Essays on Educational Production Functions in England

Amira Elasra

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in Economics

Adam Smith Business School

College of Social Sciences

University of Glasgow

June, 2016

(بِسْمِ اللهِ الرَّحْمنِ الرَّحِيمِ)

"وَمَا اخْتَلَفْتُمْ فِيهِ مِنْ شَيْءٍ فَحُكْمُهُ إِلَى اللَّهِ ذَٰلِكُمُ اللَّهُ رَبِّي عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ (١٠)" (سورة الشوري)

"وَاصْبِرْ وَمَا صَبْرُكَ إِلَّا بِاللَّهِ وَلَا تَحْزَنْ عَلَيْهِمْ وَلَا تَكُ فِي ضَيْقٍ مِمَّا يَمْكُرُونَ (127)". (سورة النحل)

"وَمَا تَكُونُ فِي شَأْنٍ وَمَا تَتْلُو مِنْهُ مِن قُرْآنٍ وَلَا تَعْمَلُونَ مِنْ عَمَلٍ إِلَّا كُنَّا عَلَيْكُمْ شُهُودًا إِذْ تُفِيضُونَ فِيهِ وَمَا يَعْزُبُ عَن رَّبِّكَ مِن مِّثْقَالِ ذَرَّةٍ فِي الْأَرْضِ وَلَا فِي السَّمَاءِ وَلَا أَصْغَرَ مِن ذَٰلِكَ وَلَا أَكْبَرَ إِلَّا فِي كِتَابٍ مُّبِينٍ (61) أَلَا إِنَّ أَوْلِيَاءَ اللَّهِ لَا خَوْفٌ عَلَيْهِمْ وَلَا هُمْ يَحْزَنُونَ (62)". (سورة يونس)

(صدق اللَّهُ العظيم)

(In the name of Allah, the Most Gracious, the Most Merciful)

'' And be patient, [O Muhammad], and your patience is not but through Allah . And do not grieve over them and do not be in distress over what they conspire (127)''. (Surat An-Nahl)

'' And, [O Muhammad], you are not [engaged] in any matter or recite any of the Qur'an and you [people] do not do any deed except that We are witness over you when you are involved in it. And not absent from your Lord is any [part] of an atom's weight within the earth or within the heaven or [anything] smaller than that or greater but that it is in a clear register (61) Unquestionably, [for] the allies of Allah there will be no fear concerning them, nor will they grieve (62)''. (Surat Yunus)

(Allah the Mighty has spoken the truth)

Contents

List of Tables

List of Figures

Acknowledgments

I owe my deepest infinite gratitude to ALLAH for guiding, helping and giving me the strength and patience throughout the past years. I cannot thank enough my parents, Sawsan and Mohamed, to my sisters, Mona and Asmaa, and to my twin brother, Ahmed for their patience, love and moral support. I deeply thank my supervisor, Dr. Luis Angeles for his guidance, research advice and excellent supervision throughout the past years. Above all, he has been an inspiring mentor, who stimulated and challenged my thinking. I also thank Prof. Richard Harris for his valuable guidance and advice during the first year in my research. My gratitude goes as well to Dr. Sai Ding for accepting to become my secondary supervisor after the first year. I will always have a deep respect and gratitude for Prof. Ashraf ELaraby for he has been the first professor who cultivated in me the passion for becoming a researcher in the Economics of Education. With them and my supervisor, this journey has been much easier and manageable.

The research project has benefited from the comments and kind advice of many other people at various stages of writing. I am especially grateful to Dr. Rebeca Echavarri, Dr. Konstantinos Angelopoulos, Dr. Francesca Flamini, Dr. Dimitris Korobilis and Dr. Stephan Heblich for discussing my work at the Glasgow University departmental seminars and the SGPE annual PhD conference. They all brought appreciated contributions towards the development of the thesis in its early stages and helped improve its overall quality.

Dr. Heba Ali, Dr. Angie Mounir, Dr. Timothy Shadrach Birabi, Dr. Aldo Elizalde Archundia, Dr. Zivile Zekaite, Thankur Parajuli, Mohiuddin Rahman and Ammar Khan, Hassan Rizvi, and all my PhD colleagues should not be omitted from this list. They have all been great colleagues and friends, with whom I exchanged many interesting ideas, while also providing an intellectually stimulating research atmosphere.

Last, but not least, the support of the Adam Smith Business School, who funded my doctoral studies, is gratefully acknowledged. Also, special thanks to the Scottish Institute for Research in Economics (SIRE) for funding my research at the United Nations Development Program.

Author's Declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Signature

Printed Name: Amira ELasra

Date:

Introduction

There has been a long debate over the relationships between different inputs in the educational process and student's outcomes since 1966 with the release of the Coleman's report, which concluded that family background and peers were more important than schools and teachers in educational outcomes. Related research has included a number of disciplines, such as Economics, Sociology and Psychology. Despite the expansion of the literature on the implications that different inputs have on students' educational outcomes, empirical research has so far lacked, in some instances, the full capacity to provide unequivocal findings. Essentially, this deficiency is mainly attributed to two main factors; the lack of reliable data and the lack of full dimensionality in the theoretical model adopted to explain such data (Levaččićć and Vignoles, 2002; Knoeppel, Verstegen, and Rinehart, 2007; Kyriakides, 2005; Rivkin, Hanushek and Kain, 2005).

The existence and reliability of data represent one of the key challenges facing economists to run efficient informative analysis. Academic achievement at any point is a cumulative function of current and prior student, family, and school experiences. Accordingly, in order to include all possible inputs into the analysis, an integrated dataset covering almost all aspects of the educational process must be built including complete student, family, and school data that are hardly ever available (Rivkin, Hanushek and Kain, 2005). Consequently, the lack in the availability of such data has, to an extent, imposed limitations on the quality of previous research findings mainly resulting from omitted variables bias.

The theoretical model adopted to explain the data also plays a major role in reaching unambiguous findings. In that regard, the analysis of the relationships between inputs and outputs of education has widely been the scope of research of many education specialists and economists. However, one of the main differences between the two streams of research lies in the variations between the methodological approaches of investigating such relationships. On one side, education specialists rely on what is known as school effectiveness analysis, while on the other side economists rely on more quantitative analysis under the general framework of educational production functions, also known as input-output or cost-quality analyses (Levaččićć and Vignoles, 2002; Knoeppel, Verstegen, and Rinehart, 2007; Kyriakides, 2005).

Given the two approaches, Levaccićć and Vignoles (2002) have drawn the attention to the fact that both approaches focuses on certain aspects in the educational process. Basically, the school effectiveness approach focuses mainly on school inputs in explaining the variations in schools' effectiveness unlike the educational production function approach, which pays more attention to resources inputs such as school expenditures and their effect on school efficiency with lack of control of student's inputs and other school related inputs leading to methodological limitations.

Previously, most education economists focused their attention on the education production function approach developed by the landmark study Equality of Educational Opportunity (often referred to as the Coleman report) (Coleman et al., 1966). Although the Coleman report is the best known study of this type, there have been a large number of other studies and synopses in the following years (Heim and Perl, 1974; Murnane, 1981). Despite the evolution of many broad guidelines regarding the specification of models in general, there has been no consensus on the exact specification of the educational production function and, more specifically, on how to measure the different components of the function, such as school resources, student characteristic variables, or even the educational outcome measures produced by these production functions (Hedges, Laine and Greenwald, 1994b).

Both economic and other social science perspectives on the determinants of adolescent's educational outcomes have emphasized the role of parental (or family) circumstances and decisions, often to the neglect of other important considerations. A more comprehensive framework would view the outcomes of adolescents as dependent on three primary factors; the decisions made by the society (or government) that determine the opportunities available to both adolescents and their parents (the "social investment in children"), the decisions made by the parents regarding the quantity and quality of family resources devoted to their children (the "parental investment in children"), and the decisions that adolescents make given the investments in and opportunities available to them (Haveman and Wolfe, 1995).

In such a framework, society (government) employs a wide variety of policy instruments, such as, education spending, monitoring and evaluation systems and regulatory policies to set the necessary environment within which families and adolescents make their decisions. The parents' decisions target certain objectives that influence how their children develop in general and reach education success in particular. Given the different resources constraints

faced by families, they make decisions that determine the level of "parental investment in children", such as household size and structure, consumption levels and saving, work and leisure, and the allocation of income and time. Additionally, adolescents also make decision with the objective to make themselves as well off as possible given the resources available to them through the society at large and their families in particular (Haveman and Wolfe, 1995).

Motivated by the existence of the two identified problems in the literature and in light of the above framework, the aim of the dissertation is to overcome those problems by building a unique large dataset that covers all aspects of the educational process covering the above three primary factors (reflecting three main blocks of inputs) including school inputs (representing the social investment in children), adolescent's family background inputs (representing parental investment in children) and adolescent's personal inputs (representing adolescents own decisions). Also, the thesis aims at overcoming such problems by adopting an integrated theoretical model and advanced quantitative methodological approaches to analyze it.

With the fulfillment of such aim the dissertation manages to fill some of the gaps identified in the Education Economics literature related to the relationships between the cognitive and affective educational outcomes of English adolescents on one hand and three main inputs representing each of the previously indentified factors on the other hand controlling for other possible heterogeneities. Specifically, the thesis examines the effect of school process inputs in Chapter 2, family structure as a key family background input in Chapter 3 and finally religion and religiosity as a key adolescent's personal input in Chapter 4.

The thesis starts with Chapter 1 building an integrated dataset for a wide range of variables that were important to investigate the proposed educational production functions. For this, three main national databases are linked as building blocks for the dataset used in the dissertation. These are the Longitudinal Study of Young People in England (LSYPE), the National Pupil Database (NPD) and the Ofsted Database. The aim is to have information about all aspects related to the education of the young person starting from his/her family background information to his/her own personal and educational attainment information in addition to the school characteristics he/she attended.

In light of what has been observed in the literature, Chapter 2 identifies a number of gaps in the Education Economics literature. To begin with, most of the existing literature have

shown that the educational production function approach hardly accounts for the school process variables (Glewwe, et al., 2011; Levaččićć and Vignoles, 2002; Teddlie and Reynolds, 2000). Instead, it focused on the effect of school resources inputs with limited attention to school process variables in which case the focus was on limited factors, such as principals' evaluation to teachers and leadership (Armor, et al., 1976; Murnane, 1975; Teddlie and Reynolds, 2000) or certain organizational aspects of the school, such as the student ability grouping scheme (Kerckhoff, 1986). Second, previous research has indicated that the joint teacher and school effectiveness research is needed in order to explain variations in educational achievement (Kyriakides, 2005), whereas both school effectiveness and teacher effectiveness were examined separately (Teddlie, 1994).

Third, earlier research has shown that an important objective of examining the effect of school process inputs is to incorporate such effect on both cognitive and non-cognitive outcomes (Sammons, Hillman and Mortimore, 1995; Teddlie and Reynolds, 2000). However, only few researcher have met such objective either by fully studying the framework for explaining the two outcomes as in the books of both Mortimore, et al. (1988) and Rutter, et al. (1979) or by examining an application for the effect of school process variables on the two outcomes as in the case of the Netherland (Knuver and Brandsma, 1993) and Greece (Kyriakides, 2005).

Last but not least, most of the earlier research on the effect of the full dimensional school process concept on students' educational outcomes has generally been less focused on the case of England (Levaččićć and Vignoles, 2002) and/or has been focused on the effect of limited organizational aspects of the school, such as the student ability grouping scheme (known as streaming) on cognitive outcomes of British students (Kerckhoff, 1986) or the effectiveness of post-16 educational institutions like assisted places scheme school (Tymms, 1992). Another study examined the effect of teacher quality (Slater, Davies and Burgess, 2009). Other studies examined the effect of school attended on both primary and secondary test scores and its continuity over time using Inner London Education Authority's Junior School Project sample showing that such effect is greater on the former than the latter with smaller effect on continuing from primary to secondary (Sammons, et al., 1995).

In light of the aforementioned gaps, Chapter 2 answers four research questions. These are:

1. What is the teacher influence on student's cognitive and affective outcomes?

2. Which aspect of school quality in the school process component is more predictive of student's cognitive and affective outcomes?
3. What is the effect of overall school quality on student's cognitive and affective outcomes?
4. How important is the school process component in the CIPO model? And whether other factors are more important in explaining student's outcomes?

In order to answer these questions Chapter 2 examines the effect of school process variables on students' both cognitive and affective educational outcomes using a more comprehensive theoretical framework based on the Context-Input-Process-Outcome model (Teddlie and Reynolds, 2000) controlling for both school context and student's inputs (Link and Ratledge, 1979; Rivkin, Hanushek and Kain, 2005). Additionally, Chapter 2 combines both the teacher and school effectiveness by examining the school process inputs at both the school level and the teacher level that are not financial resource oriented inputs. In short, the analysis combines teacher influence variable measuring student's perception of his/her teacher and school quality variable(s), to examine their effect simultaneously on students' educational outcomes.

The analysis of Chapter 2 is based on the data built in Chapter 1 comprising data from the LSYPE, the NPD and the Ofsted database, hence including new school information that have been lacked in the literature covering a wide range of school process variables in the analysis. Primarily, the analysis combines data about the student from the LSYPE and the NPD and about the school from the Ofsted database for 56 school process variables reflecting its effectiveness in nine major inspection judgments that have not been examined properly in the literature neither as combined with student information nor separately.

The primary implication of the findings is that teachers matter. Teachers play a significant positive moderate role in improving student's cognitive outcome (Aaronson, Barrow and Sander, 2007; Glewwe, et al., 2011, Kyriakides, 2005, Link and Ratledge, 1979; Rivkin, Hanushek and Kain, 2005) and a much bigger role in improving their affective outcome (Kyriakides, 2005). Moreover, the teacher effect on attitude was not affected by the overall school quality and that such effect is the leading school process factor that could significantly explain such attitude. Additionally, comparing teacher effect with the overall school quality effect, it was found that the first was slightly smaller than the latter when it comes to cognitive outcome, while it was much bigger in the case of affective outcome.

Such findings were coupled with another indicating that student's inputs may play a bigger role in explaining his/her outcomes.

Another contribution of Chapter 2 shows that most school quality aspects were found to have positive significant contribution in explaining student's cognitive outcome but not necessarily his/her affective outcome. Besides the positive impact of most school quality indices, their magnitudes were moderate for the cognitive outcome and much bigger for the affective outcome.

Finally, based on Chapter 2 findings one can conclude that school process inputs are important in explaining students' both cognitive and affective outcomes. However, the moderate magnitude of some of these variables on cognitive outcome reflected that student's related inputs such as academic self-schema (Chowdry, Crawford and Goodman, 2010; Duran and Weffer, 1992; Glick and Sahn, 2010; Murdoch and Phelps, 1973; Tymms, 1992) and attitude towards continuing to higher education (Chowdry, Crawford and Goodman, 2009; Chowdry, et al., 2010) could play a major role in explaining such outcome.

The thesis proceeds in Chapter 3 showing that after reviewing the literature there has been a long-standing interest in how family background factors determine children's educational trajectories. Family structure plays an important role in this process and examining its relationship with children's educational attainments is essential for designing policies targeting children from nonintact families. In this respect, most of the earliest research on family structure was empirical analysis by social scientists other than economists; whereas the contributions of economists have come later. Compared to earlier work, economic studies are distinguished by attention to more formal models of children's attainment process (Haveman and Wolfe, 1995).

Economic theory perceives the resources available to the family as those in the form of human capital and the availability of financial and time resources to children. It proposes that socioeconomic success is partly a function of human capital. Basically, families are singular units (agents) maximizing utility coming from children (goods) that are produced by investments in both market activity and household services (Becker, 1965; 1975; 1981; Becker and Tomes, 1986). This implies that the total amount invested in human capital differs among individuals due to differences in either demand or supply conditions. In this context, family background affects schooling through altering both the opportunities (supply conditions) and the capacities (demand conditions).

Chapter 3 adopts the economic theoretical perspective of investing in children (Beller and Chung, 1992; Boggess, 1997; Haveman and Wolfe, 1995) based on Becker's household production model (1965) that has been adopted by Beller and Chung (1992). In this perspective, children's well-being in general and educational outcome in particular (the focus of the analysis) is a function of parents' choices about the level of resources to invest in their children and the allocation of those resources among their children. In that framework, previous literature has drawn the attention to a number of reasons to believe that estimated effects of family structure are instead capturing unobserved characteristics that are correlated with family structure (Gennetian, 2005). These could be either observable but difficult to measure variables and/or unobservable variables.

Over the past few decades there has been an increasing change in family structures and forms. Partially, this has been due to the rising divorce rates and the proliferation of complex stepfamilies. Another reason for such change is the increasing rates of nonmarital fertility and cohabitation (Bianchi and Casper, 2000). Consequently, the proportion of children residing with two biological married parents has been steadily declining in contrast to nonintact family structures such as single parent and cohabiting parents. England is no exception; the recent census data shows that although there has been a decrease in the divorce rate in the last twenty years by 27% to reach 10% in 2012, there has been a much further decrease in the marriage rate by 35% during the same period. This has been coupled with an increase in the number of civil partnerships by 1196% just between 2007 and 2013 and an increase in the marriage rate by only 3.5% in the same period (Office for National Statistics, 2015).

The shift towards cohabitation and less marriages accompanying the rise in single parenting has been found to have an effect on children's educational outcomes. Numerous studies investigated why educational outcomes vary between children growing in a married parent family and those growing in nonintact family structures such as cohabiting parent, single parent and divorced parent. In general, there seem to be consensus among researchers that the former tend to have better educational outcomes than the latter, where such outcomes were measured by different educational attainment indicators such as average grades or scores, school and college completion rates, educational aspirations and academic orientations (Brown, 2004; Ginther and Pollak, 2004; Martin, 2012; Sandefur, Meier and Campbell, 2006).

The literature review of Chapter 3 has identified a gap in the Education Economics literature regarding how family structure could affect English adolescents' educational

cognitive and affective outcomes. To explain, most of the previous research on the effect of family structure on children's educational attainment has generally been conducted in North America with less volume of research in England. However, it is important to mention very few exceptions in education research literature, such as Kiernan (1997) investigating the effect of divorce on children long term development using the National Child Development Study data and Hampden-Thompson and Galindo (2015) investigating the effect of transition of family structure and the mediating role of income on children's post-16 educational persistence. Other studies have controlled for the family structure effect showing a negative impact of nonintact structure on children's primary education (Mensaha and Kiernan, 2010; 2011).

The analysis in Chapter 3 seeks to fill the gap about how variations in family structure affect educational outcomes of English adolescents. In this framework, chapter 3 answers the following research questions:

1. Does family structure account for the disparities among adolescents in their cognitive and affective educational outcomes?
2. Is the effect of family structure on such outcomes mediated by factors, such as parents' socioeconomic status and their involvement in their education?

In order to answer these questions Chapter 3 investigates the effect of family structure on children's educational outcomes in England, specifically cognitive and affective outcomes. For that, Chapter 3 proposes a more comprehensive framework controlling for the two main identified mechanisms in the literature through which family structure influences children' educational outcome, specifically family socioeconomic status and parental involvement, controlling for key family background, adolescent and school attributes (Levaccic and Vignoles, 2002). The proposed framework is based on both Becker's household production function (1965; 1975; 1991) and socialization framework accounting for parents' characteristics (Biblarz and Raftery, 1999) and school characteristics (Levaccic and Vignoles, 2002), hence including new school information in the analysis that has been lacked in the literature with exception of few studies, such as Zheng, Schimmele and Hou (2015). Additionally, the analysis uses a unique dataset comprising data from the LSYPE and the NPD.

The key finding of Chapter 3 generally supports that in the reviewed literature that living in a nonintact family structure has a negative effect on adolescents' educational outcomes (Astone and McLanahan, 1991; Rodriguez and Arnold, 1998; Wallerstein and Lewis, 2005

among others). The primary exception being that the two mechanisms examined to explain such effect do not play their expected mediating role except for the partial mediating role of the interaction effects of parental involvement on affective outcome. Accordingly, one can suggest that the effect of including those two mechanisms and other controls highlights the main finding of the analysis that part of the observed educational outcomes is "pure" family structure effect even after controlling for the effects of possible observed compensating or reinforcing family characteristics or allocation decisions on the contrary to other findings suggested in the literature that such outcomes are not pure family structure effects (Gennetian, 2005).

Deeper investigation of the discrepancies between the different structures showed that in most cases one cannot determine a general trend for whether living with 'other types' of a married couple could have worse impact than living with a single parent or whether living with married couple is better than a cohabiting couple. Moreover, the analysis agrees to a great extent with the general effect observed in such literature. Living with a lone mother does have a negative significant impact on adolescents' cognitive and affective outcome (Amato and Booth, 1997) and that is usually better than the effect of living with a lone father (Amato and Booth, 1991; Amato and Keith, 1991b; Hoffmann and Johnson, 1998).

Finally, the thesis proceeds in Chapter 4 showing that most researcher agree on that students' behaviour in general and during adolescence in particular plays an important role in shaping their characters and decision making skills. Such decisions contribute greatly to their present life outcomes in terms of following certain social conducts and reaching certain educational outcomes. It also affects their future life in terms of their aspirations to continue their education and what type of career they want to pursue (Muller and Ellison, 2001). Some students tend to drop out during high school (Kaufman, McMillen and Sweet, 1996) or adjust their educational aspirations downward (Hanson, 1994), while others work harder to have better educational and professional career (Hedges and Nowell, 1995).

Most of the main stream researchers think that successful educational outcomes are merely explained by personal attributes and school processes. However, such success is also affected by religious socialization factors (Glanville, Sikkink and Hernandez, 2008; Gruber, 2005; Lehrer, 1999; 2004a; 2004b; 2009; Leventhal and Brooks-Gunn, 2004; Sander, 1992; Weis, 1988). Sociologists generally define religious socialization as the process through which an individual forms attitudes, values and behaviours within the context of a religious belief system and practices (Brown and Gary, 1991). Such process represents all forms of religious involvement practices and how they not only influence the

general attitudes of an individual but also his/her education (Brown and Gary, 1991; Regnerus, 2000). In that framework it is important to differentiate between religious affiliation and religiosity. The former reflects the type of religion, while the latter reflects aspects like commitment to religion, strength of religious beliefs and religious involvement or participation (Lehrer, 2004b).

For numerous decades academics have engaged in the study of the influence of religion, in general, from mainly sociological and psychological perspectives (Cochran, 1992; 1993; Jeynes, 1999). Moreover, social scientists have widely examined the influence of religiosity, even to the extent of undertaking meta-analyses and examining nationwide datasets (Jeynes, 1999; 2003; 2006; 2010). Nevertheless, Chapter 4 identifies a gap in the literature that the impact of religion on educational outcomes remains underexamined in general (Barrett, 2010; Lehrer, 2004a; Muller and Ellison, 2001) and by economists in particular (Gruber, 2005).

The economic theoretical framework for understanding how variations in religion and/or religiosity affect educational outcomes can be illustrated using the human capital model developed by Becker and Chiswick (1966) and Becker (1967). In this model, the optimal level of schooling for an individual is reached when the demand for funds for investment in education equals the supply. The demand curve shows the marginal rate of return derived from each additional unit of income spent on education. The negative slope of the demand curve is attributed to the increase in the cost in terms of forgone earnings as additional schooling is acquired and productivity in the labour market rises. Moreover, the model shows that since a person's mental capacity is fixed and life is finite, diminishing marginal returns eventually occur as additional education is acquired. The supply curve shows the marginal rate of interest on funds borrowed (or not lent) to finance investments in education. The positive slope reflects the standard assumption that the cost of obtaining additional funds is increasing with additional human capital investments.

The human capital model explains the effect of religion and/or religiosity in the sense that they are viewed as reflecting distinctive features of the home environment that affect both the returns to and costs of additional investments in education and so the position of both the demand and supply curves (Chiswick, 1988; Lehrer 1999; 2004a; 2004b). On the demand side, following certain religion or having certain level of religious involvement can affect the returns from investments in education. To illustrate, certain religious groups believe in more benefits from schooling and these benefits increase with the rise in the level of religious involvement, therefore they have stronger incentives to pursue education

and thus a higher level of attainment is expected, other things held equal. On the supply side, following certain religion or having certain level of religious involvement can affect parents' willingness and ability to supply funds for investments in schooling. In that sense, a higher level of education is expected for religious groups, such as Jews in which parents are more willing and able to supply funds for such investments, other things held equal (Lehrer, 2009).

A second identified gap in the literature is that generally, previous research has mainly investigated the effect of religious affiliation and religiosity separately. Just as the literature on the effects of religious affiliation has hardly accounted for the role of religiosity, most of the literature on the effects of religiosity largely ignores religious affiliation (Lehrer, 2004a). Some researchers focused on the effect of religion affiliation on educational outcomes (Featherman, 1971; Greeley, 1981; Roof, 1979; 1981; Tomes, 1983; 1985; among others), while other focused on the effect of religious involvement on such outcomes (Coleman, Kilgore and Hoffer ,1982; Coleman and Hoffer, 1987; Freeman, 1985; Smith, 2003; among others).

Researchers focusing on religious affiliation include both sociologists and economists, while those focusing on religiosity are mainly dominated by sociologist and psychologists with little contribution from the economics literature (Gruber, 2005). The lack of such contribution is related to the economic way of reasoning which is highly sensitive to the difficulty inherent in separating the causal effects of religiosity from other factors that are correlated with outcomes. Most factors which determine the religiosity of any given individual, whether short term or long term are likely correlated with their outcomes through other channels as well. Short term factors in terms of good or bad shocks to personal well-being may cause fluctuations in religious involvement. Also, long run factors, such as correlation between religiosity and ambition or ability can cause heterogeneity across individuals.

A third gap identified in the literature is that during the past two decades some researchers have examined the influence of both religious affiliation and religiosity on educational outcomes, especially in the USA with special focus on the Black community (Barrett, 2010) and the comparison between Protestants and Catholics (Featherman, 1971; Greeley, 1981; Roof, 1979; 1981; Tomes, 1983; 1985) with less volume of research in England. Such influence is attributed to the fact that both religious affiliation and religiosity have impacts on the perceived costs and benefits of various decisions made by individuals and families over their life cycle, which in turn could indirectly affect their educational

outcomes (Lehrer, 2004b; 2009). Moreover, religion's impact on students' behaviours plays a direct role in forming their attitudes and values in general and towards education in particular (Glanville, Sikkink and Hernandez, 2008).

Because religious affiliation influences educational outcomes, the potential positive influence is likely to be stronger with the increase in religiosity and so a growing part of the literature has been paying more attention to the influence of religiosity showing that in general it has positive influences on individuals' outcomes (Lehrer, 2004; 2009; Gruber, 2005; Smith, 2003; Waite and Lehrer, 2003). In general, one can say that most of the previous studies have indicated a positive relationship between religious affiliation and religiosity on one hand and students' educational outcomes on the other (Elder and Conger, 2000; Freeman, 1985; Glanville, Sikkink and Hernandez, 2008; Regnerus, 2000; 2008; Sanders, 1998; among others).

The dearth of knowledge on the relationship between religious affiliation and/or religiosity and educational outcomes is partially attributed to lack of a sufficient theoretical framework to clearly investigate such relationships, where most researchers emphasize the importance of social capital as the main mechanism to explain these relationships (Coleman, 1961; 1988; Glanville, Sikkink and Hernandez, 2008; Lehrer, 2004a; among others). That shortage of knowledge is also attributed to limitations of the available surveys, many of which have little or no information on variables related to the mechanisms through which religious affiliation and religiosity affect such outcomes (Lehrer, 2004a). A better understanding of these mechanisms promises to enhance the understanding of adolescent development more broadly.

Chapter 4 seeks to fill the previous identified gaps in the Education Economics literature about how variations in both religious affiliation and religiosity affect educational outcomes of English adolescents. In this framework, chapter 4 answers the following research questions:

1. Does religiosity affects the social capital resources available to adolescents?
2. Do religious affiliation and religiosity account for the disparities among adolescents in their cognitive and affective educational outcomes?
3. Is the effect of religious affiliation and religiosity on such outcomes mediated by social capital or could there be other mechanism(s) that play such role?

In order to answer these questions Chapter 4 investigates the effect of religious affiliations and religiosity on adolescents' educational outcomes in England, specifically cognitive and

affective outcomes by adopting a more comprehensive theoretical framework based on both Becker's and Chiswick's human capital model (1966; 1967) and socialization framework accounting for social capital (Coleman, 1961; 1988) and school characteristics (Levaccićć and Vignoles, 2002). Additionally, it uses a unique dataset comprising data from the LSYPE and the NPD.

Six main broad findings could be summarized in Chapter 4. First, being more religiously involved adolescent and having strong beliefs in the importance of religion as expected is consistently and favourably associated with most social capital forms available to him/her, such as organizational life, engagement in public affairs, volunteerism and informal sociability (Muller and Ellison 2001). Second, it also as expected has a consistent favourable influence on the adolescent's both cognitive and affective outcome. Nonetheless, the estimated effects of religiosity are found to be only significantly modest in magnitude on affective outcome (Glanville, Sikkink and Hernandez, 2008; Muller and Ellison 2001).

Third, religious affiliation can to an extent though not necessarily explain the outcome gap among adolescent depending on the outcome examined (Coleman, 1987). Fourth, the effect of religion was found to be conditional on adolescent's attributes such as his/her academic self-schema. Fifth, investigating the role of social capital as a possible mechanism to explain the effect of both religion and religiosity has shown that social capital does not mediate such effects. Sixth, although social capital could not play the mediating role as a mechanism to explain the effect of religion and religiosity on educational outcomes, it is found to have an independent modest effect on these outcomes (Coleman, 1988; 1990b; Muller and Ellison, 2001).

Chapter 1: Data Setup and Formulation

This chapter provides a thorough explanation of the dataset that was used throughout the dissertation. It started with describing the different databases that were used to build it, and then it explained how these databases were merged to build such dataset. The chapter also explained the variables incorporated in the dataset and how they were formulated.

1.1 Dataset Building Blocks

Three main databases were used as building blocks for the dataset used in this dissertation. These are the Longitudinal Study of Young People in England (LSYPE), the National Pupil Database (NPD) and the Ofsted database. In what follows each database is briefly described.

1.1.1 The Longitudinal Study of Young People in England (LSYPE)

The LSYPE is a large-scale panel study of young people that is designed to provide information about the factors affecting the educational attainment and progress of the cohort group at the end of compulsory education. Such information is used to provide guidance to policy makers to design and evaluate the policies aimed at that group (Department for Education [DfE], 2011a). Additionally, a number of researchers have used such survey to study and assess those factors and their impact on young people educational outcome (for example, Chowdry, Crawford and Goodman, 2009; 2010; Gregg and Macmillan, 2009; the Department for Children, Schools and Families [DfCSF], 2009; Chowdry, et al., 2010).

The study covers a wide range of questions related to the family background, the parents' attitude and the young person himself/herself. The first group focuses on the young person's family background, parental socio-economic status, parental employment, income, family environment as well as local deprivation. The second group focuses on parents' attitude in general and towards the young person development in particular. The third group focuses on the young person education attainment, outcome, attitude, experiences, behaviours and personal characteristics (DfE, 2011a).

The LSYPE Sample Design and Weight Adjustments

The longitudinal study, also known as 'Next Steps' started in 2004, when respondents were at the age of 13 (year 9 or equivalent) and continued annually till 2010 forming the seven waves of the study. The annual survey comprises of interviews with young people and in the first four waves with their parents and/or guardians as well. Young people covered in

the survey attended maintained schools (state-funded), independent schools (private-funded) and pupil referral units[1]. 52 independent schools and 2 PRUs had a one sampling stage and were sampled with probability proportional to the number of pupils aged 13 at that institution using the school level annual schools census (SLASC). Independent schools were stratified by percentage of pupils achieving 5 or more A*-C GCSE grades in 2003 within boarding status (i.e. whether or not had any boarding pupils), within gender of pupils, while PRUs formed a stratum of their own (DfE, 2011a).

For the maintained schools, a two stage probability proportional to size (PPS) sampling procedure with disproportionate stratification was adopted using the Pupil Level Annual Schools Census (PLASC). Schools were primary sampling units (PSUs)[2] stratified into deprived/non-deprived, where deprivation was measured by the proportion of pupils in receipt of free school meals, and deprived schools were defined as those in the top quintile of this distribution with deprived schools over-sampled by a factor of 1.5. The second stage sampled the pupils within schools with those from major minority ethnic groups (Indian; Pakistani; Bangladeshi; Black African; Black Caribbean; and Mixed) were over-sampled at pupil level in order to achieve target issued sample numbers of 1,000 in each group. Within each deprivation stratum maintained schools were ordered, and thus implicitly stratified by region then by school admissions policy before selection. Finally, 838 schools were selected in the maintained sector. The sample excluded home schooled children, pupils in schools with less than 10 (maintained sector) or 6 (independent sector) Year 9 pupils, boarders (including weekly boarders) and children residing in the UK only for education purposes (DfE, 2011a).

Of the total 892 schools selected, 647 schools (73%) took part in the study. To explain, school level non-response was a specific problem, especially in Inner London and in the independent sector where only 56 and 57 per cent of schools responded respectively. Therefore the final issued sample was much smaller than the initial sample drawn from PLASC. The final sample of the first wave interviewed around 15770 households, who were selected to be a representative sample of young people in England. At wave four the sample was boosted to include some ethnic minority groups and the final sample size at wave seven was 8682 households (DfE, 2011a).

[1] Pupil referral Units (PRUs) are local authority's establishments that represent one type of alternative provision of education for children who are unable to attend mainstream types of schools (DfE, 2013a).

[2] It is important to mention here that after careful investigation of the data, some cases exist where one PSU is assigned for more than one school and some other cases exist where one school is assigned as more than one PSU.

In order to avoid bias resulting from unit non-response, the LSYPE adopted a twofold weighting procedure to account for wave one non-response, where pupils from maintained schools and those from non-maintained schools weighted separately. Initially a design weight was used, which is the reciprocal of the pupil's selection probability scaled so that the weighted and unweighted achieved sample sizes were equal. For interdependent schools, the sex and type of school variables were used to assign the pupil nonresponse weights, which were then combined with the design weights and Calibration weights were finally applied in order for the achieved sample size to match the population breakdown by type of school (single-sex or mixed) and by region (London/not London) (DfE, 2011a).

For maintained schools sampled weighting consisted of three steps. First, weights were calculated for school non-response by cell weighting using Logistic regression fitting the four variables; proportion of pupils from non-White ethnic groups, the proportion with 5 or more GCSEs at grades A* to C, the deprivation status of the school, and regional information. Second, pupil non-response was modelled within responding schools using logistic regression model fitting Government Office Region (GOR), ethnicity, qualifications, and an interaction term between GOR and White ethnic group. Finally, calibration weights combining the two non-response weights were calculated. The final stage provided the final weights to be used in potential statistical analysis by weighting the sample so that the maintained/independent school split matched the population proportions (92.5% maintained, 7.5% non-maintained) (DfE, 2011a).

Moving to wave two non-response logistic regression models were used to estimate a pupil's response probability and the non-response weights were then calculated as the reciprocal of this estimated response probability. The non-response weight was combined with the wave one final weight to provide wave two weight. Similar procedure was adopted to calculate the weights of the rest of the waves (for more details on the exact calculations see DfE, 2011a).

Given that each wave of the LSYPE has its own weight, any statistical analysis should account for the weights depending on the choice of variables from a particular wave. However, when variables combined belong to multiple waves, the general rule is always to use the weight from the most recent wave that a variable has been taken from in order to complete robust analysis. This more recent weight is required to compensate for the demographic structure of the cohort changing over time (DfE, 2011a).

For more robust analysis, the analysis conducted throughout the thesis has accounted for the survey weights provided by the LSYPE using the weights corresponding to the exact set of variables combined across multiple waves. For that, the analysis uses the *svyset* module of STATA to set the data file as survey design data. Specifically, the data file is set to account for the survey design in terms of the primary sampling unit, the strata and the specific sampling weight used for a particular type of analysis.

In *svyset* design data any command reports missing standard errors when it encounters a stratum with one sampling unit, or what is known as a singleton stratum, which affects the standard error. Although the best way to solve this problem is to reassign the sampling unit to another appropriately chosen stratum, there is another statistical alternative that can be used to overcome such problem by scaling the variance of those singleton strata. Specifically, when performing variance estimation the variance is scaled using certainty units (strata with a Finite population correction (FPC) equal to one are identified as units sampling with certainty). Basically, the scaling treats the strata with single sampling units as certainty units but multiplies the variance components from each sampling stage by a scaling factor. For a given sampling stage, let S be the total number of strata, S_c the number of certainty strata, and S_s the number of strata with one sampling unit. The scaling factor would be $(S - S_c)/(S - S_c - S_s)$, which is derived by using the average of the variances from the strata with multiple sampling units for each stratum with one sampling unit (StataCorp, 2013).

1.1.2 National Pupil Database (NPD)

The national pupil database is a large-scale database for pupils' educational attainments in England through the five key stages of schooling along with their school characteristics. The database was built from 2002 and designed by merging various datasets such as the key stage attainment data and the school census data (for further information see Administrative Data Liaison Service [ADLS], 2010). The database provides a wide range of information related to both pupils and schools in order to help policy makers design and evaluate the educational policies aimed at pupils and schools as well. A number of researchers have used the database to investigate pupils' performance over time and across regions and schools and the factors affecting it such as Chowdry, Crawford and Goodman (2009), DfCSF (2009) and Gregg and Washbrook (2009).

1.1.3 The Ofsted Database

The Ofsted stands for the Office for Standards in Education, Children's Services and Skills. The role of the office is to regulate and inspect to achieve excellence in the care of

children and young people, and in education and skills for learners of all ages. The Ofsted runs school inspections mainly on a yearly basis to check the quality of the services provided. These inspections cover a number of aspects that eventually assess the performance of the school and identify challenges for better future performance.

The inspection process delivers an assessment report that evaluates nine main aspects of school performance. These are: the overall effectiveness of the school, achievement and standards of learners, personal development and well-being of learners, the quality of service provision by the school and teachers, the quality of the school leadership and management, the extent to which schools enable learners to be healthy, the extent to which providers ensure that learners stay safe, the extent to which learners make a positive contribution and finally the extent to which schools enable learners to achieve economic well-being. Each of the evaluated aspect comprises a number of variables that are mostly given a certain rank for its performance; specifically, outstanding, good, satisfactory and inadequate, while few variables are answered on yes/no basis (Ofsted, 2011).

1.2 Dataset setup and Formulation

The LSYPE data has been linked to the National Pupil Database (NPD) and Ofsted database to build an integrated dataset for a wide range of variables that are important to investigate the proposed educational production functions in the following chapters. The aim is to have information about all aspects related to the education of the young person starting from his/her family background information to his/her own personal and educational attainment information in addition to the school criteria he/she attended.

The LSYPE has first been linked to the NPD using the student unique reference number that is identified in both databases, and then linked to the Ofsted database using the unique reference number of the school the young person attended and that is identified in the LSYPE. The young people included in the final dataset finished their key stage four by wave three of the LSYPE in 2006 and thus their information was merged with their records from the NDP database for the year 2006 and the Ofsted database for the academic year 2005/2006, which covered both maintained and independent schools. The final sample size is conditional on the set of variables examined for each type of analysis in each of the following chapters. Relatedly, the following provides explanation of the key variables examined throughout the thesis.

1.2.1 Dependent Variables

The analysis in the coming chapters focuses on the investigation of the educational production functions of English young people, where the main outcomes (outputs) examined are both cognitive and affective outcomes.

Cognitive Outcome

The analysis captures the young person's cognitive outcome by his/her key stage 4[3] total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG). The KS4 point score system is one of the systems used to evaluate students' attainment at the end of key stage four. Prior to 2003/04 the point score measures were calculated using the 'old style' method of assigning 8 points to an A* grade in a full GCSE (General Certificate of Secondary Education), 7 for an A, 6 for a B, etc down to 1 point for a G. Short course GCSEs are worth half the Full GCSE score. The 'new style' scoring system counts 58 for an A*, 52 for an A, 46 for a B, etc down to 16 for a G. The point scores also include the GNVQs (General National Vocational Qualifications) (for more information about the change to the scoring system, see

http://www.education.gov.uk/performancetables/nscoringsys.shtml).

The KS4 score was reported around more or less the same time of wave three of the LSYPE. Specifically, wave three field work ran from the 21st April 2006 to 28th September 2006, asking for information about the previous year (April/September 2005 - April/September 2006) (DfE, 2011a). On the other hand, KS4 GCSE exam either ran in January 2006, March 2006, summer 2006 or November 2006. This implies that in some cases using wave three variables as predictors for KS4 outcome may not be valid because students were asked for such information after their exam was taken already (like in January) which could be misleading. Accordingly, and since the data does not provide that level of detailed information about when students took their exam exactly, the predictors used are mainly derived from wave one or two of the LSYPE.

Affective Outcome

In general, it is indicated that students' attitudes towards peers, teachers, school, and learning are seen as appropriate measures of affective outcomes of schooling (Cheng,

[3] The English National Curriculum is constructed in five Key Stages: Key Stage 1 is foundation year and Years 1 to 2 for pupils aged between 5 and 7 years old, Key Stage 2 is years 3 to 6 for pupils aged between 8 and 11 years old, Key Stage 3 is years 7 to 9 - for pupils aged between 12 and 14 years old, Key Stage 4 is years 10 to 11 - for pupils aged between 15 and 16 years old, and Key Stage 5 is years 12 to 13 - for pupils aged between 17 and 18 years old (http://www.hmc.org.uk/about-hmc/projects/the-british-education-system).

1993; Hofman, Hofman, and Guldemond, 1999). In that framework, students' attitude towards school has been examined as one of the forms of their educational outcomes, known as affective outcomes (Teddlie and Reynolds, 2000). In light of that, the analysis measures the student's affective outcome by his/her attitude towards school score reported in the LSYPE.

As has been mentioned earlier, depending on the research questions examined in each of the following chapters, the mix of variables investigated varies. In light of that, the affective outcome used later on is measured either using wave three (W3yschat1) or wave four (W4schatYP) attitude towards school score variable of the LSYPE. Specifically, the attitude score summarises positive and negative answers to twelve (wave three) or five (wave four) attitudinal questions relating to how the young person feels about school (DfE, 2011d). The following provides the list of the questions answered in the two waves respectively.

Wave three young person's attitude to school score variable (W3yschat1) ranges from 0 – 48 by assigning values to twelve variables according to whether they were positive or negative statements, where 0 is the lowest score of attitude and 48 is the best attitude (for more details on the construction of the variable see DfE, 2011c). This variable is measured by the sum of the answers to the following questions, where for each question the student can answer one of 5 categories: 'strongly disagree', 'disagree', 'I don't know', 'agree' and 'strongly agree':

1. Feelings about school: I am happy when I am at school
2. Feelings about school: School is a waste of time for me
3. Feelings about school: School work is worth doing W1 Young Person file
4. Feelings about school: Most of the time I don't want to go to school
5. Feelings about school: People think my school is a good school
6. Feelings about school: On the whole I like being at school
7. Feelings about school: I work as hard as I can in school
8. Feelings about school: In a lesson, I often count the minutes till it ends
9. Feelings about school: I am bored in lessons W1 Young Person file
10. Feelings about school: The work I do in lessons is a waste of time
11. Feelings about school: The work I do in lessons is interesting to me
12. Feelings about school: I get good marks for my work

On the other hand, wave four young person's attitude to school score variable (W4schatYP) ranges from 0 – 20 and is measured using the following five questions (DfE, 2011d):

1. Agreement with statement: Most of the time I found Year 11 boring
2. Agreement with statement: School has helped give me confidence to make decisions
3. Agreement with statement: School has done little to prepare me for when I leave school
4. Agreement with statement: School has taught me things which would be useful in a job
5. Agreement with statement: My school work in Year 11 was usually worth doing

Given the structure of the two attitude variables, both represent ordinal response but with rather wide range of outcomes. Accordingly, the analysis uses the average score of attitude to cut the range down to the original 5 categories by dividing the score by the number of questions (12 for wave 3 and 5 for wave 4) and scaling it up to the next higher integer. The final average score of attitude variables labelled (W3avatt) and (W4avatt) respectively thus has 5 ordinal categories from 0 to 4, where 0 indicates the lowest score and 4 indicates the highest score.

