject | |
| The school suggested getting a tutor | |
| The school does not provide enough help | |
| The student needed help with organisation of work | |
| To catch up due to extended illness | |
| The student has additional learning needs (SEN) | |
| To prepare the student to pass a forthcoming examination | |
| To help the student pass the 11 plus examination | |
| To help ensure the student passes an entrance examination | |
| The student was struggling to keep up in this subject at school | |
| To increase the amount of time s/he spends on studying | |
| This student is home schooled | |
| Other (Please specify below) | |

3.9 **If you used Other in question 8 above please specify;**

| |
|---|
| |

**3.10 Please include the predicted or actual grade for Student 1 in the subject(s) you tutor before you started tutoring this student. If this is not applicable please leave this blank and comment about Student 1's achievement in question 3.11.**

**3.11 Do you think your efforts as a tutor have made an impact on this student's achievement? Please explain your answer.**

## 4 The tutoring session

These questions focus on what happens during tutoring sessions. They are not asking about a specific student but require you to reflect on your tutoring experience in general.

**4.1 Speaking generally about your tutoring experience, what do you consider as an effective strategy for increasing a student's confidence in the subject(s) you tutor?**

**4.2 How do you usually ascertain a student's level of knowledge and understanding? Please tick the appropriate box to indicate how often you use each method.**

| | Often | Sometimes | Rarely | Never | N/A |
|---|---|---|---|---|---|
| Ask questions and discuss verbally with the student | ☐ | ☐ | ☐ | ☐ | ☐ |
| Look at work previously completed by the student | ☐ | ☐ | ☐ | ☐ | ☐ |
| Set the student a test | ☐ | ☐ | ☐ | ☐ | ☐ |
| Set the student homework | ☐ | ☐ | ☐ | ☐ | ☐ |
| Work through a problem with the student | ☐ | ☐ | ☐ | ☐ | ☐ |

**4.3 Do you use any other method to ascertain a student's level of understanding? Please specify.**

**4.4** **Speaking generally about your tutoring experience, what do you consider as your most effective strategy for helping students gain and recall new information.**

**4.5** **Speaking generally about your tutoring experience, what do you consider as your most effective strategy for helping students to think for themselves?**

## 5 Evaluation

These questions ask about how you think tutoring is best evaluated

**5.1** **Please think about a tutoring session that went particularly well. What factors made this a beneficial learning experience for your tutee?**

5.2 **Now think about how you evaluate your tutoring performance more generally. Please rank your 3 most important evaluation indicators in order of priority with 1 being the most important**

| Rank | Evaluation Indicator |
|---|---|
| | This student is more willing to tackle new work |
| | When faced with a difficulty the student is less likely to give up |
| | The grade increase from predicted to actual examination results |
| | Examination results achieved |
| | Passing an entrance exam |
| | Passing the 11plus |
| | Obtaining a place at university |
| | Feedback from student |
| | Feedback from parent |
| | Being recommended to teach another student |
| | Other |

5.3 **Please explain your answer to question 5.2 and include any additional evaluation indicators you consider appropriate for measuring effective tutoring.**

5.4 **Please can you state 3 skills/qualities/attributes that you think make an effective tutor**

| | |
|---|---|
| **1** | |
| **2** | |
| **3** | |

5.5 **Think about an experience you had with a student which didn't work out as well as you would have liked. In your opinion what were the reasons for this?**

## 6 Student Participation

This research is focussing on collecting tutors' and students' views. It would be greatly appreciated if you could ask your student(s) to complete a survey.

**6.1 Would you be happy for your student(s) to complete a questionnaire about tutoring? This would involve you being sent copies of the questionnaire which you would then pass on to your student(s (postage would be provided). Your student(s) can then decide if they would like to complete the questionnaire or not.**

☐ Yes

☐ No

**6.2 If yes, please include your address or phone number so arrangements can be made for postage. All information will be kept strictly confidential and used only for the purpose stated above.**

Name

Number of questionnaires required

Address / Phone no. to arrange delivery of questionnaire(s)

## 7 Thank you

Thank you very much for completing this questionnaire. I appreciate your time and the information you provided. If you have not already included your contact details in the questionnaire, please leave your email address, phone number or postal address below to ensure you can be contacted if you win the **free prize draw**.

Please check the website for results, news and research reports www.privatetuition.org.uk. **If you have any questions please call 020 7911 5517 or email k.rushforth@ioe.ac.uk**. If you would like to receive a copy of the project report please indicate below.
**Katie Rushforth**

☐ **I would like to receive a copy of the project report**

Email/Postal Address where the report can be sent (if not included above):

**Please include any additional information that might be relevant for this research project, or any comments you have about the questions asked. Please also use this space for any answers to questions where you found space was limited.**

# Appendix P: Student Questionnaire

The following questions were taken from the student questionnaire and used in the analysis

Private Tuition Project

Gathering tutors' and students' views

## Student Private Tuition Questionnaire

Thank you for taking the time to complete this survey. There are 5 main sections that should not take longer than 15 mins to finish. This questionnaire is about the tutoring you have had in school subjects, **excluding musical instrument tuition**. For more information about the research project please visit **www.privatetuition.org.uk**. If you would prefer to complete this questionnaire online, please visit the project website and click on the student questionnaire tab.

If you have difficulty reading or understanding the questions, please complete this questionnaire with the help of an adult.

All students who complete this questionnaire will be entered into a **free prize draw** to win £30 of HMV CD/DVD vouchers. Please remember to leave a contact telephone number or email address at the end of the questionnaire to ensure you can be contacted if you win the vouchers.

**All Information provided will be treated as strictly private and will be used purely for research purposes.**

## 1 You and your experience of tutoring

These questions ask about you and your experience of tutoring

**1.1 Are you male or female?**

Male ☐ Female ☐

**1.2 How old are you?**

☐ 4-6 years ☐ 14-16 years ☐ 26-30 years ☐ 51-60 years
☐ 7-10 years ☐ 17-19 years ☐ 31-40 years ☐ over 60 years
☐ 11-13 years ☐ 20-25 years ☐ 41-50 years

**1.3 Which of these groups do you consider you belong to?**

☐ WHITE: of any European origin
☐ WHITE: of other origin (please specify below)
☐ BLACK: of Caribbean origin
☐ BLACK: of other origin (please specify below)
☐ ASIAN: of Indian origin
☐ ASIAN: of Pakistani origin
☐ ASIAN: of Bangladeshi origin
☐ ASIAN: of Chinese origin
☐ ASIAN: of other origin (please specify below)
☐ MIXED ORIGIN (please specify below)
☐ OTHER (please specify below)

**1.4 Do you currently attend a:**

☐ State maintained Primary or Secondary School
☐ Private Primary or Secondary School
☐ State maintained College/Sixth Form/FE College
☐ Private College/Sixth Form/FE College
☐ Special school or unit
☐ University
☐ I have been excluded from school
☐ I am home schooled
☐ or other (please specify)?

**1.5 Have you ever been home schooled (taught just at home without attending school)?**

Yes ☐ No ☐

**1.6 At present on average how many hours per week during term time are you tutored?**

☐ I don't have a tutor ☐ 1 hour ☐ 3 hours ☐ 5 hours
☐ less than 1 hour ☐ 2 hours ☐ 4 hours ☐ more than 5 hours

**1.7 Please can you mark below any school years for which you have had tutoring. E.g. if I was in year 10 and having tutoring now and I had also been tutored in year 5, I would tick year 10 and year 5.**

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**1.8 How many different tutors have ever worked with you?**

| 0 | 1 | 2 | 3 | 4 | 5 | More than 5 |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**1.9 Please list all the subject(s) (eg; Maths) that you have ever been tutored in.**

## 2 About your current tutor

This section asks questions about your current tutor. If you currently have more than one tutor, please answer the questions about just one tutor. If you do not currently have a tutor please answer the questions about a tutor you had recently.