1.2.2 Independent Variables

The analysis throughout the thesis has used a wide range of variables. The main explanatory variables are described in details within each of the following chapters; however, the following provides description of the main control variables examined.

Family Structure (W2famtyp) type is measured at wave two by five categories: married couple, cohabiting couple, lone father, lone mother and no parents in the household.

Highest educational qualification of family (W2hiqualgfam) is reported at wave two by seven categories: degree or equivalent, higher education below degree level, GCE A Level or equivalent, GCSE grades A-C or equivalent, qualifications at level 1 and below, other qualifications and no qualification. The same definition of the variable applies for the variables describing the father (W2hiqualgdad), mother (W2hiqualgmum), main parent and second parent separately.

Family NS-SEC (W2nssecfam) class stands for National Statistics Socio-economic Classification, which is reported at wave two by eight categories: higher managerial and

professional occupations, lower managerial and professional occupations, intermediate occupations, small employers and own account workers, lower supervisory and technical occupations, semi-routine occupations, routine occupations and never worked/long term unemployed. The same definition of the variable applies for the variables describing the father (W2nssecdad), mother (W2nssecmum), main parent (W2nssecMP) and second parent separately.

Income Deprivation Affecting Children Index (IDACI) measures in a local area the proportion of children under 16 who live in low income households, where the higher the score reflects the worse the deprivation conditions (DfE, 2011b) and is reported in 2005/2006.

The urban/rural (urbind) indicator of the neighbourhood is reported at wave two by eight categories: (1) urban-sparse, (2) town & fringe-sparse, (3) village-sparse, (4) hamlet and isolated dwelling-sparse, (5) urban-less sparse, (6) town & fringe-less sparse, (7) village-less sparse and (8) hamlet & isolated dwelling-less sparse[4].

Type of household tenure (W2Hous12HH) is measured at wave two by eight categories: owned outright, being bought on a mortgage/ bank loan, shared ownership (owns & rents property), rented from a council or new town, rented from a housing association, rented privately, rent free and some other arrangement.

How the young person's expenses would be paid if stayed on in education: parent(s) will support or give money is reported in wave two by yes or no (W2FeFinMP0c).

How involved is the main parent in the young person's school life? (W2schlifMP) is reported in wave two by four categories: very involved, fairly involved, not very involved and not at all involved.

Home learning environment factors such as availability of computer(s) (W2condur5MP) and internet (W2condur6MP) are reported at wave two by available or not.

Family Income (W12incestMPMEAN)

The main family income has been measured using the income information reported in both wave one and two of the LSYPE. Specifically, the analysis uses the 'total annual income from any source' variable in each wave. The variable is actually reported in the LSYPE

[4] Category (1) and (5) are identified as urban areas in general and the rest are rural areas. For more information see Department for Environment, Food & Rural Affairs (2012).

using the following two sub variables: 'total income from work, benefits, and anything else for main parent (and partner)' and 'total income from work, benefits, and anything else for main parent (and partner) higher band'. The answer of the first follows 32 categories each representing an income band and the second 60 categories, where the second is asked only if the person answers 32 in the first variable. In order to use the two variables together, I combined them in one variable for each wave then replaced the value of the assigned category by the average of the corresponding income band. Since the focus is on examining the income during wave one and two of the LSYPE together, the analysis uses the mean of the income variable created for both wave one and two.

Family Size

The family size is measured using the number of people in the household during wave two. The variable is used in certain following analysis to measure family income by dividing such income by the family size.

Gender (W1sexYP) is measured by either male or female.

Age (KS4_AGE_START) of the young person when started KS4 is reported with the values of 14, 15 or 16.

Prior attainment (KS4_CVAP3APS_Z) at key stage three is reported in the NPD by the average point score (using fine grading) for contextual value added[5].

Likelihood of the young person applying to university (W2heposs9YP) is reported at wave two as very likely, fairly likely, not very likely and not at all likely.

Young person's self-image (W2usefulYP) measures how useful the young person has felt recently as reported at wave two by four categories: more than usual, same as usual, less useful than usual and much less useful.

Young person's perception of future success (W2Fat2YP) is measured by the young person's agreement with the statements about success: even if I do well at school, I will have a hard time getting the right kind of job as reported in wave two.

[5] Contextual Value Added (CVA) is a method of measuring the progress made by pupils between different key stages. For more information see https://www.gov.uk/government/publications/national-pupil-database-user-guide-and-supoorting-information.

Risk factor (W2risk) is measured using the number of risk factors the young person has experienced in last 12 months as reported in wave two. The variable is derived using eleven risk factor variables, which are (DfE, 2011e):

1. Whether ever smoke cigarettes.
2. Frequency of smoking cigarettes.
3. Whether ever had proper alcoholic drink.
4. Whether had alcoholic drink in last 12 months.
5. Frequency of having alcoholic drink in last 12 months.
6. Whether ever tried Cannabis.
7. Whether ever graffittied on walls.
8. Whether ever vandalised public property.
9. Whether ever shoplifted.
10. Whether ever taken part in fighting or public disturbance.
11. Whether played truant in last 12 months.

Ethnicity (W1ethgrpYP) is reported with eight categories: White, Mixed, Indian, Pakistani, Bangladeshi, Black Caribbean, Black African and other.

Special education need (W2senMP) is reported in wave two as values of yes or no.

Young person's disability (W1chea1HS) is reported at wave by whether or not the young person has a long-standing physical or mental impairment, illness or disability.

School phase of education (phaseofEdu) is reported by the Oftesd in 2005/2006. It has five categories: academies, middle deemed secondary, pupil referral unit, secondary and special school.

Type of school (IndSchool) is measured as whether the school the young person attended in wave one is a maintained or independent school.

Chapter 2: School Process and Educational Outcomes in England

2.1 Introduction and Motivation

There has been a long debate over the relationships between different inputs in the educational process and student's outcomes since 1966 with the release of the Coleman's report, which concluded that family background and peers were more important than schools and teachers in educational outcomes. Related research has included a number of disciplines, such as Economics, Sociology and Psychology. Despite the expansion of the literature on the implications that different inputs have on students' educational outcomes, empirical research has so far lacked, in some instances, the full capacity to provide unequivocal findings. Essentially, this deficiency is mainly attributed to two main factors; the lack of reliable data and the lack of full dimensionality in the theoretical model adopted to explain such data (Levaččićć and Vignoles, 2002; Knoeppel, Verstegen, and Rinehart, 2007; Kyriakides, 2005; Rivkin, Hanushek and Kain, 2005).

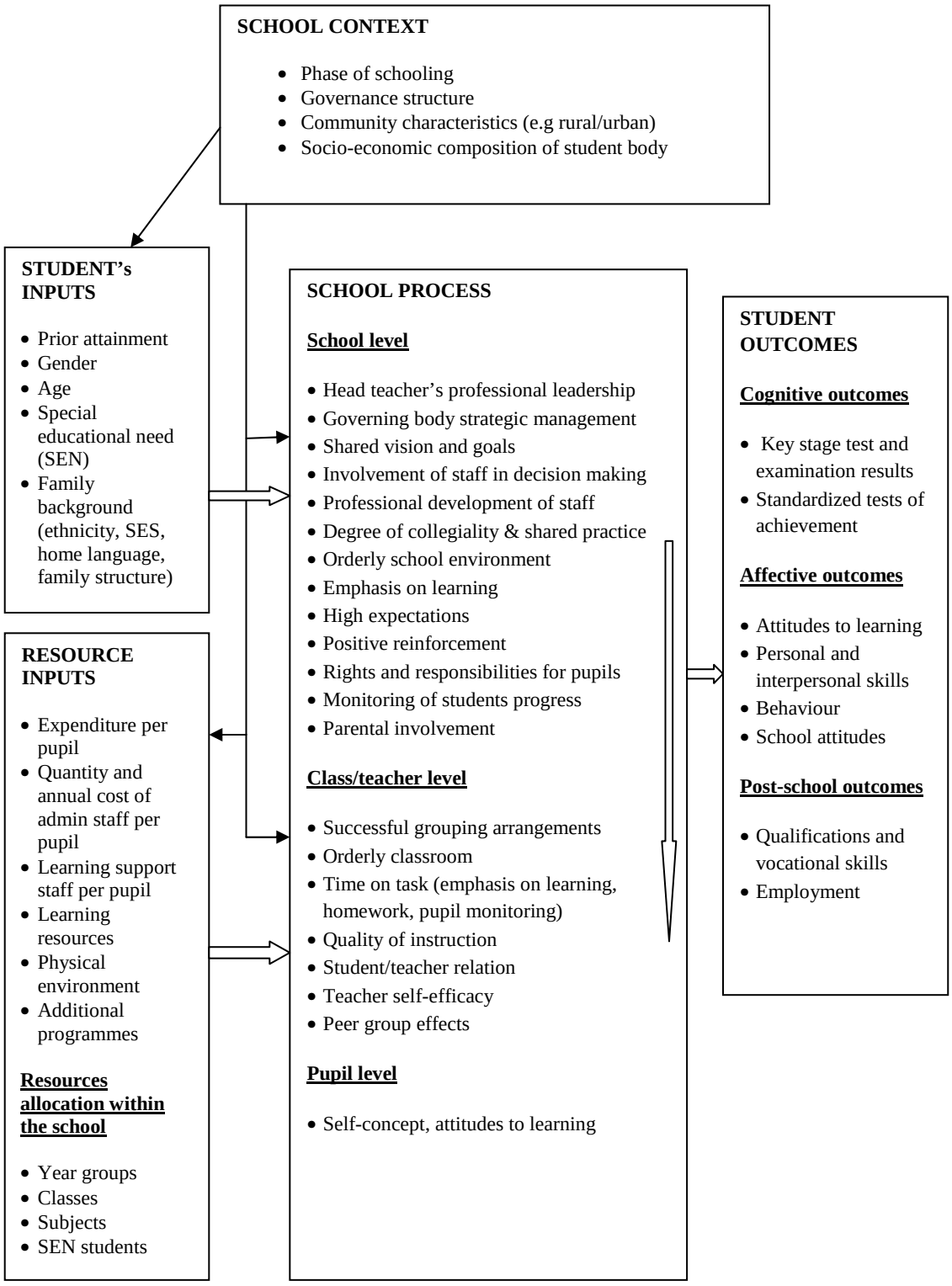
The existence and reliability of data represent one of the key challenges facing economists to run efficient informative analysis. Academic achievement at any point is a cumulative function of current and prior student, family, and school experiences. Accordingly, in order to include all possible inputs into the analysis, an integrated dataset covering almost all aspects of the educational process must be built including complete student, family, and school data that are hardly ever available (Rivkin, Hanushek and Kain, 2005). Consequently, the lack in the availability of such data has, to an extent, imposed limitations on the quality of previous research findings mainly resulting from omitted variables bias.

The theoretical model adopted to explain the data also plays a major role in reaching unambiguous findings. In that regard, the analysis of the relationships between inputs and outputs of education has widely been the scope of research of many education specialists and economists. However, one of the main differences between the two streams of research lies in the variations between the methodological approaches of investigating such relationships. On one side, education specialists rely on what is known as school effectiveness analysis, while on the other side economists rely on more quantitative analysis under the general framework of educational production functions, also known as input-output or cost-quality analyses (Levaččićć and Vignoles, 2002; Knoeppel, Verstegen, and Rinehart, 2007; Kyriakides, 2005).

In order to understand the key difference between the two approaches, it is important to clarify the general theoretical model that explains the relationships between inputs and outputs of the educational process. The theoretical model that many researchers widely rely on to identify these relationships is known as the 'Context–Input–Process–Outcome' model (Teddlie and Reynolds, 2000); hereafter CIPO model. The idea of the model is to incorporate all the possible inputs that affect students' outputs or outcomes. The model illustrates how students related inputs, school resources inputs, school context factors and the process of schooling influence students' outcomes.

The Context–Input–Process–Outcome model consists of five components, as shown in figure (2.1), each of them includes a number of variables that identify the nature of that particular component. To briefly explain the model, the *school context* component includes variables that explain the context in which schools operate. These variables may include the phase of schooling, governance structure, community characteristics (e.g. rural/urban), and the socio-economic composition of school students. The *student's inputs* component involves variables related to students and their characteristics. The *resources inputs* include variables related to all school financial resources involved in the educational process such as spending per student and learning resources. Finally, the *school process* component represents such variables that explain the overall schooling process and school environment at school level, class/teacher level and pupil level. (Teddlie and Reynolds, 2000; Bell, 2001; Levaččićć and Vignoles, 2002).

Figure 1.1: The 'Context - Input - Process - Outcome' Model



Source: Levaččićć and Vignoles (2002).

The main advantage of the CIPO model is being an integrated model that encompasses all four previously mentioned components that affect students' outcomes. Accordingly, many researchers, such as Teddlie and Reynolds (2000) agree that it represents one of the most appropriate framework for a rich analysis that controls for the high full dimensionality of the educational process. That in mind, previous research has drawn the attention to the fact that both the school effectiveness approach and the educational production function approach focuses on certain components of the model. In essence, education specialists adopt the school effectiveness approach focusing mainly on the school process component in explaining the variations in schools' effectiveness unlike economists who adopt the educational production function approach, which pays more attention to resources inputs and their effect on school efficiency (Kyriakides, 2005; Levaccićć and Vignoles, 2002). Accordingly, each of the two approaches focuses its analysis to only one component of the model leading to methodological limitations.

A typical educational production function, identified by equation (2.1), follows a similar framework of the school effectiveness literature focusing on the school level production. Specifically, schools produce outcomes using school and teacher inputs including resources inputs and school context while controlling for students inputs (Levaccićć and Vignoles, 2002)

$$O_{hij} = f(Z_{1hij}, \dots, Z_{Mhij}) \tag{2.1}$$

where O_{hij} are H educational outcomes of student i at school j and Z_{Mhij} are M inputs allocated to the production of these outcomes including school resources, school context inputs and students' inputs.

In light of what has been observed in the literature, Chapter 2 identifies a number of gaps in the Education Economics literature. To begin with, most of the existing literature have shown that the educational production function approach hardly accounts for the school process variables (Glewwe, et al., 2011; Levaccićć and Vignoles, 2002; Teddlie and Reynolds, 2000). Instead, it focused on the effect of school resources inputs with limited attention to school process variables in which case the focus was on limited factors, such as principals' evaluation to teachers and leadership (Armor, et al., 1976; Murnane, 1975; Teddlie and Reynolds, 2000) or certain organizational aspects of the school, such as the

student ability grouping scheme (Kerckhoff, 1986). Second, previous research has indicated that the joint teacher and school effectiveness research is needed in order to explain variations in educational achievement (Kyriakides, 2005), whereas both school effectiveness and teacher effectiveness were examined separately (Teddlie, 1994).

Third, earlier research has shown that an important objective of examining the effect of school process inputs is to incorporate such effect on both cognitive and non-cognitive outcomes (Sammons, Hillman and Mortimore, 1995; Teddlie and Reynolds, 2000). However, only few researcher have met such objective either by fully studying the framework for explaining the two outcomes as in the books of both Mortimore, et al. (1988) and Rutter, et al. (1979) or by examining an application for the effect of school process variables on the two outcomes as in the case of the Netherland (Knuver and Brandsma, 1993) and Greece (Kyriakides, 2005).

Last but not least, most of the earlier research on the effect of the full dimensional school process concept on students' educational outcomes has generally been less focused on the case of England (Levaččićć and Vignoles, 2002) and/or has been focused on the effect of limited organizational aspects of the school, such as the student ability grouping scheme (known as streaming) on cognitive outcomes of British students (Kerckhoff, 1986) or the effectiveness of post-16 educational institutions like assisted places scheme school (Tymms, 1992). Another study examined the effect of teacher quality (Slater, Davies and Burgess, 2009). Other studies examined the effect of school attended on both primary and secondary test scores and its continuity over time using Inner London Education Authority's Junior School Project sample showing that such effect is greater on the former than the latter with smaller effect on continuing from primary to secondary (Sammons, et al., 1995).

In light of the aforementioned gaps, Chapter 2 answers four research questions. These are:

1. What is the teacher influence on student's cognitive and affective outcomes?
2. Which aspect of school quality in the school process component is more predictive of student's cognitive and affective outcomes?
3. What is the effect of overall school quality on student's cognitive and affective outcomes?
4. How important is the school process component in the CIPO model? And whether other factors are more important in explaining student's outcomes?

In order to answer these questions Chapter 2 examines the effect of school process variables on students' both cognitive and affective educational outcomes using a more comprehensive theoretical framework based on the Context-Input-Process-Outcome model (Teddlie and Reynolds, 2000) controlling for both school context and student's inputs (Link and Ratledge, 1979; Rivkin, Hanushek and Kain, 2005). Particularly, the analysis adjusts equation (2.1) to (2.2) by studying the effect of *K* school process variables; P_{Kij} on the student level outcome rather than the school level, where C_{Lij} are *L* school context variables for student *i* at school *j* and X_{Nij} are *N* student input variables.

$$O_{hi} = f(P_{1ij} \dots P_{Kij}, C_{1i} \dots C_{Li}, X_{1i} \dots X_{Ni}) \tag{2.2}$$

Additionally, Chapter 2 combines both the teacher and school effectiveness by examining the school process inputs at both the school level and the teacher level that are not financial resource oriented inputs. In short, the analysis combines teacher influence variable measuring student's perception of his/her teacher and school quality variable(s), to examine their effect simultaneously on students' educational outcomes.

The analysis of Chapter 2 is based on the data built in Chapter 1 comprising data from the LSYPE, the NPD and the Ofsted database, hence including new school information that have been lacked in the literature covering a wide range of school process variables in the analysis. Primarily, the analysis combines data about the student from the LSYPE and the NPD and about the school from the Ofsted database for 56 school process variables reflecting its effectiveness in nine major inspection judgments (as explained in Chapter one and discussed more fully below) that have not been examined properly in the literature neither as combined with student information nor separately.

The chapter proceeds with a review of empirical literature of the effect of school process inputs on educational outcomes in section 2 followed by data, statistical method and model specification in section 3. Main findings are discussed in section 4 and the chapter ends with conclusion and discussion in section 5.

2.2 Review of Empirical Literature

Numerous studies in the education economics literature were conducted to estimate the effect of one or more inputs on the educational outcomes of students relying on the use of educational production functions. Among the first application of such functions was the one in the Coleman's et al. report (1966), which investigated the relationships between inputs and outputs of education in the USA concluding that student's inputs or more specifically families and peers inputs are the most important determinant of variations in students' educational outcomes rather than school inputs.

As has been stated earlier, most of the educational production functions examining the effect of school inputs in the literature have focused on school resources inputs rather than school process inputs following Coleman's (1966) analytical framework. The early studies of Hanushek (1971; 1981; 1986, 1989; 1991; 2008) and followed by other researchers are prominent examples of school resources inputs effect. In his studies, Hanushek focused on school resources inputs that mainly focused on assessing teacher variables associated with expenditures indicating no positive relationships with students' outcomes. Likewise, a thorough review of cross-country studies indicated a weak relationship between per-student spending and test scores (Fuchs and Woessmann, 2007; Hanushek and Kimko, 2000). Similarly, per pupil expenditure had insignificant impact on labour market outcomes in the UK (Dolton and Vignoles, 1999). Also, teaching expenditure had an insignificantly positive impact in Finland, where student's GPA and parents' education had bigger impacts with boys performing better than girls (Hakkinen, Kirjavainen and Uusitalo, 2003). A similar conclusion was found in cases of poor countries where there were no evidence that school resources are relatively more important (Fuchs and Woessmann, 2007; Galiani and Perez-Truglia, 2011; Hanushek and Kimko, 2000).

Despite the previous pessimistic view of resources effect indicated earlier, other studies have shown that financial resources such as school expenditures were found to have a positive impact on students' achievements (Barro and Lee, 2001) as in the case of England (Pugh, Mangan and Gray, 2008). Another major school resource input, such as school infrastructure was found to improve school quality in Bolivia, though it had little impact on students' outcome in terms of attendance, enrolment or academic achievement. Only the drop-out rate reflected any significant effect of such investment (Newman, et al., 2002).

A number of studies have also investigated the effect of other school non-teacher inputs such as class size (Angrist and Lavy, 1999; Browning and Heinesen, 2007; Dolton and Vignoles, 1999), teacher's training (Angrist and Lavy, 2001), teacher's absence (Das, et al., 2007), instruction time (Bellei, 2009) and school type/phase (Dearden, Ferri and Meghir, 2000; Dolton and Vignoles, 1999; Dustmann, Rajah and Soest, 1998; Feinstein and Symons, 1999). Other studies have focused on examining the effect of both student's inputs and school inputs combing both school level inputs and teacher level inputs (Kyriakides, 2005).

Following the aforementioned findings of Coleman's report (1966), Hanushek's studies and others' that there is no strong positive relationship between school financial resources and students' outcomes, several studies were conducted to further investigate the effect of school inputs on students' outcomes. Specifically, a number of researchers examined school process effect rather than school financial resources using inputs that are associated with the human and organizational aspects of the school (Mortimore, 1993; Mortimore, et al., 1988; Reynolds and Creemers, 1990; Sammons, Hillman and Mortimore, 1995).

During the last three decades a considerable body of research evidence has been accumulated showing that although family backgrounds of students and their academic self-schema are major determinants of their educational outcomes, schools have significant though small contribution in explaining variations in students' outcomes (Daly, 1991; Mortimore, et al., 1988; Reynolds, 1982; Rutter, et al., 1979; Sammons, Hillman and Mortimore, 1995; Wilkins and Raudenbush, 1989). For example, student sense of control of their environment, quality of teachers' education, and teachers' high expectations for students are types of school process factors that tend to have significant positive relationships with students' outcomes (Link and Ratledge, 1979; Summers and Wolfe, 1977; Winkler, 1975). The following review focuses on key empirical studies examining the effects of school process inputs, specifically school quality inputs and teacher inputs on student's educational outcomes.

School Process Inputs: School Level (Quality)

Most researchers who examined the effect of school process variables focused on urban elementary schools with low socioeconomic status because they believed that success stories of these schools would dispel the belief that schools made little or no difference (Teddlie and Reynolds, 2000). One example of these studies is that of Weber (1971)

showing that ongoing school process variables, such as leadership, expectations, school atmosphere and evaluation of pupil progress are important factors in determining students' outcomes. Similarly, Murnane (1975) indicated that principals' evaluations of teachers were also found to be a significant predictor of students' outcomes (Armor, et al., 1976; Teddlie and Reynolds, 2000).

Previous literature especially that related to school effectiveness has identified a wide range of school process factors that determine such effectiveness. Sammons, Hillman and Mortimore (1995) provide a summary of the main broad factors examined in the literature. These include professional leadership (Mortimore, et al, 1988; Rutter, et al, 1979), shared visions and goals (Mortimore, et al, 1988), a learning environment (Rutter, et al, 1979; Weber, 1971), concentration on teaching and learning (Mortimore, 1993), purposeful teaching (Mortimore, 1993; Rutter, et al, 1979; Stalling, 1975), high expectations (Edmonds, 1979; Rutter, et al, 1979), positive reinforcement (Walberg, 1984), monitoring progress (Edmonds, 1979; Weber, 1971), pupil rights and responsibilities (Mortimore, et al, 1988), home-school partnership (Mortimore, et al, 1988) and a learning organization (Armor, et al., 1976).

Numerous researchers examined the effect of some of these factors on students' educational outcomes. However, given the variety of school process variables, most studies tend to focus on the effect of one or more of these variables on students' educational outcomes. For example, faculty cooperation and cohesion in general and teaching staff cooperation in relation to teaching methods and pupil counselling in particular are seen as key components of a productive school climate and culture that have positive impact on students' cognitive and affective outcomes. Also, they are important with respect to meeting central organisational goals that in return affect students' outcomes (Anderson, 1982; Opdenakker and Van Damme, 2000; Sammons, Hillman and Mortimore, 1995)

Some school process variables tend to have mixed effect. For example, attention to pupil differences and development was argued to have a mixed effect on students' cognitive and affective outcomes, where it was suggested to be negative for more intelligent students (due to investing more time on differentiating activities rather than learning) and not important for less intelligent students (Opdenakker and Van Damme, 2000; Scheerens & Creemers, 1996). Accordingly, it could be suggested that the influence of paying more

attention to student differences and development depends on the student's initial cognitive and affective characteristics.

Empirical support for the effectiveness of an orderly learning environment in the school has been confirmed from qualitative and quantitative reviews showing that it has a positive influence on students' both cognitive and affective outcomes (Opdenakker and Van Damme, 2000; Scheerens, 1992). Similarly, school process factors, such as 'focus on discipline and subject matter acquisition' and 'focus on cultural education and creativity' though not much studied, were found to have only significant positive effect on affective outcomes of students with initial high cognitive and affective characteristics and negative effect for students with initial low cognitive and affective characteristics (Opdenakker and Van Damme, 2000).

Among the school process factors covered in the literature that were examined for its effect on non-cognitive aspects of education is the 'focus on education and personality development'. One of the studies that examined such factor indicated a positive effect on the motivation towards (and interest in) learning tasks. On the other hand, it had a differential effect on the attitude towards homework, where it was negative for initially high motivated pupils, and a positive effect for initially low achievement-motivated pupils. Additionally, the school focus on education and personality development was suggested to have a negative effect on mathematics cognitive outcomes (Opdenakker and Van Damme, 2000).

In general, a review of school process inputs as reflected in its management showed that decentralization and giving more autonomy to school management enhances students' outcomes (Faguet and Sanchez, 2006; PISA, 2009; Woessmann, 2003) and attendance and probability to continue schooling (Jimenez and Sawada, 1999; 2003), though better-off communities tend to benefit more from such policy (Galiani, Gertler and Schargrodsky, 2008; Galiani and Perez-Truglia, 2011). However, few studies suggested that decentralization increased the drop-out rates and failure rates among primary school students in Brazil even if it increased enrollment levels (Madeira, 2012)

Other school management policies such as tracking students by prior achievement and assigning the best half to one class and the weaker half to another class was found to be beneficial for high performing students and hurting to low performing students and so increasing inequality (Argys, Rees and Brewer, 1996; Hanushek and Woessmann, 2006;

Hoffer, 1992; Kerckhoff, 1986). However, studies comparing students with similar abilities in both tracking and non-tracking schools found that students in the former benefit more than the latter, while low ability students show neither benefit nor hurt impacts (Betts and Shkolnik, 2000; Figlio and Page, 2002). Having said that, in general it was indicated that tracking tends to improve all students' performance in poor countries where such performance is highly heterogeneous (Duflo, Pascaline and Michael, 2011; Galiani and Perez-Truglia, 2011).

The effect of school quality on students' outcomes was also examined in terms of quality of instructions, rules about time use and the opportunity to learn through consensus about the ''mission'' of the school. One of the studies that followed that framework showed that quality variables at the teacher level, such as 'rules and agreements about aspects of classroom instruction', 'rules and agreements about ways of improving affective outcomes', and 'assessment system focused on formative purposes' (also at the head teacher level) were significant predictors of students' cognitive and affective outcomes. On the other hand, 'rules about time use' and 'consensus about the ''mission'' of the school' were not significant for cognitive outcome, while the latter was only significant for affective outcome (Kyriakides, 2005).

In a way of summarizing the general impact of school inputs on students' outcomes and time in school, Glewwe, et al., (2011) provided a meta-analysis by reviewing both educational and economic literature from 1990 to 2010. The literature was filtered in a number of stages focusing mainly on high quality studies applied to developing countries using quantitative methods. The findings showed that school infrastructure, pedagogical materials and teacher and principal characteristics mostly have a significant positive impact, while most of the school organization inputs were found to have an ambiguous impact[6].

From the previous review, one could argue that when it comes to educational production functions there are a wide range of school process inputs that researchers tend to choose from to analyse their effect on educational outcomes. Hence, there tends to be no general consensus on the choice of certain school process input(s) to be studied as key determinant(s) of students' outcomes. Moreover, there is no clear consensus as well on the direction of the possible impact of school process inputs on students' educational

[6] For summary of the findings see table A.1 in appendix A.

outcomes, where it tends to differ either by type of outcome or by group(s) of students investigated. However, it could be concluded that it is still important to examine their impact in the educational production function, even if such impact was not of great importance.

School Process Inputs: Teacher Level

Previous empirical research has shown that in general teachers may not have a strong role in determining students' achievement mainly because of lacking consensus on the exact link between observable teacher characteristics and such achievement (Rivkin, Hanushek and Kain, 2005). To illustrate, teacher characteristics, such as teacher experience and teacher education demonstrated no consistent effect on student achievement (Hanushek, 1971; 1981; 1986; Hedges, Laine and Greenwald, 1994a; Rivkin, Hanushek and Kain, 2005). On one hand, some researchers suggested a weak relationship between teacher experience and students' test scores (Hanushek and Luque; 2003). On the other hand, teacher experience had a positive significant impact on student's test scores in reading subject areas in the USA (Rockoff, 2004) and mathematics (Rivkin, Hanushek and Kain, 2005).

The quality of teacher's education has also been debated in the economic literature. On one hand, some researchers proposed a positive impact on student's outcomes, where teachers who received their bachelor degrees from higher rated colleges were associated with students whose learning rate was high and it was students from lower income families who benefitted most (Summers and Wolfe, 1977). In a similar fashion, a positive significant association was found between raising the proportion of teachers graduating from prestigious colleges and students' achievements (Winkler, 1975). However, a review of Hanushek's studies showed that only 7% of them found a positive significant relationship between teacher's education and students' outcomes (Hedges, Laine and Greenwald, 1994a).

Other characteristics of teacher input into the learning process were found to have little contribution in poor learning environment as in the case of Zambia. However, after controlling for unobserved child and teacher heterogeneity, teachers' absence was found to have a negative impact on students' test scores (Das, et al., 2007). Teachers' wages were also found to have a statistically significant positive impact on students' attainment in Brazil (Menezes-Filho and Pazello, 2007). Equally, teacher training was found to have a

positive impact on elementary schools students' achievements in Jerusalem and that it was more cost effective than reducing class size or lengthening school day (Angrist and Lavy, 2001). Similarly, lengthening the instruction time in public schools in Chile had a positive significant effect on students' achievement with a larger effect in rural areas (Bellei, 2009).

Studying teacher's effect on student's educational outcome from a school process perspective has shown that earlier emphasis on more traditional teacher characteristics such as teacher's years of education or experience may have been misplaced. For example, it was indicated that there is a large positive relationship between outcome and student's perception of a positive teacher's attitude towards him/herself. Such influence was coupled with no significant impact of teacher education or experience (Link and Ratledge, 1979).

In a similar framework, the effect of teachers on students' outcomes was also examined in terms of how effective the teacher is with respect to student's perception of the teaching quality, the time spent on tasks in the classroom and the opportunity to learn with the homework assigned. One of the studies that followed that framework showed that teaching quality variables, such as maintaining appropriate classroom behaviour, maintaining attention on lesson, creating a supportive environment, maintaining positive relationships with students, classroom management, and classroom climate in addition to the amount of home work assigned were significant predictors of students' cognitive and affective outcomes. Also, teacher practices like giving information, asking questions, providing feedback, providing practice and application opportunities and the quality of organized lessons were significant predictors of students' cognitive outcome, while time spent on teaching was not significant for such outcome (Kyriakides, 2005).

Teacher quality was found to have a positive impact on student's cognitive outcomes in the USA (Rivkin, Hanushek and Kain, 2005). Such positive impact could substantially offset disadvantages associated with low socioeconomic background. Moreover, they showed that little of the variation in teacher quality was explained by observable characteristic, such as education or experience. Similar findings were reported in England (Slater, Davies and Burgess, 2009). Specifically, they indicated that teacher quality makes a big difference in the outcome of students and can reduce the socio-economic gap between students' GCSE outcomes. Moreover, the importance of teacher quality reflected that family background factors are not all that counts when studying student's outcomes.

From the previous review one could conclude that most of the previous education economics literature has focused on either studying the teacher effect from a financial resource oriented perspective or by putting more emphasis on teacher's education and experience. This has been coupled with lack of investigation of other teacher effects, especially in terms of the student's perception of the teacher. Accordingly, it could be proposed that studying the teacher effect from a new perspective suggested by the student's perception is important in examining his/her educational outcomes.

2.3 Data, Econometric Method and Model Specification

The data used for the analysis in this chapter, as explained in Chapter 1, is an integrated dataset of the LSYPE, the NPD and the Ofsted database comprising a wide range of information about the student's educational and behavioural indicators, family background factors and school context and process factors. Below is an overview of the variables used in the analysis and for further details about each variable, please refer to Chapter 1. The analysis explains the effect of school process inputs on two main educational outcomes of students; namely cognitive outcome and affective outcome.

Students' Cognitive Outcome

The analysis captures the student's cognitive outcome by his/her key stage 4 (KS4) total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG), which is more or less around the time period of wave three of the LSYPE. Although the National Pupil Database contains many measures of children's cognitive outcomes, the analysis focused on the KS4 score for two main reasons. First, it reflects the effect of school performance and quality (Kyriakides, 2005). Second, it reflects cumulative parental investments in their child cognitive development in terms of a good neighbourhood, high quality child care and support in after-school activities or in terms of schools, which are likely to be reflected in his/her KS4 score. Also, high school scores in general are usually used as good predictors of children's future outcomes such as adult earnings and completed education (Bowles and Nelson, 1994; Conlisk, 1971; Murnane, Willett and Levy, 1995).

Students' Affective outcome

In general, it is indicated that students' attitudes towards peers, teachers, school, and learning are seen as appropriate measures of affective outcomes of schooling (Cheng, 1993; Hofman, Hofman, and Guldemond, 1999). In that framework, students' attitude

towards school has been examined as one of the forms of their educational outcomes, known as affective outcomes (Teddlie and Reynolds, 2000). In light of that, the analysis measures the student's affective outcome by his/her average score of attitude towards school at wave four (2006/2007) of the LSYPE (W4schatYP). Specifically, the attitude score averages answers to five attitudinal questions relating to how the young person feels about school (for more details please see Chapter 1). These questions ask about the young person agreement with five statements. These are: most of the time I found Year 11 boring, school has helped give me confidence to make decisions, school has done little to prepare me for when I leave school, school has taught me things which would be useful in a job, and my school work in Year 11 was usually worth doing (DfE, 2011d).

Given the nature of the survey design of the LSYPE explained earlier in Chapter 1, the LSYPE database has provided sampling weights to make sure any analysis would account for the survey design of each wave. Based on the statistical calculations of these weights, it is advised that depending on the mix of waves being used in the analysis, the weights controlled for should belong to the latest wave used (for more details, refer to DFE (2011a)). Accordingly, the analysis of each dependant variable is conducted using two different samples. The cognitive outcome is analyzed using a number of covariates that have been observed either at wave one or wave two, therefore the sampling weights of wave two has been used to adjust for unit non-response and the final sample size covered 1664 students in 187 schools. The affective outcome is observed at wave four of the LSYPE and is analyzed using a number of covariates that have been observed either at wave one or wave two, therefore it is analyzed using the sampling weights of wave four and the final sample size covered 1520 students in 183 schools. The design of the sample used in the cognitive outcome analysis covered 31 strata with 190 primary sampling units and 31 strata with 185 primary sampling units in the affective outcome sample.

Independent Variables

The main aim of the current analysis is to examine the effect of school process variables on student's educational outcomes. Specifically, the analysis examines two key school process variables; teacher influence variable and school quality variable.

Teacher Influence

Credible identification of teacher influence requires matching student to teacher data (Link and Ratledge, 1979; Rockoff, 2004). The ability to associate individual teachers and students enables more precise estimation of the effects of teacher inputs on achievement than would studies relying on average teacher characteristics (Link and Ratledge, 1979; Kyriakides, 2005). However, such matching is not usually feasible for researchers largely because school administrative data may not necessarily have information about students' perception of teachers or their schools in general (Rockoff, 2004). Accordingly, one of the contributions of the current analysis is the use of data from the LSYPE wave one and two about student's perception of his/her teacher to measure teacher influence.

In light of the preceding, there are three main dimensions of the behaviour of an effective teacher identified in the teacher effectiveness research (TER). These are classroom management, the form and quality of teacher's organized lessons, and classroom climate (Kyriakides, 2005). Hence, the current analysis followed similar framework to construct the variables measuring teacher influence. Specifically, three variables of teacher influence were constructed based on data from the LSYPE about student's perception of his/her teacher. These are student-teacher relationship, teacher quality and overall teacher index.

The student-teacher relationship variable (S_Trelation_A), as reflected by the name, measures the student's perception of such relationship. The variable was constructed using information from 21 questions asked to the student about his/her teacher at wave one (W1) and wave two (W2). These were: W1 agreement with statements: I chose these subjects because I like the teachers who teach these subjects in year 10, W1-2 how many times a week YP works with teacher to prepare for exams outside lessons, W1-2 how often talk about plans for future study with teachers as part of lesson, W1-2 how often talk about plans for future study with teachers outside lessons, W1-2 how many teachers this applies to: my teachers praise me when I do my school work well, W1-2 how many teachers this applies to: I like my teachers, W2 why YP chose optional subjects: teachers advised them to study subject, W2 why YP chose optional subjects: like the teachers for this subject, W2 why YP chose vocational subjects: teachers advised me to study a course (or courses),W2 why YP did not think about doing vocational courses: teachers advised me not to do vocational courses, W2 why YP decided not to do vocational courses: teachers advised me not to do vocational courses, W2 how many teachers this applies to: my teachers don't

really listen to what I say in class, W2 how many teachers this applies to: I get treated unfairly by my teachers, W2 how much interest teachers take in YP's work compared with others, W2 how likely teachers are to blame YP if there is trouble in class compared with others, and W2 main reason for playing truant: don't like particular teacher or teachers.

The construction of the student-teacher relationship variable was first done by recoding some of the 21 variables to have similar ordering of values compared to the rest, where the lowest value indicated the best teacher outcome. Later all variables were standardized (mean=0 and standard deviation=1) then summed. Because of the ordering nature of the variables and due to their standardization, the final variable was then multiplied by -1 to avoid confusion so that as the values go up, teacher influence would reflect better student-teacher relationship. Finally, the internal consistency of the variable was estimated by Cronbach's alpha (eq. 2.3) (Kyriakides, 2005; Muller and Ellison, 2001).

$$\alpha = \frac{K}{K-1}\left(1-\frac{\sum_{i=1}^{K}\sigma_{Y_i}^2}{\sigma_X^2}\right) \tag{2.3}$$

where X is the sum of K items used in constructing the variable: $X = Y_1 + Y_2 + Y_3 + \cdots + Y_K$, and $\sigma_{Y_i}^2$ is the variance of item i. Cronbach's alpha estimates and is a lower bound to the proportion of test variance attributable to common factors among the items. Thus, it is an index of common-factor concentration, which serves purposes claimed for indices of homogeneity (Cronbach, 1951). The theoretical value of alpha varies from zero to 1 with higher values of alpha indicating better homogeneity or internal consistency. However, depending on the estimation procedure used, estimates of alpha can take on any value less than or equal to 1, including negative values, although only positive values make sense. Most researchers, as a rule of thumb, require a reliability of 0.70 or higher (Nunnally, 1978). For the student-teacher relationship variable Cronbach's alpha was (α = 0.21) indicating that it is not homogenous enough or that its internal consistency is not satisfactory enough.

The teacher quality variable (teacherquality_A) measures the student's perception of his/her teacher quality. The variable was constructed using information from 16 questions asked to the student about his/her teacher at wave one (W1) and wave two (W2). These were: W1-2 how many of YP's teachers who set homework make sure YP does it, W1 usefulness of information from teachers outside lessons, W1-2 how many teachers this applies to: my teachers make sure we do any homework that is set, W1-2 how many

teachers this applies to: the teachers at my school make it clear how we should behave, W1-2 how many teachers this applies to: the teachers in my school take action when they see anyone breaking school rules, W1-2 how many teachers this applies to: my teachers can keep order in class, W1-2 how hard teachers make YP work, W1-2 how often most teachers mark YP's work, and W2 how many teachers this applies to: my teachers treat everyone the same regardless of skin colour or cultural background.

Following the same approach, the construction of the teacher quality variable was first done by recoding some of the 16 variables to have similar ordering of values, where the lowest value indicated the best teacher outcome. Later all variables were standardized then summed. Also, the final variable was then multiplied by -1 to avoid confusion so that as the values go up, teacher influence would reflect higher teacher quality. Finally, the internal consistency of the variable was ($\alpha = 0.82$) indicating that it is homogenous enough or that its internal consistency is satisfactory enough.

The last teacher related variable measures the overall teacher index by basically summing the two previously constructed variables to provide the overall student's perception of his/her teacher in terms of relationship and teacher quality (teachereffect_A). The internal consistency of the variable was ($\alpha = 0.71$) indicating that it is homogenous enough or that its internal consistency is satisfactory enough.

It is also important to mention that given the timeframe of the variables used to create the three teacher indices, that is being observed in waves one and two of the LSYPE which are previous times points to the time point where the cognitive outcome variable (KS4 score) was observed at (2005/06), there need not be much worry about possible problem of endogeneity. The same reasoning applies for the affective outcome variable (attitude towards school), which was measured at wave four of the LSYPE.

School Quality

As explained in Chapter 1, the Ofsted database provides information about school performance for the year 2005/2006[7] using nine key judgements covering 56 questions (please refer to Chapter one for further details). These judgements reflect school overall effectiveness (OE), achievement and standards (AS), personal development and well-being (PDW), the quality of provision (QP), leadership and management (LM), the extent to which schools enable learners to be healthy (ESELH), the extent to which providers ensure

[7] The Ofsted inspection was conducted between September 2005 and July 2006.

that learners stay safe (EPELS), the extent to which learners make a positive contribution (ELMPC) and the extent to which schools enable learners to achieve economic well-being (ESELEW).

For the purpose of this Chapter, nine indices were constructed for the nine judgements using the related questions following the same framework used to construct the teacher indices. That is, questions of each judgement were standardized then summed to give an index of the overall judgement. Since all 56 questions had ordinal values with the lowest reflecting the best performance and also due to the standardization of these values, each index was then multiplied by -1 to avoid confusion so that as the values go up, the judgement reflects better school quality. The internal consistency of the nine indices indicated that only 6 are homogenous: SchOE_A (α= 0.80), SchAS_A (α= 0.86), SchPDW_A (α= 0.94), SchQP_A (α= 0.81), SchLM_A (α= 0.89), and SchELMPC_A (α= 0.80), while three are not consistent enough: SchESELH_A (α = -0.56), SchEPELS_A (α= -1.35), and SchESELEW_A (α= 0.22).

Given the nature of the variables used to construct the previous nine school quality indices, it could be argued that only the SchAS_A and SchPDW_A indices could suffer from a possible endogeneity problem with the KS4 outcome variable, where they were more or less measured around similar time point. To illustrate, the two indices were based on variables reflecting the academic standards (SchAS_A) and personal development of the student such as behaviour and attendance (SchPDW_A), which in turn could depend on the students' KS4 scores. However, a counter argument suggests that despite the possible existence of such two-way relationship, the number of students per school is very small (a maximum of 32 students per school) compared to the true number of students that could exist in the school, which could be a minimum range of (1-500)[8] students. Although that minimum range could take values less than 500, still 32 students will not be representative enough to the true number of students to reflect the overall Ofsted performance of the school. Accordingly, one can argue that even if there is possible endogeneity it would not be a severe problem. As for the affective outcome variable, it was measured at a time point after the school information was observed, so one would not expect a source of endogeneity.

[8] For more details, see < https://www.gov.uk/government/publications/number-of-secondary-schools-and-their-size-in-student-numbers>. Notice that although the statistics available is for 2012, there was no available detailed data for the year 2005/2006. However, it is suggested that the statistics would not change dramatically between the two years.

An overall school quality index (Squality_A) was also constructed to measure the overall school performance using the above nine indices and to overcome the internal inconsistency of the three inconsistent indices. Given the interrelation and mutual dependencies between the nine indices, the internal consistency of the school quality variable was ($\alpha = 0.96$) indicating that it is homogenous and that its internal consistency is very reliable. Also, given the explanation provided above one can argue that there would not be an endogeneity problem between the overall school quality index on one hand and both outcome variables on the other hand.

Specification of Control Variables

Following the model specification indicated in equation (2.2), the analysis controlled for a number of school context inputs and student's inputs. The school context inputs includes the school phase of education and whether the school the young person attended in wave one is a maintained or independent school. Given the nature of the school context variables, one could argue that they are more likely to be exogenous. Basic student's inputs, such as gender, age when started KS4, religion, ethnicity and having a special education need were controlled for. Similar explanation applies for the proposed student's inputs not to suffer from endogeneity. Moreover, a number of variables were controlled for to reflect student's academic self-schema such as prior attainment at KS3 and the likelihood of the young person applying to university reported at W2.

Family background factors were also included in the model, such as family structure type at W2, the highest educational qualification of family at W2, the family NS-SEC class at W2, the mean family income from work, benefits, and anything else over W1-2, type of household tenure at W2, the Income Deprivation Affecting Children Index (IDACI)[9] reported in 2005/2006 and the urban/rural indicator of the neighbourhood at wave two. The analysis also controls for parental involvement in children's education using variables, such as 'how the young person's expenses would be paid if stayed on in education: parent(s) will support or give money as reported in W2' and 'how involved is the main parent in the young person's school life? as reported in W2'. Finally, home learning environment factors such as availability of computer(s) and internet at W2 are accounted for.

[9] The variable of the Income Deprivation Affecting Children Index (IDACI) were standardized then adjusted to reflect an increase in value to be associated with an improvement in the deprivation index.

2.3.1 Econometric Method

It is a well established fact that one of the reasons why researchers in areas such as social sciences or even medical sciences may have less progress in better analyzing a wide range of their studies is the omnipresence of categorical data or what is generally referred to as qualitative data. To enumerate, reaching accurate results about educational issues, such as the ones addressed in this dissertation requires using large datasets. It is also quite known to all education economists that such kind of data usually has certain characteristics. The most recognized one is the categorization nature of most educational variables. That is, most of the variables that are likely to be used are discrete. This indeed imposes certain constraints on the choice of the right statistical technique to be used. (Young, 1981; Van der Heijden, De Falguerolles and De leeuw, 1989; Michailidis and De Leeuw, 1998; Yazici, et al., 2010).

Choosing some of the ordinary statistical techniques to analyze discrete variables might in some situations have certain limitations or restrictions due to the necessary assumptions imposed by such techniques. To illustrate, some of these techniques are based on certain distributional assumptions. For instance, ordinary least squares techniques assume normal distribution of the data, which does not hold for the two dependent variables examined in this chapter.

The choice of the right method depends mainly on the nature and distribution of the dependent variable involved in the analysis. As has been explained earlier in the data section, this chapter examines two dependent variables. The first measures student's cognitive outcome in terms of KS4 score and the second measures his/her average score of attitude towards school. Examining the distribution of both variables indicates that neither of them follows a normal distribution and rather the first is a count variable following a negative binomial distribution, while the second is an ordinal variable. Accordingly, given the discrete nature of the variables on one hand and the categorical nature of most of the independent variables on the other hand, Chapter 2 uses discrete choice modeling methodology to examine the proposed models.

Given that the first cognitive outcome variable is a count variable that follows a negative binomial distribution[10], the analysis uses a negative binomial regression model. Such model is one of the generalized linear models (GLM) that were first well introduced by

[10] For more details see figure B.1 in appendix B.

Nelder and Wedderburn (1972)[11], where they are considered an extension of the classical ordinary regression models in the sense that they encompass nonnormal response distributions modelling functions of the mean. This indeed represents one of the key advantages of using GLMs since the normality and constancy of variance assumptions are no longer required. The GLM is a maximum likelihood model that consists of mainly three components: a *random* component identifying the response variable Y and its probability distribution; a *systematic* component identifying the explanatory variables x in a linear predictor function and a *link function* specifying the function of $E(Y)$ that the model equates to the systematic component (for more details see McCullagh and Nelder, 1989; Hilbe, 1994; Lindsey, 2000; McCulloch, 2000; Dobson, 2001; Fahrmeir and Tutz, 2001; McCulloch and Searle, 2001, Agresti, 2002; Olsson, 2002; Dunteman and Ho, 2005).

The *random* component of a GLM represents a response variable Y that has N independent observations $(y_1,\ldots,y_N)$. This component can be expressed as

$$\mu_i = E(Y) \qquad i=1,\cdots,N \qquad (2.4)$$

The *systematic* component represents the linear predictor function, which is a function that relates a vector $(\eta_1,\ldots,\eta_N)$ to the explanatory variables through a linear model given by

$$\eta_i = \sum_j \beta_j x_{ij} \qquad i=1,\cdots,N \qquad (2.5)$$

where x_{ij} is the value of predictor $j(j=1,\cdots,p)$ for subject i. As for the *link function* $g(.)$, it links the random component μ_i and the systematic component η_i in the form

$$g(\mu_i) = \eta_i = \sum_j \beta_j x_{ij} \qquad i=1,\cdots,N \qquad (2.6)$$

[11] Although GLMs were introduced by Nelder and Wedderburn (1972), it is important to mention that many models in the class of GLMs were introduced before that. The contribution of Nelder and wedderburn was in their work of showing the similarities between seemingly disparate methods, such as linear regressions, probit regressions and contingency tables (McCulloch, 2000; Agresti, 2002).

The link function could take a number of forms. The most popular is the identity link, which specifies a linear model for the mean itself, where $g(\mu)=\mu$ and $\mu_i=\eta_i$. Simply, the identity link is the link function for the ordinary regression with normally distributed Y. Since GLMs encompass nonnormal distributed response variables, the link function could take a number of forms depending on the distribution of the response variable. These include, among others, log, power, logit, probit, complementary log-log and negative log-log functions (McCullagh and Nelder, 1989; Fahrmeir and Tutz, 2001).

Given that the first cognitive outcome variables used in Chapter 2 is following a negative binomial distribution, accordingly, the analysis uses a negative binomial regression model defined as

$$\eta_i=\ln(\mu_i)=\sum_j \beta_j x_{ij} \qquad i=1,\cdots,N \text{ and } Y\sim NegativeBinomial \tag{2.7}$$

The second affective outcome variable as indicated earlier is an ordinal variable[12]; accordingly, the analysis uses an ordinal logit model with a logit link function given by

$$\eta_i=\ln(\mu_i/1-\mu_i)=\sum_j \beta_j x_{ij} \qquad i=1,\cdots,N \tag{2.8}$$

2.3.2 Model specification

It is important to mention here, as explained earlier in Chapter 1, that the KS4 score was reported around more or less the same time of wave three of the LSYPE. Specifically, wave three field work ran from the 21st of April 2006 to 28th of September 2006, asking for information about the previous year (April/September 2005 - April/September 2006) (DfE, 2011a). On the other hand, KS4 GCSE exam either ran in January 2006, March 2006, summer 2006 or November 2006. This implies that in some cases using wave three variables as predictors for KS4 outcome may not be valid because students were asked for such information after their exam was taken already (like in January) which could be misleading. Accordingly, and since the data does not provide that level of detailed information about when students took their exam exactly, the predictors used are mainly

[12] For more details see figure B.2 in appendix B.

derived from wave one or two of the LSYPE. Moreover, in order to be consistent throughout the analysis, the approach was used when examining the affective outcome.

Based on the theoretical framework explained by equation (2.2), the analysis examined the effect of both teacher and school quality on the two outcome variables; KS4 score and attitude towards school controlling for school context and student's inputs. Specifically, the first phase of the analysis started by examining the teacher's effect on school cognitive outcome model (eq. 2.9), via three main specifications, each examining one of the three previously constructed teacher indices. Specifically, student-teacher relationship index, teacher quality index and overall teacher index.

$$\ln(\mu(co)_{it}) = \alpha + \gamma T_{i,t-1,t-2} + \sum_{L} \zeta_L (C_{it} + C_{i,t-2}) + \sum_{N} \beta_N (X_{i,t-1} + X_{i,t-2}) + \varepsilon_i \qquad (2.9)$$

where $\mu(co)_{it}$ represents the expected value of the *co*gnitive outcome variable measured at time *t* corresponding to year 2005/2006 when the KS4 outcome was measured, $T_{i,t-1,t-2}$ is the teacher influence index measured via three different indices (each constructed by a mix of variables measured at both wave one (*t-2*) and wave two (*t-1*)), C_{Li} (*L*=2) are the school context variables; one representing the school phase of education at time *t* and the other representing a dummy for whether the school attended at wave one (*t*-2) was an independent or maintained school, and X_{Ni} (*N*=17) are student's input variables measured at either wave one (*t-2*) or wave two (*t*-1). The same model is examined for the affective outcome (eq. 2.9), where $\mu(af)_{i,t+1}$ represents the expected value of the *af*fective outcome variable measured at time (*t+1*) corresponding to wave four when the outcome was measured.

$$\ln(\mu(af)_{i,t+1} / 1 - \mu(af)_{i,t+1}) = \alpha + \gamma T_{i,t-1,t-2} + \sum_{L} \zeta_L (C_{it} + C_{i,t-2}) + \sum_{N} \beta_N (X_{i,t-1} + X_{i,t-2}) + \varepsilon_i \qquad (2.10)$$

The second phase of the analysis examined the full model after adding the school quality effect measured at year 2005/2006 (eq. 2.11 examining the cognitive outcome and eq. 2.12 examining the effective outcome). Specifically, the model was examined via ten specifications each examining one of the ten school quality indices (*SQ*) explained earlier.

$$\ln(\mu(co)_{it}) = \alpha + \gamma T_{i,t-1,t-2} + \lambda SQ_{ijt} + \sum_{L} \zeta_L (C_{it} + C_{i,t-2}) + \sum_{N} \beta_N (X_{i,t-1} + X_{i,t-2}) + \varepsilon_i \quad (2.11)$$

$$\ln(\mu(af)_{i,t+1} / 1 - \mu(af)_{i,t+1}) = \alpha + \gamma T_{i,t-1,t-2} + \lambda SQ_{ijt} + \sum_{L} \zeta_L (C_{it} + C_{i,t-2}) + \sum_{N} \beta_N (X_{i,t-1} + X_{i,t-2}) + \varepsilon_i \quad (2.12)$$

where SQ_{ijt} represents the school quality index for student *i* at school *j* at time *t*.

The models specified in the previous equations indicate that all independent variables except two were reported at a time period prior to that when the dependent variables were reported, thus one can argue to an extent that it is less likely to suffer from an endogeneity problem. However, a counter argument could be that the use of one or two lagged term independent variables may not necessarily overcome the endogeneity problem. In response to that a differentiation is made between the main independent variables of interest (the three teacher variables and the ten school process variables explained in the section 2.3) and the other additional covariates in the model.

Starting with the main independent variables of interest that are both teacher and school related variables, one can assume that they are more likely to be exogenous based on a number of reasons. First, the previously reviewed literature in section 2.2 has indicated that both teacher and school related variables are more likely to be the one affecting adolescents' outcomes rather than the other way around. Second, according to the nature of the variables used to construct the nine school quality indices, it could be argued that only the SchAS_A and SchPDW_A indices could suffer from a possible endogeneity problem with the KS4 outcome variable, where they were more or less measured around similar time point. To illustrate, the two indices were based on variables reflecting the academic standards (SchAS_A) and personal development of the student such as behaviour and attendance (SchPDW_A), which in turn could depend on the students' KS4 scores. However, a counter argument suggests that despite the possible existence of such two-way relationship, the number of students sampled per school is very small (a maximum of 32 students per school) compared to the true number of students[13] that could exist in the school, which could be a minimum range of (1-500) students. Although that minimum

[13] For more details, see < https://www.gov.uk/government/publications/number-of-secondary-schools-and-their-size-in-student-numbers>. Notice that although the statistics available is for 2012, there was no available detailed data for the year 2005/2006. However, it is suggested that the statistics would not change dramatically between the two years.

range could take values less than 500, still 32 students will not be representative enough to the true number of students to reflect the overall Ofsted performance of the school. Accordingly, one can argue that even if there is a possibility for a reverse relationship implying that adolescents' outcomes could affect both teacher and school quality, one would expect that such reverse relationship would take place if the outcome of the student is measured before assessing the teacher or school quality (which is not the case here) and an adequately large enough number of students per school and/or classroom to make such effect. In that logic and given the nature of the data used in the analysis where both the outcome on one hand and the teacher and school related variables on the other are contemporaneous, one can assume that such reverse relationship is less likely to hold.

As for the rest of the additional covariates used in the model, one can argue that some of these variables could suffer from an endogeneity problem despite the lagged term. However, a number of justifications could yet be provided. First, the use of these variables as controls or even mediators has been supported by the literature. To mention a few; family socioeconomic status by (Ven Ploeg, 2013); parents' occupation and income by (Duncan and Brooks-Gunn, 1997; Hill and Duncan 1987; Krein and Belier 1988; Martin, 2012; McLanahan 1983, 1985; Shaw, 1982); neighbourhood effect by (Bowen, et al., 2008; Teachman and Paasch, 1998), which is the one variable reported at the same time point as the outcome variable and is measured by the income deprivation index, which could likely be considered exogenous since one could assume that it is not expected that the educational outcome of one adolescent measured in the model is likely to cause the deprivation index of the entire neighbourhood where the adolescent live to be high or low. Other variables that could be argued to be endogenous include parental involvement in school life that has been used by (Muller, 1995; 1998). Second, these variables are known as extraneous or confounding variables that need to be controlled for in order to avoid any biased results (Kish, 1959; Vandenbroucke, 2004). Third, even if one does not control for these confounding variables, it is likely to lead to an omission bias that could be another source of endogeneity.

In light of the previous arguments, one can state that since these confounding variables are not the main variable of interest in the model, the study does not attempt or claim to solve their potential endogeneity. Having said that, the analysis acknowledges the limitations caused by such endogeneity. As such and since the exogeneity assumption is often violated, yet to widely varying degrees, in the analysis of educational production functions,

as in most other areas of empirical economic research, what one learns about important relationships is not devoid of meaning; however, attributing causality to the estimates should be done with extreme caution. Accordingly, the following findings of the models do not claim such causality, rather they explain the association between the teacher and school quality and adolescent's outcome controlling for other confounding covariates. Lastly, it is worth noting that as with the related literatures on educational production function studies, such functions are not completely known and must be estimated using imperfect data, which makes any estimates subject to considerable uncertainty (Hanushek, 1986) and unassailable estimates of causal relationships explaining the underlying process are not yet attainable (Haveman and Wolfe, 1995).

2.4 Findings

Before explaining the findings of each educational outcome, the analysis examined the possible correlation between all variables across all model specifications and there was no high correlation problem detected between any two independent variables involved in the same model (see tables B.1 and B.2 in appendix B).

2.4.1 Students' Cognitive Outcome

Table (2.1) provides descriptive statistics for the variables examined in the *estimation sample* of the cognitive outcome analysis covering 1664 students. In order to answer the first research question, the analysis examined the teacher influence model defined in equation (2.9) via three specifications for the three teacher influence indices. Although the student-teacher relationship index lacks sufficient internal consistency ($\alpha = 0.21$), the first model in table (2.2) examined its possible impact on the student's cognitive outcome showing that it is not a significant one and that the other two teacher indices could be better indicators for such impact. Indeed, the teacher quality index indicated a significant positive contribution in explaining the student's KS4 score. However, such impact was relatively small in size indicating that with each 1 standard deviation increase in teacher quality the expected value of KS4 score goes up by a factor of only 1.063 ($1.007^{8.761}$; where 8.761 is the standard deviation of the teacher quality index) or alternatively by 6.3%. Finally, the third model examining the overall teacher index also indicated a significant positive contribution in explaining the student's KS4 score with a similar size effect of almost 6%.

Table 2.1: Descriptive Statistics of the Cognitive Outcome Model Variables

VARIABLES	Mean	Std. Dev.	Min	Max
KS4 point score	407.565	136.120	0	782
Student/teacher relation index (α = 0.21)	-0.188	5.345	-15.834	20.416
Teacher quality index (α = 0.82)	0.015	8.761	-36.657	18.057
Overall teacher index (α = 0.71)	-0.174	11.421	-46.271	38.472
SchOE_A (α = 0.79)	0.379	5.864	-37.593	10.156
SchAS_A (α = 0.86)	0.533	5.329	-12.918	12.983
SchPDW_A (α = 0.94)	0.827	8.274	-24.698	15.564
SchQP_A (α = 0.81)	0.332	4.437	-15.140	9.760
SchLM_A (α = 0.89)	0.529	6.069	-15.351	11.524
SchESELH_A (α = -0.56)	0.032	1.544	-21.296	0.223
SchEPELS_A (α = -1.3)	0.091	0.854	-14.095	0.143
SchELMPC_A (α = 0.79)	0.091	2.179	-30.906	0.325
SchESELEW_A (α = 0.21)	0.112	1.761	-22.360	0.338
Overall school quality (α = 0.95)	2.925	30.275	-194.358	61.016
Independent/maintained school	0.002	0.049	0	1
Phase of education	3.966	0.289	1	4
KS3 score (Z)	0.345	0.851	-2.739	2.193
Likelihood of the young person applying to university	3.027	0.978	1	4
Highest qualification of family	3.290	1.790	1	7
Family NS-SEC class	3.860	2.197	1	8
Mean income (Z)	0.028	0.795	-0.894	4.177
IDACI score (Z)	0.200	0.924	-3.823	1.239
Type of household tenure	2.528	1.341	1	8
Urban/Rural Indicator	5.329	0.841	2	8
MP: How the young person's expenses would be paid if stayed on in education- Parent(s) will support or give money	0.895	0.307	0	1
MP: How involved is the MP in the young person's school life?	2.049	0.778	1	4
Whether or not there is internet access from home				
Whether or not there is home computer in the household	1.163	0.369	1	2
Family structure	1.061	0.239	1	2
Young person's religion	1.747	1.247	1	5
Young person’s ethnicity	2.237	1.604	1	8
Gender	1.850	1.751	1	8
Whether young person has Special educational needs	1.540	0.499	1	2
Young person’s age	1.973	0.162	1	2

The previous three models thus indicated that the teacher had generally a positive significant influence on student's cognitive outcome, which supports the findings of Aaronson, Barrow and Sander (2007), Glewwe, et al., (2011), Kyriakides (2005), Link and Ratledge (1979) and Rivkin, Hanushek and Kain (2005) even though such influence is relatively small in size (Aaronson, Barrow and Sander, 2007; Kyriakides, 2005; Rivkin, Hanushek and Kain, 2005) indicating that student's inputs may play a bigger role in explaining his/her cognitive outcome.

Table 2.2: Teacher Influence on Cognitive Outcome

VARIABLES	(1) IRR	(2) IRR	(3) IRR
Teacher Influence			
Student/teacher relation index	1.003		
	(0.00243)		
Teacher quality index		1.007***	
		(0.00197)	
Overall teacher index			1.005***
			(0.00156)
School Context			
Independent school	1.214**	1.189**	1.208**
	(0.0983)	(0.0933)	(0.0951)
Phase of education (reference level: secondary)			
Academies	1.337***	1.387***	1.363***
	(0.0843)	(0.0990)	(0.0968)
Middle deemed Secondary	1.023	0.998	1.006
	(0.0599)	(0.0367)	(0.0505)
Student Inputs			
KS3 score (Z)	1.396***	1.385***	1.392***
	(0.0338)	(0.0316)	(0.0325)
Likelihood of the young person applying to university (reference level: not at all likely)			
Not very likely	1.161***	1.150**	1.148**
	(0.0660)	(0.0654)	(0.0651)
Fairly likely	1.238***	1.213***	1.210***
	(0.0671)	(0.0657)	(0.0651)
Very likely	1.224***	1.190***	1.189***
	(0.0662)	(0.0643)	(0.0638)
Highest qualification of family (reference level: Degree or equivalent)			
Higher education below degree level	0.998	0.992	0.992
	(0.0243)	(0.0236)	(0.0237)
GCE A Level or equiv	1.040	1.044	1.041
	(0.0263)	(0.0277)	(0.0270)
GCSE grades A-C or equiv	1.022	1.016	1.016
	(0.0295)	(0.0290)	(0.0285)
Qualifications at level 1 and below	1.031	1.017	1.020
	(0.0557)	(0.0531)	(0.0534)

Other qualifications	0.995	0.994	0.989
	(0.0775)	(0.0781)	(0.0755)
No qualification	0.957	0.964	0.956
	(0.0601)	(0.0575)	(0.0581)
Family NS-SEC class (reference level: Higher Managerial and professional occupations)			
Lower managerial and professional occupations	1.023	1.030	1.027
	(0.0201)	(0.0210)	(0.0207)
Intermediate occupations	1.077*	1.086**	1.084**
	(0.0427)	(0.0437)	(0.0436)
Small employers and own account workers	1.017	1.019	1.017
	(0.0329)	(0.0341)	(0.0344)
Lower supervisory and technical occupations	1.019	1.020	1.021
	(0.0357)	(0.0352)	(0.0352)
Semi-routine occupations	0.983	0.990	0.985
	(0.0444)	(0.0435)	(0.0436)
Routine occupations	0.984	0.988	0.986
	(0.0436)	(0.0446)	(0.0443)
Never worked/long term unemployed	0.933	0.920	0.921
	(0.104)	(0.0994)	(0.101)
Mean income (Z)	0.982*	0.983*	0.983*
	(0.00928)	(0.00899)	(0.00907)
IDACI score (Z)	1.025	1.029	1.030
	(0.0189)	(0.0186)	(0.0186)
Type of household tenure (reference level: Owned outright)			
Being bought on a mortgage/ bank loan	0.990	0.989	0.987
	(0.0224)	(0.0232)	(0.0224)
Shared ownership (owns & rents property)	1.170	1.150	1.153
	(0.215)	(0.203)	(0.208)
Rented from a Council or New Town	0.939	0.947	0.944
	(0.0500)	(0.0493)	(0.0499)
Rented from a Housing Association	0.921	0.915	0.915
	(0.0640)	(0.0637)	(0.0634)
Rented privately	1.031	1.014	1.014
	(0.0556)	(0.0535)	(0.0536)
Rent free	1.020	1.001	1.003
	(0.0807)	(0.0783)	(0.0748)
Some other arrangement	1.068	1.042	1.042
	(0.172)	(0.172)	(0.182)
Urban/Rural Indicator (reference level: Urban-sparse)			
Village-sparse	0.861**	0.884	0.867*
	(0.0532)	(0.0703)	(0.0666)
Hamlet and Isolated Dwelling-sparse	0.964	0.977	0.974
	(0.0615)	(0.0590)	(0.0609)
Urban-less sparse	1.011	1.032	1.018
	(0.0347)	(0.0375)	(0.0393)
Town & Fringe-less sparse	1.010	1.033	1.018
	(0.0387)	(0.0420)	(0.0427)
Village-less sparse	0.987	1.008	0.998

	(0.0429)	(0.0449)	(0.0465)
Hamlet & Isolated Dwelling-less sparse	1.037	1.057	1.041
	(0.0455)	(0.0460)	(0.0477)
MP: How the young person's expenses would be paid if stayed on in education-Parent(s) will support or give money	1.063	1.060	1.061
	(0.0519)	(0.0507)	(0.0507)
MP: How involved is the MP in the young person's school life? (reference level: very involved)			
Fairly involved	1.034	1.037	1.038
	(0.0289)	(0.0280)	(0.0283)
Not very involved	1.002	1.010	1.016
	(0.0311)	(0.0303)	(0.0313)
Not at all involved	1.154***	1.169***	1.176***
	(0.0582)	(0.0581)	(0.0608)
Whether or not there is internet access from home	1.007	0.998	1.000
	(0.0502)	(0.0489)	(0.0489)
Whether or not there is home computer in the household	1.090	1.107	1.103
	(0.0754)	(0.0766)	(0.0762)
Family structure (reference level: married couple)			
Cohabiting couple	1.036	1.034	1.036
	(0.0438)	(0.0407)	(0.0418)
Lone father	1.052	1.045	1.045
	(0.0812)	(0.0829)	(0.0801)
Lone mother	0.903***	0.911**	0.909**
	(0.0350)	(0.0343)	(0.0346)
No parents in the household	0.977	0.943	0.958
	(0.0655)	(0.0732)	(0.0679)
Young person's religion (reference level: Christian)			
None	0.955**	0.967	0.965
	(0.0211)	(0.0211)	(0.0213)
Buddhist	1.040	1.111	1.076
	(0.159)	(0.174)	(0.156)
Hindu	0.889	0.900	0.897
	(0.0869)	(0.0877)	(0.0850)
Jewish	0.909	0.901	0.897
	(0.0666)	(0.0662)	(0.0657)
Muslim	1.133*	1.116	1.124*
	(0.0798)	(0.0793)	(0.0778)
Sikh	0.966	0.981	0.969
	(0.0964)	(0.0997)	(0.0956)
Another religion	0.854	0.829	0.839
	(0.266)	(0.249)	(0.259)
Young person’s ethnicity (reference level: White)			
Mixed	1.092	1.124**	1.121*
	(0.0648)	(0.0657)	(0.0660)
Indian	1.230**	1.224**	1.225**
	(0.120)	(0.122)	(0.118)
Pakistani	1.086	1.103	1.095
	(0.0936)	(0.0971)	(0.0946)
Bangladeshi	1.104	1.127	1.119
	(0.117)	(0.123)	(0.119)
Black Caribbean	1.089	1.125	1.124

	(0.0934)	(0.103)	(0.105)
Black African	1.220***	1.218***	1.223***
	(0.0780)	(0.0758)	(0.0781)
Other	1.145	1.153	1.159
	(0.140)	(0.136)	(0.136)
Female	1.042**	1.051**	1.051**
	(0.0209)	(0.0218)	(0.0215)
Young person has Special educational needs	0.934	0.946	0.944
	(0.0890)	(0.0900)	(0.0899)
Young person's age when started KS4	0.471***	0.451***	0.453***
	(0.0562)	(0.0501)	(0.0538)
Constant	1.899e+07***	3.499e+07***	3.359e+07***
	(3.400e+07)	(5.826e+07)	(5.974e+07)

Standard error (Eform) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

The most important student's input in model (3) was his/her academic self-schema or prior attainment measured by KS3 score, which had a significant positive impact on KS4 score, where one standard deviation increase in KS3 score was associated with 39.2% increase in the expected value of KS4 score. Such impact is highly expected and matches the general conclusion in the literature that academic performance in high school is usually influenced by pre-high school attainment (Duran and Weffer, 1992; Glick and Sahn, 2010; Tymms, 1992). Similar conclusion was found in an earlier UK study where two fifths of the attainment gap between rich and poor pupils at the end of secondary school was attributed to their prior attainment at the beginning of secondary school (Chowdry, Crawford and Goodman, 2010).

Similarly, the likelihood of applying to university had also a positive significant impact on cognitive outcome, where students who were very likely to apply to university were more likely to have higher expected value of KS4 score by almost 19% compared to those who were not likely at all to apply to university. The same applied for those who were fairly likely to apply to university (21%) and not very likely to apply to university (15%). This finding matches a similar one reported in the UK showing that changes in students' attitudes and behaviours, especially regarding continuing to higher education, between the age of 14 and 16 were strongly associated with changes in educational attainment (Chowdry, Crawford and Goodman, 2009; Chowdry, et al., 2010). Also, the findings revealed that girls were likely to have higher expected value of KS4 score by only 5% compared to boys, which matches to a great extent the results of Yamauchi (2008), Duckworth (2009) and DfCSF (2009). As for the school context variables students who attended independent schools were likely to have higher expected value of KS4 score by almost 21% compared to those who attended maintained schools. Also, students at

academies were likely to have higher expected value of KS4 score by 36.3% compared to those at secondary schools[14]. The rest of the student's and family demographic variables are used in the analysis primarily as a ''noise reduction'' strategy when examining the relationship between teacher effect and the two school outcomes. Consequently, no specific expectations are offered about how these variables may have influenced the dependent outcomes.

Since the overall teacher index is significant and by default reflects the influence of the other two teacher indices, it is more appropriate to use it as the main teacher influence index for the second stage of analysis. In that stage, the analysis examines the model defined by equation (2.11), where the school quality effect is introduced to the model. As has been explained earlier, the model was investigated via ten specifications for the ten school quality indices. As indicated in table (2.3), all school quality indices had a significant positive impact on the student's cognitive outcome aside from the two indices reflecting the extent to which schools enable learners to be healthy (ESELH) and the extent to which learners make a positive contribution (ELMPC).

The findings indicate that school process factors are generally important to determining students' cognitive outcome, which matches the results of previous studies such as that of Weber (1971) showing that ongoing school process variables, such as leadership, expectations, school atmosphere and evaluation of pupil progress are important factors in determining students' outcomes. Moreover, empirical support for the effectiveness of an orderly learning environment in the school has been confirmed from qualitative and quantitative reviews showing that it has a positive influence on students' cognitive outcomes (Kyriakides, 2005; Opdenakker and Van Damme, 2000; Scheerens, 1992).

Despite the positive significant impact of most of the first nine school quality indices, the magnitude of such importance was relatively small ranging between almost 2% for one standard deviation increase in the extent to which providers ensure that learners stay safe index (EPELS) and 5.4% for the overall effectiveness index (OE). However, given that the

[14] On the other hand, two student's inputs had a negative significant impact on KS4 score; family income and age. In particular, one standard deviation increase in income was associated with almost 1.7% decrease in the expected mean of KS4 score. Such negative association was strikingly unexpected where one would expect a positive association. However, in order to check the possible explanation, a bivariate regression was run separately with the income variable showing that originally there tends to be a positive association, which becomes negative after controlling for other school and student heterogeneity. Also, an additional one year in the student's age was associated with 54.7% decrease in that score, which is quite a large difference that could be justified by the fact that all students in the estimation sample were aged 15 while only two students were aged either 14 or 16.

former lacked sufficient internal consistency, it could be concluded that the latter (OE) is the most important aspect of school performance in explaining cognitive outcome. The last column in table (2.3) examined the impact of the overall school quality index, which reflects all the previous nine indices. Despite the significant positive impact of the overall index, it as well had a small magnitude of only 6.2% on cognitive outcome.

In light of findings of the previous 10 models and since the overall school quality index is significant and by default reflects the influence of the other nine indices, the rest of the findings focused on the analysis of the full model (10) reflecting the two school process variables; the overall teacher index and the overall school quality. In essence, the overall teacher index in the full model did not change indicating again a small positive significant impact of almost 6% on cognitive outcome. Accordingly, given the small contributions of both teacher effect and school quality (almost 6%) on cognitive outcome, one can again conclude that other factors could have greater importance in explaining student's cognitive outcome. Indeed, the same student's inputs and school context variables that were reported in the overall teacher index model were found to be the most significant in the overall school quality full model with similar size effects (see table B.3 in appendix B for the reported values).

Table 2.3: School Quality Effect on Cognitive Outcome

VARIABLES	(1) IRR	(2) IRR	(3) IRR	(4) IRR	(5) IRR	(6) IRR	(7) IRR	(8) IRR	(9) IRR	(10) IRR
School Process										
SchOE_A	1.009***									
	(0.00261)									
SchAS_A		1.007***								
		(0.00250)								
SchPDW_A			1.005***							
			(0.00153)							
SchQP_A				1.011***						
				(0.00317)						
SchLM_A					1.007***					
					(0.00231)					
SchESELH_A						1.010				
						(0.00690)				
SchEPELS_A							1.024***			
							(0.00461)			
SchELMPC_A								1.007		
								(0.00592)		
SchESELEW_A									1.016**	
									(0.00695)	
Overall school quality										1.002***
										(0.000432)
Overall teacher index	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***
	(0.00149)	(0.00153)	(0.00150)	(0.00150)	(0.00149)	(0.00157)	(0.00156)	(0.00157)	(0.00155)	(0.00149)

All models control for school context variables and student's inputs examined in the teacher effect models (see table B.3 in appendix B for the reported values).
The goodness of fit[15] test for the full model (10): F(64, 96) = 69.42***(for details about the exact test see appendix C).
Standard error (Eform) in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[15] R^2 was not be reported since the estimation is based on a survey designed dataset, where cases are not independent and so estimating R^2 would not be appropriate.

In general, based on the previous findings one can conclude that school process inputs are important inputs in explaining the cognitive outcome of students. However, the relatively small magnitude of these variables reflected that student's related inputs such as academic self-schema and attitude towards continuing to higher education play a major role in explaining such outcome. Also, looking at the insignificance of the majority of family background factors in model 10 of table (2.3), one could suggest in line with what has been reported in the literature regarding the case of England that teacher quality (Slater, Davies and Burgess, 2009) and school quality do make a difference in the cognitive outcome of students. Moreover, as they also concluded the significance of school process inputs reflected that they should be controlled for when studying student's cognitive outcomes and not restricting the explanation of such outcomes to just family background factors.

2.4.2 Students' Affective Outcome

Table (2.4) provides descriptive statistics for the variables examined in the *estimation sample* of the affective outcome analysis covering 1520 students. Following the same model specifications of the cognitive outcome analysis, the results indicated that all three teacher influence indices did have a significant positive impact on student's affective outcome. Specifically, the three models in table (2.5) indicated that such impact was large in magnitude with both the teacher quality index and the overall teacher index having a large impact of almost 119% and 112% respectively. Having said that, along with the positive significance of the teacher influence, its large magnitude (Kyriakides, 2005) was found to be much larger than other student's inputs like his/her prior attainment while other factors were found to have a bigger role in explaining his/her affective outcome as well.

Table 2. 4: Descriptive Statistics of the Affective Outcome Model Variables

VARIABLES	Mean	Std. Dev.	Min	Max
Attitude towards school	2.319	0.797	0	4
Student/teacher relation index (α = 0.21)	-0.306	5.289	-15.834	20.416
Teacher quality index (α = 0.82)	0.026	8.752	-36.657	18.057
Overall teacher index (α = 0.71)	-0.280	11.404	-46.271	38.472
SchOE_A (α = 0.79)	0.405	5.848	-37.593	10.156
SchAS_A (α = 0.86)	0.606	5.389	-12.918	12.983
SchPDW_A (α = 0.94)	0.924	8.279	-24.698	15.564
SchQP_A (α = 0.81)	0.362	4.479	-15.140	9.760
SchLM_A (α = 0.89)	0.536	6.070	-15.351	11.524
SchESELH_A (α = -0.56)	0.053	1.465	-21.296	0.223
SchEPELS_A (α = -1.3)	0.096	0.816	-14.095	0.143
SchELMPC_A (α =	0.098	2.123	-30.906	0.325

0.79)				
SchESELEW_A (α = 0.21)	0.117	1.721	-22.360	0.338
Overall school quality (α = 0.95)	3.197	30.294	-194.358	61.016
Independent/maintained school	0.003	0.051	0	1
Phase of education	3.968	0.272	1	4
KS3 score (Z)	0.379	0.846	-2.739	2.193
Likelihood of the young person applying to university	3.048	0.969	1	4
Highest qualification of family	3.275	1.799	1	7
Family NS-SEC class	3.821	2.185	1	8
Mean income (Z)	0.039	0.802	-0.894	4.177
IDACI score (Z)	0.216	0.928	-3.823	1.239
Type of household tenure	2.509	1.330	1	8
Urban/Rural Indicator	5.334	0.855	2	8
MP: How the young person's expenses would be paid if stayed on in education- Parent(s) will support or give money	0.895	0.307	0	1
MP: How involved is the MP in the young person's school life?	2.053	0.776	1	4
Whether or not there is internet access from home	1.157	0.364	1	2
Whether or not there is home computer in the household	1.057	0.231	1	2
Family structure	1.739	1.244	1	5
Young person's religion	2.223	1.579	1	8
Young person’s ethnicity	1.813	1.718	1	8
Gender	1.544	0.498	1	2
Whether young person has Special educational needs	1.972	0.164	1	2
Young person’s age when started KS4	15	0.026	15	16

The most important student’s input was his/her likelihood of applying to university having a positive significant impact, where students who were very or fairly likely to apply to university were likely to have higher attitude by almost 119% and 107% respectively compared to those who are not likely at all to apply to university. The same applies for those who were not very likely to apply to university (34%). Similarly, his/her academic self-schema had also a significant positive impact on his/her attitude towards school, where one standard deviation increase in KS3 score was associated with a almost 34% increase in the odds of having higher attitude score. This matched the results of Murdoch and Phelps (1973) indicating that students with low academic self-schema have low school commitment. Moreover, an improvement in the deprivation index by one standard

deviation was associated with almost 26% improvement in the odds of having higher attitude score towards school.

Table 2.5: Teacher Influence on Affective Outcome

VARIABLES	(1) OR	(2) OR	(3) OR
Teacher Influence			
Student/teacher relation index	1.059***		
	(0.0144)		
Teacher quality index		1.094***	
		(0.00858)	
Overall teacher index			1.068***
			(0.00618)
School Context			
Independent school	0.178*	0.134**	0.148**
	(0.164)	(0.122)	(0.135)
Phase of education (reference level: secondary)			
Academies	0.638	1.136	0.853
	(0.303)	(0.472)	(0.352)
Middle deemed Secondary	1.286	1.062	1.070
	(0.522)	(0.191)	(0.337)
Student Inputs			
KS3 score (Z)	1.409***	1.259**	1.342***
	(0.146)	(0.136)	(0.142)
Likelihood of the young person applying to university (reference level: not at all likely)			
Not very likely	2.053**	2.074***	1.868**
	(0.592)	(0.557)	(0.536)
Fairly likely	2.638***	2.271***	2.067**
	(0.733)	(0.623)	(0.589)
Very likely	2.971***	2.350***	2.195**
	(0.905)	(0.705)	(0.676)
Highest qualification of family (reference level: Degree or equivalent)			
Higher education below degree level	0.860	0.776	0.792
	(0.206)	(0.187)	(0.191)
GCE A Level or equiv	1.007	1.066	1.021
	(0.234)	(0.259)	(0.249)
GCSE grades A-C or equiv	0.887	0.806	0.822
	(0.222)	(0.207)	(0.208)
Qualifications at level 1 and below	0.979	0.831	0.840
	(0.345)	(0.282)	(0.294)
Other qualifications	0.795	0.834	0.794
	(0.429)	(0.446)	(0.422)
No qualification	0.770	1.057	0.938
	(0.275)	(0.380)	(0.348)
Family NS-SEC class (reference level: Higher Managerial and professional occupations)			
Lower managerial and professional occupations	0.938	0.981	0.956
	(0.176)	(0.194)	(0.188)
Intermediate occupations	1.079	1.098	1.061
	(0.312)	(0.315)	(0.313)
Small employers and own account workers	0.875	0.905	0.869
	(0.265)	(0.278)	(0.265)
Lower supervisory and technical	0.963	0.962	0.960

occupations			
	(0.247)	(0.248)	(0.245)
Semi-routine occupations	1.374	1.502	1.415
	(0.386)	(0.442)	(0.417)
Routine occupations	0.699	0.710	0.662
	(0.201)	(0.194)	(0.182)
Never worked/long term unemployed	1.048	0.891	0.903
	(0.598)	(0.475)	(0.494)
Mean income (Z)	0.831**	0.850	0.849*
	(0.0752)	(0.0837)	(0.0803)
IDACI score (Z)	1.201*	1.249**	1.258**
	(0.122)	(0.135)	(0.133)
Type of household tenure (reference level: Owned outright)			
Being bought on a mortgage/ bank loan	1.006	1.042	0.984
	(0.180)	(0.204)	(0.184)
Shared ownership (owns & rents property)	1.077	0.977	0.900
	(0.897)	(0.719)	(0.645)
Rented from a Council or New Town	0.930	1.040	0.992
	(0.264)	(0.321)	(0.306)
Rented from a Housing Association	1.144	1.083	1.036
	(0.394)	(0.376)	(0.368)
Rented privately	1.314	1.171	1.122
	(0.538)	(0.421)	(0.425)
Rent free	8.255***	7.160**	7.233**
	(6.580)	(6.107)	(6.085)
Some other arrangement	9.267	8.005	7.386
	(14.27)	(12.70)	(10.74)
Urban/Rural Indicator (reference level: Urban-sparse)			
Village-sparse	0.368	0.533	0.423
	(0.323)	(0.517)	(0.403)
Hamlet and Isolated Dwelling-sparse	1.510	1.572	1.534
	(1.067)	(1.129)	(1.106)
Urban-less sparse	0.583	0.725	0.636
	(0.340)	(0.411)	(0.370)
Town & Fringe-less sparse	0.810	1.072	0.938
	(0.493)	(0.641)	(0.570)
Village-less sparse	0.504	0.630	0.574
	(0.289)	(0.360)	(0.334)
Hamlet & Isolated Dwelling-less sparse	0.309*	0.355	0.314*
	(0.213)	(0.237)	(0.210)
MP: How the young person's expenses would be paid if stayed on in education-Parent(s) will support or give money	1.182	1.240	1.206
	(0.285)	(0.293)	(0.284)
MP: How involved is the MP in the young person's school life? (reference level: very involved)			
Fairly involved	0.785	0.834	0.833
	(0.159)	(0.163)	(0.166)
Not very involved	0.552***	0.578**	0.614**
	(0.125)	(0.128)	(0.138)
Not at all involved	0.539*	0.589*	0.637
	(0.179)	(0.187)	(0.206)
Whether or not there is internet access from home	1.531	1.341	1.383
	(0.418)	(0.334)	(0.363)
Whether or not there is home computer in the household	0.766	0.922	0.892
	(0.264)	(0.300)	(0.300)
Family structure (reference level: married			

couple)			
Cohabiting couple	0.749	0.745	0.775
	(0.205)	(0.200)	(0.214)
Lone father	0.571	0.448	0.465
	(0.378)	(0.330)	(0.321)
Lone mother	0.914	1.019	1.014
	(0.180)	(0.198)	(0.207)
No parents in the household	0.948	0.511	0.614
	(0.724)	(0.406)	(0.475)
Young person's religion (reference level: Christian)			
None	0.952	1.094	1.083
	(0.140)	(0.164)	(0.162)
Buddhist	0.749	1.330	1.140
	(0.553)	(1.312)	(0.988)
Hindu	0.572	0.814	0.758
	(0.277)	(0.444)	(0.398)
Jewish	1.194	1.042	1.020
	(1.084)	(0.927)	(0.913)
Muslim	1.688	1.344	1.478
	(1.172)	(0.861)	(0.947)
Sikh	2.002	2.948*	2.472
	(1.203)	(1.882)	(1.530)
Another religion	0.313**	0.204***	0.259***
	(0.157)	(0.114)	(0.128)
Young person's ethnicity (reference level: White)			
Mixed	0.560	0.866	0.790
	(0.204)	(0.341)	(0.307)
Indian	1.872	1.477	1.562
	(0.982)	(0.788)	(0.841)
Pakistani	1.552	1.864	1.728
	(1.067)	(1.160)	(1.104)
Bangladeshi	0.570	0.628	0.591
	(0.450)	(0.516)	(0.468)
Black Caribbean	1.651*	2.228**	2.279**
	(0.456)	(0.717)	(0.748)
Black African	2.398	2.339	2.358
	(1.333)	(1.386)	(1.349)
Other	1.549	1.450	1.609
	(0.778)	(0.792)	(0.811)
Female	1.060	1.200	1.175
	(0.127)	(0.157)	(0.153)
Young person has Special educational needs	0.437*	0.457	0.477
	(0.210)	(0.246)	(0.249)
Young person's age when started KS4	1.174	0.819	0.735
	(0.777)	(0.572)	(0.512)

Standard error (Eform) in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

On the other hand, one of the main student's inputs that had a negative significant impact on attitude is the urban/rural indicator for where he/she lives. In particular, students living in hamlet & isolated dwelling-less sparse areas have almost 69% less odds of having higher attitude score compared to those living in urban-sparse areas. Although, it is more tempting to accept such negative association between attitude towards school and the rural area where the student lives, the precise reasoning behind such association should be

further examined by perhaps the effect of possible interaction between the area type and the family socioeconomic condition, which could be the scope of analysis of further research. As for the school context variables, students who attended independent schools were less likely to have higher attitude score by almost 85% compared to those who attended maintained schools.