**2.1 Is your tutor male or female?**

Male ☐ Female ☐

**2.2 Please indicate how you are tutored.**

☐ On a one-to-one basis face to face ☐ In a small group ☐ On a one-to-one basis electronically
☐ Other (please specify)

**2.3 At present how many hours per week during term time do you usually spend with this tutor?**

| Less than 1 hour | 1 hour | 2 hours | 3 hours | 4 hours | 5 hours | more than 5 hours |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**2.4 How long have you been working with this tutor?**

☐ Less than 1 term ☐ 2 terms ☐ 1 year to 18 months ☐ 2 years to 3 years
☐ 1 term ☐ 3 terms ☐ 18 months to 2 years ☐ more than 3 years

**2.5 Please list the subjects for which you are currently tutored by this tutor.**

| | Subject (eg. Maths or English Literature) |
|---|---|
| Subject 1 | |
| Subject 2 | |
| Subject 3 | |
| Subject 4 | |
| Subject 5 | |

**2.6 Please indicate the main 3 reasons why you have a tutor. Please number your reasons in order of priority (1 being the highest – 3 being the lowest).**

| **Reasons** | **Priority** |
|---|---|
| To improve my understanding of the subject | |
| To increase my confidence in the subject | |
| To help me achieve top examination grades | |
| I wanted a tutor | |
| My parent(s)/carer wanted me to have a tutor | |
| The school did not provide the subject I wanted to take | |
| The school suggested I got a tutor | |
| I am home schooled | |
| My school does not provide enough help | |
| I need help organising my work | |
| To catch up due to extended illness | |
| To help me because I am dyslexic | |
| I need help to pass a forthcoming examination | |
| I need a tutor to help me pass the 11 plus exam | |
| I have difficulty with spoken language, spelling, reading or writing | |
| To increase the amount of time I spend studying | |
| To get more work done than I do at school | |
| Other (Please specify below) | |

**2.7 If you used other in question 2.6 please specify. Other (please specify)**

| |
|---|
| |

**2.8 Thinking about your tutoring sessions with this tutor, how often do you do the following? Please read the following statements carefully and tick the appropriate box.**

| | Every session | Most sessions | Some sessions | A few sessions | We never do this | N/A |
|---|---|---|---|---|---|---|
| My tutor explains school work that I do not understand at school | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| We go through past examination papers | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor sets homework exercises for me to complete after the tutoring session | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor sets practice tests | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor always has work ready for me to do in tutoring sessions | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor helps me organise work/revision/notes/time | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor bring books/resources for me to work with | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor helps me to use strategies for memorising work | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor sometimes gives me more difficult work that is not on the syllabus | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor checks my work | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| My tutor introduces new material/topic | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**2.9 From the list of tutors actions included in question 2.8 and others you can think of, which one do you think helps you most?**

**2.10 Please include your predicted grades or levels in the subjects this tutor helps you with before you had tutoring. If you don't know or this does not apply to you please leave this box blank and move on to the next question.**

**2.11 Do you think you will do better in this subject as a result of having tutoring?**

**2.12 In your opinion, is this tutor a good tutor? Why or why not?**

## 3 Effective Tutoring

These questions focus on students' views of what makes a good tutor. They are not asking about a specific tutor but ask you to think about all the tutoring you have had.

**3.1 Have you ever had any bad/unpleasant experiences with a tutor? Can you explain what happened? In your opinion, what were the reasons for this?**

**3.2 What is the best thing about having a tutor?**

**3.3 Are there any disadvantages?**

| |
|---|
| |

**3.4 How would you evaluate the performance of your tutor(s)? Please number your 3 most important indicators in order of priority, 1 being the highest and 3 being the lowest.**

| Your Evaluation Indicators | Rank |
|---|---|
| I feel more willing to tackle new work as a result of having a tutor | |
| When faced with a difficulty I am less likely to give up | |
| My grades in class have increased in the subject(s) | |
| I now have better exam results | |
| My tutor helped me pass my exams in this subject(s) | |
| My tutor helped me pass an entrance exam | |
| My tutor helped me pass the 11 plus | |
| My tutor helped me obtain a place at university | |
| Other | |

**3.5 Please can you state 3 skills/qualities/attributes that you think make a good tutor**

| | |
|---|---|
| 1: | |
| 2: | |
| 3: | |

**3.6 Thinking about tutors in general, please read these statements carefully and tick the appropriate box.**

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Don't know/N/A |
|---|---|---|---|---|---|---|
| Any tutor can help raise my achievement | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| If a student isn't willing to learn/make an effort, there is no point in tutoring. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

## 4 Thank you

Thank you very much for completing this questionnaire.

Please keep checking the website for results and news. If you would like to enter the free prize draw or receive a copy of the project report please fill in your details below.

Katie Rushforth

**4.1 Please indicate how you answered this questionnaire**

☐ I completed this alone

☐ I completed this with help, who helped you? ____________________

**4.2 Do you have any comments to make or extra information to include?**

____________________

**4.3 If you would like to be involved in the free prize draw to win £30 of HMV CD/DVD vouchers please enter your name and tel no./ email address below. All information will be kept strictly confidential.**

Name: ____________________

Tel no. /Email: ____________________

☐ I would like to receive a copy of the project report

Please include an email address where the report will be sent (if not included above):

____________________

# Appendix Q: Coding Frame

**TUTOR QUALITIES**
Sense of humour
Patience
Subject knowledge of tutor
Knowledge / familiarity - exam boards
Experience / qualifications / life-long learning
Rapport / ability to relate / empathy / understanding
Communication skills
Listening
Positive attitude
Enthusiastic / happy tutor
Approachability
Friendly / kind / smile /
(Work well in a) 1:1 situation
Reliable
Helpful

**TUTORING / ACTIONS / TECHNIQUES**
Praise / encouragement - strict
Exam techniques
Flexible to the needs of the learner
Flexible in terms of being available
Focus
Preparation / preparation for next session
Revise / review / practice
Explaining to self or tutor
Error correction
Error correction - self correction
Problem solving
Independent problem solving
Simplifying problems
Set task and observe learner
Make students research
Body language
Use of questions
Create interest in the topic
Consistency
Memorising strategies
Learning strategies
Clear explanations
Discussion
Providing greater understanding
Organisation
Efficiency
Treat student as mature learner
Task management (determining level of knowledge - increasing task difficulty)
Real life examples
Examples

Homework
Make work fun
Tests / quizzes / past exam papers
Games
Handouts / diagrams / creativity / resources
Introduce new material / learn more
Explains school work not understand at school
Checks my work

**EVALUATION INDICATORS**
Confidence
Motivation
Change in attitude / interest in the subject
Enthusiasm / happy student
Student moved up a set
Students achieve their full potential
Exam results
School reports
Grade increase
Obtaining a place at university / scholarship
Passing an entrance exam
Passing the 11 plus
Feedback from student
Career achieved by student
Recommendations / word of mouth
More work from agency
Extended tutoring relationships
General improvement

Reference to parent / carer
Reference to school
Yes
Unsure - positive - hopefully
Unsure – negative
No
N/A
Dependent on student / varies by student
Uncodeable / unusable / did not answer the question

**Addition codes added for students responses**
Convenience
Contradiction with school work / methods
Problems with concentration
Financial
Less time for social things
Pressure
Language barrier / problems

# Appendix R: Parental Education and Occupation Models

Due to the proportion of missing data for the parental education and occupation variables, these were not included in the final models (see section 4.2.6 and Appendix F). However it is possible that the decision to exclude these variables may have impacted on the estimates for PT due to the relationship between PT participation and parental education and occupation (see section 5.1.1, 6.1.1 and Ireson & Rushforth, 2005 and 2011).

To explore the impact of these variables a number of models were calculated and compared with and without these measures. Table R.1 shows the mean EMSKS2 Model 2 with and without the control for parental education.

*Table R.1 Estimates for mean EMSKS2 Model 2 using PT participation in any subject for 1 term or 2 or more terms, including and excluding parental education*

| | *M* EMSKS2 MODEL 2 inc parental education | | | | *M* EMSKS2 MODEL 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | B | *SE* | Sig. | ES |
| KS1 APS | 0.74 | (0.03) | <.001 | 0.74 | 0.73 | (0.03) | <.001 | 0.73 |
| PT 1 term | 0.07 | (0.22) | ns | 0.01 | 0.09 | (0.22) | ns | 0.02 |
| PT >1 term | **0.70** | **(0.31)** | **.022** | **0.12** | **0.74** | **(0.31)** | **.017** | **0.12** |
| Female | -0.68 | (0.17) | <.001 | -0.11 | -0.68 | (0.17) | <.001 | -0.11 |
| SEN | -1.65 | (0.28) | <.001 | -0.28 | -1.73 | (0.28) | <.001 | -0.29 |
| Black | -0.68 | (0.34) | .045 | -0.11 | -0.64 | (0.34) | .058 | -0.11 |
| Mixed | -0.26 | (0.30) | ns | -0.04 | -0.27 | (0.30) | ns | -0.05 |
| Asian (exc) | 0.00 | (0.40) | ns | 0.00 | -0.03 | (0.40) | ns | 0.00 |
| Pakistani | -0.73 | (0.48) | ns | -0.12 | -0.83 | (0.48) | .085 | -0.14 |
| SES grp1 | -0.05 | (0.20) | ns | -0.01 | -0.07 | (0.20) | ns | -0.01 |
| SES grp3 | -0.34 | (0.22) | ns | -0.06 | -0.41 | (0.22) | .056 | -0.07 |
| Parent | 0.33 | (0.17) | .051 | 0.06 | 0.31 | (0.17) | .068 | 0.05 |
| Music | 0.41 | (0.19) | .032 | 0.07 | 0.46 | (0.19) | .015 | 0.08 |
| Homework>5 hrs | 0.84 | (0.35) | .016 | 0.14 | 0.78 | (0.35) | .027 | 0.13 |
| Secondary education only | -0.43 | (0.24) | .074 | -0.07 | | | | |
| College/vocational quals | 0.22 | (0.19) | ns | 0.04 | | | | |
| Total | 669 | | | | 669 | | | |
| $R^2$ | .58 | | | | .58 | | | |

Details outlining how the parental education variable was calculated are provided in Appendix F. In Table R.1 university level qualifications have been included as the baseline group, with one control for compulsory schooling qualifications and another for college and vocational qualifications. The mean EMSKS2 Model 2 was specifically selected due to the significant effect that was found for extended periods of PT and mean EMSKS2 score in the full models presented in section 5.5. The model was calculated with the parental education controls and repeated without these controls but using the same number of cases. Including parental education controls reduced the number of students in the model from 899 to 669 due to the number of participants who did not include or did not know this information.

As can be seen from the results presented in Table R.1, adding parental education makes nominal difference to the model. The combined measure of PT in any subject for extended periods has a significant impact on mean EMSKS2 score in both models. The model shows that students whose parents have only compulsory schooling qualifications do less well than students whose parents have university level qualifications, although this difference is only marginally significant at the 7% level. There was no statistical difference in outcome score between students whose parents have college and vocational level qualifications or university level qualifications.

Parental occupation was added to the model discussed above; adding parental occupation reduced the sample further to include just 445 students. Further details about the occupational groupings are included in Appendix F. Categorising the occupations into the Major Groups from the ISCO was problematic due to the limited information provided by a number of participants regarding the job description. Due to the small numbers in some categories, the major groupings were combined accordingly. The frequency and percentage of the occupations included in the model for each Major Group are included in Table R.2. The models with and without parental education and occupation variables are compared in Table R.3.

Table R.3 shows that the inclusion of both parental education and occupation variables do not substantially change the PT estimates. Major groups 1 and 2 (legislators, senior officials, managers and professionals) were used as the baseline group for the mother's occupation variable. Students whose mothers were in any other group aside from groups 1 and 2 had a lower KS2 score, although this difference is not statistically significant. The only statistically significant difference was between students with mothers in major groups 1 and 2 and students with mothers in groups 6-9 who achieved almost one fifth of a KS level lower in mean EMSKS2 score.

*Table R.2 ISCO occupation classifications for parents of children in KS2*

| | Mother's occupation | | Father's occupation | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| Major group 1 legislators, senior officials and managers | 9 | 2 | 54 | 12.1 |
| Major group 2 professionals | 92 | 20.7 | 87 | 19.6 |
| Major group 3 technicians & associate professionals | 37 | 8.3 | 53 | 11.9 |
| Major group 4 clerks | 27 | 6.1 | 13 | 2.9 |
| Major group 5 service workers & shop and market sales work | 75 | 16.9 | 41 | 9.2 |
| Major group 6 skilled agricultural & fishery workers | 2 | .4 | 9 | 2 |
| Major group 7 craft & related trades workers | 2 | .4 | 83 | 18.7 |
| Major group 8 plant & machine operators and assemblers | 5 | 1.1 | 49 | 11 |
| Major group 9 elementary occupations | 11 | 2.5 | 10 | 2.2 |
| Major group 0 armed forces | 0 | 0 | 3 | .7 |
| Domestic engineer, cares for children/spouse/partner | 166 | 37.3 | 2 | .4 |
| Unemployed | 6 | 1.3 | 34 | 7.6 |
| Cannot work due to ill health | 4 | .9 | 4 | .9 |
| Retired | 1 | .2 | 1 | .2 |
| Full-time student | 8 | 1.8 | 2 | .4 |
| **Total** | **445** | **100** | **445** | **100** |

The same process was repeated to determine the impact of adding parental education and occupation data to the PT estimates for the Y11 analysis. The mean EMSKS4 model was chosen showing the impact of 1 term or 2 or more terms PT during KS4 in any subject on mean EMSKS4 score. In the original model presented in section 6.5 a significant PT estimate was found for both 1 term and 2 or more terms PT. Table R.4 compares the estimates for the mean EMSKS4 Model 3 with and without a control for parental education. As with the comparison above the baseline group is university level qualifications, with controls included for compulsory schooling and vocational and college level qualifications. The model presented in Table R.4 shows the variables controlling for parental education are not significant predictors of mean EMSKS4 score. The PT estimates in both models were very similar, however when the sample was reduced from 991 (included in the original model presented in section 6.5) to 775 the estimate for 2 or more terms of PT was also reduced and was no longer significant at the 5% level.

*Table R.3 Estimates for mean EMSKS2 Model 2 using PT participation in any subject for 1 term or 2 or more terms, including and excluding parental education and occupation*

| | *M* EMSKS2 MODEL 2 inc parental education & occupation | | | | *M* EMSKS2 MODEL 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| KS1 APS | 0.73 | (0.04) | <.001 | 0.73 | 0.74 | (0.04) | <.001 | 0.74 |
| PT 1 term | 0.11 | (0.28) | ns | 0.02 | 0.21 | (0.28) | ns | 0.04 |
| PT >1 term | **0.86** | **(0.39)** | **.030** | **0.14** | **0.93** | **(0.39)** | **.017** | **0.15** |
| Female | -0.72 | (0.21) | .001 | -0.12 | -0.71 | (0.21) | .001 | -0.12 |
| SEN | -1.62 | (0.35) | <.001 | -0.27 | -1.67 | (0.35) | <.001 | -0.28 |
| Black | -0.15 | (0.47) | ns | -0.03 | -0.14 | (0.46) | ns | -0.02 |
| Mixed | -0.57 | (0.39) | ns | -0.09 | -0.58 | (0.39) | ns | -0.10 |
| Asian (exc) | 0.04 | (0.49) | ns | 0.01 | -0.01 | (0.47) | ns | 0.00 |
| Pakistani | -1.29 | (0.57) | .025 | -0.22 | -1.29 | (0.56) | .021 | -0.22 |
| SES grp1 | 0.02 | (0.25) | ns | 0.00 | 0.03 | (0.24) | ns | 0.00 |
| SES grp3 | -0.22 | (0.28) | ns | -0.04 | -0.32 | (0.27) | ns | -0.05 |
| Parent | 0.19 | (0.22) | ns | 0.03 | 0.23 | (0.21) | ns | 0.04 |
| Music | 0.39 | (0.24) | ns | 0.06 | 0.45 | (0.24) | .062 | 0.07 |
| Homework>5 hrs | 0.48 | (0.42) | ns | 0.08 | 0.60 | (0.41) | ns | 0.10 |
| Secondary education only | 0.01 | (0.33) | ns | 0.00 | | | | |
| College/vocational quals | 0.34 | (0.25) | ns | 0.06 | | | | |
| Mother's occupation MG 3 | -0.47 | (0.42) | ns | -0.08 | | | | |
| Mother's occupation MG 4 | -0.34 | (0.46) | ns | -0.06 | | | | |
| Mother's occupation MG 5 | -0.45 | (0.34) | ns | -0.07 | | | | |
| Mother's occupation MG 6-9 | -1.16 | (0.55) | .036 | -0.19 | | | | |
| Mother's occupation MG 10, 0, other | -0.02 | (0.30) | ns | 0.00 | | | | |
| Father's occupation MG 2 | -0.06 | (0.38) | ns | -0.01 | | | | |
| Father's occupation MG 3 | -0.15 | (0.40) | ns | -0.02 | | | | |
| Father's occupation MG 4 -5 | -0.18 | (0.41) | ns | -0.03 | | | | |
| Father's occupation MG 6-7 | -0.41 | (0.38) | ns | -0.07 | | | | |
| Father's occupation MG 8 | -0.33 | (0.46) | ns | -0.05 | | | | |
| Father's occupation MG 9-10, 0 , other | -0.60 | (0.43) | ns | -0.10 | | | | |
| Total | 445 | | | | 445 | | | |
| $R^2$ | 0.59 | | | | 0.59 | | | |

*Table R.4 Estimates for mean EMSKS4 Model 3 using PT participation in any subject for 1 term or 2 or more terms, including and excluding parental education*