In the second stage, the school quality effect was introduced to the model via ten specifications for the ten school quality indices. As indicated in table (2.6), only three indices are found to have a significant impact on student's affective outcome. Specifically, school achievement and standards (AS), quality of provision (QP) and leadership and management (LM) were found to have a positive influence on student's attitude towards school. Such findings are likely to occur since students with better attitude towards school are likely to have better academic achievement (Murdoch and Phelps, 1973), which in turn would be reflected in the school overall level of achievement (AS). Also, the school quality of provision and its leadership and management are likely to improve students' attitude towards school, where one would expect students to better value the time they spend at school as long as the school provides better environment for students to be willing to attend school and devote more effort for school work (Kyriakides, 2005; Opdenakker and Van Damme, 2000; Scheerens, 1992).

Besides such positive impact, it was moderate reflecting a range of 18% and 15% (AS and LM respectively) and 21% (QP) improvement in student's attitude with each 1 standard deviation increase in those school quality indices. These magnitudes are larger than those of the same indices explaining cognitive outcome. Consequently, though the analysis does not intended to empirically compare between the two analysis given the nature of the two samples used, one could intuitively indicate that these quality aspects of the school are likely to have relatively more sizable influence on student's affective rather than cognitive outcome.

Table 2.6: School Quality Effect on Affective Outcome

VARIABLES	(1) OR	(2) OR	(3) OR	(4) OR	(5) OR	(6) OR	(7) OR	(8) OR	(9) OR	(10) OR
School Process										
SchOE_A	1.015									
	(0.0145)									
SchAS_A		1.031**								
		(0.0152)								
SchPDW_A			1.007							
			(0.00966)							
SchQP_A				1.043**						
				(0.0182)						
SchLM_A					1.024*					
					(0.0142)					
SchESELH_A						0.967				
						(0.0254)				
SchEPELS_A							0.970			
							(0.0218)			
SchELMPC_A								0.959		
								(0.0348)		
SchESELEW_A									0.993	
									(0.0311)	
Overall school quality										1.003
										(0.00281)
Overall teacher index	1.067***	1.067***	1.067***	1.067***	1.067***	1.068***	1.068***	1.068***	1.068***	1.067***
	(0.00608)	(0.00613)	(0.00612)	(0.00609)	(0.00610)	(0.00620)	(0.00619)	(0.00622)	(0.00618)	(0.00609)

All models control for school context variables and student's inputs examined in the teacher effect models (see table B.4 in appendix B for the reported values).
The goodness of fit test for the full model (10): F(64, 91) = 12.10***
Standard error (Eform) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The last model (10) in table (2.6) examined the impact of the overall school quality index, which was found to be insignificant arguably due to the insignificance of six out of the nine involved indices it reflects. In that regard, there is some evidence in the literature that schools which are among the most effective in enhancing cognitive outcomes are not necessarily among the most effective in helping their students achieve non-cognitive outcomes (Opdenakker & Van Damme, 2000; Kyriakides, 2005). It could also be explained by the likelihood that other school factors and student inputs could have more significant importance in explaining students' attitude towards school. To explain, consider the overall teacher index in the full model (10) indicating again a huge positive significant impact of 109% on such attitude. This implies that the teacher effect on attitude was not affected by the overall school quality and that such effect is the leading school process factor that could significantly explain such attitude as has also been observed in the teacher effect models earlier. Accordingly, given the huge contribution of the teacher effect, one can conclude that it was found to be bigger than other student's inputs like his/her prior attainment while other factors were found to have a bigger role in explaining his/her affective outcome as well. Indeed, the same student's inputs and school context variables that were reported in the overall teacher index model were found to be significant in the overall school quality full model with similar size effects (see table B.4 in appendix B for the reported values).

In general, based on the previous findings one can conclude that school process inputs especially teacher's inputs are important inputs in explaining the affective outcome of students. However, the insignificance of the overall school quality index reflected that student's related inputs such as attitude towards continuing to higher education play a major role in explaining such outcome. Also, looking at the insignificance of the majority of family background factors in model 10 of table (2.6), one could suggest that teacher quality mainly and certain school quality aspects do make a difference in the affective outcome of students. Moreover, the significance of school process inputs reflected that it would be ideal to be controlled for when studying student's affective outcomes and not restricting the explanation of such outcomes to just family background factors.

2.5 Conclusion and Discussion

There has been a long debate over the relationships between different inputs in the educational process and student's outcomes since 1966 with the release of the Coleman's report, which concluded that family background and peers were more important than

schools and teachers in educational outcomes. Despite the expansion of the literature on the implications that different inputs have on students' educational outcomes, empirical research has so far lacked, in some instances, the full capacity to provide unequivocal findings. Essentially, this deficiency is mainly attributed to two main factors; the lack of reliable data and the lack of full dimensionality in the theoretical model adopted to explain such data, where education specialists focus on the effect of school process inputs of the CIPO model while economists focus on resources inputs (Levaččićć and Vignoles, 2002; Knoeppel, Verstegen, and Rinehart, 2007; Kyriakides, 2005; Rivkin, Hanushek and Kain, 2005).

Earlier research on the effect of the full dimensional school process concept on students' educational outcomes has generally been less focused on the case of England (Levaččićć and Vignoles, 2002) and/or has been focused on the effect of limited organizational aspects of the school, such as the student ability grouping scheme (known as streaming) on cognitive outcomes of British students (Kerckhoff, 1986) or the effectiveness of post-16 educational institutions like assisted places scheme school (Tymms, 1992). Others examined the effect of teacher quality (Slater, Davies and Burgess, 2009) and the effect of school attended on both primary and secondary test scores and its continuity over time showing that such effect is greater on the former than the latter with smaller effect on continuing from primary to secondary (Sammons, et al., 1995).

In light of that and of what has been observed in the literature, this chapter introduced the school process component of the CIPO model to the educational production function approach by examining the effect of school process inputs on English students' educational cognitive and affective outcomes controlling for both school context and student's inputs. Specifically, the chapter examined the school process inputs that are not financial resource oriented at both the school level and the teacher level simultaneously, thus combining teacher influence variable(s) measuring student's perception of his/her teacher and school quality variable(s).

For this purpose, the chapter created a unique dataset comprising data from the LSYPE, the NPD and the Ofsted database, hence including new school information that has been lacked in the literature and so covering a wide range of school process variables in the analysis. Primarily, the analysis combined data about student's characteristics and family background factors from the LSYPE and outcomes from the NPD in addition to data about

56 school process variables from the Ofsted database reflecting its effectiveness in nine major inspection judgments that have not been examined fully in the literature neither as combined with student information nor separately.

The primary implication of the findings is that teachers matter. Teachers play a significant positive moderate role in improving student's cognitive outcome (Aaronson, Barrow and Sander, 2007; Glewwe, et al., 2011, Kyriakides, 2005, Link and Ratledge, 1979; Rivkin, Hanushek and Kain, 2005) and a much bigger role in improving their affective outcome (Kyriakides, 2005). Moreover, the teacher effect on attitude was not affected by the overall school quality and that such effect is the leading school process factor that could significantly explain such attitude. Additionally, comparing teacher effect with the overall school quality effect, it was found that the first was slightly smaller than the latter when it comes to cognitive outcome, while it was much bigger in the case of affective outcome. Such findings were coupled with another indicating that student's inputs may play a bigger role in explaining his/her outcomes.

These findings do not necessarily imply that the school does not matter. Rather they imply that teachers within school play a major role in affecting both students' cognitive and affective outcome. Accordingly, both schools and teachers should invest more in teachers' non-financial and/or human qualities, such as teacher effectiveness in monitoring students performance in terms of homework doing and his/her availability for student support outside class. Also, schools should pay more attention and put more emphasis on the teacher performance in terms of how he/she influences students' social conduct and how far he/she is being fair with students from different cultural backgrounds. Perhaps, a common proposed policy would be to link teachers' compensation with their performance in terms of the aforementioned aspects rather than just their education and level of experience (Aaronson, Barrow and Sander, 2007)

Most school quality aspects were found to have positive significant contribution in explaining student's cognitive outcome but not necessarily his/her affective outcome. Basically, the findings indicated that school process factors are generally important to determining students' cognitive outcome, which matches the results of previous studies such as that of Weber (1971) showing that ongoing school process variables, like leadership, expectations, school atmosphere and evaluation of pupil progress are important factors in determining students' cognitive outcomes. Moreover, empirical support for the effectiveness of an orderly learning environment in the school has been confirmed from

qualitative and quantitative reviews showing that it has a positive influence on students' cognitive outcomes (Kyriakides, 2005; Opdenakker and Van Damme, 2000; Scheerens, 1992). For the affective outcome, it was shown that the school quality of provision and its leadership and management are likely to improve students' attitude towards school, where one would expect students to better value the time they spend at school as long as the school provides better environment for students to be willing to attend school and devote more effort for school work (Kyriakides, 2005; Opdenakker and Van Damme, 2000; Scheerens, 1992).

Despite the positive impact of most school quality indices, their magnitudes were moderate for the cognitive outcome and bigger for the affective outcome. Consequently, one could indicate that these quality aspects are likely to have relatively more sizable influence on student's affective rather than cognitive outcome. Moreover, the overall school quality was found to significantly improve educational cognitive but not affective outcome. In that regard, there is some evidence in the literature that schools which are among the most effective in enhancing cognitive outcomes are not necessarily among the most effective in helping their students achieve affective outcomes (Opdenakker & Van Damme, 2000; Kyriakides, 2005). These findings reveal the importance of investigating the extent to which similar factors at school level are associated with the effectiveness of schools in achieving both cognitive and affective outcomes. In that regard, the findings have shown that the school achievement and standards (AS), the quality of provision (QP), and its leadership and management (LM) had positive significant contributions in explaining both outcomes.

Based on the previous findings one can conclude that school process inputs are important in explaining students' both cognitive and affective outcomes. However, the moderate magnitude of some of these variables on cognitive outcome reflected that student's related inputs such as academic self-schema (Chowdry, Crawford and Goodman, 2010; Duran and Weffer, 1992; Glick and Sahn, 2010; Murdoch and Phelps, 1973; Tymms, 1992) and attitude towards continuing to higher education (Chowdry, Crawford and Goodman, 2009; Chowdry, et al., 2010) could play a major role in explaining such outcome.

During the last three decades a considerable body of research evidence has been accumulated showing that although family backgrounds of students and their academic self-schema are major determinants of their educational outcomes, schools have significant

contribution in explaining variations in students' outcomes (Daly, 1991; Mortimore, et al., 1988; Reynolds, 1982; Rutter, et al., 1979; Sammons, Hillman and Mortimore, 1995; Wilkins and Raudenbush, 1989). The findings of this chapter has reached a similar conclusion, where by looking at the insignificance of the majority of family background factors, one could suggest in line with what has been reported in the literature regarding the case of England that teacher quality (Slater, Davies and Burgess, 2009) and school quality do matter for the cognitive and affective outcomes of students. Moreover, the significance of school process inputs reflected that it would be ideal to be controlled for when studying student's outcomes and not restricting the explanation to just family background factors (Tymms, 1992). Ideally, students from any family background could have better cognitive and affective outcome if they were taught by better teachers in better schools.

Despite the aforementioned importance of school process inputs, some studies have shown that in deciding which school to enrol their children, English parents mostly choose the schools that have the highest test scores results while hardly taking into account what their children really feel about the school or what can be called child's wellbeing in the school (Gibbons and Silva, 2011). Their claim was that there is no relationship between such attitude and the average level of test scores in the school. In that regard, the findings have shown that student's attitude towards school or put differently their perception of the school was significantly positively related to the overall academic achievement of the school, which would make both parents and the children somehow equally happy when making the decision of which school to join. However, it was found as well that other school quality aspects such as the quality of provision plays a somewhat greater role in affecting both children's cognitive and affective outcomes. Accordingly, parents should not form their decision entirely based on just the level of academic achievement of the school but also on other factors such as the quality of how effective will teaching and learning be in meeting the full range of their children's needs, how well do the curriculum and other activities meet the range of needs and interests of the children and how well their children are going to be cared for, guided and supported.

Although the analysis has adopted the CIPO model to control for the full dimensionality of the educational process, a clear limitation exists with the lack of evidence about the effect of school resources inputs, which comes as a result of the lack of the necessary data about school related expenditure indicators. Relatedly, similar to the findings proposed by (Slater, Davies and Burgess, 2009) that teachers matter a great deal, it could be argued that

the lack of data about other teacher inputs such as teacher's education, experience, length of tenure and salary could have helped explain more such teacher effect. In that regard, it would be important for future research to examine the overall teacher index combining both observable teacher inputs about his/her level of education, experience and salary with the student's perception of his/her teacher so that a clearer conclusion could be drawn about the full nature of the teacher effect.

Previous school and teacher effectiveness research has shown that the influences of schooling on students' cognitive and affective outcomes are multilevel. That is, classrooms have unique influences on students' outcomes, independently of factors operating at the school and student levels. Furthermore, by controlling for both student inputs and classroom contextual inputs, variables at the school level could explain variation in achievement at the school level (Kyriakides, 2005). Consequently, another limitation of the analysis is that it lacked information on the classroom level restricting the implementation of such multilevel analysis. As such, further research would be of great value with richer data at the classroom level and with multilevel modeling, which may well uncover some important elements of both the teacher and school influences on outcomes.

Chapter 3: Family Structure and Educational Outcomes in England

3.1 Introduction and Conceptual Discussion of Family Structure

There has been a long-standing interest in how family background factors determine children's educational trajectories. Family structure plays an important role in this process and examining its relationship with children's educational attainments is essential for designing policies targeting children from nonintact families. It is important to mention here that what is meant by family structure in this framework is the marital status of the parent(s) in particular and/or the type of parent(s) in general, such as being foster or adoptive parent(s). In this respect, most of the earliest research on family structure was empirical analysis by sociologists; whereas the contributions of economists have come later. Compared to earlier work, economic studies are distinguished by attention to more formal models of children's attainment process (Haveman and Wolfe, 1995).

To explain how family structure influences children's educational outcomes, earlier research has traditionally proposed three main theoretical frameworks; the sociological, psychological and economic (Biblarz and Raftery, 1999; Haveman and Wolfe, 1995; Hill, Yeung and Duncan, 2001). Additionally, there has been some research on another two frameworks through which family structure could be associated with children's attainment. These are parental competency and martial conflict theory (Biblarz and Raftery, 1999). Although the main focus in the literature was on the first three frameworks, one can generally differentiate between them based on the mechanism through which family structure influences children's outcome (Haveman and Wolfe, 1995).

Previous literature in sociology, psychology and economics proposed different causal mechanisms that might explain the relationship between family structure and children's educational outcomes. Although each discipline indicates that children in intact families are more likely to receive on average more social, cultural, psychological or economic resources than children from nonintact families, the difference among the three underlying theories is rarely helpful since they all draw on insights from all three disciplines (Ginther and Pollak, 2004). Additionally, the notion of resources in the three disciplinary perspectives is very broad (Biblarz and Raftery, 1999).

Sociology and developmental psychology (*socialization*) theories perceive resources in the form of parenting styles across family structures (Biblarz and Raftery, 1999). Examples include lack of time spent by single parents with children could negatively affect their development (Thomson, Hanson, and McLanahan, 1994). Father's absence could constrain

children ability to operate in the society (McLanahan and Sandefur, 1994) or could reduce the family's ability to provide optimal amounts of support and control to children (Astone and McLanahan, 1991; Thomson, Hanson, and McLanahan, 1994). Loss of a parent might lead to a trauma, which negatively influences women's psychological well-being (Wu and Martinson, 1993). Stepparents may lack sufficient ability to interact with their stepchildren (Cherlin and Furstenberg, 1994).

It has only been in the past few decades that modern economic analysis has been involved in investigating the family. The revolutionary work in this area was done by Nobel laureate Gary Becker in the 1960s and 1970s, which has since been consolidated into his monograph, A Treatise on the Family (1981, 1991). Since then there has been a growing interest in the economic literature to examine a wide range of family issues. One of these issues is family structure and how it affects children's development (Carlin, 1999).

Economic theory perceives resources in the form of human capital and the availability of financial and time resources to children. It proposes that socioeconomic success is partly a function of human capital. Basically, families are singular units (agents) maximizing utility coming from children (goods) that are produced by investments in both market activity and household services (Becker, 1965; 1975; 1981; Becker and Tomes, 1986; Leibowitz, 1974). This implies that the total amount invested in human capital differs among individuals due to differences in either demand or supply conditions. In this context, family background affects schooling through altering both the opportunities (supply conditions) and the capacities (demand conditions).

Relying on the household production theoretical framework (Becker, 1965) one can explain children's educational attainment as a good produced with inputs of market goods and services and parental time that enters the household's utility function (Beller and Chung, 1992; Gennetian, 2005). A household production function for the child's educational attainment can be represented as:

$$Z_1 = f(T_i, X_i; E_i) \tag{3.1}$$

where Z_1 is the educational attainment of the child; T_i are the inputs of parents' home time, which could be reflected in variables such as mother's employment or number of siblings (Beller and Chung, 1992); X_i are the inputs of goods and services purchased with family income; and E_i is a vector of other demographic factors that could affect children's

attainment. Within this framework one can analyze the effect of different family structures on children's outcome as a key demographic factor.

A review of the economic literature by Biblarz and Raftery (1999) reports that an efficient system for maximizing utility and, by extension, the human capital of children is that of a two parent family. Specifically, it is considered among the best-functioning forms in modern capitalist society because it allows for the provision of household services by one partner and economic resources (or market goods) by the other. Additionally, since children's success relies on both economic resources and other services provided by the parents, living in a two parents households allows for the provision of these complementary resources. In that logic, economic theory might suggest that children from single parent families would do worse than those in two parents families since one parent cannot provide all required resource to the success of the child. For example, according to some researcher (DaVanzo and Rahman, 1993; Meyer and Garasky, 1993) a review of demographic trends in the USA from three different data sources: the Current Population Survey (CPS), the Survey of Income and Program Participation (SIPP), and the Wisconsin Court Record Database (WCRD) indicate that single father families may do better compared to those from single mother families due to their financial advantage of having higher income by 187% according to the CPS.

Given the different perspectives of the aforementioned theories, the gap between economic theory on one hand and sociology and psychology theories on the other hand tends to narrow when the key resource addressed is time rather than financial resources (Ginther and Pollak, 2004). Also, one of the reasons for the discrepancies in the findings of these theories lies in the choice of the control variables and the intervening variables included in the analysis (Biblarz and Raftery, 1999). Another reason is the change of the findings overtime due to changes in the causes of family structure transitions, which used to be death in older times and more recently changed to divorce and nonmarital childbearing (Bumpass and Sweet, 1989). The change in the cause affects other family conditions such as the right for social benefits due to death of the father, which in turn affect children's outcomes (Acock and Keicolt 1989; Amato and Keith 1991a, 1991b; Holden and Smock 1991; Sugarman 1993, 1995).

This chapter adopts the economic theoretical perspective of investing in children (Beller and Chung, 1992; Boggess, 1997; Haveman and Wolfe, 1995) based on Becker's household production function framework (1965) that has been adopted by a number of researchers such as Beller and Chung (1992) and Gennetian (2005) as shown in equation

(3.1). In this perspective, children's well-being in general and educational outcome in particular (the focus of the analysis) is a function of family structure and parents' choices about the level of resources to invest in their children.

Previous literature has drawn the attention to a number of reasons to believe that estimated effects of family structure are instead capturing unobserved characteristics that are correlated with family structure (Gennetian, 2005). These could be either observable but difficult to measure variables and/or unobservable variables. Examples include sexual customs that could play a role in nonmarital childbearing (Akerlof, Yellen and Katz, 1996), producing an upward bias in the estimates of family structure. Without controlling for these biases, estimated differences between children with varying family structures may instead reflect systematic differences in the processes that led to a particular family structure. Therefore, the current analysis proposes a more comprehensive framework controlling for the main identified mechanisms in the literature through which family structure influences children' educational outcome in addition to key family background, adolescent and school attributes (Levaččićć and Vignoles, 2002).

Over the past few decades there has been an increasing change in family structures and forms. Partially, this has been due to the rising divorce rates and the proliferation of complex stepfamilies. Another reason for such change is the increasing rates of nonmarital fertility and cohabitation (Bianchi and Casper, 2000). Consequently, the proportion of children residing with two biological married parents has been steadily declining in contrast to nonintact family structures such as single parent and cohabiting parents. England is no exception; the recent census data shows that although there has been a decrease in the divorce rate in the last twenty years by 27% to reach 10% in 2012, there has been a much further decrease in the marriage rate by 35% during the same period. This has been coupled with an increase in the number of civil partnerships by 1196% just between 2007 and 2013 and an increase in the marriage rate by only 3.5% in the same period (Office for National Statistics, 2015).

The shift towards cohabitation and less marriages accompanying the rise in single parenting has been found to have an effect on children's educational outcomes. Numerous studies investigated why educational outcomes vary between children growing in a married parent family and those growing in nonintact family structures such as cohabiting parent, single parent and divorced parent. In general, there seem to be consensus among researchers that the former tend to have better educational outcomes than the latter, where such outcomes were measured by different educational attainment indicators such as

average grades or scores, school and college completion rates, educational aspirations and academic orientations (Brown, 2004; Ginther and Pollak, 2004; Martin, 2012; Sandefur, Meier and Campbell, 2006).

The following literature review of Chapter 3 has identified a gap in the Education Economics literature regarding how family structure could affect English adolescents' both educational cognitive and affective outcomes. To explain, most of the previous research on the effect of family structure on children's educational attainment has generally been conducted in North America with less volume of research in England. However, it is important to mention very few exceptions in education research literature, such as Kiernan (1997) investigating the effect of divorce on children long term development using the National Child Development Study data and Hampden-Thompson and Galindo (2015) investigating the effect of transition of family structure and the mediating role of income on children's post-16 educational persistence. Other studies have controlled for the family structure effect showing a negative impact of nonintact structure on children's primary education (Mensaha and Kiernan, 2010; 2011).

The analysis in Chapter 3 seeks to fill the gap about how variations in family structure affect educational outcomes of English adolescents. In this framework, chapter 3 answers the following research questions:

1. Does family structure account for the disparities among adolescents in their cognitive and affective educational outcomes?
2. Is the effect of family structure on such outcomes mediated by factors, such as parents' socioeconomic status and their involvement in their education?

In order to answer these questions Chapter 3 investigates the effect of family structure on children's educational outcomes in England, specifically cognitive and affective outcomes. For that, Chapter 3 proposes a more comprehensive framework controlling for the two main identified mechanisms in the literature through which family structure influences children' educational outcome, specifically family socioeconomic status and parental involvement, controlling for key family background, adolescent and school attributes (Levaccicć and Vignoles, 2002). The proposed framework is based on both Becker's household production function (1965; 1975; 1991) and socialization framework accounting for parents' characteristics (Biblarz and Raftery, 1999) and school characteristics (Levaccicć and Vignoles, 2002), hence including new school information in the analysis that has been lacked in the literature with exception of few studies, such as Zheng,

Schimmele and Hou (2015). Additionally, the analysis uses a unique dataset comprising data from the LSYPE and the NPD.

The chapter proceeds with a review of empirical literature in section 2 followed by data, model specification and statistical method in section 3. Main findings are discussed in section 4 and the chapter ends with conclusion and discussion in section 5.

3.2 Review of Empirical Literature

Previous research has shown that generally children from single parent families are likely to fare worse in educational achievement than those from intact families (Astone and McLanahan, 1991; Rodriguez and Arnold, 1998), have worse attitude towards school (Wallerstein and Lewis, 2005) and are also more likely to drop out of school (Bowlby and McMullen, 2002; Hetherington et al., 1998). Children residing with a single parent or a stepparent are less likely to complete high school or attend college compared to those residing with both parents (Amato, 1988; Coleman, 1988; Corak, 1999; Krein and Beller, 1988; McLanahan, 1985; McLanahan, Astone and Marks, 1988; Mueller and Cooper 1986; Shaw 1982).

Similar studies have shown that children's cognitive achievement tends to be better in two-biological parent married families than in cohabiting families (Dunifon and Kowaleski-Jones, 2002; Nelson et al., 2001). Likewise, rising family conflict and lack of family "cohesiveness" or joint activities led to worse educational achievement in children from divorced or remarried families (West, Sweeting and Richards, 2000). Also, boys growing in non-traditional family structure were found to do worse in schooling compared to those who belong to traditional two-biological parent family structure (Cid and Stokes, 2013).

Other studies suggested that children of biological parents or a single mother are likely to have higher educational attainment and occupational status than children living with a stepparent or with a single father (Biblarz and Raftery, 1999). Their findings were consistent with evolutionary psychology[16], which argues that mothers care more about the well-being of their children than do fathers. Similar findings implied that living with a stepfather had a negative significant correlation with children's educational attainment (Wojtkiewicz, 1993; Boggess, 1998). Other studies have shown that nonintact family types

[16] Evolutionary psychology theories explore the relationship between family structure and children's development in general without specifying the pathways through which parental motivations affect outcomes
for children. In that sense, it is considered a complement to theories that propose resource based mechanisms. Their main argument is that biological parents are more willing to provide resources than stepparents and that mothers are more willing to provide resources than fathers (Ginther and Pollak, 2004). For more details on evolutionary psychology and extensive references to the literature, see Daly and Wilson 1999).

such as single-mother, single-father, and stepfamilies have similar negative consequences for children (Dawson, 1991) and that children of a single mother do as well as children from two biological parents when other factors are taken into account (Biblarz, Raftery, and Bucur, 1997; McLanahan, 1985).

It is important to mention however that unlike most studies (see discussion by Hill, Yeung and Duncan, 2001) few have argued that family structure fixed effect was not significant for explaining children's educational outcomes (Björklund and Sundström (2002) when controlling for income (Smith, Brooks-Gunn and Klebanov, 1997. Also, another study suggested an unexpectedly positive effect of a single parent structure on children's achievement scores (Cooksey, 1997). The argument was that having a divorce may positively affect children in the case of high parental conflict, especially for young parents.

Mechanisms of Family Structure Impact

As has been explained earlier, the theoretical mechanisms that are central to explaining the relationship between family structure and educational outcomes could be basically classified into two main mechanisms defining the type of family resources; economic resources and parental resources (Amato, 1993; Becker and Tomes, 1986; Beller and Chung, 1992; Carlson and Corcoran, 2001; Gennetian, 2005; Hanson et al., 1997; McLanahan and Sandefur, 1994; Thornton, 2001 among others). The importance of these two mechanisms stems from being two fundamental dimensions of children's academic socialization or what is referred to as the family's ability to instil values about the importance of education into their children (Hill et al., 2004; Taylor, Clayton, and Rowley, 2004). Previous studies have indicated that nonintact families with low socioeconomic resources and less parental involvement have adverse impact on children's educational outcome through damaging their academic socialization (Brown, 2004; Marchant, Paulson and Rothlisberg, 2001; Sewel, Haller and Portes, 1969). The following review explains why and how this has been concluded.

1. *Parental Socioeconomic Status*

Economic resources indicated by parental socioeconomic status vary among family structures and there has been generally a debate about whether it is a cause or a consequence of such status (Eggebeen and Lichter, 1991; Garfinkel and McLanahan, 1986; McLanahan and Sandefur, 1994). At the same time such status is highly associated with children's educational outcomes and is often recognized in the literature as a mechanism through which family structure affects such outcomes (McLanahan and Sandefur, 1994).

The reasoning of such mechanism is justified by the correlation between family structure and its socioeconomic status and that poverty in general adversely affect children's well-being (Carlson and Corcoran, 2001).

One of the channels through which parental socioeconomic status affect children's outcome is the level of material resources children have access to and how such status exposes them to different social norms that associate with educational expectations (Magnuson and Berger, 2009; Teachman, 2008; Thomson, Hanson and McLanahan, 1994). Socioeconomic status affects children's aspirations through its impact at both rational and psychological levels (Kao and Tienda, 1998). The availability of resources to children's affects their rational decisions about the availability and possibility of succeeding in and continuing education and thus their decision about their willingness to progress to higher education (Hochschild, 1988; Teachman and Paasch, 1998).

A second channel through which socioeconomic status affect children's academic characteristics and socialization is the availability of home learning resources such as computers, books and access to internet or even extracurricular activities such as field trips. The availability of such resources transmits positive messages about the value of education and thus enhances the academic socialization of the children and their aspiration towards education (Magnuson and Berger, 2009; Teachman and Paasch, 1998). A third channel for the transmission of socioeconomic status effect is through the neighbourhood effect. Adverse neighbourhood conditions could negatively affect children's attitudes about returns to education (Bowen, et al., 2008; Teachman and Paasch, 1998).

A number of studies have found that nonintact families tend to suffer from lack of economic resources compared to married parents' families (Argys et al., 1998; Ver Ploeg, 2002). Specifically, lone mother families are more likely than other families to be poor (Garfinkel and McLanahan, 1986) and to suffer more from poverty (Astone and McLanahan, 1991). Similarly, cohabiting parents with low levels of education suffer from less earning compared to married parents, despite having the same working hour patterns and they tend not share resources to the same extent that married parents do, because they tend to suffer from more material hardship such as food, income and housing insecurity, which in turn might undermine effective parenting (Brown, 2004; Duncan and Hoffman, 1985; Manning and Brown, 2003; McLanhan, 1997).

Studies found that generally the deficiency of socioeconomic resources is more likely to negatively affect children's educational outcome. For example, income differences

between intact and nonintact families explained 30% to 50% of their children high school graduation (McLanahan, 1985; McLanahan, Astone and Marks, 1988; McLanahan and Bumpass, 1988; Sandefur, McLanahan and Wojtkiewicz, 1989; Shaw 1982). Likewise, single parent families and cohabiting families were found to have lower socioeconomic status, which negatively affects children's outcomes (Astone and McLanahan, 1991; Brown, 2004; Garg, Melanson and Levin, 2007; Manning and Brown, 2006). Similar findings were found for British single mothers, where the availability of financial resources was found to be more important than the two parents staying together (Kiernan, 1997).

2. Parental Involvement in Children's Education

Despite the importance of economic resources usually represented by the socioeconomic status of the family, it was revealed that they do not fully explain such relationship and that children's outcome is associated with the level of parental resources represented by their involvement in their children's life in general and education in particular or sometimes referred to as social capital, which explains later reformation of socioeconomic status across generations (Astone and McLanahan, 1991; Brown, 2004; Coleman, 1988; Magnuson and Berger, 2009; Thomson, Hanson and McLanahan, 1994). In line with that, it was found that parental expectations rather than their income or education were shown to be a stronger determinant of children's aspiration (Marchant et al., 2001). Even after controlling for parent's socioeconomic status, such status was found to have negligible impact on children's outcomes in the absence of strong parental involvement (Coleman, 1988). In that context, it was shown that some single parent families adjust and compensate for their lack of economic resources by becoming more involved with their children's education (McLanahan and Booth, 1989).

In general, indicators of parental involvement were reported to have a positive influence on children's academic performance (Gutman, McLoyd, and Tokoyawa, 2005). Forms of parental involvement, such as parents' support (Steinberg, Elmen, and Mounts, 1989), parent adolescent emotional closeness (Crosnoe, 2004), parents' involvement in their children's schools and discussing school issues with them (Muller, 1995; 1998), and parents' educational support (Bridgeland et al., 2006; Stone, 2006) improve their children's academic performance. Children who perceive their parents to have high values in education tend to adopt such values as their personal goals and thus have better academic behaviours (Gonzalez-DeHass, Willems and Holbein, 2005; Marchant et al., 2001).

Parental behaviour in general or parental involvement in children's education in particular is another dimension of children's academic socialization. The quantity and quality of such involvement in the form of helping with homework, after school activities and general supervision has been found to be key mediators of the family structure effect (Dunifon and Kowaleski-Jones, 2002) and to positively affect both children's educational cognitive and affective outcomes (Fan and Williams, 2010; McLanahan and Sandefur, 1994). Such involvement allows parents to transmit their expectations and values to their children (Astone and McLanahan, 1991; Sewell, Haller and Portes, 1969).

Parental involvement in children's education tends to be less in nonintact families, where children receive less consistent parenting practices and less social control compared to intact families (Dornbusch et al., 1985; Steinberg, 1987; Wallerstein and Kelly, 1979). The tendency of less involvement is attributed sometimes to the lack of parental time supervising and nurturing their children, such as in the case of single parent families (Amato, 1987; Thomson, McLanahan and Curtin, 1992) due to the absence of a second parent and other times to the work-family conflict faced by the existing parent, which can lead to emotional, task, and responsibility overload and provide less encouragement and support for their children's schooling (Astone and McLanahan, 1991; Cavanagh, Schiller, and Riegle-Crumb, 2006; Cherlin, 1992; Magnuson and Berger, 2009).

Less parental involvement are likely to exist in cohabiting parents families and stepparent families due to the unclear norms of parental roles in the former and lack of commitment from the stepparent side in the latter (Brown, 2004; Downey, 1995) due to lack of biological kinship (Hofferth and Anderson, 2003) or the incomplete institutionalization of stepfamilies, such as lack of consensus about when it is appropriate for a stepfather to discipline a stepchild (Cherlin, 1978). It could also be due to the tendency of experiencing high depression levels among cohabiting mothers or single mothers because of the higher likelihood of unemployment and insufficient income or relationship instability, which leads to poor mental health (Belle, 1990; Brown, 2000; Demo and Acock, 1996). Such adverse parental well-being tends to increase children's risk of having poor educational outcomes and behavioural problems (Amato and Booth, 1997).

Weak parental involvement was found to adversely affect children's educational outcomes and aspiration. This was attributed to low parental expectations for their children and their low ability to transmit their expectations (Astone and McLanahan, 1991; Coleman, 1988; Garg et al., 2007) and also to low parental levels of psychological well-being, which might weaken parenting or amplify sensitivity to children's behavioural problems (Carlson and

Corcoran, 2001). Consequently, ineffective or inadequate parental involvement may lead children to feel overwhelmed and subsequently withdraw from school (Astone and McLanahan, 1991; Baker and Stevenson, 1986). Likewise, children with low educational aspiration tend to disengage from school at early age, where such aspiration was found to be a main predictor of their educational outcomes (Sewell and Shah, 1968).

3. Other Possible Mechanisms

Although socioeconomic status and parental involvement are well established reasons for explaining the gap in children's school outcomes between intact and nonintact family structures, it was shown that they do not explain the entire relationship between family structure and children's postsecondary educational outcomes measured by their university enrollment and completion. Rather, it was suggested that those two factors influence children's academic socialization and hence indirectly explain the gap in postsecondary educational outcomes. Specifically, their indirect effect through children's educational characteristics accounts for higher proportion of the gap than their combined direct effect (Zheng, Schimmele and Hou, 2015). Similarly, controlling for children's engagement with school was suggested to account for major proportions of the effects of parental practices (Astone and McLanahan, 1991).

In addition to the two aforementioned mechanisms, studies have indicated that even after controlling for those two factors there are still other parental variables that could contribute to the explanation of the relationship between family structure and children's outcomes (Astone and McLanahan, 1991; Teachman, 2008). Accordingly, researchers should pay more attention to the selection process and to the right choice of variables accounting for unobserved heterogeneity.

In light of the previous review of the influence of family structure on children's educational outcomes, this chapter extended the literature by investigating the two mechanisms of parental socioeconomic status and involvement in their children's education to explain the gap in educational outcomes between children across different family structures using a unique English dataset.

3.3 Data, Econometric Method and Model Specification

The data used for the analysis in this chapter, as explained in Chapter 1, is an integrated dataset comprising a wide range of information about the child's educational and behavioural development indicators, family background factors and school factors. Below is an overview of the variables used in the analysis and for further details about each

variable, please refer to Chapter 1. The analysis explained the variations in two main educational outcomes of adolescents across different family structure; namely cognitive outcome and affective outcome.

Adolescent's Cognitive Outcome

The analysis captures the adolescent's cognitive outcome by his/her key stage 4 total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG), which was reported around more or less the same time of wave three of the LSYPE. The analysis focuses on the KS4 score for two main reasons. First, it is an outcome that reflects cumulative parental investments in adolescents' cognitive development in terms of a good neighbourhood, high quality care and support in after-school activities or in terms of schools, which are likely to be reflected in a child's KS4 score. Also, high school scores in general are usually used as good predictors of adolescents 's future outcomes such as adult earnings and completed education (Bowles and Nelson, 1994; Conlisk, 1971; Murnane, Willett and Levy, 1995).

Adolescent's Affective outcome

In general, it is indicated that students' attitudes towards peers, teachers, school, and learning are seen as appropriate measures of affective outcomes of schooling (Cheng, 1993; Hofman, Hofman, and Guldemond, 1999). In that framework, students' attitude towards school has been examined as one of the forms of their educational outcomes, known as affective outcomes (Teddlie and Reynolds, 2000). In light of that, the analysis measures the student's affective outcome by his/her average score of attitude towards school at wave three (2005/2006) of the LSYPE (W3avatt). Specifically, the attitude score averages answers to twelve attitudinal questions relating to how the young person feels about school (for more details please see Chapter 1).

Given the nature of the survey design of the LSYPE explained earlier in Chapter 1, the LSYPE database has provided sampling weights to make sure any analysis would account for the survey design of each wave. Based on the statistical calculations of these weights, it is advised that depending on the mix of waves being used in the analysis, the weights controlled for should belong to the latest wave used (for more details, refer to DFE (2011a)). Accordingly, the analysis of each dependant variable is conducted using two different samples. The cognitive outcome was analyzed using a number of covariates that have been observed either at wave one or wave two, therefore the sampling weights of

wave two has been used to adjust for unit non-response[17] and the final sample size covered 7128 adolescents. The affective outcome is observed at wave three of the LSYPE and is analyzed using a number of covariates that have been observed either at wave one or wave two, therefore it is analyzed using the sampling weights of wave three and the final sample size covered 7009 students. The design of the two samples used in the analysis covered 37 strata with 626 primary sampling units.

Independent Variables

The main aim of the current analysis is to examine the effect of family structure on student's educational outcomes. Moreover, the analysis examines two key mechanisms to explain such effect; parental socioeconomic status and parental involvement.

Family Structure

The analysis examines family structure as the key variable of interest. In general, there are multiple classifications of family structures. These include, among others, classifications based on a mother's marital status at the time of the child's birth, and classifications based on the biological mix of siblings, or those based on the beginning and end dates of the mother's first three marriages (Biblarz and Raftery, 1999; Gennetian, 2005; Ginther and Pollak, 2004; Haveman and Wolfe, 1995). The current analysis empirical definition of family structure is based on whether the adolescent belongs to an intact family (at W2) defined by living with both his married biological parents. Otherwise, he/she belongs to a nonintact family structure.

The family structure variable is generated using information from three variables in the LSYPE; the family type (w2famtyp), the relationship of the main parent to young person (w2relMP) and the relationship of the second parent to young person (w2relSP), where the main/second parent is defined as the adult (reference person in the survey) responsible for the adolescent who may not necessarily be the birth parent. The first identifies the structure of the family regardless of the biological nature of the parents. For example, it gives information about living with a married couple but that couple may not necessarily be the biological parent(s) of the adolescent. It may also be identified as a married couple but at the time of the survey interview one of the spouses was not attending and so another

[17] The LSYPE database has provided a set of sampling weights, each corresponding to one of the seven waves of the study. Based on the statistical calculations of these weights, it is advised that depending on the mix of waves being used in the analysis, the weights controlled for should belong to the latest wave used. For more details, refer to DFE (2011a).

person in the household was identified as a main/second parent. The other two variables are used to identify whether the couple are the biological parents of the young person, or not. It is important to mention here that using the main parent and second parent relationship with the young person as variables to identify the biological nature of the adults whom the young person live with reveals a number of facts: the main and/or second parent may not necessarily mean the father and/or the mother. Thus, most adolescents by default live with a biological parent(s), however, in some cases the adolescent could be living with a main parent and/or a second parent who may not necessarily be his/her birth parent.

In that regard the analysis uses two family structures variables: one with a reduced structure and another with a full structure in order to see any potential differences in their effects. Specifically, the *reduced* family structure variable is a nominal categorical variable with six structures defined as (1) Married couple both biological parents, (2) Other Married couple, which is defined as any married couple with one or both of the main or second parent is not a biological parent and it also includes the cases that lack information about either the MP or SP but was defined as married couple, (3) Cohabiting couple, (4) Lone Father, (5) Lone mother, and (6) No parents in the household. Note that in category 3, cohabiting couple, both adults, one of them, or none of them, may be biological parents. The *full* family structure variable includes eight structures defined as (1) Married couple both biological parents, (2) Married couple, step-parent(s), which also includes cases with 2 step parents, and so on for other rare combinations, (3) Other Married couple, which is defined as any of the following: 'married couple with one or both of the MP/SP is not a biological parent', 'married couple with one or both adoptive parent' and 'married couple with one or both foster parent', (4) Cohabiting couple both biological parents, (5) Other Cohabiting couple, one or less biological parent(s), which is defined as any cohabiting couple with one or both of the MP/SP is not a biological parent, (6) Lone Father, (7) Lone mother, and (8) No parents in the household. The two structure variables include the cases that provide information about the family type even if they lack information about either the MP or SP relationship to the young person.

Accounting for Parents' Socioeconomic Status

The first mechanism examined to explain the outcome gap between adolescents across different family structures is the parents' socioeconomic status. The analysis hypothesizes that deleterious effects of nonintact family structure on adolescent's educational outcomes will be at least partially explained by differences in family socioeconomic status across

family structures (Ven Ploeg, 2013). As has been indicated earlier in the literature, different measures of such status have been used over the years. These include mainly family income, parents' education and parents' NS-SEC class.

Prior research reveals that results are consistent when parents' occupation and income are included in the measure of family socioeconomic status (Martin, 2012). Consequently, the analysis accounted for the family's NS-SEC class as one of the measures of the family socioeconomic status. It was measured at wave two of the LSYPE as an ordinal variable indicating the SEC class of the family. Eight main classes were reported including (1) higher managerial and professional occupations, (2) lower managerial and professional occupations, (3) intermediate occupations, (4) small employers and own account workers, (5) lower supervisory and technical occupations, (6) semi-routine occupations, (7) routine occupations and (8) never worked/long term unemployed.

Another measure of family socioeconomic status is family income, which represents potential access to potential long term resources or more permanent income, which in turn affects adolescents' outcomes (Duncan and Brooks-Gunn, 1997; Hill and Duncan 1987; Krein and Belier 1988; McLanahan 1983, 1985; Shaw, 1982). For that, the analysis measures family income by the mean family income from work, benefits, and anything else over waves one and two adjusted for the family size at wave two. In addition, a third channel for the transmission of socioeconomic status effect is through the neighbourhood effect. Adverse neighbourhood conditions could negatively affect adolescents' attitudes about returns to education (Bowen, et al., 2008; Teachman and Paasch, 1998). Accordingly, the analysis used the Income Deprivation Affecting Children Index (IDACI) reported in 2005/2006 as a third measure of socioeconomic status effect.

Accounting for Parents' Involvement in Adolescents' Education

In a meta-analysis of parenting and school success, Rosenzweig (2000) indicated seven specific parenting practices that account for 16% of the variance in students' academic achievement. These were: parental engagement, providing resources and learning experiences, parent participation in school activities, parental educational aspirations and grade expectations, authoritative parenting, autonomy support and emotional support. Such parental involvement could indicate parents' interest and participation in their adolescents' learning and schooling through encouraging, facilitating, or supplementing school teaching (Seginer and Vermults, 2002). Accordingly, the analysis used three variables to reflect parental involvement in their adolescents' education.

Earlier studies have found that adolescents have better schooling outcomes when their parents discuss their schooling with them and when parents are involved in their school (Muller, 1995; 1998). Accordingly, the analysis used a variable to reflect parent participation in school activities, such as 'how involved is the main parent in the young person's school life? (W2)'. The variable takes values of (1) Very involved, (2) Fairly involved, (3) Not very involved and (4) Not at all involved. Also, a variable reflecting parental aspirations for their adolescents, such as 'what would the main parent like the young person to do when reaching school leaving age (W2). The variable takes values of (1) continue in full time education, (2) start learning a trade / get a place on a training course, (3) start an apprenticeship, (4) get a full-time paid job (either as an employee or self-employment), (5) something else. Finally, a variable reflecting parents' willingness to provide resources and learning experiences measured by 'whether parent(s) will support or give money if the young person stayed on in education (W2)'.

Specification of Other Covariates

The estimation included control variables that are known to affect either investment in adolescents or adolescents' educational outcomes. Two main sets of control variables are included; child's controls and school controls.

Adolescent's controls include child's ethnicity that captures any cultural differences that may affect his outcome or parents' marriage patterns (Krein and Belier, 1988; McLanahan, 1985; Shaw, 1982). The child's gender is controlled for since prior studies on stepfamilies finds that girls perform differently than boys (Hill and Duncan, 1987; Hill, Yeung and Duncan, 2001; Krein and Belier, 1988; McLanahan, 1985). An indicator of general health reported at wave one of the LSYPE (whether or not the adolescent has a long-standing physical or mental impairment, illness or disability) is included to control for the potential effects of disability or poor health on his/her outcome and parental behaviour (Gennetian, 2005). The child's age at the beginning of KS4 controls for differences in outcomes due to age.

The analysis controls for child's academic self-schema, where theorization of the concept defines it as child's cognitive generalization of their past achievements, including learning experiences which affect his/her cognitive, affective and behavioural responses to learning (Markus, 1977). In light of that, students with positive academic self-schema are more likely to have confidence in their ability to achieve, they value education more and they see the process of educational attainment as more positive and rewarding (Plucker, 1998;

Trusty, 1998). In this context, the estimation measured child's academic self-schema by both his/her prior cognitive outcome in key stage 3 average point score (using fine grading) for contextual value added and his/her likelihood of applying to university reported at W2.

Given that income and labour force participation change dramatically after divorce, particularly for mothers (Duncan and Hoffman, 1985; Hoffman and Duncan, 1988; Rainwater, 1979) and since the single parent status does not provide information for the reason behind being single, for example due to divorce or nonmarital childbearing or death of spouse, one would want to control for a relatively exogenous measure of socioeconomic status, meaning one less affected by divorce itself for instance. For this reason, the current analysis controlled for the family's education status (Gennetian, 2005; Sewell, Haller and Portes, 1969) measured at wave two of the LSYPE. The variable is an ordinal one indicating the highest educational qualification of the family as reported by the main parent. Seven main qualifications were reported including (1) degree or equivalent, (2) Higher education below degree level, (3) GCE A level or equivalent, (4) GCSE grades A-C or equivalent, (5) qualifications at level 1 and below, (6) Other qualifications and (7) No qualification.

Unobserved characteristics of parents could explain both their socioeconomic status and their adolescents' educational outcomes. For example, a married couple family could have low socioeconomic status because of a typically unobserved problem that interferes with their education or employment and, in turn, their adolescents' education (Martin, 2012). In order to account for such unobserved heterogeneity, the analysis controlled for two variables reflecting parents' labour force problems using a measure for 'Whether the main parent is currently receiving job seeker allowance at W2'[18].

Previous studies showed that the greater the number of siblings, the lower children's attainments (Blake 1989; Powell and Steelman 1993; Steelman and Powell 1989). If children from single mother families have fewer siblings than children from two parent families, this would represent an advantage associated with the single mother family structure. Therefore, studies that take away this advantage by controlling for the number of siblings show a stronger negative effect of single motherhood (Biblarz and Raftery, 1999). Therefore, the analysis controlled for the number of siblings (Martin, 2012) using the number of siblings to young person including non resident siblings (W2).

[18] Another variable was tested to measure the effect of whether either MP/SP or both is currently receiving job seeker allowance at W2. However, a high correlation of 0.84 was detected between the variable and the family structure variable for both the cognitive and affective outcome analysis.

Along with the effect of sibling size, the analysis controlled for variables to capture differential educational outcomes due to the age composition of household members. For example, having an infant in the household may have an adverse effect on time allocated to a school aged adolescent independent from the effect of having more siblings (Gennetian, 2005). Accordingly, the analysis accounts for the number of younger siblings that young person had at wave one (no updated information was available for wave two). Finally, the analysis controlled for school effect using two variables: whether it is a maintained or independent school and a teacher effect variable reflecting adolescents' perception of their teachers (refer to Chapter 2 for further details).

3.3.1 Econometric Method and Model specifications

Following the same econometric approaches employed in Chapter 2, Chapter 3 uses a negative binomial regression model to examine the influence of family structure on adolescents' educational cognitive outcome and an ordinal logit model to examine the affective outcome[19]. Based on the theoretical framework explained earlier, the analysis examines the effect of family structure on the two outcome variables; KS4 score and attitude towards school controlling for school context and student's inputs and how such effect could be mediated by parental socioeconomic status and parental involvement.

It is important to mention here, as explained earlier in Chapter 1, that the KS4 score was reported around more or less the same time of wave three of the LSYPE. Specifically, wave three field work ran from the 21st of April 2006 to 28th of September 2006, asking for information about the previous year (April/September 2005 - April/September 2006) (DfE, 2011a). On the other hand, KS4 GCSE exam either ran in January 2006, March 2006, summer 2006 or November 2006. This implies that in some cases using wave three variables as predictors for KS4 outcome may not be valid because students were asked for such information after their exam was taken already (like in January) which could be misleading. Accordingly, and since the data does not provide that level of detailed information about when students took their exam exactly, the predictors used are mainly derived from wave one or two of the LSYPE. Moreover, in order to be consistent throughout the analysis, the approach was used when examining the affective outcome.

Specifically, the analysis examines cognitive outcome via the model defined in eq. (3.2) and affective outcome via the model defined in eq. (3.3)

[19] For more details see figures D.1 and D.2 in appendix D.

$$\ln(\mu(co)_{it}) = \alpha + \gamma F_{i,t-1} + \sum_K \lambda_K (SEC_{i,t-1} + I_{i,t-1,t-2} + D_{it}) + \sum_M \eta_M PI_{mi,t-1} + \sum_N \beta_N (X_{i,t-1} + X_{i,t-2}) + \sum_L \zeta_L (S_{i,t-2} + S_{i,t-1,t-2}) + \varepsilon_i \quad (3.2)$$

$$\ln(\mu(af)_{it} / 1 - \mu(af)_{it}) = \alpha + \gamma F_{i,t-1} + \sum_K \lambda_K (SEC_{i,t-1} + I_{i,t-1,t-2} + D_{it}) + \sum_M \eta_M PI_{mi,t-1} + \sum_N \beta_N (X_{i,t-1} + X_{i,t-2}) + \sum_L \zeta_L (S_{i,t-2} + S_{i,t-1,t-2}) + \varepsilon_i \quad (3.3)$$

where $\mu(co)_{it}$ represents the expected value of the *co*gnitive outcome variable and $\mu(af)_{it}$ represents the expected value of the *af*fective outcome variable measured at time *t* corresponding to year 2005/2006 around wave three of the LSYPE and $F_{i,t-1}$ is family structure. The socioeconomic status mechanism is introduced in the model using three variables; namely $SEC_{i,t-1}$ is family NS-SEC class, $I_{i,t-1,t-2}$ is the mean family income over wave one (*t-2*) and wave two (*t-1*)), and D_{it} is the income deprivation index reported in 2005/2006. The parental involvement mechanism is tested using three variables measured at wave two (*t-1*). X_{Ni} (*N*=10) are student's input variables measured at either wave one (*t-2*) or wave two (*t*-1), and finally S_{Li} (*L*=2) are two school variables; one representing a dummy for whether the school attended at wave one (*t*-2) was an independent or maintained school, and the other represents the teacher influence index (constructed by a mix of variables measured at both wave one (*t-2*) and wave two (*t-1*)).

The models specified in the previous equations indicate that all independent variables except one were reported at a time period prior to that when the dependent variables were reported, thus one can argue to an extent that it is less likely to suffer from an endogeneity problem. However, a counter argument could be that the use of one or two lagged term independent variables may not necessarily overcome the endogeneity problem. In response to that a differentiation is made between the main independent variable of interest (family structure) and the other additional covariates in the model.

Starting with the main independent variable of interest that is family structure one can assume that it is more likely to be exogenous based on a number of reasons. First, the previously reviewed literature in section 3.2 has indicated that family structure is more likely to be the one affecting children's outcomes through the parents' socioeconomic

status or parental involvement among other mechanisms rather than the other way around (Beller and Chung, 1992; Biblarz and Raftery, 1999; Boggess, 1997; Gennetian, 2005; Haveman and Wolfe, 1995). Second, even if there is a possibility for a reverse relationship implying that children's outcomes could affect the family structure, one would expect that such reverse relationship to happen if the family structure variable was observed after the outcome of the child, which is the opposite case in the analysis where the family structure was observed before the child's outcome was observed. Third, even if the possibility of a reverse relationship could hold, one might argue that it might take a longer time to reveal. That is, family structure would not necessarily change just after a year or few years of a certain child's outcome. In that logic and given the nature of the data used in the analysis where both the outcome and the family structure status are slightly contemporaneous, one can assume that such reverse relationship is less likely to hold.

As for the rest of the additional covariates used in the model, one can argue that some of these variables could suffer from an endogeneity problem despite the lagged term. However, a number of justifications could yet be provided. First, the use of these variables as controls or even mediators has been supported by the literature. To mention a few; family socioeconomic status by (Ven Ploeg, 2013); parents' occupation and income by (Duncan and Brooks-Gunn, 1997; Hill and Duncan 1987; Krein and Belier 1988; Martin, 2012; McLanahan 1983, 1985; Shaw, 1982); neighbourhood effect by (Bowen, et al., 2008; Teachman and Paasch, 1998), which is the one variable reported at the same time point as the outcome variable and is measured by the income deprivation index, which could likely be considered exogenous since one could assume that it is not expected that the educational outcome of one adolescent measured in the model is likely to cause the deprivation index of the entire neighbourhood where the adolescent live to be high or low. Other variables that could be argued to be endogenous include parental involvement in school life that has been used by (Muller, 1995; 1998); labour force problem and number of siblings by (Martin, 2012); the number of younger siblings by (Gennetian, 2005). Second, these variables are known as extraneous or confounding variables that need to be controlled for in order to avoid any biased results (Kish, 1959; Vandenbroucke, 2004). Third, even if one does not control for these confounding variables, it is likely to lead to an omission bias that could be another source of endogeneity.

In light of the previous arguments, one can state that since these confounding variables are not the main variable of interest in the model, the study does not attempt or claim to solve

their potential endogeneity. Having said that, the analysis acknowledges the limitations caused by such endogeneity. As such and since the exogeneity assumption is often violated, yet to widely varying degrees, in the analysis of educational production functions, as in most other areas of empirical economic research, what one learns about important relationships is not devoid of meaning; however, attributing causality to the estimates should be done with extreme caution. Accordingly, the following findings of the models do not claim such causality, rather they explain the association between the family structure and children's outcome controlling for other confounding covariates. Lastly, it is worth noting that as with the related literatures on educational production function studies, such functions are not completely known and must be estimated using imperfect data, which makes any estimates subject to considerable uncertainty (Hanushek, 1986) and unassailable estimates of causal relationships explaining the underlying process are not yet attainable (Haveman and Wolfe, 1995).

3.4 Findings

Before explaining the findings of each educational outcome, the analysis examined the possible correlation between all variables across all model specifications and there is no high correlation problem detected between any two independent variables involved in the same model (see tables D.1 and D.2 in appendix D).

Table (3.1) provides descriptive statistics for the two family structures in both samples examining cognitive and affective outcomes. Almost 59% of the families investigated are married with two biological parents that are defined as intact families. Also, the second dominant structure is the lone mother family representing 23% of the sample, which is a huge portion compared to the share of other structures. A deeper look in the full structure variable shows that almost 71% of those identified as other married couple are step couple and 68% of those identified as cohabiting couples are other types of cohabiting other than those with two biological parents. Accordingly, one can see that although more than half of the adolescents live in intact families, 23% live with lone mothers and 18% live in other nonintact families, which does have an impact on their educational outcome.

Table 3.1: Distribution of Adolescents across Family Structures

	Cognitive Outcome		Affective Outcome	
	Reduced Structure	Full Structure	Reduced Structure	Full Structure
Married two biological parents (MB)	4,191	4,191	4,132	4,132
	(58.80)	(58.80)	(58.95)	(58.95)
Other Married couple (OM)	626	184	615	178
	(8.78)	(2.58)	(8.77)	(2.54)
Married with one or both step-parent (MS)	-	442	-	437
	(-)	(6.20)	(-)	(6.23)
Cohabiting couple (CC)	484	-	474	-
	(6.79)	(-)	(6.76)	(-)
Cohabiting two biological parents (CB)	-	156	-	151
	(-)	(2.19)	(-)	(2.15)
Other Cohabiting couple (OC)	-	328	-	323
	(-)	(4.60)	(-)	(4.61)
Lone father (LF)	133	133	132	132
	(1.87)	(1.87)	(1.88)	(1.88)
Lone mother (LM)	1,642	1,642	1,605	1,605
	(23.04)	(23.04)	(22.9)	(22.9)
No parents in the household (NP)	52	52	51	51
	(0.73)	(0.73)	(0.73)	(0.73)
Total	7,128	7,128	7,009	7,009
	(100)	(100)	(100)	(100)

Percentage in parentheses. [-] means not defined.

3.4.1 Adolescent's Cognitive Outcome

Table (3.2) provides descriptive statistics for the variables examined in the *estimation sample* of the cognitive outcome analysis covering 7128 adolescents. The analysis starts by investigating the relationship between the reduced family structure and cognitive outcome via model (1) of table (3.3). Indeed, as expected, adolescents in nonintact families tend to perform worse in KS4 than those in intact families (Astone and McLanahan, 1991; Dunifon and Kowaleski-Jones, 2002; Nelson et al., 2001; Rodriguez and Arnold, 1998). Specifically, those living with other married couple, cohabiting couple (Brown, 2004; Duncan and Hoffman, 1985; Dunifon and Kowaleski-Jones, 2002; Manning and Brown, 2003; McLanhan, 1997; Nelson et al., 2001), lone father (Dawson, 1991) and lone mother families (Dawson, 1991) have expected value of KS4 score lower than those living in intact families by 3.7% for the first two, 10.3% for those living with a lone father and almost 9% for those living with a lone mother.

Table 3.2: Descriptive Statistics of the Cognitive Outcome Model Variables

VARIABLES	Mean	Std. Dev.	Min	Max
KS4 point score	381.212	149.973	0	886
Family structure-reduced	2.237	1.692	1	6
Family structure-full	2.890	2.578	1	8
Family's NS-SEC class	3.977	2.247	1	8
Mean income (Z)	-0.020	0.848	-0.893	11.986
IDACI score (Z)	-0.136	0.970	-1.291	3.875
MP: How involved is the MP in the young person's school life?	2.034	0.781	1	4
MP educational aspiration for the young person	1.297	0.754	1	5
MP: How the young person's expenses would be paid if stayed on in education- Parent(s) will support or give money	0.881	0.324	0	1
KS3 score (Z)	0.158	0.962	-2.739	2.267
Likelihood of the young person applying to university	2.899	1.024	1	4
Highest qualification of family	3.436	1.860	1	7
Whether the main parent is currently receiving job seeker allowance	0.008	0.088	0	1
Number of siblings	1.915	1.424	0	15
Number of younger of siblings	0.955	1.062	0	12
Young person's ethnicity	1.888	1.785	1	8
Gender	1.499	0.500	1	2
Whether young person has disability	1.866	0.341	1	2
Young person's age when started KS4	15	0.044	14	16
Independent/maintained school	0.001	0.029	0	1
Overall teacher index ($\alpha = 0.71$)	-0.097	11.204	-50.612	38.472

In order to explain how belonging to a nonintact family structure tends to worsen adolescents cognitive outcomes, the socioeconomic status of the family is introduced into the model (2) to control for any discrepancies in such status and whether or not it could mediate the family structure effect. As illustrated earlier, the socioeconomic status mechanism is tested via three variables; the family's SEC class, its income and the IDACI

score of the neighbourhood. However, the findings show that such status hardly mediates the effect of family structure with almost no change in the significance or the magnitude of the four previously differentiated family structures aside from the loss of any significant effect of cohabitation. The findings may also imply that adolescents from lone mother families may do slightly better compared to those from lone father families even after controlling for socioeconomic differences (Amato and Booth, 1991; Amato and Keith, 1991b; Hoffmann and Johnson, 1998). Moreover, such status tends to have an independent effect on cognitive outcome via the three specified variables. For example, one standard deviation increase in the deprivation index is associated with almost 2% decrease in the expected value of KS4 score (Bowen, et al., 2008; Teachman and Paasch, 1998).

Table 3.3: Family Structure Influence on Cognitive Outcome

	Reduced Family Structure			Full Family Structure		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IRR	IRR	IRR	IRR	IRR	IRR
Family Structure (reference level: married natural couple)						
Other Married couple (OM)	0.963**	0.965**	0.965**	n.a	n.a	n.a
	(0.0167)	(0.0168)	(0.0169)			
Other Married couple (OM)	n.a	n.a	n.a	0.898***	0.902***	0.905***
				(0.0334)	(0.0339)	(0.0346)
Married with one or both step-parent (MS)	n.a	n.a	n.a	0.988	0.989	0.988
	n.a	n.a	n.a	(0.0194)	(0.0193)	(0.0193)
Cohabiting couple (CC)	0.964*	0.968	0.970	n.a	n.a	n.a
	(0.0195)	(0.0198)	(0.0203)	n.a	n.a	n.a
Cohabiting two biological parents (CB)	n.a	n.a	n.a	0.973	0.982	0.987
	n.a	n.a	n.a	(0.0374)	(0.0381)	(0.0382)
Other Cohabiting couple (OC)	n.a	n.a	n.a	0.960*	0.962	0.962
	n.a	n.a	n.a	(0.0236)	(0.0240)	(0.0247)
Lone father (LF)	0.897**	0.898**	0.901**	0.896**	0.897**	0.901**
	(0.0411)	(0.0408)	(0.0411)	(0.0411)	(0.0408)	(0.0411)
Lone mother (LM)	0.912***	0.915***	0.914***	0.912***	0.915***	0.914***
	(0.0135)	(0.0140)	(0.0143)	(0.0135)	(0.0140)	(0.0142)
No parents in the household (NP)	0.913	0.929	0.937	0.912	0.928	0.936
	(0.0806)	(0.0845)	(0.0851)	(0.0805)	(0.0843)	(0.0849)

MP's NS-SEC class (reference level: Higher Managerial and professional occupations)				
Lower managerial and professional occupations	1.033**	1.035***	1.033***	1.035***
	(0.0130)	(0.0130)	(0.0130)	(0.0130)
Intermediate occupations	1.034	1.037*	1.034	1.037*
	(0.0223)	(0.0227)	(0.0223)	(0.0226)
Small employers and own account workers	1.038*	1.040**	1.037*	1.039**
	(0.0201)	(0.0201)	(0.0200)	(0.0200)
Lower supervisory and technical occupations	1.042**	1.044**	1.040**	1.042**
	(0.0209)	(0.0204)	(0.0207)	(0.0202)
Semi-routine occupations	1.040	1.045*	1.040	1.045*
	(0.0257)	(0.0256)	(0.0258)	(0.0257)
Routine occupations	0.974	0.979	0.974	0.979
	(0.0214)	(0.0214)	(0.0214)	(0.0215)
Never worked/long term unemployed	0.948	0.952	0.949	0.953
	(0.0457)	(0.0458)	(0.0458)	(0.0459)
Mean income (Z)	0.987***	0.986***	0.987***	0.986***
	(0.00455)	(0.00451)	(0.00456)	(0.00452)
IDACI score (Z)	0.980**	0.982**	0.980**	0.981**
	(0.00790)	(0.00784)	(0.00789)	(0.00784)
MP: How involved is the MP in the young person's school life? (reference level: very involved)				
Fairly involved		1.028**		1.027**
		(0.0133)		(0.0133)
Not very involved		1.031**		1.030*
		(0.0157)		(0.0157)
Not at all involved		1.050		1.050
		(0.0365)		(0.0363)
MP's educational aspiration for young person (reference level: continue in full time education)				
Start learning a trade / get a place on a training course		0.970		0.970
		(0.0242)		(0.0241)
Start an apprenticeship		0.992		0.992
		(0.0298)		(0.0299)
Get a full-time paid job		0.889**		0.888**
		(0.0445)		(0.0444)

Something else			0.914			0.914
			(0.0744)			(0.0743)
MP: How the young person's expenses would be paid if stayed on in education- Parent(s) will support or give money			1.048**			1.046*
			(0.0243)			(0.0243)
Constant	50,564***	53,502***	56,863***	53,498***	56,484***	59,744***
	(123,330)	(130,334)	(140,886)	(131,006)	(138,160)	(148,635)

All models control for highest education level in the family, gender, ethnicity, disability, age, KS3 attainment, likelihood to apply to university, whether the main parent is currently receiving job seeker allowance, number of siblings, number of younger siblings, independent/maintained school and overall teacher index (see table D.3 in appendix D for the reported values).
Standard error (Eform) in parentheses. n.a means category not available since it is not defined as a structure.
*** p<0.01, ** p<0.05, * p<0.1

The effect of the family's SEC class shows that when the occupational class of the family is 'lower managerial and professional occupations', or 'small employers and own account workers', or 'lower supervisory and technical occupations', adolescents are likely to have higher cognitive outcome by 3% for the first and 4% for the other two classes compared to those living in families with 'higher managerial and professional occupations'. Some might interpret such positive association as unexpected, in which case it can be explained by the low significant negative correlation (ρ=-0.32) between cognitive outcome and the family's SEC variable, indicating that originally a negative relationship should exist between the deterioration in the SEC class and the outcome. This could imply that the effect of the family's SEC is conditional on other covariates in the model. The same applies for the effect of family income, which is found to be negatively associated with cognitive outcome, while it has a low significant positive correlation with such outcome (ρ=0.21) reflecting that its effect is also conditional on other covariates in the model.

With the absence of potential mediating role of the socioeconomic status, the analysis introduces parental involvement as an additional mechanism to test if it can explain the association between family structure and cognitive outcome. In essence, model (3) shows that parental involvement also has hardly any mediating role, where adolescents from other married families, lone father and lone mother families performing worse than those from intact families with almost no change in their magnitudes. Additionally, the effect of the three socioeconomic status variables almost does not change with the addition of the three new parental involvement variables (Coleman, 1988), which are also found to have an independent significant impact on cognitive outcome.

Adolescents whose parents aspire for them to get a full time job (either as an employee or self-employed) at the school leaving age are likely to have a lower cognitive outcome by 11% compared to those whose parents aspire for them to continue on full time education instead. Also, those whose parents are willing to financially support them to continue their education have 5% higher outcome than those whose parents are not willing to support them (Bridgeland et al., 2006; Steinberg, Elmen, and Mounts, 1989; Stone, 2006;). At the same time, adolescents whose parents are fairly involved or not very involved in their school life are likely to have higher cognitive outcome by almost 3% compared to those whose parents are very involved in their school life. The unexpected positive association detected can be explained by the fact that the effect of involvement in school life variables is conditional on the effect of other covariates in the model as shown by the very small significant negative correlation between it and cognitive outcome (ρ=-0.03)[20].

The analysis goes a step further by examining the *full* family structure variable to determine whether further discrepancies could be detected with more detailed family structures. To elaborate, model (4) examines the full family structure effect showing similar findings reflecting that adolescents in nonintact families tend to perform worse in KS4 than those in intact families. Specifically, those living with other married couple, lone father, other cohabiting couple, and lone mother families have lower KS4 score than those living in intact families by almost 10% for the first two, 4% for those living with other cohabiting couple and almost 9% for those living with a lone mother. Hence, one can suggest that the ‘’other married’’ category in the reduced structure is actually formed by two very different groups. First, the ‘’married, step-parent(s)" that performs very well, almost the same as the married biological parents, where the former are likely to have only 1% lower outcome compared to the latter. Second, the married with adoptive or foster parents (represented by the other married category in the full structure) that performs very poorly, as poor as lone father or lone mother. Thus, separating this category into two in the full structure does reveal a valuable pattern.

Testing for whether the family socioeconomic status could mediate the family structure effect, model (5) shows similar findings to that reported for model (2) where such status

[20] The unexpected positive impact of the significant categories could also be explained by the bivariate regression between the school involvement variable and the cognitive outcome which shows positive effects of those categories in contrast to the ‘not at all involved’ category having an expected negative effect. This could imply that the difference between those two categories and the reference category ‘very involved’ is not substantial enough to indicate the exact relationship between those levels of involvement. This is shown by the low economic significant magnitude of just 3% in model (3) and the expected negative significant effect on outcome of the ‘not at all involved’ category compared to the reference category of ‘very involved’ in the bivariate regression.

hardly mediates the effect of family structure with almost no change in the significance or the magnitude of three of the previously differentiated family structures. Moreover, such status tends to have the same independent effects on cognitive outcome via the three specified variables as those of model (2). Testing further for whether parental involvement can explain the association between family structure and cognitive outcome, model (6) shows that parental involvement also has hardly any mediating role with almost no change in the significance or the magnitude of the three previously differentiated family structures. Additionally, the effect of the three socioeconomic status variables almost does not change with the addition of the three new parental involvement variables, which are also found to have the same independent significant impact on cognitive outcome identified in model (3).

The previous six models entail three main findings: first, the comparison between the reduced and the full family structure variables does not reveal any significant difference in their effect on the adolescent cognitive outcome. Second, the family structure always has an independent significant effect on such outcome. Third, neither the socioeconomic status nor the parental involvement mediates the effect of family structure. Thus, it could be said that other unobserved family heterogeneities may explain the significant effect of family structure. More importantly, it shows that although previous findings in the literature may suggest that family structure matters only because of parental socio-economic status and involvement, the findings presented here show that there is more to family structure than that. Such independent effect could be derived by other unobserved factors, perhaps more psychological ones, such as the love and care provided by two parents, favourably both biological, for the young person during his childhood and adolescence.

3.4.2 Adolescent's Affective Outcome

Following the same analytical framework, table 3.4 provides basic descriptive statistics of the variables examined in the affective outcome estimation sample. The analysis first investigates the relationship between family structure and affective outcome in model (1) of table (3.5) showing that indeed, as expected, adolescents in nonintact families tend to have worse attitude towards school than those in intact families (Wallerstein and Lewis, 2005). Specifically, the odds of those living with other married couple and lone mother to have higher attitude score are lower than those living with intact families by 20% and 23% respectively.

Table 3.4: Descriptive Statistics of the Affective Outcome Model Variables

VARIABLES	Mean	Std. Dev.	Min	Max
Attitude towards school score	2.314	0.721	0	4
Family structure-reduced	2.322	1.690	1	6
Family structure-full	2.881	2.574	1	8
Family's NS-SEC class	3.965	2.241	1	8
Mean income (Z)	-0.021	0.840	-0.893	11.986
IDACI score (Z)	-0.141	0.968	-1.291	3.875
MP: How involved is the MP in the young person's school life?	2.032	0.780	1	4
MP educational aspiration for the young person	1.293	0.749	1	5
MP: How the young person's expenses would be paid if stayed on in education- Parent(s) will support or give money	0.882	0.323	0	1
KS3 score (Z)	0.170	0.952	-2.739	2.267
Likelihood of the young person applying to university	2.909	1.019	1	4
Highest qualification of family	3.426	1.855	1	7
Whether the main parent is currently receiving job seeker allowance	0.008	0.087	0	1
Number of siblings	1.906	1.410	0	15
Number of younger of siblings	0.951	1.053	0	12
Young person's ethnicity	1.884	1.786	1	8
Gender	1.500	0.500	1	2
Whether young person has disability	1.866	0.341	1	2
Young person's age when started KS4	15	0.045	14	16
Independent/maintained school	0.001	0.029	0	1
Overall teacher index ($\alpha = 0.71$)	-0.076	11.196	-50.612	38.472

In order to explain how belonging to a nonintact family structure tends to worsen adolescents affective outcome, the socioeconomic status of the family is introduced into the model (2) to control for any discrepancies in such status and whether or not it could mediate the family structure effect. However, the findings show that socioeconomic status does not mediates the effect of family structure with almost no change in the magnitude or the significance of the two previously differentiated family structures. Moreover, such

status has an independent effect on affective outcome via only the family income, where one standard deviation increase in income is associated with almost 7% decrease in the odds of having higher attitude score. Similar to the effect found on the cognitive outcome, such negative unexpected association can be explained by the low significant positive correlation (ρ=0.03) between affective outcome and the family income, indicating that originally a positive relationship should exist between the increase in income and attitude towards school. This again implies that the effect of the family income is conditional on other covariates in the model.

Table 3.5: Family Structure Influence on Affective Outcome

	Reduced Family Structure			Full Family Structure		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	OR	OR	OR	OR	OR	OR
Family Structure (reference level: married natural couple)						
Other Married couple (OM)	0.800**	0.806**	0.804**	n.a	n.a	n.a
	(0.0739)	(0.0751)	(0.0751)			
Other Married couple (OM)	n.a	n.a	n.a	0.673**	0.686**	0.674**
				(0.122)	(0.125)	(0.121)
Married with one or both step-parent (MS)	n.a	n.a	n.a	0.853	0.856	0.858
	n.a	n.a	n.a	(0.0920)	(0.0926)	(0.0932)
Cohabiting couple (CC)	0.840	0.843	0.849	n.a	n.a	n.a
	(0.0943)	(0.0967)	(0.0981)	n.a	n.a	n.a
Cohabiting two biological parents (CB)	n.a	n.a	n.a	0.793	0.796	0.797
	n.a	n.a	n.a	(0.161)	(0.163)	(0.162)
Other Cohabiting couple (OC)	n.a	n.a	n.a	0.861	0.864	0.874
	n.a	n.a	n.a	(0.113)	(0.116)	(0.118)
Lone father (LF)	0.748	0.751	0.784	0.746	0.750	0.782
	(0.151)	(0.150)	(0.152)	(0.150)	(0.150)	(0.151)
Lone mother (LM)	0.771***	0.765***	0.769***	0.770***	0.764***	0.767***
	(0.0583)	(0.0600)	(0.0610)	(0.0582)	(0.0599)	(0.0609)
No parents in the household (NP)	1.352	1.374	1.327	1.348	1.370	1.322
	(0.476)	(0.488)	(0.473)	(0.475)	(0.486)	(0.471)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)						

Lower managerial and professional occupations	0.951	0.954	0.951	0.953
	(0.0841)	(0.0846)	(0.0842)	(0.0847)
Intermediate occupations	0.988	0.994	0.987	0.993
	(0.130)	(0.131)	(0.130)	(0.131)
Small employers and own account workers	0.951	0.955	0.950	0.953
	(0.134)	(0.135)	(0.134)	(0.135)
Lower supervisory and technical occupations	0.962	0.993	0.957	0.988
	(0.108)	(0.111)	(0.108)	(0.111)
Semi-routine occupations	1.006	1.029	1.007	1.030
	(0.127)	(0.131)	(0.127)	(0.131)
Routine occupations	0.895	0.919	0.894	0.918
	(0.110)	(0.113)	(0.110)	(0.113)
Never worked/long term unemployed	0.810	0.822	0.811	0.822
	(0.155)	(0.156)	(0.155)	(0.156)
Mean income (Z)	0.932*	0.938*	0.934*	0.940
	(0.0360)	(0.0362)	(0.0362)	(0.0363)
IDACI score (Z)	0.972	0.963	0.972	0.963
	(0.0392)	(0.0385)	(0.0392)	(0.0385)
MP: How involved is the MP in the young person's school life? (reference level: very involved)				
Fairly involved		0.863**		0.860**
		(0.0648)		(0.0647)
Not very involved		0.867*		0.863*
		(0.0731)		(0.0729)
Not at all involved		0.561***		0.559***
		(0.0863)		(0.0862)
MP's educational aspiration for young person (reference level: continue in full time education)				
Start learning a trade / get a place on a training course		0.691***		0.690***
		(0.0824)		(0.0822)
Start an apprenticeship		0.656***		0.656***
		(0.0808)		(0.0809)
Get a full-time paid job		0.442***		0.440***
		(0.0944)		(0.0936)
Something else		0.855		0.852
		(0.240)		(0.237)
MP: How the young person's expenses would be paid if		1.029		1.023

stayed on in education- Parent(s) will support or give money		
	(0.0934)	(0.0930)

All models control for highest education level in the family, gender, ethnicity, disability, age, KS3 attainment, likelihood to apply to university, whether the main parent is currently receiving job seeker allowance, number of siblings, number of younger siblings, independent/maintained school and overall teacher index (see table D.4 in appendix D for the reported values).
Standard error (Eform) in parentheses. n.a means category not available since it is not defined as a structure.
*** p<0.01, ** p<0.05, * p<0.1

With the absence of potential mediating role of the socioeconomic status, the analysis introduces parental involvement as an additional mechanism to test if it could explain the association between family structure and affective outcome. Nevertheless, model (3) shows that parental involvement has hardly any mediating role with no change in either the significance or the magnitude of living with other married couple or a lone mother. Additionally, the effect of the three socioeconomic status variables almost does not change with the addition of the three new parental involvement variables, which on the contrary are found to have mostly an independent significant impact on affective outcome.

Adolescents whose parents are not at all involved in their school life are likely to have a worse attitude towards school by almost 44% compared to those whose parents are very involved in their school life. At the same time, adolescents whose parents aspire for them to 'start learning a trade / get a place on a training course' or 'start an apprenticeship' or 'get a full time job (either as an employee or self-employed)' are likely to have worse attitude by 31%, 34% and 56% respectively compared to those whose parents aspire for them to continue on full time education instead. Accordingly, it could be implied that adolescents who perceive their parents to have high values in education and its importance tend to adopt such values and thus have better academic behaviours (Gonzalez-DeHass, Willems and Holbein, 2005; Marchant et al., 2001).

Following the same analytical framework, the analysis goes a step further by examining the *full* family structure variable to determine whether further discrepancies could be detected with more detailed family structures. To elaborate, model (4) examines the full family structure effect showing similar findings reflecting that adolescents in nonintact families tend to have worse attitude than those in intact families. Specifically, those living with other married couple and lone mother families have worse attitude towards school than those living in intact families by 33% and 23% respectively.

Testing for whether the family socioeconomic status could mediate the family structure effect, model (5) shows similar findings to that reported for model (2) where such status hardly mediates the effect of family structure with almost no change in the significance or the magnitude of the two previously differentiated family structures. Moreover, such status tends to have the same independent effect on affective outcome via only the family income as that of model (2). Testing further for whether parental involvement can explain the association between family structure and affective outcome, model (6) shows that parental involvement also has hardly any mediating role with almost no change in the significance or the magnitude of the two previously differentiated family. Additionally, the effect of the three socioeconomic status variables almost does not change with the addition of the three new parental involvement variables, which are found to have the same independent significant impact on affective outcome identified in model (3).

The previous six models entail three main findings: first, the comparison between the reduced and the full family structure variables does not reveal any significant difference in their effect on the adolescent affective outcome. Second, the family structure always has an independent significant effect on such outcome. Third, neither the socioeconomic status nor the parental involvement mediates the effect of family structure. Thus, it could be said that other unobserved family heterogeneities may explain the significant effect of family structure on affective outcome as well. Once again, although previous findings in the literature may suggest that family structure matters only because of parental socio-economic status and involvement, the findings presented here show that there is more to family structure than that. Such independent effect could be derived by other unobserved factors, perhaps more psychological ones, such as the love and care provided by two parents, favourably both biological, for the young person during his childhood and adolescence.

3.4.3 Testing for Interactions

Given the absence of an adequate mediating role of the main effects of both the socioeconomic status and parental involvement, the analysis goes a step further by introducing the interaction effect of both mechanisms sequentially with the family structure variable, as indicated by equations (3.4) and (3.5).

$$\ln(\mu(o)_{it}) = \alpha + \gamma F_{i,t-1} + \sum_K \lambda_K (SEC_{i,t-1} + I_{i,t-1,t-2} + D_{it}) + \sum_M \eta_M PI_{mi,t-1} + \sum_W \delta_W F_{i,t-1} (SEC_{i,t-1} + I_{i,t-1,t-2} + D_{it}) + \sum_V \vartheta_V F_{i,t-1} PI_{vi,t-1} + \sum_N \beta_N (X_{i,t-1} + X_{i,t-2}) + \sum_L \zeta_L (S_{i,t-2} + S_{i,t-1,t-2}) + \varepsilon_i \quad (3.4)$$

$$\ln(\mu(af)_{it} / 1-\mu(af)_{it}) = \alpha + \gamma F_{i,t-1} + \sum_K \lambda_K (SEC_{i,t-1} + I_{i,t-1,t-2} + D_{it}) + \sum_M \eta_M PI_{mi,t-1} + \sum_W \delta_W F_{i,t-1} (SEC_{i,t-1} + I_{i,t-1,t-2} + D_{it}) + \sum_V \vartheta_V F_{i,t-1} PI_{vi,t-1} + \sum_N \beta_N (X_{i,t-1} + X_{i,t-2}) + \sum_L \zeta_L (S_{i,t-2} + S_{i,t-1,t-2}) + \varepsilon_i \quad (3.5)$$

Having said that and given the nature of a model involving interaction effects, it would be more accurate to explain the relationships between family structure and the adolescent's outcome using the post estimation average marginal effects (AME)[21]. The average marginal effects are estimated at observed values of the rest of the covariates in the model. They are better in explaining the effect of family structure than using the standard regression coefficient in models involving interaction terms since the former takes the values of all covariates into account, while the latter does not take into account the interaction effect[22].

Starting with the *reduced* family structure variable, model (1) introduces the interaction effect of the socioeconomic status mechanism with family structure, showing that even with the inclusion of such interaction there is no mediating role of such status for the effect of family structure on cognitive outcome. Essentially, the average marginal effects in upper part of table (3.6) shows that adolescent living with other married couple, cohabiting couples and a lone mother are having 4% lower outcome for the first two and 8% of the latter compared those living in intact families. Such magnitude hardly changes after controlling for the interaction effects of parental involvement with family structure in model (2), which implies that parental involvement does not have a mediating role for family structure as well.

[21] For more details about the regression output please see tables (D.5) and (D.6) in appendix D.

[22] Intuitively, the AME for living with a lone mother, for example, is computed in the following steps: (1) starting with the first case, the adolescent is treated as though he/she lives in intact family, regardless of what the structure actually is and leave all other independent variable values as is. Compute the outcome this adolescent (if he/she lives in intact family) would have, (2) the same process is repeated but this time treating the adolescent as though he/she lives with alone mother, (3) the difference in the two outcomes just computed is the marginal effect for that case, (4) the process is repeated for every case in the sample, (5) compute the average of all the marginal effects computed. This gives the AME for living with a lone mother.

Table 3.6: Average Marginal Effects (%)

Cognitive Outcome				
	Reduced Family Structure		Full Family Structure	
VARIABLES	(1)	(2)	(3)	(4)
Family Structure (reference level: married natural couple)				
Other Married couple (OM)	-4**	-4**	n.a	n.a
	(0.018134)	(0.018618)		
Other Married couple (OM)	n.a	n.a	-10***	-11***
			(0.039156)	(0.040757)
Married with one or both step-parent (MS)	n.a	n.a	-1	-1
			(0.020514)	(0.02053)
Cohabiting couple (CC)	-4**	-5***	n.a	n.a
	(0.019589)	(0.019632)		
Cohabiting two biological parents (CB)	n.a	n.a	-2	-
			(0.035145)	-
Other Cohabiting couple (OC)	n.a	n.a	-4*	-6***
			(0.023827)	(0.02481)
Lone father (LF)	-5	-3	-5	-3
	(0.046548)	(0..05907)	(0.046542)	(0.05918)
Lone mother (LM)	-8***	-8***	-8***	-8***
	(0.015258)	(0.016280)	(0.01526)	(0.01628)
No parents in the household (NP)	-19	-	-19	-
	(0.163777)	-	(0.163339)	-
Affective Outcome (=4)				
VARIABLES	(2)	(3)	(5)	(6)
Family Structure (reference level: married natural couple)				
Other Married couple (OM)	-23***	-21**	n.a	n.a
	(0.094794)	(0.092637)		
Other Married couple (OM)	n.a	n.a	-37*	-35*
			(0.219273)	(0.112534)
Married with one or both step-parent (MS)	n.a	n.a	-19*	-21*
			(0.113787)	(0.21372)
Cohabiting couple (CC)	-15	-16	n.a	n.a
	(0.116624)	(0.118812)		

Cohabiting two biological parents (CB)	n.a	n.a	-24	-
			(0.202044)	-
Other Cohabiting couple (OC)	n.a	n.a	-11	-11
			(0.137686)	(0.139688)
Lone father (LF)	-41*	-19	-41*	-20
	(0.237251)	(0.219026)	(0.238163)	(0.220746)
Lone mother (LM)	-26***	-25***	-27***	-26***
	(0.086687)	(0.089138)	(0.086876)	(0.089678)
No parents in the household (NP)	26	-	26	-
	(0.440119)	-	(0.440448)	-

Note: the average marginal effect is estimated using the form dln(y)/dx. (-) means not estimable. n.a means category not available since it is not defined as a structure.
Standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Examining the *full* family structure variable to determine whether further discrepancies could be detected with more detailed family structures, model (4) shows similar findings reflecting that after controlling for socioeconomic status interaction effects adolescents living with other married couple, other cohabiting couple and lone mother families have lower cognitive outcome than those living in intact families by 10%, 4%, and 8% respectively. These adverse effects slightly increase after controlling for parental involvement interaction effects in model (5) for the first two groups.

The same analytical framework examined the effect possible interactions on adolescents' affective outcome. The findings in the lower part of table (3.6) report the average marginal effects for the highest outcome where the average attitude score is 4 showing that starting with the *reduced* family structure variable, model (1) reveals that there is no mediating role of the socioeconomic status for the effect of family structure on affective outcome. Essentially, the probability of having the highest average score of attitude (score=4) for adolescent living with other married couple, a lone father and a lone mother compared those living in intact families decreases by 23%, 41% and 26% respectively. However, the inclusion of the parental involvement interaction effects in model (2) plays a partially mediating role in explaining the effect of family structure, where there is no change in the significance or magnitude of those living with other married couple and a lone mother while those living with a lone father have no significantly different though smaller outcome compared those living in intact families.

Examining the *full* family structure variable to determine whether further discrepancies could be detected with more detailed family structures, model (3) shows similar findings reflecting that after controlling for socioeconomic status interaction effects the probability of having the highest average score of attitude (score=4) for adolescent living with married step couple, other married couple, a lone father and a lone mother compared those living in intact families decreases by 19%, 37%, 41% and 27% respectively. However, the inclusion of the parental involvement interaction effects in model (4) plays a partially mediating role in explaining the effect of family structure, where there is no change in the significance or magnitude of those living with married step couple, other married couple and a lone mother while those living with a lone father have no significantly different though smaller outcome compared those living in intact families. Accordingly, one can again conclude that family structure still has an independent effect on cognitive outcome even after controlling for any possible interaction effects for both the socioeconomic status mechanism and the parental involvement mechanism, confirming the earlier finding that other unobserved family heterogeneities could explain the effect of family structure on adolescents' affective outcome as well.

The previous interactions models reveal four main findings: first, similar to the models with no such interactions the comparison between the reduced and the full family structure variables hardly reveal any significant difference in their effect on the adolescent cognitive and affective outcome aside from the addition of a significant effect of living in a step-parent family on affective outcome. Second, the family structure always has an independent significant effect on such outcome. Third, the socioeconomic status does not mediate the effect of family structure though parental involvement partially mediates such effect. Thus, it could be said that other unobserved family heterogeneities may explain the significant effect of family structure on affective outcome as well. Fourth, the comparison between the set of models with and without the interaction terms usually if not always reveals similar findings across models.