| | *M* EMSKS4 MODEL 3 inc parental education | | | | *M* EMSKS4 MODEL 3 | | | |
|---|---|---|---|---|---|---|---|---|
| | B | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.18 | (0.03) | <.001 | 1.18 | 1.18 | (0.03) | <.001 | 1.18 |
| PT 1 term | **0.91** | **(0.45)** | **.046** | **0.15** | **0.91** | **(0.45)** | **.042** | **0.15** |
| PT >1 term | 0.72 | (0.41) | .077 | 0.12 | 0.72 | (0.40) | .075 | 0.12 |
| Any PT before Y10 | 0.63 | (0.38) | .096 | 0.11 | 0.63 | (0.38) | .097 | 0.11 |
| Female | -0.01 | (0.25) | ns | 0.00 | -0.01 | (0.25) | ns | 0.00 |
| SEN | -0.53 | (0.45) | ns | -0.09 | -0.52 | (0.44) | ns | -0.09 |
| Black | 0.03 | (0.52) | ns | 0.01 | 0.05 | (0.51) | ns | 0.01 |
| Mixed | 0.97 | (0.64) | ns | 0.16 | 0.99 | (0.64) | ns | 0.16 |
| Asian | 1.92 | (0.51) | <.001 | 0.32 | 1.93 | (0.50) | <.001 | 0.32 |
| SES grp1 | -0.08 | (0.31) | ns | -0.01 | -0.07 | (0.30) | ns | -0.01 |
| SES grp3 | -0.47 | (0.28) | ns | -0.08 | -0.49 | (0.28) | .083 | -0.08 |
| Parent | 0.71 | (0.26) | .005 | 0.12 | 0.71 | (0.25) | .005 | 0.12 |
| Homework >1-<5hrs pw | 1.18 | (0.37) | .001 | 0.20 | 1.18 | (0.36) | .001 | 0.20 |
| Homework >=5hrs pw | 2.09 | (0.46) | <.001 | 0.35 | 2.09 | (0.45) | <.001 | 0.35 |
| English class | 0.37 | (0.25) | ns | 0.06 | 0.37 | (0.25) | ns | 0.06 |
| College | -0.72 | (0.33) | .029 | -0.12 | -0.72 | (0.33) | .028 | -0.12 |
| Apprenticeship | -1.69 | (0.53) | .001 | -0.28 | -1.69 | (0.53) | .001 | -0.28 |
| Leave School | -0.92 | (0.87) | ns | -0.15 | -0.92 | (0.87) | ns | -0.15 |
| Not sure/other | -1.45 | (0.45) | .001 | -0.24 | -1.46 | (0.45) | .001 | -0.24 |
| Secondary education only | 0.01 | (0.29) | ns | 0.00 | | | | |
| College/vocational quals | -0.10 | (0.33) | ns | -0.02 | | | | |
| Total | 775 | | | | 775 | | | |
| $R^2$ | 0.73 | | | | 0.72 | | | |

The parent occupation variables were used in the same manner as the Y6 comparisons outlined above. Table R.5 shows the frequency and percentage of parental occupations included in the model. The groups have been collapsed appropriately to inclusion in the model. The baseline category is major group 1 and 2 for mother's occupation and major group 1 for father's occupation.

*Table R.5 ISCO occupation classifications for parents of children in KS4*

| | Mother's occupation | | Father's occupation | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| Major group 1 legislators, senior officials and managers | 45 | 8.2 | 106 | 19.3 |
| Major group 2 professionals | 120 | 21.8 | 110 | 20 |
| Major group 3 technicians and associate professionals | 102 | 18.5 | 76 | 13.8 |
| Major group 4 clerks | 97 | 17.6 | 19 | 3.5 |
| Major group 5 service workers and shop and market sales work | 118 | 21.5 | 37 | 6.7 |
| Major group 6 skilled agricultural and fishery workers | 0 | 0 | 7 | 1.3 |
| Major group 7 craft and related trades workers | 4 | 0.7 | 118 | 21.5 |
| Major group 8 plant and machine operators and assemblers | 9 | 1.6 | 47 | 8.5 |
| Major group 9 elementary occupations | 22 | 4 | 25 | 4.5 |
| Major group 0 armed forces | 0 | 0 | 2 | 0.4 |
| Domestic engineer, cares for children/spouse | 28 | 5.1 | 1 | 0.2 |
| Unemployed | 1 | 0.2 | 1 | 0.2 |
| Retired | 0 | 0 | 1 | 0.2 |
| Cannot work due to ill health | 2 | 0.4 | 0 | 0 |
| Full-time student | 2 | 0.4 | 0 | 0 |
| Total | 550 | 100 | 550 | 100 |

Including both education and occupation variables reduced the sample to 550, incorporating only half of the students from the original model. Reducing the sample also meant reducing the numbers participating in PT; for both models presented in Table R.6 the estimate for PT for 2 or more terms in any subject was no longer significant. Table R.6 shows that none of the occupation or education variable estimates are statistically significant at the 5% level, however including and excluding these variables does make a small change to the PT estimates. The model without the education and occupational controls has a slightly larger estimate for 1 term of PT. This shows that part of the PT estimates may be reflecting parental education and occupation, although these comparisons show that the impact is very small.

*Table R.6 Estimates for mean EMSKS4 Model 3 using PT participation in any subject for 1 term or 2 or more terms, including and excluding parental education and occupation*

| | *M* EMSKS4 MODEL 3 inc parental education & occupation | | | | *M* EMSKS4 MODEL 3 | | | |
|---|---|---|---|---|---|---|---|---|
| | β | *SE* | Sig. | ES | β | *SE* | Sig. | ES |
| EMSKS3 | 1.15 | (0.03) | <.001 | 1.15 | 1.16 | (0.03) | <.001 | 1.16 |
| PT 1 term | 0.89 | (0.52) | .087 | 0.15 | **1.08** | **(0.51)** | **.034** | **0.18** |
| PT >1 term | 0.28 | (0.48) | ns | 0.05 | 0.36 | (0.47) | ns | 0.06 |
| Any PT before Y10 | 0.74 | (0.43) | .084 | 0.12 | 0.75 | (0.42) | .074 | 0.13 |
| Female | 0.44 | (0.30) | ns | 0.07 | 0.25 | (0.29) | ns | 0.04 |
| SEN | -0.66 | (0.56) | ns | -0.11 | -0.54 | (0.55) | ns | -0.09 |
| Black | 0.60 | (0.71) | ns | 0.10 | 0.57 | (0.70) | ns | 0.10 |
| Mixed | 0.28 | (0.79) | ns | 0.05 | 0.20 | (0.77) | ns | 0.03 |
| Asian | 1.73 | (0.66) | .009 | 0.29 | 1.56 | (0.65) | .016 | 0.26 |
| SES grp1 | 0.05 | (0.34) | ns | 0.01 | 0.02 | (0.33) | ns | 0.00 |
| SES grp3 | -0.55 | (0.36) | ns | -0.09 | -0.69 | (0.35) | .047 | -0.12 |
| Parent | 0.97 | (0.29) | .001 | 0.16 | 0.97 | (0.29) | .001 | 0.16 |
| Homework >1-<5hrs pw | 0.93 | (0.45) | .040 | 0.16 | 0.82 | (0.45) | .067 | 0.14 |
| Homework >=5hrs pw | 1.73 | (0.54) | .001 | 0.29 | 1.72 | (0.53) | .001 | 0.29 |
| English class | 0.36 | (0.30) | ns | 0.06 | 0.41 | (0.30) | ns | 0.07 |
| College | -1.10 | (0.40) | .006 | -0.18 | -1.00 | (0.39) | .010 | -0.17 |
| Apprenticeship | -1.53 | (0.72) | .034 | -0.25 | -1.45 | (0.70) | .039 | -0.24 |
| Leave School | -1.28 | (1.03) | ns | -0.21 | -1.28 | (1.01) | ns | -0.21 |
| Not sure/other | -1.64 | (0.52) | .002 | -0.27 | -1.51 | (0.52) | .004 | -0.25 |
| Secondary education only | 0.14 | (0.36) | ns | 0.02 | | | | |
| College/vocational quals | -0.09 | (0.41) | ns | -0.01 | | | | |
| Mother's occupation MG 3 | 0.32 | (0.40) | ns | 0.05 | | | | |
| Mother's occupation MG 4 | 0.73 | (0.41) | .080 | 0.12 | | | | |
| Mother's occupation MG 5 | 0.10 | (0.41) | ns | 0.02 | | | | |
| Mother's occupation MG 6-9 | 0.42 | (0.62) | ns | 0.07 | | | | |
| Mother's occupation MG 10, 0, other | -1.11 | (0.63) | .078 | -0.19 | | | | |
| Father's occupation MG 2 | -0.39 | (0.45) | ns | -0.07 | | | | |
| Father's occupation MG 3 | 0.02 | (0.48) | ns | 0.00 | | | | |
| Father's occupation MG 4 -5 | -0.48 | (0.53) | ns | -0.08 | | | | |
| Father's occupation MG 6-7 | -0.48 | (0.44) | ns | -0.08 | | | | |
| Father's occupation MG 8 | -0.97 | (0.57) | .090 | -0.16 | | | | |
| Father's occupation MG 9-10, 0 , other | 0.08 | (0.67) | ns | 0.01 | | | | |
| Total | 550 | | | | 550 | | | |
| $R^2$ | 0.71 | | | | 0.72 | | | |

# Appendix S: Additional Tutor Details

*Table S.1 Ethnicity of tutors included in the sample*

| | *n* | % |
|---|---|---|
| **White** | **161** | **(83)** |
| of European origin | 156 | 80.4 |
| of other origin | 5 | 2.6 |
| **Black** | **10** | **(5.2)** |
| of African origin | 5 | 2.6 |
| of Caribbean origin | 5 | 2.6 |
| of other origin | 0 | 0 |
| **Asian** | **19** | **(9.8)** |
| of Indian origin | 9 | 4.6 |
| of Pakistani origin | 5 | 2.6 |
| of Bangladeshi origin | 1 | 0.5 |
| of Chinese origin | 1 | 0.5 |
| of other origin | 3 | 1.5 |
| **Mixed** | **2** | **1** |
| **Other** | **1** | **0.5** |
| **I'd rather not specify** | **1** | **0.5** |
| **Total responses** | **194** | **100** |

The data on subjects and levels were analysed together for English, maths and science and displayed in the table below. There was a significant difference between tutor gender and the level of the students taught (see Table S.2). A total of 75% of tutors who only tutored primary age students were female. In contrast to this, of the tutors that taught specifically students in the secondary school range, 69.2% were male, and of those who taught only post-16 level students 83.3% were male. There was a significant difference between the gender of the tutor and age range of students taught ($\chi^2(8) = 19.03$, $p = .01$ with the Cramer's V Value .33; undergraduate level was combined with undergraduate and post-16 to enable sufficient numbers in the chi-square).

*Table S.2 Percentage of tutors tutoring at each level*

| Level | *n* | % of tutors (*N* 181) | % Female* |
|---|---|---|---|
| Primary | 13 | 7.2 | 75 |
| Secondary to GCSE (or equivalent) | 14 | 7.7 | 30.8 |
| A Level (or equivalent) | 14 | 7.7 | 16.7 |
| Undergraduate | 5 | 2.8 | 20 |
| From primary to secondary GCSE Level | 19 | 10.5 | 73.7 |
| From secondary GCSE Level to A Level | 35 | 19.3 | 51.4 |
| From Primary to A level | 21 | 11.6 | 66.7 |
| From Primary to Undergraduate Level | 26 | 14.4 | 52 |
| From Secondary GCSE Level to Undergraduate Level | 28 | 15.5 | 48.1 |
| A level to Undergraduate Level | 6 | 3.3 | 33.3 |

*p=.01

Table S.3 shows the proportion of tutors that taught maths, English and science at different levels. English and science subjects have been combined in this table; full details for individual subjects can be found in Table S.4 and S.5. The majority of maths tutors (72.4%) taught at secondary school level, less tutors in the sample taught maths at primary school compared to post-16 level (25.6% compared to 28.9% respectively); 11.1% of respondents reported they tutored maths to undergraduates.

Similar numbers were reported for tutoring English at both primary and secondary level. In comparison to the number of tutors involved in maths tutoring, there was less tutoring reported in English subjects at secondary level, and similar numbers for both maths and English tuition at primary level. For A level (or equivalent) 28.9% of tutors indicated they tutored maths at this level compared to 14.4% of tutors who indicated they taught English. The majority of science tutoring, as with maths, was reported to occur at the secondary level. Unlike maths and English tutors, well over half of science tutors reported tutoring science at post-16 level.

*Table S.3 Tutors tutoring maths, combined English and combined science at different levels*

| | Maths | | English combined | | Science combined | |
|---|---|---|---|---|---|---|
| | % of respondents (*N*180) | % of maths tutors (*n*105) | % of respondents (*N*180) | % of English tutors (*n*72) | % of respondents (*N*180) | % of science tutors (*n* 60) |
| Primary | 25.6 | 43.8 | 21.7 | 54.2 | 7.2 | 21.7 |
| Secondary to GCSE | 42.8 | 72.4 | 27.2 | 68.1 | 23.9 | 71.7 |
| A Level | 28.9 | 48.6 | 14.4 | 36.1 | 21.1 | 63.3 |
| Undergraduate | 11.1 | 18.1 | 5.6 | 13.9 | 3.9 | 11.7 |
| Other | - | - | 1.1 | 2.8 | - | - |
| TESL/TEFL | - | - | 5 | 6.9 | - | - |

*Table S.4 Tutors tutoring English at different levels*

| English Tutoring (N 180) | *n English* | % | *n English Literature* | % | *n English Language* | % | *n English combined* | % | *% of English tutors(n72)* |
|---|---|---|---|---|---|---|---|---|---|
| Primary | 32 | 17.8 | 4 | 2.2 | 7 | 3.9 | 39 | 21.7 | 54.2 |
| Secondary to GCSE | 37 | 20.6 | 14 | 7.7 | 10 | 5.5 | 49 | 27.2 | 68.1 |
| A Level | 17 | 9.4 | 10 | 5.5 | 5 | 2.8 | 26 | 14.4 | 36.1 |
| Undergraduate | 6 | 3.3 | 4 | 2.2 | 2 | 1.1 | 10 | 5.6 | 13.9 |
| Other | 2 | 1.1 | 0 | 0 | 0 | 0 | 2 | 1.1 | 2.8 |
| TESL/TEFL | 6 | 3.3 | 0 | 0 | 3 | 1.7 | 9 | 5 | 6.9 |

*Table S.5 Tutors tutoring science at different levels*

| Tutoring Science (N180) | *n Science* | % | *n Biology* | % | *n Chemistry* | % | *n Physics* | % | *n Science Combined* | % | *% of science tutors (n 60)* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary | 11 | 6.1 | 2 | 1.1 | 1 | 0.6 | 1 | 0.6 | 13 | 7.2 | 21.7 |
| Secondary to GCSE | 25 | 13.9 | 15 | 8.3 | 15 | 8.3 | 19 | 10.6 | 43 | 23.9 | 71.7 |
| A Level | 4 | 2.2 | 11 | 6.1 | 13 | 7.2 | 18 | 10 | 38 | 21.1 | 63.3 |
| Undergraduate | 1 | 0.6 | 3 | 1.7 | 0 | 0 | 5 | 2.8 | 7 | 3.9 | 11.7 |

*Table S.6 Frequency of subjects tutored to Student 1*

| Subjects | *n* | % | % of students |
|---|---|---|---|
| English | 37 | 16 | 24.5 |
| English Literature | 7 | 3 | 4.6 |
| English Language | 10 | 4.3 | 6.6 |
| **English Combined** | **(47)** | | **(31.1)** |
| Science | 15 | 6.5 | 9.9 |
| Biology | 9 | 3.9 | 6 |
| Chemistry | 11 | 4.8 | 7.3 |
| Physics | 7 | 3 | 4.6 |
| **Science Combined** | **(38)** | | **(25.2)** |
| Maths | 77 | 33.3 | 51 |
| Art & Design | 1 | 0.4 | 0.7 |
| Business Studies | 5 | 2.2 | 3.3 |
| Classics | 1 | 0.4 | 0.7 |
| Economics | 2 | 0.9 | 1.3 |
| French | 8 | 3.5 | 5.3 |
| Geography | 3 | 1.3 | 2 |
| German | 1 | 0.4 | 0.7 |
| History | 3 | 1.3 | 2 |
| ICT | 4 | 1.7 | 2.6 |
| Psychology | 1 | 0.4 | 0.7 |
| Reading | 2 | 0.9 | 1.3 |
| Spanish | 4 | 1.7 | 2.6 |
| Study Skills | 2 | 0.9 | 1.3 |
| Urdu | 0 | 0 | 0 |
| Verbal Reasoning | 5 | 2.2 | 3.3 |
| Non Verbal Reasoning | 1 | 0.4 | 0.7 |
| All primary curriculum KS1 and KS2 | 2 | 0.9 | 1.3 |
| Other | 13 | 5.6 | 8.6 |
| TOTAL | 231 | 100 | |

Tutors were asked to provide up to three reasons why they were tutoring Student 1. Out of 147 tutors who responded to this question, most of them gave three reasons for tutoring (86.4%), 10.2% provided two reasons, 3.4% offered just one reason. In total 416 reasons were provided for tutoring 147 different students. Different options were given in a drop down menu and there was an option to select an 'other' category and specify. The results are presented below in Table S.7 in order of frequency.

*Table S.7 Reasons for tutoring provided by tutors in order of frequency*

| | Reason 1 | | Reason 2 | | Reason 3 | | Reasons combined | | % of tutors (N147) |
|---|---|---|---|---|---|---|---|---|---|
| | % | *n* | % | *n* | % | *n* | % | *n* | % |
| To improve understanding of the subject | 23.1 | 34 | 23.2 | 33 | 8.7 | 11 | 18.7 | 78 | 53 |
| To increase the student's self confidence | 15 | 22 | 20.4 | 29 | 14.2 | 18 | 16.6 | 69 | 47 |
| The parent(s) requested it | 7.5 | 11 | 8.5 | 12 | 19.7 | 25 | 11.6 | 48 | 32.7 |
| †To help the student achieve the top examination grades | 13.6 | 20 | 9.2 | 13 | 5.5 | 7 | 9.6 | 40 | 27.2 |
| †To prepare the student to pass a forthcoming examination | 9.5 | 14 | 7.8 | 11 | 10.2 | 13 | 9.1 | 38 | 25.9 |
| The student was struggling to keep up in this subject at school | 6.1 | 9 | 6.3 | 9 | 4.7 | 6 | 5.7 | 24 | 16.3 |
| The student requested it | 2.7 | 4 | 5.6 | 8 | 8.7 | 11 | 5.5 | 23 | 15.6 |
| The school does not provide enough help | 2.7 | 4 | 4.2 | 6 | 4.7 | 6 | 3.8 | 16 | 10.9 |
| Other | 3.4 | 5 | 1.4 | 2 | 5.5 | 7 | 3.4 | 14 | 9.5 |
| The student has additional learning needs (SEN) | 4.1 | 6 | 2.1 | 3 | 2.4 | 3 | 2.9 | 12 | 8.2 |
| †To help ensure the student passes an entrance examination | 4.1 | 6 | 2.1 | 3 | 0.0 | 0 | 2.2 | 9 | 6.1 |
| This student is home-schooled | 3.4 | 5 | 0 | 0 | 2.4 | 3 | 1.9 | 8 | 5.4 |
| The student needed help with organisation of work | 0 | 0 | 2.8 | 4 | 3.1 | 4 | 1.9 | 8 | 5.4 |
| To increase the amount of time he/she spends studying | 0.7 | 1 | 2.1 | 3 | 2.4 | 3 | 1.7 | 7 | 4.7 |
| To stretch the student beyond school requirements | 0.7 | 1 | 1.4 | 2 | 3.1 | 4 | 1.7 | 7 | 4.7 |
| †To help the student pass the 11 plus examination | 1.4 | 2 | 0.7 | 1 | 2.4 | 3 | 1.5 | 6 | 4.1 |
| To catch up due to extended illness | 1.4 | 2 | 1.4 | 2 | 0.8 | 1 | 1.2 | 5 | 3.4 |
| The school suggested getting a tutor | 0.7 | 1 | 0.7 | 1 | 0.8 | 1 | 0.7 | 3 | 2 |
| The school did not provide the subject | 0 | 0 | 0 | 0 | 0.8 | 1 | 0.2 | 1 | 0.7 |
| **EXAMINATION related reasons combined** | **28.6** | **42** | **19.8** | **28** | **18.1** | **23** | **22.4** | **93** | **63.3** |
| **TOTAL number of reasons provided** | **100** | **147** | **100** | **142** | **100** | **127** | **100** | **416** | |