3.5 Conclusion and Discussion

This chapter has investigated the relationships between family structure and educational outcomes. The arguments are that the outcome gap among adolescents could be explained to an extent by the type of family they live with and that living in a nonintact family has adverse impact on these outcomes. The analysis also seeks to fill some of the gap in the literature about why nonintact structures of English families could lead to worse

educational outcomes. For this, two identified intervening mechanisms in the literature of the family socioeconomic status and parental involvement are tested for whether they could mediate such effect. In light of that, some broad patterns emerge in the data.

This analysis generally supports the results reviewed earlier that living in a nonintact family structure has a negative effect on adolescents' educational outcomes (Astone and McLanahan, 1991; Rodriguez and Arnold, 1998; Wallerstein and Lewis, 2005 among others). The primary exception being that the two mechanisms examined to explain such effect do not play their expected mediating role except for the partial mediating role of the interaction effects of parental involvement on affective outcome. Accordingly, one can suggest that the effect of including those two mechanisms and other controls highlights the main finding of the analysis that part of the observed educational outcomes is "pure" family structure effect even after controlling for the effects of possible observed compensating or reinforcing family characteristics or allocation decisions on the contrary to other findings suggested in the literature that such outcomes are not pure family structure effects (Gennetian, 2005).

Based on the previous findings, it could be said that in the English context family structure always plays an independent effect on the adolescent's educational outcome and that other unobserved family heterogeneities could explain such adverse effect. As such, policy makers should pay more attention to compensating such adverse effect through policies targeting the adolescent him/herself rather than focusing only on the parent(s). Such policies like providing benefits, for example, in the form of unemployment benefits to single parents or to those parents with financial problems are shown here not have a significant effect on the adolescent's outcome.

The data reveal consistent patterns across models with and without including the possible interaction effects between the two mechanisms and family structures for both outcomes examined. The findings also show that parental involvement interaction effect partially explains to an extent the affective outcome gap among adolescents across different family structure (Astone and McLanahan, 1991; Brown, 2004; Coleman, 1988; Magnuson and Berger, 2009; Thomson, Hanson and McLanahan, 1994 among others). Moreover, such consistency exists to a great extent for the effect of the two mechanisms across models. As stated earlier, the findings indicate that indeed living in a nonintact family does have an adverse effect on adolescents' educational outcomes, both cognitive and affective.

Specifically, two main structures dominated such adverse effect; other married couple and lone mother families. Furthermore, the extended version of the family structure shows that living with a married step couple has also an adverse impact on affective outcome.

Deeper investigation of the discrepancies between the previously identified structures shows that in most cases one cannot determine a general trend for whether living with other married couple could have worse impact than living with a single parent or whether living with married couple is better than a cohabiting couple. For example, living with a lone mother has worse effect on cognitive outcome than with other cohabiting couple; and in certain cases (full structure analysis) slightly better than living with other married couple. This entails that in some cases having a non-biological parent(s) in the family as in the examined sample where the married couple could be adoptive, foster or any non-biological couple, is worse than living with just a single parent (Hofferth and Anderson, 2003).

The effect of living with a single mother has widely been investigated in the literature. Essentially, the analysis agrees to a great extent with the general effect observed in such literature. Living with a lone mother does have a negative significant impact on adolescents' cognitive and affective outcome (Amato and Booth, 1997) and that is usually better than the effect of living with a lone father (Amato and Booth, 1991; Amato and Keith, 1991b; Hoffmann and Johnson, 1998). Some researchers tend to justify the difference in the two impacts with the adequacy of the socioeconomic status. However, the current analysis has distinguished between such effect on both cognitive and affective outcome. To explain, living with a lone mother has an adverse effect on cognitive outcome regardless of the type of occupation the mother has, however, no such conclusive statement could be made for the effect on affective outcome, where in certain occupation such as being a small employers and own account worker, living with a lone mother could have a positive impact on the adolescent's attitude towards school. Accordingly, relying on the lone mother type of occupation may not be adequate enough to justify the adverse effect on her adolescents' educational outcome. In fact, the adverse effect of living with a lone mother is mostly related to her involvement in the adolescent's school life and her aspiration for his/her future. Nevertheless, living with a lone mother has an independent adverse effect on both outcomes that could be explained by other unobserved family heterogeneities.

A key limitation of the analysis is the lack of data on the historical family structure status and whether there has been any change in it during the lifetime of the adolescent, which may not adequately reflect any possible change in the living arrangements during childhood (Ginther and Pollak, 2004). The use of one year variable might serve as a weak proxy for childhood circumstances and events, and can result in unreliable estimates (Wolfe, et al., 1996). Accordingly, future research should account for changes in family structure over the childhood of adolescents. Nevertheless, the findings show that while omitted variable bias is possible, one could say that the regressions at least do not suffer from reverse causation (bad performance in school should not cause family structure). Thus, one could say that these cross-section results might suggest a causal relationship.

Traditional classifications of family structure sometimes ignore the complexity of blended families and the existence of step siblings. Although, the adolescent may be living with two parents, the family structure effect may have different implications for an adolescent's well-being than growing up in a family in which not all the siblings are with both biological parents (Hetherington and Jodl, 1994; White, 1994). Although the analysis has shown that having more siblings is likely to adversely affect both outcomes with no conclusive direction for the effect of the age difference between siblings, the analysis suffer from the limitation that it did not account for the possibility of having a step sibling in the family due to lack of data. A similar limitation exists related to the absence of information about the causes of family disruptions, whether separation or death, for example, and how that accounts for the differences in outcome (Beller and Chung, 1992; Biblarz and Gottainer, 2000; Skevik, 2003). Future research examining the possible effects of having a step sibling and the cause of family disruption would be a promising direction for further inquiry.

Finally, most researchers tend to explain the effect of socioeconomic status by examining the effect of both parents' occupations. However, the analysis of this chapter rather examined the effect of the highest occupation in the family reported by the reference point of the LSYPE survey (the main parent). Two main reasons account for that; first, the separate effect of the mother and the father led to a 30% reduction in the sample size which could lead to loss of statistical power. Second, such separation led to a drop of half of the examined family structures from the estimation sample when combining all variables together, leaving us with only the main reference structure of married two biological parents, other married couple and cohabiting couple. Accordingly, analysis of the remaining structures was not possible, violating the main purpose of the analysis.

Chapter 4: Religion and Educational Outcomes in England

4.1 Introduction and Conceptual Framework

Students' behaviour in general and during adolescence in particular plays an important role in shaping their characters and decision making skills. Such decisions contribute greatly to their present life outcomes in terms of following certain social conducts and reaching certain educational outcomes. It also affects their future life in terms of their aspirations to continue their education and what type of career they want to pursue (Muller and Ellison, 2001). Some students tend to drop out during high school (Kaufman, McMillen and Sweet, 1996) or adjust their educational aspirations downward (Hanson, 1994), while others work harder to have better educational and professional career (Hedges and Nowell, 1995).

Most of the main stream researchers think that successful educational outcomes are merely explained by personal attributes and school processes. However, such success is also affected by religious socialization factors (Glanville, Sikkink and Hernandez, 2008; Gruber, 2005; Lehrer, 1999; 2004a; 2004b; 2009; Leventhal and Brooks-Gunn, 2004; Sander, 1992; Weis, 1988). Sociologists generally define religious socialization as the process through which an individual forms attitudes, values and behaviours within the context of a religious belief system and practices (Brown and Gary, 1991). Such process represents all forms of religious involvement practices and how they not only influence the general attitudes of an individual but also his/her education (Brown and Gary, 1991; Regnerus, 2000). In that framework it is important to differentiate between religious affiliation and religiosity. The former reflects the type of religion, while the latter reflects aspects like commitment to religion, strength of religious beliefs and religious involvement or participation (Lehrer, 2004b).

For numerous decades academics have engaged in the study of the influence of religion, in general, from mainly sociological and psychological perspectives (Cochran, 1992; 1993; Jeynes, 1999). Many have studied the relationship between religious revival and crime rates, alcohol consumption, family life, drug abuse, and other social outcomes (Hammond, 1974; Jeynes, 2005; Smith, 1980). Researchers have also investigated how contemporary religious commitment affects criminal behaviour, substance abuse, premarital sex, among other measures (Cochran, 1992; 1993; Jeynes, 1999; 2003; 2006). Others have found a correlation between religious involvement and psychological health (Donahue and Benson, 1995; Ellison, Burr and McCall, 1997; Glanville, Sikkink and Hernandez, 2008; Wright, Frost and Wisecarver, 1993). Moreover, social scientists have widely examined the

influence of religiosity, even to the extent of undertaking meta-analyses and examining nationwide datasets (Jeynes, 1999; 2003; 2006; 2010). Nevertheless, the following literature review identifies a gap in the literature that the impact of religion on educational outcomes remains underexamined in general (Barrett, 2010; Lehrer, 2004a; Muller and Ellison, 2001) and by economists in particular (Gruber, 2005).

The economic theoretical framework for understanding how variations in religion and/or religiosity affect educational outcomes can be illustrated using the human capital model developed by Becker and Chiswick (1966) and Becker (1967). In this model, the optimal level of schooling for an individual is reached when the demand for funds for investment in education equals the supply. The demand curve shows the marginal rate of return derived from each additional unit of income spent on education. The negative slope of the demand curve is attributed to the increase in the cost in terms of forgone earnings as additional schooling is acquired and productivity in the labour market rises. Moreover, the model shows that since a person's mental capacity is fixed and life is finite, diminishing marginal returns eventually occur as additional education is acquired. The supply curve shows the marginal rate of interest on funds borrowed (or not lent) to finance investments in education. The positive slope reflects the standard assumption that the cost of obtaining additional funds is increasing with additional human capital investments.

The human capital model can be used to explain the effect of religion and/or religiosity in the sense that they are viewed as reflecting distinctive features of the home environment that affect both the returns to and costs of additional investments in education and so the position of both the demand and supply curves (Chiswick, 1988; Lehrer 1999; 2004a; 2004b). On the demand side, following certain religion or having certain level of religious involvement can affect the returns from investments in education. To illustrate, certain religious groups believe in more benefits from schooling and these benefits increase with the rise in the level of religious involvement, therefore they have stronger incentives to pursue education and thus a higher level of attainment is expected, other things held equal. On the supply side, following certain religion or having certain level of religious involvement can affect parents' willingness and ability to supply funds for investments in schooling. In that sense, a higher level of education is expected for religious groups, such as Jews in which parents are more willing and able to supply funds for such investments, other things held equal (Lehrer, 2009).

A second identified gap in the literature is that generally, previous research has mainly investigated the effect of religious affiliation and religiosity separately. Just as the

literature on the effects of religious affiliation has hardly accounted for the role of religiosity, most of the literature on the effects of religiosity largely ignores religious affiliation (Lehrer, 2004a). Some researchers focused on the effect of religion affiliation on educational outcomes (Featherman, 1971; Greeley, 1981; Roof, 1979; 1981; Tomes, 1983; 1985; among others), while other focused on the effect of religious involvement on such outcomes (Coleman, Kilgore and Hoffer ,1982; Coleman and Hoffer, 1987; Freeman, 1985; Smith, 2003; among others).

Researchers focusing on religious affiliation include both sociologists and economists, while those focusing on religiosity are mainly dominated by sociologist and psychologists with little contribution from the economics literature (Gruber, 2005). The lack of such contribution is related to the economic way of reasoning which is highly sensitive to the difficulty inherent in separating the causal effects of religiosity from other factors that are correlated with outcomes. Most factors which determine the religiosity of any given individual, whether short term or long term are likely correlated with their outcomes through other channels as well. Short term factors in terms of good or bad shocks to personal well-being may cause fluctuations in religious involvement. Also, long run factors, such as correlation between religiosity and ambition or ability can cause heterogeneity across individuals.

In an attempt to overcome the correlation problem between religiosity and other factors that are correlated with outcomes, Gurber (2005) suggested using market density or the share of the population in an area which is of an individual's religion to determine the level of religious participation. The findings indicated the existence of a positive association between the two variables and also positive associations between both market density and religious participation on one hand and economic outcomes in terms of levels of education, income and marriage on the other hand, while negative associations with levels of welfare receipt, disability and divorce.

A third gap identified in the literature is that during the past two decades some researchers have examined the influence of both religious affiliation and religiosity on educational outcomes, especially in the USA with special focus on the Black community (Barrett, 2010) and the comparison between Protestants and Catholics (Featherman, 1971; Greeley, 1981; Roof, 1979; 1981; Tomes, 1983; 1985) with less volume of research in England. Such influence is attributed to the fact that both religious affiliation and religiosity have impacts on the perceived costs and benefits of various decisions made by individuals and families over their life cycle, which in turn could indirectly affect their educational

outcomes (Lehrer, 2004b; 2009). Moreover, religion's impact on students' behaviours plays a direct role in forming their attitudes and values in general and towards education in particular (Glanville, Sikkink and Hernandez, 2008).

Although many researchers have focused on investigating the influence of religious affiliation on educational outcomes, some have lacked a clear pattern of such influence due to differences in the religious beliefs among certain groups, such as Protestants and Catholics (with the exception of Jews who usually have more earnings and higher return on human capital) (Chiswick, 1988, 1993; Darnell and Sherkat, 1997; Gruber, 2005; Lehrer, 1999; 2005; Sherkat and Darnell, 1999). This shortcoming has led others to ignore religion as an important determinant of schooling decisions (Haveman and Wolfe, 1995). Nevertheless, there has been a consensus that most religions encourage healthy and constructive behaviours, which in turn plays an important role in improving children's educational outcomes (Lehrer 2004a).

Because religious affiliation influences educational outcomes, the potential positive influence is likely to be stronger with the increase in religiosity and so a growing part of the literature has been paying more attention to the influence of religiosity showing that in general it has positive influences on individuals' outcomes (Lehrer, 2004; 2009; Gruber, 2005; Smith, 2003; Waite and Lehrer, 2003). Religiosity strengths the importance of; going to school, exerting effort in achieving high grades and completing a higher education degree (Regnerus, 2008). Religiosity positively improves both social behaviours (Bryk, Lee and Holland, 1993) and educational behavioural outcomes, such as school attendance rates and labour force attachment (Freeman, 1985). It reduces dropping out and improves test scores and advanced course taking (Coleman, Kilgore and Hoffer ,1982; Coleman and Hoffer, 1987; Smith, 2003). It also improves educational expectations (Regnerus, 2000; Sanders, 1998) and increases grades among rural teens (Elder and Conger, 2000) and immigrant students (Bankston and Zhou, 2002).

In general, one can say that most of the previous studies have indicated a positive relationship between religious affiliation and religiosity on one hand and students' educational outcomes on the other (Elder and Conger, 2000; Freeman, 1985; Glanville, Sikkink and Hernandez, 2008; Regnerus, 2000; 2008; Sanders, 1998; among others). Nevertheless, few have argued that it might hinder attainments of some type of youth (Darnell and Sherkat, 1997; Ellison and Sherkat, 1993). Moreover, despite the emerging interest in studying the effect of religion in general, theoretical explanations for such

influence remain largely disjointed and unclear (Glanville, Sikkink and Hernandez, 2008; Lehrer, 2004a; Smith, 2003).

The dearth of knowledge on the relationship between religious affiliation and/or religiosity and educational outcomes is partially attributed to lack of a sufficient theoretical framework to clearly investigate such relationships, where most researchers emphasize the importance of social capital as the main mechanism to explain these relationships (Coleman, 1961; 1988; Glanville, Sikkink and Hernandez, 2008; Lehrer, 2004a; among others). That shortage of knowledge is also attributed to limitations of the available surveys, many of which have little or no information on variables related to the mechanisms through which religious affiliation and religiosity affect such outcomes (Lehrer, 2004a). A better understanding of these mechanisms promises to enhance the understanding of adolescent development more broadly.

The analysis in this chapter seeks to fill the previous identified gaps in the Education Economics literature about how variations in religious affiliation and religiosity affect educational outcomes of English adolescents. In this framework and in light of the previous introduction, the current analysis answers the following research questions:

1. Does religiosity affects the social capital resources available to adolescents?
2. Do religious affiliation and religiosity account for the disparities among adolescents in their cognitive and affective educational outcomes?
3. Is the effect of religious affiliation and religiosity on such outcomes mediated by social capital or could there be other mechanism(s) that play such role?

In order to answer these questions Chapter 4 investigates the effect of religious affiliations and religiosity on adolescents' educational outcomes in England, specifically cognitive and affective outcomes by adopting a more comprehensive theoretical framework based on both Becker's and Chiswick's human capital model (1966; 1967) and socialization framework accounting for social capital (Coleman, 1961; 1988) and school characteristics (Levaccićć and Vignoles, 2002). Additionally, it uses a unique dataset comprising data from the LSYPE and the NPD.

The chapter proceeds with a review of empirical literature in section 2 followed by data, model specification and statistical method in section 3. Main findings are discussed in section 4 and the chapter ends with conclusion and discussion in section 5.

4.2 Review of Empirical Literature

The theorization of the religion's effect on students' educational outcomes has been fragmented, where little is known about the process through which such effect takes place (Glanville, Sikkink and Hernandez, 2008; Smith, 2003). Attempts were made by a number of researchers aimed at identifying the main mechanisms through which religion could affect students' in general. A limited number of mechanisms were identified to mediate the effect of religion through the effect on the demand and supply for funds to invest in education. Having said that it is important to mention that most of the mechanisms identified in the literature are demand side rather than supply side mechanisms (Lehrer, 1999; 2004a, 2004b; 2009; Sander, 1992).

A number of studies have tried to explain the relationship between religiosity and adolescents' educational outcomes via the effect of religiosity on adolescents' social behaviours (Bahr, Hawks and Wang, 1993; Benson, 1990; Jeynes, 2010; Miller and Olson, 1988; Muller and Ellison, 2001) or their academic self-schema (Hutchins and Adler, 1963; Jeynes, 2010; Van Biema, 2007) or family attributes (Brody, Stoneman and Flor, 1996; Freeman, 1985; Muller and Ellison, 2001) or students' own attributes (Freeman, 1985). Nevertheless, there has not been a sufficient investigation of the effects of most of these mechanisms in mediating the influence of religion on educational outcomes.

Religious beliefs could have direct effect on the supply of schooling (Lehrer, 2004b). For example, conservative Protestants beliefs of authority and submission are frequently in conflict with the humanistic values openly taught or implied in secular curricula, which makes parents more reserved against such curricula leading to a supply curve further to the left with less schooling investment at any given marginal costs (Sherkat and Darnell, 1999). On the contrary, factors such as the 'diaspora hypothesis' that historically Jews invest more in their children human capital because they are more portable than physical capital (Brenner and Kiefer, 1981) in addition to their high levels of wealth (Keister, 2003; 2005; 2009) lead to a supply curve further to the right with higher supply of investment at any given cost.

Previous research has suggested that factors such as the employment of family members which has a positive impact and the status of welfare support which has a negative impact should be accounted for since they were found to be influential when explaining the relationship between religion and religiosity on one hand and adolescents' educational outcomes on the other (Freeman, 1985). In that context, religious commitment was found to have a positive influence on adolescents' cognitive outcomes even after controlling for

socioeconomic status, gender, and whether the he/she attended a private religious school. More religiously committed adolescents in terms of church attendance outperform their less religious counterparts on standardized tests and are more likely to complete their core curriculum as planned (Jeynes, 1999; 2002; Regnerus, 2000).

Social Capital as a Demand Side Mechanism

The early work of Durkheim (1897) and more recent work of Coleman (1961) and his follow-up work on social capital (1988) showed that adolescents' social relationships or as metaphorically stated in the literature 'social capital' plays a role in increasing their human capital in general and improving their educational outcomes in particular (Furstenberg and Hughes, 1995; Goddard, 2003; Gruber, 2005; Iannaccone, 1990; Muller and Ellison, 2001; Teachman, Paasch and Carver, 1997). In that framework, researchers have indicated that social capital -though 'loose' (Barrett, 2009; Muller and Ellison, 2001)- is commonly identified as the main demand side mechanism that could explain the influence of religion in general and religiosity in particular on adolescents' educational outcomes (Barrett, 2010; Lehrer, 2004a; Smith, 2003).

Simply, social capital refers to the social relationships that people invest in, whether consciously or unconsciously, to enable them to fulfil their goals (Glanville, Sikkink and Hernandez, 2008). Social capital represents the actual and potential resources linked to membership in a group (Bourdieu, 1997; Smith, 2003). Basically, building social connections does not necessarily grant acquiring social capital; rather, other forms of relationships possess certain qualities that make them a special resource that both help in taking certain actions and contribute to positive outcomes. In that sense, social capital is that kind of resource that cannot be held by one individual, but is a quality of the relationships among different individuals (Coleman, 1987; 1988; 1990a).

Previous studies have shown that religiosity in general has a positive influence on students' cognitive outcomes through the direct influence on their social behaviours especially during their teenagehood (Jeynes, 2010). A number of studies reveal that religiously committed teens are less likely to become involved in drug and alcohol abuse (Bahr, Hawks and Wang, 1993; Benson, 1990; Brownfield and Sorenson, 1991; Glanville, Sikkink and Hernandez, 2008; Jeynes, 1999). Similarly, other studies indicate that they are less likely to engage in sexual behaviour or early nonmarital childbearing (Beck, Cole and Hammond, 1991; Donahue and Benson, 1995; Holman and Harding, 1996; Miller and Olson, 1988; Muller and Ellison, 2001). Likewise, a number of studies confirm that

religiosity has adverse impact on students' thoughts of suicide, attempted suicide, actual suicide among American teenagers (Donahue and Benson, 1995) and their levels of depressions (Wright, Frost, and Wisecarver, 1993).

The aforementioned effects of religiosity suggest that the demand curve should be further to the right for youths raised in more religious homes. As such, they will have lower psychological costs of attending school, and their time spent on human capital investments is likely to be more productive. Accordingly, this causal mechanism implies that youths who are more religious would pursue more schooling and earn a higher rate of return on their investments (Lehrer, 2004a). Previous literature has examined a number of social capital forms and their role in mediating the relationship between religiosity and students' educational outcomes. Some of these forms are explained in the following review.

In general, social capital serves as a normative function in directing behaviour towards certain directions and away from others (Coleman, 1988; Barrett, 2009; Donahue and Benson, 1995; Elder and Conger, 2000). In that sense, being religiously involved with certain institutions would provide adolescents with access to such social capital that would reinforce certain norms and values. Religious involvement provides also adolescents with a chance to have role models that can affect their attitudes and beliefs in a way to make them work hard not to let such role models down (Wuthnow, 1995), which in turn positively affects their educational outcomes (Barrett, 2010; Smith, 2003).

One form of social capital is known as intergenerational closure or the socializing influence achieved when adolescents and their peers are involved in social networks that are linked and hence closed intergenerationally with other adults; often their parents (Coleman, 1988; Lin, 2001; Muller and Ellison, 2001; Smith, 2003; Barrett, 2009). In that framework, religious groups have been driven by such intergenerational social networks (Glanville, Sikkink and Hernandez, 2008; Olson, 1989). For example, joining specific religious groups in certain circumstances is driven by pre-existing social relationships in schools, neighbourhoods and workplaces (Sherkat and Wilson, 1995; Stark and Bainbridge, 1980). What is likely to be more important is that such religious groups help building friendships and enduring social ties, including intergenerational bonds (Fischer, 1982; Lenski, 1961; Mclntosh and Alston, 1982).

The existence of such closure mediates the impact of religious involvement as it acts not only as a source of information to adolescents but can also influence and monitor their behaviour more effectively than a network that lacks closure or the presence of adult

reinforcement (Coleman, 1990a). Although such closure was found to contribute to better adolescents' educational outcomes and lower drop-out rates as it facilitates norms enforcement and communication with other parents (Carbonaro, 1998; Coleman, 1988), its presence was lower among Black students compared to White ones and to increase with the advancements in parental socioeconomic status (Carbonaro, 1998). It was also found to improve achievement among second generation immigrant adolescents (Portes, 2000) and among fourth graders (Fletcher, et al., 2001).

Social capital plays an important role in enhancing adolescents' outcomes through long term investments. Religious involvement effect on such outcomes is mediated as well through such investments in adolescents in the form of time and efforts. Sunday school teachers, youth group leaders, and so forth help adolescents both in their social and academic lives and play a role in overcoming related problems (Wuthnow, 1995). Also, many religious institutions such as congregation may provide space for healthy youth activities that are not specifically religious in nature, such as scouting and athletics, but can encompass desirable values and provide adult leadership (Muller and Ellison, 2001). Such activities also help improve adolescents' self-discipline (Mathison, 2001)

Parental involvement as a source of social capital is also promoted by religious involvement. Religious institutions provide family advice on issues related to parenting and family problems through classes and seminars (Ellison, Bartkowski and Segal, 1996; Wilcox, 1998). In addition, such institutions like churches provide family support activities that help strengthen family relationships and hence increase interactions between parents and children (Caldwell, Green and Billingsley, 1992; McAdoo and Crawford, 1990; Pearce and Axinn, 1998).

Peers friendship is also considered as a form of social capital that could be enhanced through religious involvement. In that sense, religious institutions offer a setting in which young people can build friendships with peers of similar backgrounds and values (Brownfield and Sorenson, 1991; Burkett, 1993; Feld, 1981; McPherson, Smith-Lovin and Cook, 2001; Stark, 1996). Such relationships are thought to enhance adolescents' educational outcomes (Crosnoe, Cavanagh and Elder, 2003) through reinforcing values and aspirations, where religious involvement facilitates building and maintaining social ties with peers who share both good school and social values and goals (Brownfield and Sorenson 1991; Freeman, 1985; Muller and Ellison 2001). Peer friendship also improves outcomes by discouraging deviant behaviour (Muller and Ellison, 2001) and reducing the possibility of interacting with young people with adverse behaviours (Gorsuch, 1995).

Participation in extracurricular activities (or as Barrett (2010) defines as cultural capital) mediates the impact of religiosity on educational outcomes by helping adolescents gain community and leadership skills and coping skills; among others (Dance, 2002; Lam, 2002; Liu, et al., 1998; Regnerus, 2000; Smith, 2003; Wuthnow, 1999). Through religious involvement adolescents gain more community interaction life and leadership skills that could be easily transferred and reflected in their educational behaviours and interactions in classrooms, study groups and extracurricular activities (Smith, 2003; Tocqueville, 1969). Similarly, coping with difficulties skills gained through religious involvement in the form of prayer, meditation, confession, forgiveness; among others (Taylor, et al., 2000) could also influence adolescents' educational outcomes, especially those who suffer from poverty and under-resourced schools (Barrett, 2010; Balk, 1991; Shortz and Worthington, 1994).

While early research examined all types of extracurricular activities combined, or emphasized sports participation (Holland and Andre, 1987), there is no consensus on how to classify such activities and no a clear identification of which types of activities enhance which particular educational outcomes (Glanville, Sikkink and Hernandez, 2008). Nonetheless, participation in extracurricular activities generally improves both educational cognitive and affective outcomes. Cognitive outcomes included higher grades (Broh, 2002; Eccles and Barber, 1999; Eccles, et al., 2003; Marsh, 1992) and higher achievement test scores (Broh, 2002; Eccles, et al., 2003). Affective outcomes influenced specifically by sports activities included greater attachment to school (Eccles and Barber, 1999; Fredricks and Eccles, 2005) and higher educational aspirations (Marsh, 1992). In addition such participation lowered the likelihood of dropping out of school (McNeal, 1995).

Previous research suggested that a large portion of the estimated effects of religiosity on academic progress was explained by family and community social capital (Muller and Ellison, 2001). Similarly, parental religiosity is linked to higher parental involvement in family interactions, which in turn promotes pro-family attitudes and religious family values that influences children's educational outcomes (Brody, Stoneman and Flor, 1996).

A number of empirical studies have tried to investigate the social capital mechanisms in explaining the relationship between religiosity and students' educational outcomes. Nevertheless, there has not been a consensus about more clear routes through which one can explain such relationship. Although, researchers could not specify the exact links between the two, some have indicated that at least some part of religiosity in the form of churchgoing effect has an actual causal impact, where background factors were found to

have incomparable impacts on behaviours and outcomes examined such as time allocation, going to school and work activity (Freeman, 1985). That is, the impact of religiosity is not due to adolescents' good attitude resulting from going to church nor is it due to some students having better background factors than others.

The impact of social capital accounted for only a small portion of the effect of religiosity on academic progress (Glanville, Sikkink and Hernandez, 2008). Incorporating the ethnicity dimension into the role of social capital in explaining the gap in adolescents' educational outcomes across different levels of religiosity indicated that such role vary among ethnicities. Controlling for social capital and key demographic variables such as gender and socioeconomic status wiped out the statistical significance of religiosity as a predictor of positive educational outcomes among White students unlike the case of Black students as such religiosity remained the most effective predictor. Accordingly, there could be other mechanisms through which religiosity influences students' educational outcomes (Barrett, 2009).

Other Demand Side Mechanisms

Factors such as fertility (number of siblings), family structure and mother's employment were found to mediate the effect of religion on students' educational outcomes (Lehrer, 1995; 2004b; 2009; Sander, 1992). For examples, Jew students usually live in small families (Della Pergolla, 1980; Goldscheider, 1967) with abundant maternal time, especially in early years of children's education (Chiswick, 1986), which leads to a demand curve that is further to the right and thus more schooling and higher marginal rates of return to education (Chiswick, 1988; Hartman and Hartman, 1996; Lehrer, 1999). In addition, Judaism emphasizes the importance of reading and analysis, which again leads to more demand for education (Chiswick, 1999).

Fertility plays a role in determining the quality of children in general and their educational outcomes in particular (Becker, 1981; Blake, 1981), where it has been shown that there is a negative association between fertility and children's outcomes. Such negative relationship is attributed to the negative relationship between fertility and resources availability and allocation among children in terms of both income and time, which leads to less investment in children's education (Chiswick, 1988; Lenski, 1963). Although, previous studies have indicated that low fertility of Jews improves their children's outcomes, there has been a lack of clear conclusion on the effect of fertility among Catholics (Janssen and Hauser, 1981; Westoff and Jones, 1979).

Certain religious affiliations and the level of religious involvement associated with them could affect children's' educational outcomes through their effect on the family structure condition. For example, conservative Protestants have relatively low levels of schooling and early entry into marriage, both of which are associated with unstable unions and high divorce rates (Cherlin, 2009; Lehrer 2003; Lesthaege and Neidert, 2006). On the contrary, Jews tend to have more stable marriages (Bumpass and Sweet, 1972). However, family structure had only a marginal difference across structures (Freeman, 1985).

Religion affects children's educational outcome through its effect on maternal time availability which is associated in turn with employment. Hence, mother's employment tends to mediate the effect of religion on children's educational outcomes (Lehrer, 1995; Sander, 1992). For example, exclusivist Protestants have the least egalitarian attitude towards women employment (Heaton and Cornwall, 1989; Lehrer, 1995). This could positively increase maternal time availability (Lehrer, 1995) but could also be offset with the high fertility rate common among them (Heaton and Goodman, 1985; Lehrer, 1996; Marcum, 1981). Also, Jews tend to have higher educational outcomes as their mothers are less likely to be employed especially during their early childhood (Chiswick, 1986; 1989).

The effect of religion on women employment in general is mediated by what is known as the bargaining effect between spouses with different religious affiliations and/or religious involvement levels regarding division of labour or more specifically women employment. Another mediator is the effect of intermarriages on marital breakup, where such marriages tend to be less stable reducing incentives to invest in children's human capital (Becker, Landes and Michael, 1977; Chiswick and Lehrer, 1991) and also increasing incentives for women to work to overcome the potential adverse effects of possible divorce (Greene and Quester, 1982; Johnson and Skinner, 1986).

A more important demand side factor is parents' encouragement towards education. This factor could mediate the effect of religion through its effect on children's productivity (Lehrer, 1999). For instance, conservative Protestant parents often discourage their children from taking college preparatory courses, out of a concern that such courses may be harmful to them, thus leading children to have a demand curve further to the left with less schooling and lower productivity (Darnell and Sherkat, 1997; 2004a; Sherket and Darnell, 1999).

In an economic framework, some studies have investigated the role of two mechanisms in the broader concept of utility functions in explaining the relationship between religiosity

and adolescents' education (Freeman, 1985). These are religious attitudes or motivations and labour market opportunities. Attitudes was measured in different ways by adolescent's perception of the important role of religion in his/her life, which was found to have insignificant impact on outcomes indicating that religiosity not the attitude that affects outcomes (Datcher-Loury and Loury, 1985). Labour market opportunities reflecting the perception of adolescent's about his/her success in entering the labour market were on the other hand found significant. However, both did not change the effect of neither religiosity nor the other controlled variables suggesting that other mechanisms could potentially explain the effect of religiosity (Freeman, 1985).

Some researchers tend to explain the gap in educational outcomes between religiously committed adolescents and their less religious counterparts by their economic neighbourhood effect. Some researchers have indicated that the power of religiosity in explaining such gap would be greatest for adolescents in poorer neighbourhoods (Regnerus, 2000). Likewise, after deep investigation others have showed that although adolescents in low-income neighbourhoods do not differ in their religious involvement - church attendance- patterns from their counterparts in higher-income areas, the religious commitment of the former are more likely to influence their academic progress compared to the latter (Regenrus and Elder, 2003).

4.3 Data, Econometric Method and Model Specification

The data used for the analysis in this chapter, as explained in Chapter 1, is an integrated dataset comprising a wide range of information about the child's educational and behavioural development indicators, family background factors and school factors. Below is an overview of the variables used in the analysis and for further details about each variable, please refer to Chapter 1. The analysis explains the gap in two main educational outcomes of adolescents across different religions and religiosity levels; namely cognitive outcome and affective outcome.

Adolescent's Cognitive Outcome

The analysis captures the adolescent's cognitive outcome by his/her key stage 4 total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG), which was reported around more or less the same time of wave three of the LSYPE. The analysis examines KS4 score since it reflects cumulative parental investments in the adolescent's cognitive development in terms of a good neighbourhood, high quality care and support in after-school activities or in terms of schools, which are likely to be reflected in his/her KS4

score. Also, analyzing such score is considered important since high school scores in general are usually used as good predictors of children's future outcomes such as adult earnings and completed education (Bowles and Nelson, 1994; Conlisk, 1971; Murnane, Willett and Levy, 1995).

Adolescent's Affective outcome

In general, it is known that students' attitudes towards peers, teachers, school, and learning are seen as appropriate measures of affective outcomes of schooling (Cheng, 1993; Hofman, Hofman, and Guldemond, 1999). In that framework, students' attitude towards school has been examined as one of the forms of their educational outcomes, known as affective outcome (Teddlie and Reynolds, 2000). In light of that, the analysis measures the student's affective outcome by his/her average score of attitude towards school at wave three (2005/2006) of the LSYPE (W3avatt). Specifically, the attitude score averages the answers to twelve attitudinal questions relating to how the young person feels about school (DfE, 2011d) (for more details about the questions, please refer to Chapter 1).

Given the nature of the survey design of the LSYPE explained earlier in Chapter 1, the LSYPE database has provided sampling weights to make sure any analysis would account for the survey design of each wave. Based on the statistical calculations of these weights, it is advised that depending on the mix of waves being used in the analysis, the weights controlled for should belong to the latest wave used (for more details, refer to DFE (2011a)). Accordingly, the analysis of each dependant variable is conducted using two different samples. The cognitive outcome is analyzed using a number of covariates that have been observed either at wave one or wave two, therefore the sampling weights of wave two has been used to adjust for unit non-response and the final sample size covered 2612 students. The affective outcome is observed at wave three of the LSYPE and is analyzed using a number of covariates that have been observed either at wave one or wave two, therefore it is analyzed using the sampling weights of wave three and the final sample size covered 2583 adolescents. The design of the two samples used in the analysis covered 36 strata with 575 primary sampling units.

Independent Variables

Most of the previous studies that have focused on the investigation of the effect of religiosity on educational attainments did not control for the differences between religions.

Part of this is attributed to the fact that most of these studies were mainly focusing on one religion; Christianity as it is the most prevailing religion in the regions where such studies were conducted (Coleman, Kilgore and Hoffer, 1982; Coleman and Hoffer, 1987; Freeman, 1985; Smith, 2003; among others). Additionally, their argument is that the relationship between religious involvement and educational outcomes is comparable across different religions where churches, for example, serve as agents of socialization. In addition, the interpersonal processes of building relationships and having regular religious practices regardless of the type of religion reinforce conventional attitudes toward success that are themselves conducive to achievement (Barrett, 2009; Brown and Gary, 1991; Regnerus, 2000). Nevertheless, there is a possibility that some religions are relatively more dynamic in this sense than others (Barrett, 2009).

A number of studies have shown that religion affiliation should be taken into account when studying the effect of religiosity since levels of religiosity are not uniform across religions with conservative Protestants, for example, tend to participate in church services more frequently than members of most other religious groups (Lehrer, 2004b). Also, the effect of certain religion might be distorted by the level of religiosity, for instance, conservative Protestant tend to discourage secular curricula, which implies that those with more religious involvement may have adverse effect on their educational outcomes by cancelling out the positive effect of being more religiously involved (Lehrer, 2009; Waite and Lehrer, 2003). However, it was shown that the positive effect could cancel out the negative one (Lehrer, 2004a).

Religion

In order to examine the gap between educational outcomes of adolescents across religions and levels of religiosity, the analysis started by investigating the differential effects across religions. There are many possible definitions of religious affiliation, ranging from very general to very detailed. The religions identified in the dataset as described in Chapter 1 are Christian, Buddhist, Hindu, Jewish, Muslim, Sikh, and another religion. In that regard, it is important to mention that the LSYPE provides information about the religion of the young person, the main parent and the second parent. However, prior investigation of the religion variables has indicated that the religion of the young person recorded is not necessarily similar to that of the main parent or the second parent. Accordingly, the analysis captures the religion of the young person where it is similar to that of the main parent. The choice of the main parent as the identification person is based on the fact that

he/she is identified as the main reference person for the household in the survey and also because the cases where the second parent provides information tend to be very small.

Religiosity

The choice of the religiosity variable has varied among studies. Some researchers have used frequency of attending religious activities (Barrett, 2009; Gruber, 2005; Lehrer, 2004a; Mullar and Ellison, 2001), while others used the variable indicating whether the adolescent think of him/herself as religious (Mullar and Ellison, 2001). Most researchers prefer to use the attendance aspect as the key measure of religiosity compared to the importance of religion measure since the former usually exhibits the most stable relationship with educational outcomes (Regnerus, 2000; Regnerus and Elder, 2003; Mullar and Ellison, 2001). Moreover, the use of attendance plays a stronger role in building human, social and cultural capital rather than only thinking that religion itself is important (Glanville, Sikkink and Hernandez, 2008; Iannaccone, 1990). Consequently, one can say that using the frequency of attending religious activities as a measure would play a role in building such capital, which in turn affects the adolescent's education outcomes.

The analysis measures religiosity using an index to reflect both the attendance and the importance aspect of religion to the adolescent (Muller and Ellison, 2001). Specifically, the religiosity index captures both the importance of religion to the young person's way of life reported in both wave one and two (very important, fairly important, not very important and not at all important) and whether he/she has gone to religious classes or courses in last 12 months as reported in both wave one and two. As such, the index comprises of four variables, which were standardized (mean=0 and standard deviation=1) then summed. Given the ordering nature of the values of the four comprising variables, the values of the index report the lack of religiosity of the adolescent where higher values of the index represents more lack of religiosity. The internal consistency of the index was tested using Cronbach's and alpha indicating that the religiosity index is consistent or homogonous enough with ($\alpha = 0.72$) (please refer to eq. 2.3 in Chapter 2 for further details).

Some might think that there is some direction of causality in the opposite direction. That is, high academic achievement and positive behaviour could cause more involvement in religious practices. Although this direction of causality is possible, a number of studies controlled for this possibility and showed little or no causal relationship (Jeynes, 2010). Moreover, the current analysis used a religiosity index that was observed in a prior time (waves one and two) to the observed outcome variables (wave three). Accordingly, one can

argue that there is no likelihood for such endogeneity. Another possible problem that has been mentioned in the literature is that measures of both religious affiliation and religiosity (specifically, participation in religious activities) are entered into regressions without attention paid to the high correlation between these variables (Lehrer, 2009). Taking that into account, no such high correlation was found between the two examined variables (ρ=-0.48).

Social Capital

The main aim of the current analysis is to examine the effect of religion and religiosity on adolescents' educational outcomes. In order to do that, the analysis examines social capital as a possible demand-side mechanism that may explain such influences. As mentioned earlier, Coleman was clear that social capital is a resource inherent in social relationships rather than one that could be held by an individual, although the benefits could accrue to an individual (Coleman 1988; 1990b). The following analysis operationalises social capital as individual-level rather than group-level attributes, similar to Coleman's operationalisation (Coleman 1987; 1988; 1990b) and Muller and Ellison (2001), which represents a deviation from a strict interpretation of the concept.

Using Putnam (2002) index framework to measure social capital, six main categories of measures have been fully or partially incorporated (Barrett, 2009; Muller and Ellison, 2001) to indicate adolescent's access to social capital resources. These include measures of organizational life, engagement in public affairs, volunteerism, informal sociability, social trust and parental educational involvement. To illustrate, organizational life of the adolescent is measured dichotomously indicating any level of participation (Broh 2002; Eccles et al. 2003; Darling 2005), using whether he/she has gone to a youth club or similar (including scouts or girl guides) in last 4 weeks reported in wave two. In that framework, it was shown that membership in multiple organizations within the school, rather than just one particular type or another, likely provides additional access to social capital (Eccles, et al. 2003; Fredricks and Eccles, 2005; Glanville, Sikkink and Hernandez, 2008).

Engagement in public affairs is measured by whether the young person has gone to a political meeting, march, demonstration, or rally in last 4 weeks reported in wave two. Volunteerism is measured by whether he/she has done community work in last 4 weeks reported in wave two. Informal sociability is measured by how many times YP had friends round to house in last 7 days (1: none, 2: once or twice, 3: 3-5 times, 4: 6 or more times)

reported in wave two. Social trust should reflect how the adolescent perceive others and is measured by how much it matters to him/her in deciding on a job to have a job where he/she helps other people (1: matters a lot to me, 2: matters a little to me, 3: doesn't matter) reported in wave one. Finally, parental involvement is measured using whether the main parent had any specially arranged meetings with teachers about the young person's schooling reported in wave two (Barrett, 2009; Muller and Ellison, 2001).

Accounting for Other Covariates

Previous research has indicated that certain control variables should be accounted for since they were found to be influential when explaining the relationship between religion and religiosity on one hand and students' educational outcomes on the other. These include the employment of members in the family and the status of welfare support, unlike family structure that had only a marginal effect (Freeman, 1985). Accordingly, the analysis controls for the main parent's occupation[23] at wave two and for the status of welfare measured by whether at least one benefit was received by the main and/or the second parent at wave two. Family structure is also controlled for using family structure variable at wave two[24].

Family income is controlled for using the mean family income from work, benefits, and anything else over waves one and two adjusted for the family size at wave two. In addition, the analysis controls for other socio-demographic variables including the family education level measured at wave two, the urban/rural indicator at wave two and the IDACI deprivation index reported in 2005/2006. Moreover, given the possible difference in the religion of the main parent and second parent, the analysis controls for a dummy variable for the existence of such difference.

To avoid the bias that religious participation has a larger influence than it actually does, several other variables that are likely to be related to both religiosity and educational outcomes are controlled for (Regnerus and Elder, 2003). For instance, adolescents with a better self-image may be more likely to participate in social activities, such as religious services, and they may also do better in school (Glanville, Sikkink and Hernandez, 2008). Accordingly, the analysis controlled for *adolescent's self-image* using a variable for how useful the young person has felt recently (W2). Moreover, labour market opportunities

[23] The choice of the main parent as the identification person is based on the fact that he/she is identified as the main reference person for the household in the survey and also because the cases where the second parent provides information tend to be very small.

[24] The family structure variable used in the analysis follows the same definition of that used in Chapter 1.

reflected in his/her *perception of future success*, such as getting a job (Freeman, 1985) is also suggested to explain the gap in their outcomes across different levels of their religiosity. Therefore, the analysis controls for the adolescent's agreement with the statements about success: even if I do well at school, I will have a hard time getting the right kind of job (W2).