† combined to provide an indication of examination related reasons for tutoring

The most common primary reason for tutoring was 'to improve understanding of the subject'. The second and third most common primary reasons for tutoring were to increase a student's self confidence and to help the student achieve the top examination grades. However if all the reasons concerning examinations were combined (top examination grades, forthcoming examination, entrance exam and 11-plus), examinations were the most common reason for seeking tuition (28.6%).

The respondents who specified 'other' provided a number of varied reasons many of which were closely related to the options already provided. A total of 3 tutors mentioned help with English language so the pupil could access the curriculum at school. A further 2 tutors mentioned that they had been requested to tutor the student as they were children in care.

Tutors were questioned about their usual strategies for ascertaining a student's level of understanding. These results are presented in section 8.3.2. These findings were correlated to find patterns in the data. The findings are presented in Table S.8.

*Table S.8 Correlation coefficients: ascertaining a student's level of understanding*

| | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 1 | Ask questions and discuss verbally with the student | - | | | |
| 2 | Work through a problem with the student | **.29**** | - | | |
| 3 | Look at work previously completed by the student | .04 | -.04 | - | |
| 4 | Set the student a test | -.02 | -.03 | .15 | - |
| 5 | Set the student homework | .13 | .03 | **.17*** | **.28**** |

*p<.05 **p<.01

*Table S.9 Details of tutors included in the sample and quoted in the thesis*

| | | | Qualifications | | | | | Experience | | | Subject | | | | | Level | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference No. | Gender | Age | Undergraduate | Masters | EdD, Mphil, PhD | PGCE | Training | Avge. no hrs/w | Years of Experience | No. of students | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 | Primary | Secondary | Post 16 | Undergraduate |
| 7 | F | 26-30 | ✓ | ✓ | | ✓ | | 2.0 | 2-5 yrs | 11 to 15 | Maths | Other | | | | ✓ | ✓ | ✓ | ✓ |
| 11 | M | >60 | ✓ | | | ✓ | | 4.0 | 2-5 yrs | 11 to 15 | Physics | ICT | Science | Other | | | ✓ | ✓ | ✓ |
| 18 | M | 26-30 | ✓ | | | ✓ | | 2.0 | 5-10 yrs | 6 to 10 | Biology | Biology | Science | Mandarin | Study Skills | | ✓ | ✓ | |
| 21 | F | 20-25 | ✓ | | | | | 1.0 | 2-5 yrs | 6 to 10 | Psychology | Biology | Maths | | | ✓ | ✓ | ✓ | ✓ |
| 24 | F | 51-60 | ✓ | | | | | 3.0 | 1-2 yrs | 6 to 10 | English | Maths | Biology | Science | | ✓ | ✓ | | |
| 25 | M | >60 | ✓ | ✓ | | | | 2.0 | 5-10 yrs | >20 | Eng lang | Eng lit | History | Business | | ✓ | ✓ | ✓ | ✓ |
| 29 | M | 26-30 | ✓ | ✓ | | | | 8.0 | 2-5 yrs | 11 to 15 | English | English | Study Skills | | | ✓ | ✓ | ✓ | ✓ |
| 40 | M | 41-50 | ✓ | | | ✓ | | 6.0 | 1-2 yrs | 1 to 5 | ICT | | | | | | | ✓ | |
| 50 | F | 26-30 | ✓ | ✓ | | | | 0.0 | 2-5 yrs | 6 to 10 | French | Maths | English | | | | ✓ | ✓ | ✓ |
| 54 | M | 26-30 | ✓ | | | ✓ | | 15.0 | 2-5 yrs | >20 | Biology | Biology | Other | | | | ✓ | ✓ | |
| 60 | F | 20-25 | ✓ | | | | | 2.0 | 2-5 yrs | 1 to 5 | Business | Maths | Other | | | | ✓ | ✓ | |
| 68 | F | 20-25 | | | | ✓ | | 2.0 | 1-2 yrs | 1 to 5 | Biology | Chemistry | Physics | Biology | | | ✓ | ✓ | |
| 72 | F | 26-30 | ✓ | | | ✓ | | 4.0 | 5-10 yrs | 11 to 15 | English | Other | Maths | | | ✓ | ✓ | ✓ | |
| 76 | M | 20-25 | ✓ | ✓ | | | | 1.5 | <1 yr | 1 to 5 | Chemistry | | | | | | | ✓ | |
| 78 | F | 41-50 | ✓ | | | ✓ | | 8.0 | 5-10 yrs | >20 | Maths | | | | | | ✓ | ✓ | |
| 103 | M | 20-25 | ✓ | ✓ | | | | 2.0 | 1-2 yrs | 1 to 5 | Physics | Maths | | | | | | ✓ | |
| 106 | F | 41-50 | ✓ | ✓ | | | | 20.0 | 10-20 yrs | >20 | Eng lang | Eng lit | Maths | History | All Primary | ✓ | ✓ | ✓ | ✓ |
| 108 | F | 31-40 | ✓ | | | | | 7.0 | 5-10 yrs | >20 | French | English | | | | ✓ | ✓ | ✓ | |

| | | | Qualifications | | | | | Experience | | | Subject | | | | | Level | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference No. | Gender | Age | Undergraduate | Masters | EdD, Mphil, PhD | PGCE | Training | Avge. no hrs/w | Years of Experience | No. of students | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 | Primary | Secondary | Post 16 | Undergraduate |
| 110 | M | 41-50 | ✓ | ✓ | | | | 4.0 | 5-10 yrs | >20 | Maths | Physics | Business | Other | Other | | | ✓ | ✓ |
| 113 | M | 20-25 | ✓ | ✓ | | | | 0.2 | 2-5 yrs | 6 to 10 | | | Maths | | | | ✓ | ✓ | ✓ |
| 116 | F | 51-60 | ✓ | ✓ | | ✓ | | 3.0 | 2-5 yrs | 11 to 15 | English | Maths | | | | | | | |
| 127 | F | 51-60 | ✓ | ✓ | | ✓ | | 5.0 | 5-10 yrs | >20 | English | Maths | Verbal | | | ✓ | | | |
| 128 | F | 41-50 | ✓ | | ✓ | | | 0.0 | 10-20 yrs | 11 to 15 | Eng lit | Eng lit | | | | | ✓ | ✓ | |
| 133 | M | 51-60 | ✓ | | | ✓ | | 8.0 | 10-20 yrs | >20 | Maths | Maths | | | | ✓ | ✓ | ✓ | ✓ |
| 134 | M | 51-60 | ✓ | | | | | 5.0 | 10-20 yrs | >20 | Biology | Chemistry | Maths | Physics | Science | | ✓ | | |
| 138 | F | >60 | ✓ | | | | | 6.0 | 5-10 yrs | >20 | Maths | Maths | Maths | | | ✓ | ✓ | ✓ | |
| 140 | F | 31-40 | ✓ | | | ✓ | | 2.0 | 2-5 yrs | 1 to 5 | Business | Economics | | | | | ✓ | ✓ | |
| 142 | F | 51-60 | ✓ | | | | | 18.0 | 10-20 yrs | >20 | Maths | Other | | | | ✓ | ✓ | ✓ | |
| 143 | F | 51-60 | ✓ | ✓ | | | ✓ | 2.0 | 2-5 yrs | >20 | Maths | Physics | Other | Science | | | ✓ | ✓ | ✓ |
| 148 | F | 26-30 | ✓ | ✓ | | | | 5.0 | 1-2 yrs | 6 to 10 | French | German | Spanish | Verbal | English | ✓ | ✓ | ✓ | |
| 149 | F | 51-60 | ✓ | | | ✓ | ✓ | 3.0 | 1-2 yrs | 11 to 15 | Science | English | Maths | Verbal | Non Verbal | ✓ | ✓ | | ✓ |
| 159 | M | >60 | ✓ | | | | | 5.5 | 5-10 yrs | >20 | Maths | | | | | | ✓ | | |
| 160 | F | 31-40 | ✓ | | | | | | <1 yr | 1 to 5 | English | German | English | | | | ✓ | ✓ | |
| 161 | M | 51-60 | ✓ | ✓ | ✓ | ✓ | | 4.0 | <1 yr | 1 to 5 | Maths | English | Science | | | ✓ | | | |
| 164 | F | | | | | ✓ | | 3.0 | 10-20 yrs | 16 to 20 | Spanish | German | French | | | | ✓ | ✓ | |
| 166 | F | 31-40 | ✓ | | | ✓ | | 1.5 | <1 yr | 11 to 15 | English | French | German | | | ✓ | ✓ | ✓ | |
| 167 | M | 51-60 | ✓ | | | ✓ | | 4.0 | 5-10 yrs | >20 | English | Maths | Other | Other | | ✓ | | ✓ | |
| 170 | M | >60 | ✓ | | | | | 10.0 | 5-10 yrs | >20 | Biology | Chemistry | Maths | Physics | | | ✓ | | |

| | | Qualifications | | | | | | Experience | | | Subject | | | | | Level | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference No. | Gender | Age | Undergraduate | Masters | EdD, Mphil, PhD | PGCE | Training | Avge. no hrs/w | Years of Experience | No. of students | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 | Primary | Secondary | Post 16 | Undergraduate |
| 172 | M | >60 | ✓ | | | ✓ | | 1.0 | 5-10 yrs | 11 to 15 | Maths | | | | | | ✓ | | |
| 179 | F | >60 | ✓ | | | ✓ | | 4.0 | >20 yrs | | Physics | | | | | | | ✓ | |
| 180 | F | 51-60 | ✓ | | | ✓ | | 3.5 | 1-2 yrs | >20 | English | Maths | | | | ✓ | | | |
| 181 | F | 41-50 | | | | ✓ | | 18.0 | >20 yrs | >20 | Reading | Other | | | | ✓ | | | |
| 185 | M | 31-40 | ✓ | | | ✓ | | 9.0 | 2-5 yrs | 16 to 20 | English | Maths | French | History | | ✓ | ✓ | ✓ | |
| 190 | M | | ✓ | | | ✓ | | 7.0 | >20 yrs | >20 | English | English | Maths | Maths | Spanish | ✓ | ✓ | | |
| 191 | M | >60 | ✓ | | | ✓ | | 8.5 | >20 yrs | >20 | English | French | Other | | | | ✓ | ✓ | ✓ |
| 195 | F | 51-60 | ✓ | ✓ | | ✓ | | 2.0 | 2-5 yrs | 6 to 10 | English | Maths | Other | | | ✓ | | | |
| 196 | F | 51-60 | ✓ | ✓ | | ✓ | ✓ | 12.0 | >20 yrs | >20 | Maths | Physics | Chemistry | | | ✓ | ✓ | ✓ | ✓ |
| 197 | M | 51-60 | ✓ | | | ✓ | ✓ | 7.0 | >20 yrs | >20 | Maths | | | | | ✓ | ✓ | ✓ | |
| 198 | F | 41-50 | ✓ | | | ✓ | ✓ | 4.0 | 2-5 yrs | 6 to 10 | Maths | English | Geography | Science | Other | ✓ | | | |
| 200 | F | 51-60 | ✓ | ✓ | | ✓ | ✓ | 3.0 | 5-10 yrs | 6 to 10 | English | | | | | | ✓ | | |
| 202 | M | 51-60 | ✓ | | ✓ | ✓ | | 20.0 | 5-10 yrs | >20 | Chemistry | Physics | Biology | Maths | | | ✓ | ✓ | |
| 203 | F | >60 | ✓ | | | ✓ | | 7.0 | 5-10 yrs | >20 | English | Maths | Other | Other | Other | ✓ | | | |
| 204 | M | 51-60 | ✓ | | | ✓ | ✓ | 12.0 | 10-20 yrs | >20 | Maths | English | History | | | | ✓ | | |
| 205 | M | 51-60 | ✓ | ✓ | ✓ | ✓ | | 1.0 | <1 yr | 1 to 5 | Biology | | | | | | | ✓ | |

*Table S.10 Details of Student 1 included by the tutors and quoted in the thesis*

| Student 1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Reference No. | Gender | Age | Hours/week | Period tutored | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| 166 | M | 17-19 yrs | 1.00 | >1 term - 2 terms | French | | | | |
| 190 | F | 4-6 yrs | 1.00 | >2 terms - 3 terms | English | | | | |
| 202 | M | 14-16 yrs | 1.00 | >1 term - 2 terms | Chemistry | Biology | | | |

# Appendix T: Additional Student Details

*Table T.1 Ethnicity of students included in the sample*

| | *n* | % |
|---|---|---|
| **White** | **(72)** | **(80)** |
| of European origin | 70 | 77.8 |
| of other origin | 2 | 2.2 |
| **Black** | **(6)** | **(6.6)** |
| of African origin | 5 | 5.5 |
| of Caribbean origin | 1 | 1.1 |
| of other origin | 0 | 0 |
| **Asian** | **(7)** | **(7.7)** |
| of Indian origin | 4 | 4.4 |
| of Pakistani origin | 1 | 1.1 |
| of Bangladeshi origin | 0 | 0 |
| of Chinese origin | 0 | 0 |
| of other origin | 2 | 2.2 |
| **Mixed** | **4** | **4.4** |
| **Other** | **1** | **1.1** |
| **TOTAL** | **90** | **100** |

Students were able to list up to five subjects for which they were being tutored; the majority of students indicated they were tutored in more than one subject. Table T.2 shows the different subject combinations.

*Table T.2 Tutored subject combinations for students included in the sample*

| Subject | *n* |
|---|---|
| **1 subject** | |
| Maths | 19 |
| English | 9 |
| Science | 5 |
| All primary curriculum KS1 & KS2 | 1 |
| **2 subjects** | |
| Maths and English | 15 |
| Maths and science | 6 |
| Science and science (2 types of science) | 2 |
| Maths and French | 2 |
| English and French | 1 |
| English and Spanish | 1 |
| ICT and business studies | 1 |
| **3 subjects** | |
| Maths, English and science | 4 |
| Maths, English and French | 2 |
| Maths, English and reading | 2 |
| Maths, science and French | 1 |
| Maths, French and German | 1 |
| Maths and 2 sciences | 1 |
| Maths, verbal reasoning and non-verbal reasoning | 1 |
| Geography, business studies and other subject | 1 |
| **4 subjects** | |
| Maths and 3 sciences subjects | 1 |
| Maths, English, Science and ICT | 1 |
| Maths, English, study skills and reading | 1 |
| **5 subjects** | |
| Maths, English and 3 science subjects | 4 |
| Maths, English, science, ICT and history | 1 |
| Maths, English, science, ICT and verbal reasoning | 1 |
| Maths, 3 sciences and geography | 1 |
| Maths, English, science, French and verbal reasoning | 1 |
| Maths, English, science, psychology and other | 1 |

*Table T.3 Frequency of subjects tutored by Tutor 1*

| Subject | *n* | % of students (*N* 86) |
|---|---|---|
| English | 27 | 31.4 |
| English language | 2 | 2.3 |
| English Literature | 2 | 2.3 |
| **English combined** | **(31)** | **36.1** |
| Science | 8 | 9.3 |
| Biology | 6 | 7 |
| Chemistry | 13 | 15.1 |
| Physics | 7 | 8.1 |
| **Science combined** | **(34)** | **39.5** |
| Maths | 55 | 64 |
| French | 4 | 4.7 |
| Geography | 3 | 3.5 |
| History | 2 | 2.3 |
| ICT | 2 | 2.3 |
| Psychology | 1 | 1.2 |
| Reading | 1 | 1.2 |
| Non Verbal reasoning | 1 | 1.2 |
| Verbal reasoning | 2 | 2.3 |
| Other | 1 | 1.2 |