Adolescent's bad behaviour could also be related to both religiosity and educational outcomes (Glanville, Sikkink and Hernandez, 2008). To explain, the time spent by adolescents in religious activities and social settings may simply crowd out the effect of other factors, thereby reducing the opportunity for adolescents to become involved in more behavioural risky activities. Furthermore, some studies show that adolescents with dangerous risky behaviours may avoid religious involvement at a relatively early age (Cochran, Wood, and Arneklev, 1994). In that context, if some adolescents tend to have negative attitude towards religion, then the apparent religious variations in cognitive and affective outcomes may reflect unobserved selection processes (Muller and Ellison, 2001). Consequently, a variable measuring risk factor is controlled for using the number of risk factors the young person has experienced in last 12 months, such as drinking alcohol, smoking cigarettes, shoplifting, etc (W2).

The analysis controls for the adolescent's academic self-schema, where theorization of the concept defines it as child's cognitive generalization of their past achievements, including learning experiences which affect his/her cognitive, affective and behavioural responses to learning (Finn, 1989; Markus, 1977). In light of that, students with positive academic self-schema are more likely to have confidence in their ability to achieve, they value education more and they see the process of educational attainment as more positive and rewarding (Gamoran, 1987; Plucker, 1998; Muller and Ellison, 2001; Stevenson, Schiller and Schneider, 1994; Trusty, 1998; Useem, 1992). In this context, the estimation measures the adolescent's academic self-schema by both his/her prior cognitive outcome in key stage 3 average point score and his/her likelihood of applying to university reported at W2.

The analysis controls also for several basic adolescent's attributes, such as ethnicity, gender and age (Barrett, 2009; Glanville, Sikkink and Hernandez, 2008; Lehrer, 1999; 2004a; Muller and Ellison, 2001). An indicator of general health reported at wave one of the LSYPE (whether or not the child has a long-standing physical or mental impairment, illness or disability) is included to control for the potential effects of disability or poor health on his/her future outcome. Finally, the analysis controls for school effect using two variables: whether the young person attended a maintained or independent school at wave

1 and an overall teacher index reflecting the adolescent's perception of his/her teachers (refer to Chapter 2 for further details).

4.3.1 Econometric Method and Model Specification

Following the same statistical approach employed in Chapter 2, Chapter 4 uses Chapter 3 uses a negative binomial regression model to examine the influence of family structure on adolescents' educational cognitive outcome and an ordinal logit model to examine the affective outcome[25]. Based on the theoretical framework explained earlier, the analysis examines the effect of both religious affiliation and religiosity on the two outcome variables; KS4 score and attitude towards school controlling for school context and student's inputs and how such effect could be mediated by social capital.

It is important to mention here, as explained earlier in Chapter 1, that the KS4 score was reported around more or less the same time of wave three of the LSYPE. Specifically, wave three field work ran from the 21st of April 2006 to 28th of September 2006, asking for information about the previous year (April/September 2005 - April/September 2006) (DfE, 2011a). On the other hand, KS4 GCSE exam either ran in January 2006, March 2006, summer 2006 or November 2006. This implies that in some cases using wave three variables as predictors for KS4 outcome may not be valid because students were asked for such information after their exam was taken already (like in January) which could be misleading. Accordingly, and since the data does not provide that level of detailed information about when students took their exam exactly, the predictors used are mainly derived from wave one or two of the LSYPE. Moreover, in order to be consistent throughout the analysis, the approach was used when examining the affective outcome.

Specifically, the analysis examines cognitive outcome via the model defined in eq. (4.2) and affective outcome via the model defined in eq. (4.3)

$$\ln(\mu(o)_{it}) = \alpha + \gamma \mathrm{R}_i + \lambda RI_{i,t-1,t-2} + \sum_M \eta_M SC_{Mi,t-1} + \sum_N \beta_N (X_{i,t-1} + X_{i,t-2}) + \sum_L \zeta_L (S_{i,t-2} + S_{i,t-1,t-2}) + \varepsilon_i \quad (4.2)$$

[25] For more details see figures E.1 and E.3 in appendix E.

$$\ln(\mu(af)_{it}/1-\mu(af)_{it}) = \alpha + \gamma \mathrm{R}_i + \lambda RI_{i,t-1,t-2} + \sum_M \eta_M SC_{Mi,t-1} + \sum_N \beta_N (X_{i,t-1} + X_{i,t-2}) + \sum_L \zeta_L (S_{i,t-2} + S_{i,t-1,t-2}) + \varepsilon_i \quad (4.3)$$

where $\mu(co)_{it}$ represents the expected value of the *co*gnitive outcome variable and $\mu(af)_{it}$ represents the expected value of the *af*fective outcome variable measured at time *t* corresponding to year 2005/2006 around wave three of the LSYPE, R_i is the religion of the adolescent, $RI_{i,t-1,t-2}$ is the religiosity index constructed by a mix of variables measured at both wave one (*t-2*) and wave two (*t-1*)), SC_i are (M=6) social capital variables measured at wave two (*t-1*), X_{Ni} (N=17) are student's input variables measured at either wave one (*t-2*) or wave two (*t*-1), and finally S_{Li} (L=2) are the school variables; one representing a dummy for whether the school attended at wave one (*t*-2) was an independent or maintained school, and the other represents the teacher influence index (constructed by a mix of variables measured at both wave one (*t-2*) and wave two (*t-1*)).

The models specified in the previous equations indicate that all independent variables except one were reported at a time period prior to that when the dependent variables were reported, thus one can argue to an extent that it is less likely to suffer from an endogeneity problem. However, a counter argument could be that the use of one or two lagged term independent variables may not necessarily overcome the endogeneity problem. In response to that a differentiation is made between the main independent variables of interest (religious affiliation and religiosity) and the other additional covariates in the model.

Starting with the main independent variables of interest that are both religious affiliation and religiosity, one can assume that they are more likely to be exogenous based on a number of reasons. First, the previously reviewed literature in section 4.2 has indicated that both religious affiliation and religiosity variables are more likely to be the one affecting adolescents' outcomes rather than the other way around (Glanville, Sikkink and Hernandez, 2008; Lehrer, 1999; 2004a, 2004b; 2009; Sander, 1992; Smith, 2003). Second, even if there is a possibility for a reverse relationship implying that adolescents' outcomes could affect their religiosity, one would expect that such reverse relationship would take place if the adolescent's outcome was measured before observing his/her religiosity level, which is not the case here. Additionally, if that was the case one might expect it to take a

longer time to reveal. That is, the adolescent's level of religiosity might not necessarily change just after a year or few years of a certain adolescent's outcome. Moreover, a number of studies controlled for this possibility and showed little or no causal relationship (Jeynes, 2010). In that logic and given the nature of the data used in the analysis where both the outcome on one hand and the religiosity index on the other are contemporaneous, one can assume that such reverse relationship is less likely to hold.

As for the rest of the additional covariates used in the model, one can argue that some of these variables could suffer from an endogeneity problem despite the lagged term. However, a number of justifications could yet be provided. First, the use of these variables as controls or even mediators has been supported by the literature. To mention a few; family socioeconomic status by (Ven Ploeg, 2013); parents' occupation and income by (Duncan and Brooks-Gunn, 1997; Hill and Duncan 1987; Krein and Belier 1988; Martin, 2012; McLanahan 1983, 1985; Shaw, 1982); neighbourhood effect by (Bowen, et al., 2008; Teachman and Paasch, 1998), which is the one variable reported at the same time point as the outcome variable and is measured by the income deprivation index, which could likely be considered exogenous since one could assume that it is not expected that the educational outcome of one adolescent measured in the model is likely to cause the deprivation index of the entire neighbourhood where the adolescent live to be high or low. Other variables that could be argued to be endogenous include organizational life examined by (Broh 2002; Eccles et al. 2003; Darling 2005); parental involvement by (Barrett, 2009; Muller and Ellison, 2001); status of welfare support and his/her perception of future success by (Freeman, 1985); adolescent's self-image and risk factor by (Glanville, Sikkink and Hernandez, 2008; Muller and Ellison, 2001). Second, these variables are known as extraneous or confounding variables that need to be controlled for in order to avoid any biased results (Kish, 1959; Vandenbroucke, 2004). Third, even if one does not control for these confounding variables, it is likely to lead to an omission bias that could be another source of endogeneity.

In light of the previous arguments, one can state that since these confounding variables are not the main variable of interest in the model, the study does not attempt or claim to solve their potential endogeneity. Having said that, the analysis acknowledges the limitations caused by such endogeneity. As such and since the exogeneity assumption is often violated, yet to widely varying degrees, in the analysis of educational production functions, as in most other areas of empirical economic research, what one learns about important

relationships is not devoid of meaning; however, attributing causality to the estimates should be done with extreme caution. Accordingly, the following findings of the models do not claim such causality, rather they explain the association between religious affiliation and religiosity on one hand and adolescent's outcome on the other controlling for other confounding covariates. Lastly, it is worth noting that as with the related literatures on educational production function studies, such functions are not completely known and must be estimated using imperfect data, which makes any estimates subject to considerable uncertainty (Hanushek, 1986) and unassailable estimates of causal relationships explaining the underlying process are not yet attainable (Haveman and Wolfe, 1995).

4.4 Findings

Before explaining the findings of each educational outcome, the analysis examined the possible correlation between all variables across all model specifications and there is no high correlation problem detected between any two independent variables involved in the same model (see tables E.1 and E.2 in appendix E).

The analysis starts with examining first the relationship between religiosity and social capital because it is expected that religiosity contributes to the social capital available to the adolescent. Given the nature of the dependent variables logistic regression is used to investigate binary responses (organizational life, engagement in public affairs, volunteerism, and parental involvement,) while ordered logistic regression is used to investigate ordered response (informal sociability). The regressions adjust for the survey design and weights reported for both wave two and wave three as has been explained in the data section. However, it is important to mention that due to possible collinearity, the final samples used in these regressions are slightly smaller than the original estimation samples of both cognitive and affective outcomes. In that regard, it is important to mention that the sixth measure of social capital (social trust) has not been examined here since it was reported in wave one, while the religiosity index (and most of the control variables) was reported in waves one and/or two.

Indeed, religiosity is clearly associated with social capital (Muller and Ellison, 201), as shown in table (4.1). Adolescents who are more religiously involved and have more beliefs in the importance of their religion tend to engage in more activities in their organizational life, have more engagement in public affairs, and tend to volunteer more in community work. Moreover, such high religiosity is also associated with lower levels of informal

sociability, where the adolescents tend to have their friends around their homes much less than those who are less religious. This, however, may not necessarily imply that being more religious adversely affect the adolescent's informal social life. One possible explanation could be that he/she prefers other forms of sociability, which could be supported by the previous findings that he/she has better access to the other social capital resources available. Moreover, religiosity is significantly associated with parental involvement in school life, which may suggest that religiosity in general may have a significant influence on how parents become involved in their children school life.

Table 4.1: Religiosity Influence on Social Capital (Odds Ratio)

	Organizational Life	Engagement in public affairs	Volunteerism	Informal sociability	Parental involvement
VARIABLE	(Cognitive Outcome)				
Religiosity	0.832***	0.841***	0.873***	1.042***	0.959*
	(0.0182)	(0.0484)	(0.0322)	(0.0175)	(0.0239)
	(Affective Outcome)				
Religiosity	0.833***	0.838***	0.876***	1.047*	0.958*
	(0.0182)	(0.0491)	(0.0323)	(0.0179)	(0.0241)

Note: all models controls for main parent's SEC class, family income, IDACI score, receipt of benefit status, family structure, urban/rural indicator, highest education level in the family, possible religion difference between the MP and the SP, KS3 score, likelihood to apply to university, ethnicity, gender, disability, age, self-image, risk factor, perception of future success, independent/maintained school and overall teacher index.
Standard error (Eform) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Now the analysis turns to investigating the relationship between religion, religiosity and social capital on one hand and educational outcomes on the other. It is expected that such relationship is likely to differ depending on the outcome examined (Coleman, 1987). The interest here is to examine whether religious affiliation and religiosity are associated such outcomes and how social capital can help explain such associations.

4.4.1 Adolescent's Cognitive Outcome

Table (4.2) provides descriptive statistics for the variables examined in the *estimation sample* of the cognitive outcome analysis covering 2612 adolescents. On average, the levels of religiosity tend to be moderately low in the sample. Similarly, levels of social capital measures of organizational life, engagement in public affairs, volunteerism, and parental involvement tend to be low, while those of informal sociability and social trust tend to be more or less around their averages.

Table 4.2: Descriptive Statistics of the Cognitive Outcome Model Variables

VARIABLES	Mean	Std. Dev.	Min	Max
KS4 point score	419.690	133.969	0	886
Young person's religion	2.878	1.662	2	8
Religiosity index ($\alpha = 0.72$)	0.366	3.056	-6.202	4.544
Organizational Life	0.202	0.402	0	1
Engagement in public affairs	0.020	0.140	0	1
Volunteerism	0.063	0.243	0	1
Informal sociability	1.851	0.890	1	4
Social trust	1.711	0.633	1	3
Parental involvement	0.199	0.400	0	1
Independent/maintained school	0.001	0.034	0	1
Overall teacher index ($\alpha = 0.71$)	1.600	10.855	-39.636	38.472
MP's NS-SEC class	4.092	2.150	1	8
Mean income (Z)	0.072	0.914	-0.893	9.675
IDACI score (Z)	-0.272	0.905	-1.291	3.823
Whether the parents receive benefit	0.989	0.105	0	1
Urban/Rural Indicator	5.246	0.784	1	8
Family structure	1.052	0.228	1	4
Religion difference between MP/SP	0.891	0.312	0	1
Highest qualification of family	3.181	1.816	1	7
KS3 score (Z)	0.352	0.896	-2.739	2.267
Likelihood of the young person applying to university	3.098	0.948	1	4
Adolescent's self-image	1.890	0.593	1	4
Adolescent's risk factor (Z)	-0.158	0.884	-0.732	4.058
Adolescent's perception of future success	2.631	0.766	1	4
Young person's ethnicity	2.018	1.829	1	8
Gender	1.487	0.500	1	2
Whether young person has disability	1.877	0.329	1	2
Young person's age when started KS4	15	0.039	14	16

The analysis first investigates the relationship between religious affiliation and cognitive outcome showing that generally following a certain religion is likely to affect such outcome. Indeed, as shown in model (1) in table (4.3), Buddhist, Muslims and Sikh adolescents are likely to have significantly higher expected value of KS4 score by 26% for the first and 12% for the other two religions compared to Christian adolescents. Even after introducing religiosity to the model (2), these three religions are still significantly improving adolescents' cognitive outcome with no change in their magnitudes[26]. Such high likelihood could be due to the religious conditions faced by Muslim students, for example, in terms of their social life activities that are to some extent different from Christians. Moreover, the former are raised up in a way that emphasizes how having a good character is the most important part of being righteous (Mah, O'Neill and Chapma, 2012). Due to such conditions, Muslim students tend to have much less exposure to drinking problems or similar kind of problems that students generally face in their teenagehood.

Another reason for the favourable performance of Buddhist, Muslim and Sikh adolescents is that they are likely to have more profound discipline beliefs in respecting their parents and committing to their parents' attitudes towards their education, who in most of the cases give high importance to their children education and the desire of having better outcomes. This parental attitude is very dominant in Muslim families that believe in the importance of education as a possible success resulting from more religious involvement especially in a non-Muslim dominated society (Mah, O'Neill and Chapma, 2012). However, the empirical evidence to support such argument is very limited as in the case of examining Muslim parenting practices in western societies (Beshir and Beshir, 2000; Mah, O'Neill and Chapma, 2012; Tarazi, 1995). Furthermore, one can say that most of these adolescents' families are immigrants to England, even if they were born there. Such situation affects their attitudes towards education, where they tend to be more determined to have high outcomes in order to have more financially secured future in terms of job and income and also to feel the success of being a productive member in a religiously different majority

[26] The negative impact of the Jewish affiliation on cognitive outcome in model (1) does not match the expected impact reported in most literature. In order to explain such negativity a set of regressions (not reported here) were estimated starting with a bivariate regression of religion and cognitive outcome revealing a significant positive impact. However, once the set of controls are introduced to the model such impact becomes negative and insignificant (as shown in model (1)). Nevertheless, running model (1) after removing the three variables of self image, risk factor and future prospects indicated an insignificant positive impact of being Jewish. Accordingly, one could suggest that these behavioural factors could explain to an extent the change in the sign of the impact on cognitive outcome. Another adjustment was made to model (1) by removing instead the effect of the socioeconomic status measured by the main parent SEC class and family income variables showing that being Jewish still has an insignificant negative impact on cognitive outcome. Hence, it can also be argued that the effect of being Jewish is conditional on other covariates and the socioeconomic status does not mediate such effect.

society (Duderija, 2007; Mah, O'Neill and Chapma, 2012; Portes and Zhou, 1993). Having said that, the same model shows that religiosity though as expected is having a favourable influence on cognitive outcome, yet such influence is unexpectedly statistically insignificant. Hence, one could suggest that the effects of these religions are capturing possible cultural differences that may not be related to religiosity or the religiosity of the parents themselves. In order to investigate the possible explanations for these findings, social capital is introduced in model (3).

Table 4.3: Religion and Religiosity Influence on Cognitive Outcome

VARIABLES	(1) IRR	(2) IRR	(3) IRR
Young person's religion (reference level: Christian)			
Buddhist	1.255**	1.253**	1.239**
	(0.125)	(0.125)	(0.119)
Hindu	1.050	1.051	1.056
	(0.0511)	(0.0513)	(0.0515)
Jewish	0.992	0.990	0.999
	(0.0511)	(0.0510)	(0.0548)
Muslim	1.124**	1.122**	1.117**
	(0.0623)	(0.0632)	(0.0621)
Sikh	1.121**	1.121**	1.125**
	(0.0597)	(0.0597)	(0.0609)
Another religion	1.137	1.137	1.141*
	(0.0899)	(0.0896)	(0.0909)
Religiosity index		0.999	0.999
		(0.00210)	(0.00223)
Organizational Life			1.003
			(0.0151)
Engagement in public affairs			1.026
			(0.0332)
Volunteerism			1.015
			(0.0248)
Informal sociability (reference level: 6 or more times)			
None			0.997
			(0.0357)
once or twice			0.997
			(0.0397)
3-5 times			0.996
			(0.0348)
Social Trust (reference level: matters a lot to me)			
matters a little to me			0.991
			(0.0147)
doesn't matter			0.959*
			(0.0218)
Parental involvement			0.942***
			(0.0173)
KS3 score (Z)	1.411***	1.411***	1.407***
	(0.0327)	(0.0328)	(0.0323)
Likelihood of the young person applying to university (reference level: very likely)			
Not at all likely	0.892***	0.893***	0.892***
	(0.0282)	(0.0283)	(0.0285)

Not very likely	0.978	0.979	0.976
	(0.0182)	(0.0182)	(0.0183)
Fairly likely	1.021	1.021	1.020
	(0.0142)	(0.0142)	(0.0140)
Young person's ethnicity (reference level: White)			
Mixed	1.051	1.050	1.049
	(0.0433)	(0.0436)	(0.0441)
Indian	1.007	1.004	0.997
	(0.0476)	(0.0482)	(0.0476)
Pakistani	0.943	0.940	0.944
	(0.0555)	(0.0555)	(0.0550)
Bangladeshi	1.017	1.015	1.015
	(0.0680)	(0.0679)	(0.0679)
Black Caribbean	1.037	1.034	1.043
	(0.0444)	(0.0444)	(0.0439)
Black African	1.132***	1.128***	1.128***
	(0.0453)	(0.0468)	(0.0472)
Other	1.045	1.043	1.045
	(0.0713)	(0.0712)	(0.0702)
Female	1.069***	1.069***	1.060***
	(0.0136)	(0.0136)	(0.0137)
Adolescent's self-image (reference level: more than usual)			
Same as usual	0.989	0.989	0.988
	(0.0154)	(0.0154)	(0.0156)
Less useful than usual	0.940**	0.940**	0.940**
	(0.0280)	(0.0280)	(0.0282)
Much less useful	0.974	0.975	0.973
	(0.0533)	(0.0533)	(0.0526)
Adolescent's risk factor (Z)	0.962***	0.962***	0.966***
	(0.00819)	(0.00818)	(0.00823)
Adolescent's perception of future success (reference level: strongly agree)			
Agree	1.032	1.032	1.035
	(0.0321)	(0.0320)	(0.0321)
Disagree	1.028	1.027	1.030
	(0.0283)	(0.0283)	(0.0284)
Strongly disagree	1.020	1.020	1.022
	(0.0326)	(0.0326)	(0.0327)
Whether the parents receive benefit (reference level: no)	1.047	1.047	1.037
	(0.0571)	(0.0571)	(0.0605)
Urban/Rural Indicator (reference level: Urban-sparse)			
Town & Fringe-sparse	1.167***	1.169***	1.158***
	(0.0659)	(0.0657)	(0.0652)
Village-sparse	1.178*	1.178*	1.149
	(0.106)	(0.106)	(0.105)
Hamlet and Isolated Dwelling-sparse	1.073	1.074	1.062
	(0.0715)	(0.0715)	(0.0758)
Urban-less sparse	1.120***	1.121***	1.114***
	(0.0308)	(0.0305)	(0.0348)
Town & Fringe-less sparse	1.103***	1.104***	1.097***
	(0.0264)	(0.0263)	(0.0287)
Village-less sparse	1.131***	1.132***	1.123***
	(0.0394)	(0.0391)	(0.0419)
Hamlet & Isolated Dwelling-less sparse	1.172***	1.173***	1.165***
	(0.0568)	(0.0564)	(0.0580)

Religion difference between MP/SP (reference level: no)	1.002	1.001	1.000
	(0.0189)	(0.0189)	(0.0190)
Constant	5.621e+06**	5.584e+06**	5.460e+06**
	(3.633e+07)	(3.615e+07)	(3.606e+07)

All models control for main parent's SEC class, family income, IDACI score, family structure, highest education level in the family, gender, disability, age, independent/maintained school and overall teacher index (see table E.3 in appendix E for the reported values).
Standard error (Eform) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The introduction of social capital shows that similar to earlier findings, Buddhist, Muslims, Sikh adolescents and those following another religion still have significantly higher cognitive outcome than Christians. This implies that religious affiliation has indeed an independent effect on such outcome (Bryk, et al., 1993; Coleman and Hoffer, 1987; Darnell and Sherkat, 1997). In light of that, social capital is found to generally have positive impact on cognitive outcome although only social trust and parental involvement are found to have a significant impact (Coleman, 1988; 1990b; Muller and Ellison, 2001). Specifically, adolescents with the lowest level of social trust (i.e. those whom it doesn't matter to them in deciding on a job to have one where he/she helps other people) are likely to have lower KS4 score by almost 4% compared to those with the highest level of social trust. On the other hand, adolescents whose parents had any special meetings with their teachers regarding their schooling are also likely to have lower score by almost 6% than those who had not. Although this may suggest that parental involvement may have adverse impact on cognitive outcome, it could rather imply that attending such special meetings may suggest possible adverse condition faced by the student, which in turn could explain his/her lower score. Indeed, it is shown that one standard deviation increase in the risk factor is significantly associated with almost 3% reduction in the expected value of KS4 score (Muller and Ellison, 2001). As for the effect of religiosity it still has an insignificant favourable impact on cognitive outcome after introducing social capital. This in turn may suggest that other mechanism(s) in the model could be mediating the effect of religiosity[27].

[27] In order to test this assumption, a fourth model (not reported here) was tested by removing the effect of academic self-schema measured by both prior attainment in KS3 and the adolescent's likelihood of applying to university, which are both found to have a significant impact on cognitive outcome. Three main findings could be drawn from the removal of academic self-schema. First, religious affiliation clearly loses its significance except for Hindu adolescents implying that its effect is conditional on controlling for the adolescent's academic self schema. Second, religiosity starts to have a modest significant favourable impact on cognitive outcome (Muller and Ellison, 2001), where one standard deviation deterioration in such religiosity is associated with around 2% decrease in cognitive outcome. Third, despite the small magnitude of religiosity, one could hardly notice any change in such magnitude with and without controlling for academic self schema. This may indicate that academic self-schema could be a possible mechanism to explain the effect of religiosity rather than social capital. Removing the effect of academic self-schema has also changed the significance of social capital, where it is found that all measures of social capital have now a significant impact on cognitive outcome except for organizational life and engagement in public affairs.

It is worth mentioning in the framework of model (3) controlling for social capital that some of the remaining variables reveal some interesting findings in explaining the variation in cognitive outcome. To demonstrate, girls tend to perform better than boys. Moreover, the urbanization indicator of where the adolescent live has a significant positive impact on his/her outcome across most urban/rural areas compared to urban-sparse areas. This might suggest that living away from the main urban areas could actually enhance the outcome of adolescents by likely keeping them away from more intensive distracting environment that is likely to exist in major urban areas. Also, adolescents from most ethnicities tend to perform better in their KS4 exams than White adolescents, however; only Black African adolescents tend to perform significantly better.

The findings also reveal that generally receiving a benefit does not significantly affect the cognitive outcome of the family adolescents. The same applies for whether there is a difference in the religious affiliation of both the main parent and the second parent, implying that such difference has no effect on outcome. Nevertheless, the adolescent's self image of how useful he/she is indicates a favourable significant impact of such image on his/her cognitive outcome (Glanville, Sikkink and Hernandez, 2008), whereas the perception of his/her future success does not have such significant impact.

The rest of the adolescent's and family demographic variables are used in the analysis primarily as a ''noise reduction'' strategy when examining the relationship between religion and religiosity on one hand and the two school outcomes on the other and how social capital mediates such relationship. Consequently, no specific expectations are offered about how these variables may have influenced the dependent outcomes.

4.4.2 Adolescent's Affective Outcome

Table (4.4) provides descriptive statistics for the variables examined in the *estimation sample* of the cognitive outcome analysis covering 2583 adolescents. Similar to the cognitive outcome sample, on average, the levels of religiosity tend to be moderately low in the affective outcome sample. Similarly, levels of social capital measures of organizational life, engagement in public affairs, volunteerism, and parental involvement tend to be low, while those of informal sociability and social trust tend to be more or less around their averages.

Table 4.4: Descriptive Statistics of the Affective Outcome Model Variables

VARIABLES	Mean	Std. Dev.	Min	Max
Attitude towards school	2.464	0.668	0	4
Young person's religion	2.869	1.655	2	8
Religiosity index (α = 0.72)	0.376	3.053	-6.202	4.544
Organizational Life	0.201	0.401	0	1
Engagement in public affairs	0.019	0.138	0	1
Volunteerism	0.063	0.244	0	1
Informal sociability	1.850	0.889	1	4
Social trust	1.715	0.632	1	3
Parental involvement	0.197	0.398	0	1
Independent/maintained school	0.001	0.034	0	1
Overall teacher index (α = 0.71)	1.592	10.861	-39.636	38.472
MP's NS-SEC class	4.093	2.146	1	8
Mean income (Z)	0.071	0.909	-0.893	9.675
IDACI score (Z)	-0.275	0.903	-1.291	3.823
Whether the parents receive benefit	0.989	0.105	0	1
Urban/Rural Indicator	5.246	0.785	1	8
Family structure	1.053	0.229	1	4
Religion difference between MP/SP	0.890	0.313	0	1
Highest qualification of family	3.174	1.811	1	7
KS3 score (Z)	0.354	0.894	-2.739	2.267
Likelihood of the young person applying to university	3.100	0.949	1	4
Adolescent's self-image	1.890	0.592	1	4
Adolescent's risk factor (Z)	-0.159	0.885	-0.732	4.058
Adolescent's perception of future success	2.630	0.767	1	4
Young person's ethnicity	2.012	1.829	1	8
Gender	1.487	0.500	1	2

Whether young person has disability	1.877	0.329	1	2
Young person's age when started KS4	15	0.039	14	16

Following the same analytical framework, the analysis of the affective outcome first investigates the relationship between religious affiliation and attitude towards school showing in model (1) in table (4.5) that generally following a certain religion is not likely to affect such attitude even after introducing religiosity to the model (2). This suggests that the effect of religious affiliation could be conditional on the effect of other covariates in the model that are likely to explain it. Moreover, the same model shows that religiosity as expected is having a modest favourable statistically significant influence on such attitude, where one standard deviation deterioration in such religiosity is associated with 10.6% decrease in the odds of having higher affective outcome.

Table 4.5: Religion and Religiosity Influence on Affective Outcome

VARIABLES	(1) OR	(2) OR	(3) OR
Young person's religion (reference level: Christian)			
Buddhist	0.614	0.597	0.520
	(0.536)	(0.517)	(0.465)
Hindu	1.235	1.283	1.321
	(0.671)	(0.693)	(0.713)
Jewish	1.391	1.270	1.156
	(1.078)	(0.982)	(0.906)
Muslim	0.870	0.812	0.779
	(0.354)	(0.329)	(0.322)
Sikh	1.279	1.265	1.287
	(0.733)	(0.724)	(0.735)
Another religion	0.463	0.464	0.453
	(0.295)	(0.296)	(0.287)
Religiosity index		0.964**	0.962**
		(0.0173)	(0.0181)
Organizational Life			0.860
			(0.105)
Engagement in public affairs			0.783
			(0.271)
Volunteerism			0.768
			(0.136)
Informal sociability (reference level: 6 or more times)			
None			1.289
			(0.298)
once or twice			1.393
			(0.314)
3-5 times			1.408
			(0.337)
Social Trust (reference level: matters a lot to me)			

matters a little to me			0.884
			(0.0932)
doesn't matter			0.590***
			(0.100)
Parental involvement			0.963
			(0.120)
Young person's ethnicity (reference level: White)			
Mixed	2.026**	1.940*	1.927*
	(0.720)	(0.688)	(0.705)
Indian	1.394	1.250	1.196
	(0.725)	(0.645)	(0.601)
Pakistani	1.246	1.132	1.148
	(0.550)	(0.493)	(0.509)
Bangladeshi	1.723	1.593	1.535
	(0.761)	(0.701)	(0.682)
Black Caribbean	1.054	0.941	0.921
	(0.323)	(0.293)	(0.289)
Black African	1.475	1.308	1.323
	(0.426)	(0.389)	(0.390)
Other	1.459	1.351	1.409
	(0.682)	(0.630)	(0.669)
Female	1.153	1.151	1.087
	(0.111)	(0.110)	(0.107)
Adolescent's self-image (reference level: more than usual)			
Same as usual	0.980	0.979	0.971
	(0.122)	(0.122)	(0.123)
Less useful than usual	0.469***	0.464***	0.456***
	(0.114)	(0.113)	(0.112)
Much less useful	0.390***	0.391***	0.374***
	(0.118)	(0.118)	(0.114)
Adolescent's risk factor (Z)	0.619***	0.619***	0.623***
	(0.0354)	(0.0355)	(0.0375)
Adolescent's perception of future success (reference level: strongly agree)			
Agree	1.111	1.111	1.120
	(0.206)	(0.204)	(0.204)
Disagree	1.543**	1.532**	1.550**
	(0.295)	(0.290)	(0.291)
Strongly disagree	2.383***	2.381***	2.425***
	(0.625)	(0.620)	(0.626)
Whether the parents receive benefit (reference level: no)	1.271	1.296	1.411
	(0.621)	(0.642)	(0.697)
Religion difference between MP/SP (reference level: no)	0.820	0.810	0.800
	(0.135)	(0.133)	(0.132)

All models control for main parent's SEC class, family income, IDACI score, family structure, urban/rural indicator, highest education level in the family, KS3 score, likelihood to apply to university, disability, age, independent/maintained school and overall teacher index (see table E.3 in appendix E for the reported values).
Standard error (Eform) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

In an attempt to explain the aforementioned effects, the introduction of social capital in model (3) shows that like earlier findings none of the religions have any significant impact on affective outcome compared to Christianity. In light of that, only the social trust

variable has a large significant impact on affective outcome. In essence, adolescents with the lowest level of social trust are likely to have fewer odds in having higher attitude score by 41% compared to those with the highest level of social trust. This implies that adolescents who care more about having a job in which he/she helps other people are likely to have better attitude towards school.

As for the effect of religiosity, it still has the same modest significant favourable impact on attitude even after controlling for social capital (Glanville, Sikkink and Hernandez, 2008; Muller and Ellison, 2001). This in turn may point out that first religiosity tend to have an independent favourable impact on affective outcome (in accordance with freeman, 1985) and second, other potential mechanism(s) rather than social capital could be mediating the effect of religiosity. Accordingly, future research about potential mechanism(s) to explain the effect of religiosity on attitude towards school would be beneficial.

It is worth mentioning in the framework of model (3) that some of the remaining variables reveal some interesting findings in explaining the variation in adolescents' attitude towards school. To demonstrate, girls tend to have better attitude than boys though such attitude is not significantly different. Moreover, adolescents from most ethnicities tend to have better attitude than White adolescents, however; only adolescents from Mixed ethnicities tend to have significantly better attitude. The findings also reveal that generally receiving a benefit does not significantly affect the attitude of adolescents even though such effect is favourable. On the other hand, the existence of a difference in the religious affiliation of both the main parent and the second parent has an adverse yet insignificant effect on attitude.

The adolescent's self image of how useful he/she is indicates a favourable significant impact of such image on his/her attitude, implying that self-image is a very important predictor of adolescents' attitude towards school (Glanville, Sikkink and Hernandez, 2008). The same applies for the perception of his/her future success that is also found to have such significant impact (Freeman, 1985). It is also found that there is a negative association between higher risk factor and attitude towards school, implying that as one should expect, an increase in the behavioural risk factor of the adolescent is likely to adversely affect his/her attitude towards schooling (Muller and Ellison, 2001).

4.5 Conclusion and Discussion

This chapter has investigated the relationships between religious affiliation and religiosity on one hand and educational outcomes on the other. The arguments are that first the outcome gap among adolescents could be explained to an extent by their religious affiliations and second that such gap could also be explained by their level of religiosity that is likely to improve their educational cognitive and affective outcomes. The analysis also seeks to fill some of the gap in the literature about why religiosity of English Adolescents could lead to better educational outcomes. For this, a set of potential intervening measures that can broadly be described as social capital according to Putnam index (2002) are examined.

The findings of this chapter not only add to the growing literature on the effect of religion and religiosity on adolescents' educational outcomes, but also seek to fill the gap about such effect on English adolescents in particular. In essence, earlier research has indicated that differences in religious affiliations and levels of religiosity regardless of how it is measured do have an impact on adolescents' outcomes. To a great extent, this chapter reaches similar findings with few exceptions. However, it is could be worth mentioning that such findings are suggestive rather than definitive, and can be further elaborated by future research in numerous directions. Having said that, six main broad findings could be summarized.

First, being more religiously involved adolescent and having strong beliefs in the importance of religion as expected is consistently and favourably associated with most social capital forms available to him/her, such as organizational life, engagement in public affairs, volunteerism and informal sociability (Muller and Ellison 2001). Second, it also as expected has a consistent favourable influence on the adolescent's both cognitive and affective outcome. Nonetheless, the estimated effects of religiosity are found to be only significantly modest in magnitude on affective outcome (Glanville, Sikkink and Hernandez, 2008; Muller and Ellison 2001). Third, religious affiliation can to an extent though not necessarily explain the outcome gap among adolescent depending on the outcome examined (Coleman, 1987). For example, Buddhist, Muslim and Sikh adolescents are likely to have better cognitive outcome than Christians, while there are no significant differences in the effect of different religions on attitude towards school. Fourth, the effect of religion is found to be conditional on adolescent's attributes such as his/her academic self-schema.

Fifth, investigating the role of social capital as a possible mechanism to explain the effect of both religion and religiosity has shown that social capital does not mediate such effects. To elaborate, religion is found to have an independent effect on cognitive outcome even after controlling for social capital (Bryk, et al., 1993; Coleman and Hoffer, 1987; Darnell and Sherkat, 1997). Similarly, social capital apparently does not fill the role of mediating the effect of religiosity. In essence, introducing social capital measures into the model did not have an impact on the effect of religiosity on affective outcome; neither in terms of significance nor magnitude. This implies that other possible mechanism(s) rather than social capital could mediate the effect of religiosity. As such, one could reach a similar conclusion to that of Glanville, Sikkink and Hernandez (2008) and Muller and Ellison (2001) that religiosity has an independent effect on attitude towards school and may provide a broader base of other social capital forms or other mechanisms that could explain such effect.

Sixth, although social capital could not play the mediating role as a mechanism to explain the effect of religion and religiosity on educational outcomes, it is found to have an independent modest effect on these outcomes (Coleman, 1988; 1990b; Muller and Ellison, 2001). Specifically, social capital is found to generally have positive impact on both cognitive and affective outcome. For example, social trust and parental involvement are found to have a significant impact on cognitive outcome, while only social trust has a significant impact on affective outcome.

Earlier research has indicated that religion plays a particularly important role among various minority adolescent populations (Bankston and Zhou 1996; Freeman 1986). It was also shown that religious involvement play a role in promoting educational outcomes of those adolescents (Portes and Zhou 1993) by reducing the time that they could possible spend on other risky activities that could sometimes be common among certain minority groups (Warner 1997) especially at certain socioeconomic classes. Quite as evident, the analysis indicates few strong and consistent ethnic variations (Muller and Ellison, 2001). Although the beneficial links between religiosity and adolescents' cognitive outcome appear to be not significantly different for Mixed, Indians, Pakistanis, Bangladeshis, Black Caribbean and other ethnicities compared to Whites, Black African adolescents have consistently better KS4 score compared to White adolescents across different model specifications. As for affective outcome, Mixed adolescents are consistently likely to have better attitude towards school compared to White adolescents. However, a deep analysis of

ethnic variations that includes immigrant status and perhaps interactions with both religious affiliation and religiosity is beyond the scope of this chapter but is certainly worthy of future investigation.

Finally, most previous studies have relied on the use of a dummy variable for measuring the high versus low levels of religious involvement (Lehrer, 2004a), which may eliminate the effect of variations between levels of involvement (Lehrer, 2009) that could reflect the crowding out effect of very high levels of involvement on less time available for secular endeavours (Chiswick and Huang, 2008). However, due to lack of sufficient data on the different levels of religious involvement the analysis followed a similar approach in constructing the religiosity index. In that regard, it is important to mention that the LSYPE did provide information about levels of religious involvement but only for a small number of adolescents in both wave one and two[28], which would have caused a dramatic loss of statistical power when combined with the rest of the variables in the examined models.

[28] The number of cases available are 561 and 554 adolescents in wave one for both samples examining cognitive and affective outcome respectively and 472 and 464 adolescents for wave two.

Main Lessons and Directions for Future Research

Both economic and other social science perspectives on the determinants of adolescent's educational outcomes have emphasized the role of parental (or family) circumstances and decisions, often to the neglect of other important considerations. A more comprehensive framework would view the outcomes of adolescents as dependent on three primary factors; the decisions made by the society (or government) that determine the opportunities available to both adolescents and their parents (the "social investment in children"), the decisions made by the parents regarding the quantity and quality of family resources devoted to their children (the "parental investment in children"), and the decisions that adolescents make given the investments in and opportunities available to them (Haveman and Wolfe, 1995). Previous research has shown that there is a lack of full dimensionality when studying the relationships between inputs and outputs of the educational process. In addition, most researchers are constrained by the lack of sufficient reliable data.

Motivated by the existence of the two identified problems in the literature and in light of the above framework, the aim of the dissertation was to overcome those problems by building a unique large dataset that covers all aspects of the educational process covering the above three primary factors (reflecting three main blocks of inputs) including school inputs (representing the social investment in children), adolescent's family background inputs (representing parental investment in children) and adolescent's personal inputs (representing adolescents own decisions). Also, the thesis aimed at overcoming such problems by adopting an integrated theoretical model and advanced quantitative methodological approaches to analyze it.

With the fulfillment of such aim the dissertation managed to fill some of the gaps identified in the Education Economics literature related to the relationships between the cognitive and affective educational outcomes of English adolescents on one hand and three main inputs representing each of the previously indentified factors on the other hand controlling for other possible heterogeneities. Specifically, the thesis examined the effect of school process inputs in Chapter 2, family structure as a key family background input in Chapter 3 and finally religion and religiosity as a key adolescent's personal input in Chapter 4. The following concludes the main findings and implications of the examined relationships and suggests directions for future research.

Chapter 1 succeeded in the setup and formulation of an integrated dataset for a wide range of variables that were important to investigate the proposed educational production functions. For this, three main national databases were linked as building blocks for the dataset used in the dissertation. These are the Longitudinal Study of Young People in England (LSYPE), the National Pupil Database (NPD) and the Ofsted Database. The aim was to have information about all aspects related to the education of the young person starting from his/her family background information to his/her own personal and educational attainment information in addition to the school characteristics he/she attended.

Starting with 'school inputs' as the first primary factor determining adolescents' education outcomes, Chapter 2 has shown that despite the expansion of the literature on the implications that different inputs have on students' educational outcomes, empirical research has so far lacked, in some instances, the full capacity to provide unequivocal findings. Essentially, this deficiency is mainly attributed to two main factors; the lack of reliable data and the lack of full dimensionality in the theoretical model adopted to explain such data, where education specialists focus on the effect of school process inputs of the CIPO model while economists focus on resources inputs (Levaččićć and Vignoles, 2002; Knoeppel, Verstegen, and Rinehart, 2007; Kyriakides, 2005; Rivkin, Hanushek and Kain, 2005).

Earlier research on the effect of the full dimensional school process concept on students' educational outcomes has generally been less focused on the case of England (Levaččićć and Vignoles, 2002) and/or has been focused on the effect of limited organizational aspects of the school, such as the student ability grouping scheme (known as streaming) on cognitive outcomes of British students (Kerckhoff, 1986) or the effectiveness of post-16 educational institutions like assisted places scheme school (Tymms, 1992). Others examined the effect of teacher quality (Slater, Davies and Burgess, 2009) and the effect of school attended on both primary and secondary test scores and its continuity over time showing that such effect is greater on the former than the latter with smaller effect on continuing from primary to secondary (Sammons, et al., 1995).

In light of that and of what has been observed in the literature, Chapter 2 introduced the school process component of the CIPO model to the educational production function approach by examining the effect of school process inputs on English students' educational

cognitive and affective outcomes controlling for both school context and student's inputs. Specifically, the chapter examined the school process inputs that are not financial resource oriented at both the school level and the teacher level simultaneously, thus combining teacher influence variable(s) measuring student's perception of his/her teacher and school quality variable(s).

For this purpose, Chapter 2 created a unique dataset comprising data from the LSYPE, the NPD and the Ofsted database, hence including new school information that has been lacked in the literature and so covering a wide range of school process variables in the analysis. Primarily, the analysis combined data about student's characteristics and family background factors from the LSYPE and outcomes from the NPD in addition to data about 56 school process variables from the Ofsted database reflecting its effectiveness in nine major inspection judgments that have not been examined fully in the literature neither as combined with student information nor separately.

The primary implication of the findings is that teachers matter. Teachers play a significant positive moderate role in improving student's cognitive outcome (Aaronson, Barrow and Sander, 2007; Glewwe, et al., 2011, Kyriakides, 2005, Link and Ratledge, 1979; Rivkin, Hanushek and Kain, 2005) and a much bigger role in improving their affective outcome (Kyriakides, 2005). Moreover, the teacher effect on attitude was not affected by the overall school quality and that such effect is the leading school process factor that could significantly explain such attitude. Additionally, comparing teacher effect with the overall school quality effect, it was found that the first was slightly smaller than the latter when it comes to cognitive outcome, while it was much bigger in the case of affective outcome. Such findings were coupled with another indicating that student's inputs may play a bigger role in explaining his/her outcomes.