*Table T.4 Reasons for tutoring provided by students in order of frequency*

| | Reason 1 | | Reason 2 | | Reason 3 | | Reasons combined | | % of students *N*70 |
|---|---|---|---|---|---|---|---|---|---|
| | % | *n* | % | *n* | % | *n* | % | *n* | % |
| To improve my understanding of the subject | 30 | 21 | 24.2 | 15 | 23 | 14 | 25.9 | 50 | 71.4 |
| †To help me achieve top examination grades | 27.1 | 19 | 21 | 13 | 11.5 | 7 | 20.2 | 39 | 55.7 |
| To increase my confidence in the subject | 11.4 | 8 | 22.6 | 14 | 14.8 | 9 | 16.1 | 31 | 44.3 |
| My parent(s)/carer wanted me to have a tutor | 1.4 | 1 | 4.8 | 3 | 14.8 | 9 | 6.7 | 13 | 18.6 |
| †I need help to pass a forthcoming examination | 2.9 | 2 | 8.1 | 5 | 4.9 | 3 | 5.2 | 10 | 14.3 |
| My school does not provide enough help | 1.4 | 1 | 3.2 | 2 | 8.2 | 5 | 4.2 | 8 | 11.4 |
| Other | 5.7 | 4 | 1.6 | 1 | 3.3 | 2 | 3.6 | 7 | 10 |
| †I need a tutor to help me pass the 11 plus exam | 2.9 | 2 | 3.2 | 2 | 3.3 | 2 | 3.1 | 6 | 8.6 |
| To help me because I am dyslexic | 8.6 | 6 | 0 | 0 | 0 | 0 | 3.1 | 6 | 8.6 |
| To get more work done than I do at school | 0 | 0 | 3.2 | 2 | 4.9 | 3 | 2.6 | 5 | 7.1 |
| I need help organising my work | 0 | 0 | 1.6 | 1 | 4.9 | 3 | 2.1 | 4 | 5.7 |
| I have difficulty with spoken language, spelling, reading or writing | 4.3 | 3 | 0 | 0 | 1.6 | 1 | 2.1 | 4 | 5.7 |
| I wanted a tutor | 1.4 | 1 | 1.6 | 1 | 1.6 | 1 | 1.6 | 3 | 4.3 |
| To increase the amount of time I spend studying | 0 | 0 | 3.2 | 2 | 1.6 | 1 | 1.6 | 3 | 4.3 |
| To catch up due to extended illness | 0 | 0 | 1.6 | 1 | 1.6 | 1 | 1 | 2 | 2.9 |
| The school did not provide the subject I wanted to take | 1.4 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 | 1.4 |
| I am home schooled | 1.4 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 | 1.4 |
| The school suggested I got a tutor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EXAMINATION related reasons combined** | **32.9** | **23** | **32.3** | **20** | **19.7** | **12** | **28.5** | **55** | **78.6** |
| **Total** | **100** | **70** | **100** | **62** | **100** | **61** | **100** | **193** | |

† combined to provide an indication of examination related reasons for tutoring

*Table T.5 Details of the students included in the sample and quoted in the thesis*

| | | | Student | | | | | | Tutor 1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference No. | Gender | Age | Avge. no. hrs/week | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 | Gender | Avge. no. hrs/week | Period Tutored | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| 4 | M | 17-19 yrs | 1 hr | Maths | Physics | | | | M | 1 hr | 2 terms | Maths | | | | |
| 7 | M | 14-16 yrs | 1 hr | ICT | Business | | | | M | 1 hr | 3 terms | ICT | | | | |
| 9 | M | 17-19 yrs | > 5 hrs | Physics | | | | | M | 5 hrs | 1 term | Physics | | | | |
| 14 | M | 14-16 yrs | 2 hrs | English | Maths | | | | M | 2 hrs | 18 mths - 2 yrs | English | Maths | | | |
| 19 | F | 11-13 yrs | 2 hrs | Maths | Science | | | | M | 2 hrs | < 1 term | Maths | Science | | | |
| 20 | M | 11-13 yrs | 1 hr | English | Maths | | | | M | 1 hr | 1 yr - 18 mths | Maths | | | | |
| 21 | M | 7-10 yrs | 1 hr | Maths | | | | | M | 1 hr | 3 terms | Maths | | | | |
| 24 | F | 11-13 yrs | 1 hr | Maths | | | | | M | 1 hr | 3 terms | Maths | | | | |
| 26 | F | 14-16 yrs | > 5 hrs | Maths | Chemistry | Physics | Biology | Geogr | M | 2 hrs | 1 term | Geography | | | | |
| 31 | F | 17-19 yrs | 1 hr | Maths | French | | | | F | 1 hr | 1 yr - 18 mths | Maths | | | | |
| 32 | F | 14-16 yrs | 2 hrs | Maths | Chemistry | Physics | Biology | English | F | 2 hrs | 3 terms | Chemistry | Maths | Physics | | |
| 34 | M | 14-16 yrs | 1 hr | English | | | | | M | 1 hr | < 1 term | English | | | | |
| 36 | F | 11-13 yrs | 1 hr | Maths | English | French | | | M | 1 hr | < 1 term | Maths | English | French | | |
| 38 | F | 17-19 yrs | 2 hrs | Maths | Science | English | Psychology | Other | F | 1 hr | < 1 term | Other | Psychology | | | |
| 42 | F | 17-19 yrs | 1 hr | Maths | Science | Chemistry | | | F | 1 hr | > 3 years | Chemistry | | | | |
| 43 | F | 17-19 yrs | 1 hr | Maths | Chemistry | | | | F | 1 hr | 3 terms | Chemistry | | | | |
| 44 | F | 17-19 yrs | 1 hr | Chemistry | | | | | F | 1 hr | 2 terms | Chemistry | | | | |
| 47 | F | 7-10 yrs | 1 hr | Maths | Verbal | Non Verbal | | | M | 1 hr | 3 terms | Verbal | Non Verbal | Maths | | |
| 49 | F | 17-19 yrs | 2 hrs | Spanish | Eng lit | | | | F | 1 hr | < 1 term | Eng lit | | | | |
| 50 | F | 11-13 yrs | - | Maths | English | | | | M | < 1 hr | < 1 term | Maths | | | | |

| | | | Student | | | | | | Tutor | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference No. | Gender | Age | Avge. no. hrs/week | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 | Gender | Avge. no. hrs/week | Period Tutored | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| 51 | F | 17-19 yrs | 2 hrs | Maths | Biology | | | | M | 2 hrs | < 1 term | Biology | | | | |
| 52 | M | 14-16 yrs | 1 hr | Maths | English | | | | M | 1 hr | 1 yr - 18 mths | Maths | | | | |
| 53 | F | 14-16 yrs | 1hr | English | Maths | Science | | | F | 1 hr | 1 term | Maths | Science | | | |
| 54 | M | 14-16 yrs | 2 hrs | Maths | English | | | | M | 2 hrs | 2 terms | Maths | | | | |
| 55 | M | 14-16 yrs | 2 hrs | Maths | | | | | M | 2 hrs | < 1 term | Maths | | | | |
| 56 | | 14-16 yrs | 1 hr | Maths | English | | | | M | 1 hr | 1 term | Maths | | | | |
| 57 | F | 17-19 yrs | 1 hr | Maths | | | | | M | 1 hr | < 1 term | Maths | | | | |
| 59 | M | 14-16 yrs | 1 hr | Maths | French | German | | | F | 1 hr | 1 yr - 18 mths | French | | | | |
| 61 | F | 14-16 yrs | 1 hr | Maths | | | | | F | < 1 hr | 2 - 3 yrs | Maths | | | | |
| 64 | F | 17-19 yrs | - | - | | | | | - | - | - | - | | | | |
| 65 | M | 17-19 yrs | 1 hr | Maths | Chemistry | | | | F | 1 hr | < 1 term | Chemistry | | | | |
| 67 | F | 17-19 yrs | > 5 hrs | Maths | Biology | Chemistry | Physics | | F | 2 hrs | 1 yr - 18 mths | Chemistry | | | | |
| 68 | F | 14-16 yrs | 1 hr | Maths | | | | | F | 1 hr | > 3 years | Maths | | | | |
| 70 | M | 11-13 yrs | 1 hr | Maths | | | | | M | 1 hr | 2 terms | Maths | | | | |
| 73 | F | 14-16 yrs | 4 hrs | Maths | English | Biology | Chemistry | Physics | M | 5 hrs | 2 - 3 yrs | Maths | Physics | Biology | Chemistry | English |
| 74 | M | 7-10 yrs | 1 hr | English | Maths | Verbal | Science | French | F | 1 hr | 2 - 3 yrs | Maths | English | Science | French | |
| 77 | F | 7-10 yrs | 1 hr | Maths | English | Science | ICT | | F | < 1 hr | 3 terms | Maths | English | Science | ICT | |
| 79 | M | 14-16 yrs | 1 hr | Eng lang | French | | | | M | 1 hr | 2 terms | Eng lang | | | | |
| 82 | F | 14-16 yrs | 2 hrs | Maths | English | | | | M | 1 hr | 2 terms | Eng lang | Eng lit | | | |
| 83 | F | 14-16 yrs | 1 hr | Maths | English | | | | M | 1 hr | 18 mths – 2 yrs | English | | | | |
| 84 | M | 14-16 yrs | < 1 hr | English | | | | | M | < 1 hr | 1 yr - 18 mths | English | | | | |
| 87 | F | 7-10 yrs | 1 hr | Maths | English | | | | F | 1 hr | > 3 years | Maths | English | | | |
| 89 | M | 7-10 yrs | 1 hr | All Primary | | | | | F | 1 hr | > 3 years | Maths | Reading | English | | |
| 90 | F | 17-19 yrs | 1 hr | Chemistry | | | | | M | 1 hr | < 1 term | Chemistry | | | | |