These findings do not necessarily imply that the school does not matter. Rather they imply that teachers within school play a major role in affecting both students' cognitive and affective outcome. Accordingly, both schools and teachers should invest more in teachers' non-financial and/or human qualities, such as teacher effectiveness in monitoring students performance in terms of homework doing and his/her availability for student support outside class. Also, schools should pay more attention and put more emphasis on the teacher performance in terms of how he/she influences students' social conduct and how far he/she is being fair with students from different cultural backgrounds. Perhaps, a common proposed policy would be to link teachers' compensation with their performance

in terms of the aforementioned aspects rather than just their education and level of experience (Aaronson, Barrow and Sander, 2007)

Most school quality aspects were found to have positive significant contribution in explaining student's cognitive outcome but not necessarily his/her affective outcome. Basically, the findings indicated that school process factors are generally important to determining students' cognitive outcome, which matches the results of previous studies such as that of Weber (1971) showing that ongoing school process variables, like leadership, expectations, school atmosphere and evaluation of pupil progress are important factors in determining students' cognitive outcomes. Moreover, empirical support for the effectiveness of an orderly learning environment in the school has been confirmed from qualitative and quantitative reviews showing that it has a positive influence on students' cognitive outcomes (Kyriakides, 2005; Opdenakker and Van Damme, 2000; Scheerens, 1992). For the affective outcome, it was shown that the school quality of provision and its leadership and management are likely to improve students' attitude towards school, where one would expect students to better value the time they spend at school as long as the school provides better environment for students to be willing to attend school and devote more effort for school work (Kyriakides, 2005; Opdenakker and Van Damme, 2000; Scheerens, 1992).

Despite the positive impact of most school quality indices, their magnitudes were moderate for the cognitive outcome and bigger for the affective outcome. Consequently, one could indicate that these quality aspects are likely to have relatively more sizable influence on student's affective rather than cognitive outcome. Moreover, the overall school quality was found to significantly improve educational cognitive but not affective outcome. In that regard, there is some evidence in the literature that schools which are among the most effective in enhancing cognitive outcomes are not necessarily among the most effective in helping their students achieve affective outcomes (Opdenakker & Van Damme, 2000; Kyriakides, 2005). These findings reveal the importance of investigating the extent to which similar factors at school level are associated with the effectiveness of schools in achieving both cognitive and affective outcomes. In that regard, the findings have shown that the school achievement and standards (AS), the quality of provision (QP), and its leadership and management (LM) had positive significant contributions in explaining both outcomes.

Based on the previous findings one can conclude that school process inputs are important in explaining students' both cognitive and affective outcomes. However, the moderate magnitude of some of these variables on cognitive outcome reflected that student's related inputs such as academic self-schema (Chowdry, Crawford and Goodman, 2010; Duran and Weffer, 1992; Glick and Sahn, 2010; Murdoch and Phelps, 1973; Tymms, 1992) and attitude towards continuing to higher education (Chowdry, Crawford and Goodman, 2009; Chowdry, et al., 2010) could play a major role in explaining such outcome.

During the last three decades a considerable body of research evidence has been accumulated showing that although family backgrounds of students and their academic self-schema are major determinants of their educational outcomes, schools have significant contribution in explaining variations in students' outcomes (Daly, 1991; Mortimore, et al., 1988; Reynolds, 1982; Rutter, et al., 1979; Sammons, Hillman and Mortimore, 1995; Wilkins and Raudenbush, 1989). The findings of Chapter 2 has reached a similar conclusion, where by looking at the insignificance of the majority of family background factors, one could suggest in line with what has been reported in the literature regarding the case of England that teacher quality (Slater, Davies and Burgess, 2009) and school quality do matter for the cognitive and affective outcomes of students. Moreover, the significance of school process inputs reflected that it would be ideal to be controlled for when studying student's outcomes and not restricting the explanation to just family background factors (Tymms, 1992). Ideally, students from any family background could have better cognitive and affective outcome if they were taught by better teachers in better schools.

Despite the aforementioned importance of school process inputs, some studies have shown that in deciding which school to enrol their children, English parents mostly choose the schools that have the highest test scores results while hardly taking into account what their children really feel about the school or what can be called child's wellbeing in the school (Gibbons and Silva, 2011). Their claim was that there is no relationship between such attitude and the average level of test scores in the school. In that regard, the findings have shown that student's attitude towards school or put differently their perception of the school was significantly positively related to the overall academic achievement of the school, which would make both parents and the children somehow equally happy when making the decision of which school to join. However, it was found as well that other school quality aspects such as the quality of provision plays a somewhat greater role in affecting both children's cognitive and affective outcomes. Accordingly, parents should

not form their decision entirely based on just the level of academic achievement of the school but also on other factors such as the quality of how effective will teaching and learning be in meeting the full range of their children's needs, how well do the curriculum and other activities meet the range of needs and interests of the children and how well their children are going to be cared for, guided and supported.

Although Chapter 2 has adopted the CIPO model to control for the full dimensionality of the educational process, a clear limitation exists with the lack of evidence about the effect of school resources inputs, which comes as a result of the lack of the necessary data about school related expenditure indicators. Relatedly, similar to the findings proposed by (Slater, Davies and Burgess, 2009) that teachers matter a great deal, it could be argued that the lack of data about other teacher inputs such as teacher's education, experience, length of tenure and salary could have helped explain more such teacher effect. In that regard, it would be important for future research to examine the overall teacher index combining both observable teacher inputs about his/her level of education, experience and salary with the student's perception of his/her teacher so that a clearer conclusion could be drawn about the full nature of the teacher effect.

Previous school and teacher effectiveness research has shown that the influences of schooling on students' cognitive and affective outcomes are multilevel. That is, classrooms have unique influences on students' outcomes, independently of factors operating at the school and student levels. Furthermore, by controlling for both student inputs and classroom contextual inputs, variables at the school level could explain variation in achievement at the school level (Kyriakides, 2005). Consequently, another limitation of the analysis is that it lacked information on the classroom level restricting the implementation of such multilevel analysis. As such, further research would be of great value with richer data at the classroom level and with multilevel modeling, which may well uncover some important elements of both the teacher and school influences on outcomes.

Moving to 'parental investment in children' as the second primary factor determining adolescents' educational outcomes, Chapter 3 has investigated the relationships between family structure and adolescents' cognitive and affective educational outcomes. The arguments are that the outcome gap among adolescents could be explained to an extent by the type of family they live with and that living in a nonintact family has adverse impact on these outcomes. The chapter also sought to fill some of the gap in the literature about why

nonintact structures of English families could lead to worse educational outcomes. For this, two identified intervening mechanisms in the literature of the family socioeconomic status and parental involvement were tested for whether they could mediate such effect. In light of that, some broad patterns emerge in the data.

The key finding of Chapter 3 generally supports that in the reviewed literature that living in a nonintact family structure has a negative effect on adolescents' educational outcomes (Astone and McLanahan, 1991; Rodriguez and Arnold, 1998; Wallerstein and Lewis, 2005 among others). The primary exception being that the two mechanisms examined to explain such effect do not play their expected mediating role except for the partial mediating role of the interaction effects of parental involvement on affective outcome. Accordingly, one can suggest that the effect of including those two mechanisms and other controls highlights the main finding of the analysis that part of the observed educational outcomes is "pure" family structure effect even after controlling for the effects of possible observed compensating or reinforcing family characteristics or allocation decisions on the contrary to other findings suggested in the literature that such outcomes are not pure family structure effects (Gennetian, 2005).

Based on the previous findings, it could be said that in the English context family structure always plays an independent effect on the adolescent's educational outcome and that other unobserved family heterogeneities could explain such adverse effect. As such, policy makers should pay more attention to compensating such adverse effect through policies targeting the adolescent him/herself rather than focusing only on the parent(s). Such policies like providing benefits, for example, in the form of unemployment benefits to single parents or to those parents with financial problems are shown here not have a significant effect on the adolescent's outcome.

The data used in chapter 3 revealed consistent patterns across models with and without including the possible interaction effects between the two mechanisms and family structures for both outcomes examined. The findings also showed that parental involvement interaction effect partially explains to an extent the affective outcome gap among adolescents across different family structure (Astone and McLanahan, 1991; Brown, 2004; Coleman, 1988; Magnuson and Berger, 2009; Thomson, Hanson and McLanahan, 1994 among others). Moreover, such consistency exists to a great extent for the effect of the two mechanisms across models. As stated earlier, the findings indicated

that indeed living in a nonintact family does have an adverse effect on adolescents' educational outcomes, both cognitive and affective. Specifically, two main structures dominated such adverse effect; other married couple and lone mother families. Furthermore, the extended version of the family structure showed that living with a married step couple has also an adverse impact on affective outcome.

Deeper investigation of the discrepancies between the previously identified structures shows that in most cases one cannot determine a general trend for whether living with other married couple could have worse impact than living with a single parent or whether living with married couple is better than a cohabiting couple. For example, living with a lone mother has worse effect on cognitive outcome than with other cohabiting couple; and in certain cases (full structure analysis) slightly better than living with other married couple. This entails that in some cases having a non-biological parent(s) in the family as in the examined sample where the married couple could be adoptive, foster or any non-biological couple, is worse than living with just a single parent (Hofferth and Anderson, 2003).

The effect of living with a single mother has widely been investigated in the literature. Essentially, the analysis agrees to a great extent with the general effect observed in such literature. Living with a lone mother does have a negative significant impact on adolescents' cognitive and affective outcome (Amato and Booth, 1997) and that is usually better than the effect of living with a lone father (Amato and Booth, 1991; Amato and Keith, 1991b; Hoffmann and Johnson, 1998). Some researchers tend to justify the difference in the two impacts with the adequacy of the socioeconomic status. However, Chapter 3 has distinguished between such effect on both cognitive and affective outcome. To explain, living with a lone mother has an adverse effect on cognitive outcome regardless of the type of occupation the mother has, however, no such conclusive statement could be made for the effect on affective outcome, where in certain occupation such as being a small employers and own account worker, living with a lone mother could have a positive impact on the adolescent's attitude towards school. Accordingly, relying on the lone mother type of occupation may not be adequate enough to justify the adverse effect on her adolescents' educational outcome. In fact, the adverse effect of living with a lone mother is mostly related to her involvement in the adolescent's school life and her aspiration for his/her future. Nevertheless, living with a lone mother has an independent

adverse effect on both outcomes that could be explained by other unobserved family heterogeneities.

A key limitation of Chapter 3 is the lack of data on the historical family structure status and whether there has been any change in it during the lifetime of the adolescent, which may not adequately reflect any possible change in the living arrangements during childhood (Ginther and Pollak, 2004). The use of one year variable might serve as a weak proxy for childhood circumstances and events, and can result in unreliable estimates (Wolfe, et al., 1996). Accordingly, future research should account for changes in family structure over the childhood of adolescents. Nevertheless, the findings show that while omitted variable bias is possible, one would could say that the regressions at least do not suffer from reverse causation (bad performance in school should not cause family structure). Thus, one could say that these cross-section results suggest a causal relationship.

Traditional classifications of family structure sometimes ignore the complexity of blended families and the existence of step siblings. Although, the adolescent may be living with two parents, the family structure effect may have different implications for an adolescent's well-being than growing up in a family in which not all the siblings are with both biological parents (Hetherington and Jodl, 1994; White, 1994). Although the analysis in Chapter 3 has shown that having more siblings is likely to adversely affect both outcomes with no conclusive direction for the effect of the age difference between siblings, the analysis suffer from the limitation that it did not account for the possibility of having a step sibling in the family due to lack of data. A similar limitation exists related to the absence of information about the causes of family disruptions, whether separation or death, for example, and how that accounts for the differences in outcome (Beller and Chung, 1992; Biblarz and Gottainer, 2000; Skevik, 2003). Future research examining the possible effects of having a step sibling and the cause of family disruption would be a promising direction for further inquiry. Finally, most researchers tend to explain the effect of socioeconomic status by examining the effect of both parents' occupations. However, the analysis of Chapter 3 rather examined the effect of the highest occupation in the family reported by the reference point of the LSYPE survey (the main parent).

Proceeding to the study of 'adolescents' own inputs' as the third primary factor determining their educational outcomes, Chapter 4 has investigated the relationships between religious affiliation and religiosity on one hand and their educational outcomes on

the other. The arguments are that first the outcome gap among adolescents could be explained to an extent by their religious affiliations and second that such gap could also be explained by their level of religiosity that is likely to improve their educational cognitive and affective outcomes. Chapter 4 also sought to fill some of the gap in the literature about why religiosity of English Adolescents could lead to better educational outcomes. For this, a set of potential intervening measures that can broadly be described as social capital according to Putnam index (2002) were examined.

The findings of Chapter 4 not only add to the growing literature on the effect of religion and religiosity on adolescents' educational outcomes, but also sought to fill the gap about such effect on English adolescents in particular. In essence, earlier research has indicated that differences in religious affiliations and levels of religiosity regardless of how it is measured do have an impact on adolescents' outcomes. To a great extent, chapter 4 reached similar findings with few exceptions. However, it could be worth mentioning that such findings were suggestive rather than definitive, and can be further elaborated by future research in numerous directions. Having said that, six main broad findings could be summarized.

First, being more religiously involved adolescent and having strong beliefs in the importance of religion as expected is consistently and favourably associated with most social capital forms available to him/her, such as organizational life, engagement in public affairs, volunteerism and informal sociability (Muller and Ellison 2001). Second, it also as expected has a consistent favourable influence on the adolescent's both cognitive and affective outcome. Nonetheless, the estimated effects of religiosity are found to be only significantly modest in magnitude on affective outcome (Glanville, Sikkink and Hernandez, 2008; Muller and Ellison 2001). Third, religious affiliation can to an extent though not necessarily explain the outcome gap among adolescent depending on the outcome examined (Coleman, 1987). For example, Buddhist, Muslim and Sikh adolescents are likely to have better cognitive outcome than Christians, while there are no significant differences in the effect of different religions on attitude towards school. Fourth, the effect of religion is found to be conditional on adolescent's attributes such as his/her academic self-schema.

Fifth, investigating the role of social capital as a possible mechanism to explain the effect of both religion and religiosity has shown that social capital does not mediate such effects.

To elaborate, religion is found to have an independent effect on cognitive outcome even after controlling for social capital (Bryk, et al., 1993; Coleman and Hoffer, 1987; Darnell and Sherkat, 1997). Similarly, social capital apparently does not fill the role of mediating the effect of religiosity. In essence, introducing social capital measures into the model did not have an impact on the effect of religiosity on affective outcome; neither in terms of significance nor magnitude. This implies that other possible mechanism(s) rather than social capital could mediate the effect of religiosity. As such, one could reach a similar conclusion to that of Glanville, Sikkink and Hernandez (2008) and Muller and Ellison (2001) that religiosity has an independent effect on attitude towards school and may provide a broader base of other social capital forms or other mechanisms that could explain such effect.

Sixth, although social capital could not play the mediating role as a mechanism to explain the effect of religion and religiosity on educational outcomes, it is found to have an independent modest effect on these outcomes (Coleman, 1988; 1990b; Muller and Ellison, 2001). Specifically, social capital is found to generally have positive impact on both cognitive and affective outcome. For example, social trust and parental involvement are found to have a significant impact on cognitive outcome, while only social trust has a significant impact on affective outcome.

Most previous studies have relied on the use of a dummy variable for measuring the high versus low levels of religious involvement (Lehrer, 2004a), which may eliminate the effect of variations between levels of involvement (Lehrer, 2009) that could reflect the crowding out effect of very high levels of involvement on less time available for secular endeavours (Chiswick and Huang, 2008). However, due to lack of sufficient data on the different levels of religious involvement Chapter 4 followed a similar approach in constructing the religiosity index.

Finally, earlier research has indicated that religion plays a particularly important role among various minority adolescent populations (Bankston and Zhou 1996; Freeman 1986). It was also showed that religious involvement play a role in promoting educational outcomes of those adolescents (Portes and Zhou 1993) by reducing the time that they could possible spend on other risky activities that could sometimes be common among certain minority groups (Warner 1997) especially at certain socioeconomic classes. Quite as evident, Chapter 4 indicated few strong and consistent ethnic variations (Muller and Ellison, 2001). Although the beneficial links between religiosity and adolescents' cognitive

outcome appear to be not significantly different for Mixed, Indians, Pakistanis, Bangladeshis, Black Caribbean and other ethnicities compared to Whites, Black African adolescents have consistently better KS4 score compared to White adolescents across different model specifications. As for affective outcome, Mixed adolescents are consistently likely to have better attitude towards school compared to White adolescents. However, a deep analysis of ethnic variations that includes immigrant status and perhaps interactions with both religious affiliation and religiosity is beyond the scope of this chapter but is certainly worthy of future investigation.

Appendices

A. Summary Findings of School Inputs Impacts on Students' Cognitive Educational Output

Table A.1: Summary Findings of School Inputs Impacts on Students' Cognitive Educational Output

Input	Most common Impact	Results from high quality studies	Results from studies that used Randomized Control Trials[29]
School infrastructure and pedagogical materials			
Textbooks and related materials	Significant positive	Weakly supportive	Textbooks in specific have no impact: insignificant non-positive
Basic school infrastructure	Mostly positive and sometimes significantly positive	Supportive	-
Electricity	Positive	Not supportive (weak impact)	-
School library	Significant positive	Supportive	-
Other school infrastructure	Significant positive	Supportive	-
General indices for school infrastructure (ex: blackboards, charts, etc.)	Positive	Supportive	Flip charts in Kenya have insignificant negative impact that does not necessarily contradict previous results.
Computers and related materials	Ambiguous impact with more tendency of being insignificant	Weakly supportive	Consistent with results of high quality studies
Teacher characteristics			

[29] Randomized Control Trials (RCTs) is a quantitative technique that designs experiments ensuring better measurements to correct errors in variables and that the error term in the model is not correlated with the variables of interest (Glewwe, et al., 2011).

Teacher's level of education	Positive	Not supportive, ambiguous impact	Teacher and principal characteristics are not studied here because they are difficult to randomize.
teacher experience	Positive	weakly supportive	
Teacher knowledge of the subject	Significant positive	Supportive	
In-service teacher training	Significant positive	Moderately supportive	
Teacher effectiveness by gender	Ambiguous impact with slight evidence on any systematic differences	Supportive	
Teacher having a teaching degree	Ambiguous	No reported studies	
Index of overall teacher quality	Significant positive		
Principal characteristics			
Years of experience	Positive	Not reviewed since none had more than one higher quality study	-
Level of education	Little support on having a clear impact		-
School organization			
class size	Unclear conclusion favouring a negative impact on students' outcome with still some unexpected positive estimates in other cases.	Supportive	One study in India found negative impact. However, it was hard to separate between class size effect and contract teacher effect since treatment schools were randomly assigned to receive an extra contract teacher.
School meals	inconclusive impact	Supportive	One study in the Philippines found insignificant negative impact
Multi-grade teaching	Indefinite impact	Supportive	-

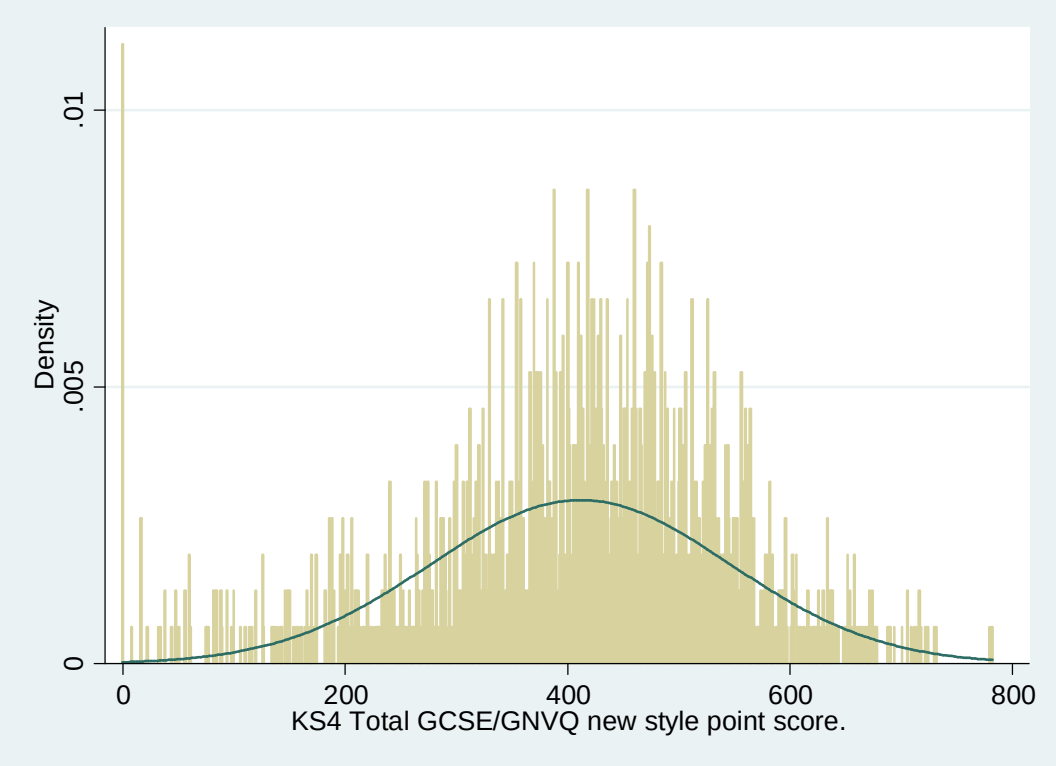
Tutoring	Ambiguous impact	Not supportive, positive impact	One study in India suggests having a positive impact on children falling behind in school.
Teacher giving examples	Unclear impact	Not reviewed since none had two or more high quality study	-
School expenditure per pupil	Little support of school spending having positive influence		-
Cost of enrolling in school	Unclear effect in cases where such cost adversely affects students' attendance and when it decreases the available pedagogical resources at home		-
School size	Inconclusive with a tendency of having unclear sign.		-
Teacher assignment of homework	Significant positive		-
Teacher salary	Positive		-
Group work	Positive		-
Student's attendance	Significant positive		-
Contract teachers	Positive	Supportive	An Indian study reported a significant positive effect, though it could be attributed to the class size randomized experiment.
Hours of the school day	Positive	Supportive	-
Teacher absenteeism	Negative	supportive	-
Community information	-	-	One study on India suggests that there is almost no impact

campaigns			on test scores.
Provision of merit-based scholarships	-	-	One study reaching inconclusive results of two positive estimates, one of them is significant.

(-) means no study has been reviewed.

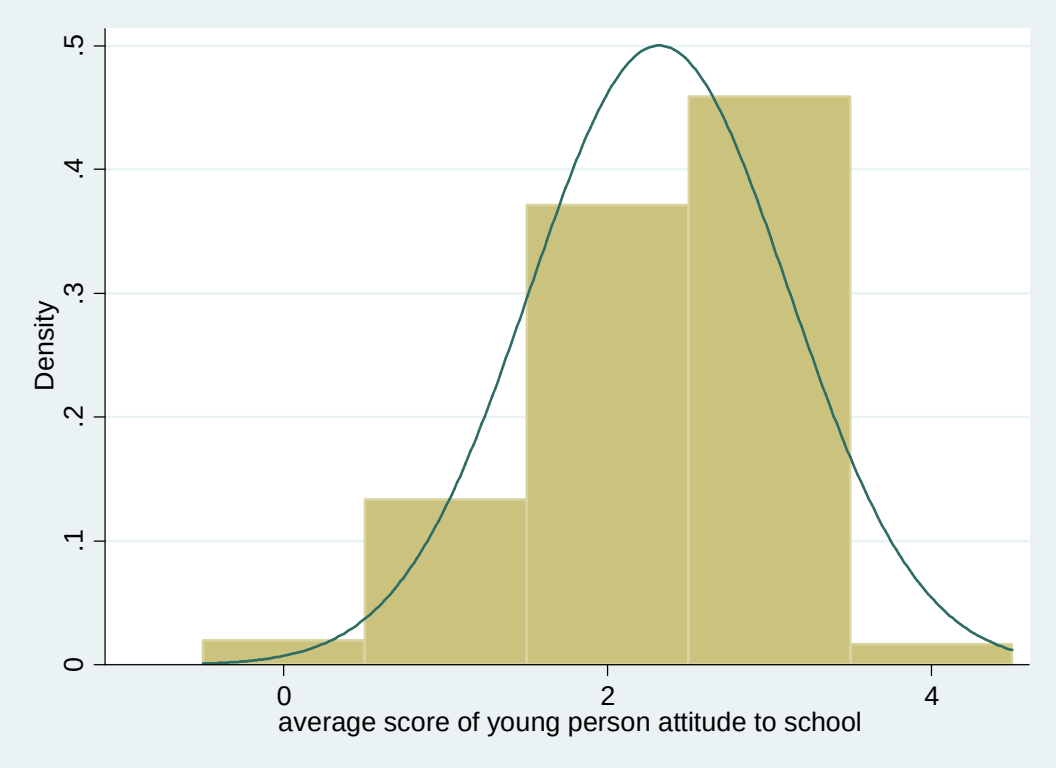
B. Chapter 2 Related Statistical Figures and Tables

Figure B.2: Histogram of key stage 4 total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG)



Shapiro-Wilk W test for normality rejected at W=0.97321and P-value=0.000

Figure B.3: Histogram of attitude towards school score at wave four (W4avatt)



Shapiro-Wilk W test for normality rejected at W= 0.98783 and P-value=0.000

The correlation analysis (table B.1) between the independent variables in the cognitive outcome models indicates that there is correlation of 0.8 at least between the following pairs of variables: (teacherquality-teacher effect) (Squality_A-schAS_A) (schAS_A-schOE_A) (SchPDW_A-SchAs-A) (SchQP_A-SchOE_A) (schQP_A-SchAS_A) (sch_QP_A-schPDW_A) (SchLM_A-SchOE_A) (SchLM_A-schAS_A) (SchLM_A-schPDW_A) (SchLM_A-schQP_A) (SchEPELS_A-SchESELH_A) (SchELMPC_A-SchEPELS_A) (SchESELEW_A - SchELMPC_A). Also, there is also correlation of 0.9 at least between: (Squality_A-SchOE-A) (Squality_A-SchPDW_A) (Squality_A-SchQP_A) (Squality_A-SchLM_A). So in general we can see that the high correlation exists between school quality variables and teacher variables and since the models examined did not use those pairs of variables together then there should not be a correlation problem.

Table B.1: Correlation Matrix of Cognitive Outcome Models

	KS4_PT~G	W12i~N_Z	W2Hous~H	W2hiq~am	W2nss~am	W2FeF~0c	W2co~6MP	W2co~5MP	W2famtyp	W1re~1YP	W1sexYP	W2senMP	KS4_CV~Z
KS4_PTSTNEWG	1.0000												
W12inces~N_Z	0.2209	1.0000											
W2Hous12HH	-0.2675	-0.2323	1.0000										
W2hiqualgfam	-0.3266	-0.3724	0.2792	1.0000									
W2nssecfam	-0.3138	-0.4049	0.2904	0.5353	1.0000								
W2FeFinMP0c	0.1934	0.1543	-0.2115	-0.2542	-0.2110	1.0000							
W2condur6MP	-0.2909	-0.2227	0.2502	0.3232	0.2742	-0.1777	1.0000						
W2condur5MP	-0.2222	-0.1488	0.1553	0.2204	0.1755	-0.0851	0.4673	1.0000					
W2famtyp	-0.2280	-0.3056	0.3134	0.2719	0.1862	-0.1875	0.2436	0.1687	1.0000				
W1relig1YP	0.0521	-0.1044	-0.0176	0.1955	0.1778	-0.0789	0.0770	0.0190	-0.0551	1.0000			
W1sexYP	0.1077	-0.0283	0.0146	0.0204	0.0010	0.0057	0.0318	0.0075	0.0457	0.0221	1.0000		
W2senMP	0.0842	0.0221	-0.0201	-0.0454	-0.0410	0.0274	0.0033	-0.0197	0.0107	0.0223	0.0541	1.0000	
KS4_CVAP3A~Z	0.7369	0.2980	-0.2824	-0.4040	-0.3832	0.2172	-0.3229	-0.2262	-0.2122	-0.1350	0.0760	0.0906	1.0000
KS4_AGE_ST~T	-0.0446	0.0147	-0.0259	0.0097	0.0237	0.0565	0.0000	0.0000	-0.0417	0.0000	0.0348	-0.1069	-0.0013
W1ethgrpYP	0.0037	-0.1206	0.1399	0.1268	0.1276	-0.1402	0.0704	0.0261	0.1225	0.4492	0.0640	0.0471	-0.1747
W1kidskolMP	-0.2256	-0.0314	0.0702	0.0629	0.0474	-0.0387	0.0789	0.0322	0.0554	-0.0126	0.0114	-0.0059	-0.1970
W2schlifMP	-0.0042	0.0417	-0.0091	-0.0136	-0.0484	0.0542	-0.0318	-0.0321	0.0710	-0.1504	0.0128	0.0390	0.0427
W2heposs9YP	0.4969	0.1580	-0.1402	-0.2047	-0.2072	0.0916	-0.1636	-0.1100	-0.0964	0.1752	0.1291	0.0842	0.4352
IndSchool	-0.0117	-0.0006	-0.0285	-0.0354	-0.0360	0.0168	0.0448	-0.0125	-0.0294	0.0846	0.0453	0.0082	-0.0262
phaseofEdu	-0.0205	0.0272	-0.0325	-0.0284	-0.0369	0.0136	-0.0434	-0.0134	-0.0975	-0.0253	0.0365	0.0059	0.0161
urbind	0.0786	0.1254	-0.0553	-0.1222	-0.1320	0.0525	-0.0854	-0.0276	-0.1019	-0.1286	0.0184	-0.0141	0.1171
KS4_IDACI_~A	0.2774	0.3128	-0.3477	-0.3644	-0.4079	0.2107	-0.2760	-0.2124	-0.2728	-0.1470	-0.0469	0.0279	0.3678
S_Trelatio~A	-0.0629	-0.0690	0.0734	0.1087	0.1269	-0.0453	0.0720	0.0580	0.0025	0.1549	-0.0444	0.0321	-0.1429
teacherqua~A	0.2450	0.0456	-0.0358	-0.0635	-0.0278	0.0414	-0.0779	-0.0165	-0.1239	0.1433	-0.0515	0.0402	0.1475
teachereff~A	0.1585	0.0027	0.0069	0.0022	0.0381	0.0106	-0.0261	0.0145	-0.0939	0.1824	-0.0603	0.0459	0.0463
Squality_A	0.3210	0.1376	-0.1255	-0.1963	-0.1880	0.0762	-0.1324	-0.0924	-0.1036	0.0353	0.0374	0.0218	0.2842
SchOE_A	0.2937	0.1209	-0.1002	-0.1736	-0.1691	0.0487	-0.1128	-0.0688	-0.0933	0.0255	0.0349	0.0419	0.2501
SchAS_A	0.3273	0.1854	-0.1392	-0.2495	-0.2386	0.1033	-0.1640	-0.1015	-0.1239	0.0198	0.0321	0.0171	0.3247
SchPDW_A	0.3194	0.1288	-0.1426	-0.1965	-0.1804	0.1020	-0.1306	-0.0844	-0.1062	0.0287	0.0462	0.0036	0.2934
SchQP_A	0.3082	0.1216	-0.1131	-0.1764	-0.1576	0.0707	-0.1253	-0.0810	-0.0979	0.0506	0.0352	-0.0041	0.2606
SchLM_A	0.2817	0.1018	-0.0874	-0.1512	-0.1491	0.0560	-0.1196	-0.0848	-0.0973	0.0539	0.0429	0.0021	0.2177
SchESELH_A	0.0757	0.0421	-0.0642	-0.0538	-0.0602	-0.0260	-0.0232	-0.0783	0.0046	0.0265	-0.0044	0.0467	0.0876
SchEPELS_A	0.0633	0.0215	-0.0137	-0.0071	-0.0358	-0.0206	-0.0006	-0.0267	0.0039	0.0339	-0.0153	0.0518	0.0482
SchELMPC_A	0.0765	0.0470	-0.0481	-0.0339	-0.0511	0.0019	-0.0111	-0.0320	-0.0040	0.0030	-0.0222	0.0466	0.0702
SchESELEW_A	0.1105	0.0346	-0.0240	-0.0604	-0.0553	0.0153	-0.0290	-0.0373	-0.0151	-0.0300	0.0148	0.0447	0.0980

	KS4_AG~T	W1ethg~P	W1kids~P	W2schl~P	W2hepo~P	IndSch~l	phaseo~u	urbind	KS4_ID~A	S_Trel~A	teac~y_A	teac~t_A	Squali~A
KS4_AGE_ST~T	1.0000												
W1ethgrpYP	-0.0594	1.0000											
W1kidskolMP	0.0000	0.0004	1.0000										
W2schlifMP	-0.0223	-0.2286	0.1433	1.0000									
W2heposs9YP	-0.0354	0.2148	-0.1314	-0.0886	1.0000								
IndSchool	0.0000	-0.0168	0.0042	-0.0504	-0.0515	1.0000							
phaseofEdu	0.0000	-0.0613	0.0105	0.0181	-0.0307	0.0058	1.0000						
urbind	0.0413	-0.1748	-0.0686	0.0803	-0.0020	-0.0192	0.0018	1.0000					
KS4_IDACI_~A	0.0460	-0.3522	-0.0830	0.1082	0.0904	0.0192	0.0919	0.2668	1.0000				
S_Trelatio~A	-0.0038	0.0974	-0.0518	-0.1517	0.0713	-0.0108	-0.0385	-0.0534	-0.1236	1.0000			
teacherqua~A	0.0225	0.0267	-0.2856	-0.1077	0.2173	0.0004	-0.0200	-0.0070	0.0308	0.2682	1.0000		
teachereff~A	0.0155	0.0661	-0.2433	-0.1536	0.2000	-0.0048	-0.0333	-0.0303	-0.0342	0.6737	0.8926	1.0000	
Squality_A	-0.0082	0.0582	-0.3044	-0.0493	0.1675	-0.0161	-0.0668	0.0998	0.1821	-0.0615	0.1712	0.1025	1.0000
SchOE_A	-0.0078	0.0556	-0.2575	-0.0480	0.1469	-0.0153	-0.0294	0.0719	0.1459	-0.0436	0.1361	0.0840	0.9430
SchAS_A	-0.0092	0.0362	-0.2976	-0.0382	0.1699	0.0535	0.0017	0.1031	0.2380	-0.0981	0.1787	0.0911	0.8975
SchPDW_A	-0.0026	0.0391	-0.3104	-0.0478	0.1690	0.0105	-0.1194	0.1062	0.1858	-0.0642	0.1809	0.1088	0.9113
SchQP_A	-0.0054	0.0705	-0.2860	-0.0564	0.1562	-0.0229	-0.0144	0.0748	0.1284	-0.0705	0.1714	0.0985	0.9220
SchLM_A	-0.0177	0.1088	-0.2507	-0.0728	0.1532	-0.1161	-0.1190	0.0939	0.1172	-0.0384	0.1565	0.1021	0.9021
SchESELH_A	0.0000	0.0031	-0.1566	-0.0021	0.0534	0.0061	-0.0147	0.0456	0.1167	0.0028	0.0601	0.0474	0.4045
SchEPELS_A	0.0000	0.0235	-0.0887	0.0038	0.0427	0.0030	-0.0071	0.0235	0.0439	-0.0048	0.0309	0.0215	0.3921
SchELMPC_A	0.0000	-0.0173	-0.1084	0.0288	0.0412	0.0053	-0.0127	0.0420	0.0858	-0.0020	0.0235	0.0171	0.4754
SchESELEW_A	0.0000	-0.0234	-0.1173	0.0092	0.0410	0.0063	-0.0153	0.0503	0.0942	-0.0019	0.0315	0.0232	0.4893

	SchOE_A	SchAS_A	SchPDW_A	SchQP_A	SchLM_A	SchE~H_A	SchEPE~A	SchELM~A	SchE~W_A
SchOE_A	1.0000								
SchAS_A	0.8284	1.0000							
SchPDW_A	0.7912	0.8246	1.0000						
SchQP_A	0.8492	0.8713	0.8441	1.0000					
SchLM_A	0.8460	0.8148	0.8085	0.8726	1.0000				
SchESELH_A	0.3571	0.1863	0.2400	0.2280	0.1839	1.0000			
SchEPELS_A	0.3896	0.1519	0.1856	0.2098	0.1575	0.8313	1.0000		
SchELMPC_A	0.4756	0.2215	0.2807	0.2497	0.2253	0.7704	0.8560	1.0000	
SchESELEW_A	0.5125	0.2555	0.2776	0.2829	0.2654	0.6323	0.7679	0.8678	1.0000

.

Number of obs=1664.

The correlation analysis (table B.2) between the independent variables in the affective outcome models indicates that there is correlation of 0.8 at least between the following pairs of variables: (teacherquality - teacher effect) (schAS_A-schOE_A) (SchPDW_A-schOE_A) (SchPDW_A-SchAs-A) (SchQP_A-SchOE_A) ((schQP_A-SchAS_A) (sch_QP_A-schPDW_A) (SchLM_A-SchOE_A) (SchLM_A-schAS_A) (SchLM_A-schPDW_A) (SchLM_A-schQP_A) (SchEPELS_A-SchESELH_A) (SchELMPC_A-SchEPELS_A) (SchESELEW_A - SchELMPC_A). Also, there is also correlation of 0.9 at least between: (Squality_A-SchOE-A) (Squality_A-schAS_A) (Squality_A-SchPDW_A) (Squality_A-SchQP_A) (Squality_A-SchLM_A). So in general we can see that the high correlation exists between school quality variables and teacher variables and since the models examined did not use those pairs of variables together then there should not be a correlation problem.

Table B.2: Correlation Matrix of Affective Outcome Models

	W4avatt	W12i~N_Z	W2Hous~H	W2hiq~am	W2nss~am	W2FeF~0c	W2co~6MP	W2co~5MP	W2famtyp	W1re~1YP	W1sexYP	W2senMP	KS4_CV~Z
W4avatt	1.0000												
W12inces~N_Z	0.0135	1.0000											
W2Hous12HH	-0.0687	-0.2328	1.0000										
W2hiqualgfam	-0.0952	-0.3801	0.2887	1.0000									
W2nssecfam	-0.0775	-0.4045	0.2813	0.5399	1.0000								
W2FeFinMP0c	0.0566	0.1558	-0.2186	-0.2635	-0.2184	1.0000							
W2condur6MP	-0.1066	-0.2263	0.2695	0.3318	0.2806	-0.1885	1.0000						
W2condur5MP	-0.0444	-0.1512	0.1612	0.2254	0.1765	-0.0923	0.4587	1.0000					
W2famtyp	-0.0781	-0.3042	0.3331	0.2818	0.1918	-0.1960	0.2606	0.1772	1.0000				
W1relig1YP	0.1113	-0.1184	-0.0189	0.2048	0.1802	-0.0792	0.0802	0.0267	-0.0414	1.0000			
W1sexYP	0.0184	-0.0268	0.0104	0.0203	0.0054	0.0002	0.0237	0.0069	0.0440	0.0272	1.0000		
W2senMP	0.1077	0.0294	-0.0291	-0.0568	-0.0469	0.0337	-0.0047	-0.0282	0.0034	0.0365	0.0552	1.0000	
KS4_CVAP3A~Z	0.1983	0.2986	-0.2868	-0.4179	-0.3893	0.2106	-0.3434	-0.2228	-0.2138	-0.1440	0.0686	0.0967	1.0000
KS4_AGE_ST~T	-0.0103	-0.0066	-0.0098	0.0103	0.0138	0.0088	-0.0111	-0.0063	-0.0153	-0.0036	0.0235	-0.1522	-0.0445
W1ethgrpYP	0.1055	-0.1277	0.1324	0.1326	0.1279	-0.1322	0.0848	0.0432	0.1217	0.4695	0.0627	0.0424	-0.1650
W1kidskolMP	-0.1852	-0.0215	0.0775	0.0608	0.0513	-0.0503	0.0763	0.0148	0.0501	-0.0192	0.0211	-0.0087	-0.2043
W2schlifMP	-0.1158	0.0484	-0.0001	-0.0195	-0.0483	0.0540	-0.0459	-0.0425	0.0662	-0.1521	0.0203	0.0426	0.0440
W2heposs9YP	0.2579	0.1634	-0.1477	-0.2074	-0.2124	0.0989	-0.1672	-0.0827	-0.1010	0.1677	0.1231	0.0871	0.4415
IndSchool	-0.0528	-0.0013	-0.0293	-0.0364	-0.0369	0.0176	0.0485	-0.0126	-0.0305	0.0904	0.0470	0.0087	-0.0296
phaseofEdu	-0.0142	0.0162	-0.0047	-0.0172	-0.0305	0.0232	-0.0631	-0.0239	-0.0749	-0.0434	0.0637	0.0099	-0.0064
urbind	-0.0220	0.1239	-0.0561	-0.1205	-0.1315	0.0461	-0.0813	-0.0223	-0.1033	-0.1342	0.0188	-0.0094	0.1115
KS4_IDACI_~A	0.0824	0.3104	-0.3504	-0.3753	-0.4158	0.2098	-0.2973	-0.2211	-0.2765	-0.1605	-0.0460	0.0393	0.3650
S_Trelatio~A	0.1608	-0.0641	0.0775	0.1061	0.1180	-0.0426	0.0753	0.0670	0.0055	0.1356	-0.0357	0.0447	-0.1451
teacherqua~A	0.3983	0.0318	-0.0387	-0.0743	-0.0381	0.0400	-0.0877	-0.0148	-0.0980	0.1263	-0.0523	0.0504	0.1563
teachereff~A	0.3802	-0.0053	0.0062	-0.0078	0.0255	0.0110	-0.0324	0.0197	-0.0726	0.1598	-0.0567	0.0594	0.0527
Squality_A	0.1365	0.1344	-0.1368	-0.1928	-0.1839	0.0806	-0.1441	-0.0962	-0.1063	0.0396	0.0299	0.0186	0.3004
SchOE_A	0.1246	0.1209	-0.1096	-0.1694	-0.1617	0.0530	-0.1271	-0.0750	-0.0994	0.0402	0.0275	0.0244	0.2669
SchAS_A	0.1414	0.1783	-0.1481	-0.2490	-0.2381	0.1012	-0.1689	-0.1010	-0.1213	0.0226	0.0258	0.0162	0.3302
SchPDW_A	0.1187	0.1283	-0.1641	-0.1969	-0.1844	0.1120	-0.1422	-0.0902	-0.1109	0.0329	0.0395	0.0028	0.3079
SchQP_A	0.1535	0.1174	-0.1220	-0.1737	-0.1536	0.0691	-0.1375	-0.0871	-0.0980	0.0557	0.0304	-0.0065	0.2681
SchLM_A	0.1497	0.0989	-0.1032	-0.1500	-0.1476	0.0596	-0.1298	-0.0786	-0.1016	0.0541	0.0431	0.0004	0.2368
SchESELH_A	0.0243	0.0413	-0.0505	-0.0466	-0.0538	-0.0206	-0.0252	-0.0771	0.0031	0.0236	-0.0159	0.0574	0.1035
SchEPELS_A	0.0230	0.0170	-0.0040	0.0024	-0.0205	-0.0197	-0.0069	-0.0357	0.0064	0.0300	-0.0295	0.0604	0.0614
SchELMPC_A	-0.0112	0.0438	-0.0359	-0.0210	-0.0344	0.0069	-0.0150	-0.0428	-0.0007	-0.0018	-0.0349	0.0538	0.0827
SchESELEW_A	0.0204	0.0281	-0.0119	-0.0464	-0.0370	0.0115	-0.0329	-0.0495	-0.0119	-0.0368	0.0010	0.0517	0.1132

	KS4_AG~T	W1ethg~P	W1kids~P	W2schl~P	W2hepo~P	IndSch~l	phaseo~u	urbind	KS4_ID~A	S_Trel~A	teac~y_A	teac~t_A	Squali~A
KS4_AGE_ST~T	1.0000												
W1ethgrpYP	-0.0122	1.0000											
W1kidskolMP	-0.0224	0.0142	1.0000										
W2schlifMP	-0.0348	-0.2168	0.1357	1.0000									
W2heposs9YP	-0.0278	0.2088	-0.1385	-0.0927	1.0000								
IndSchool	-0.0013	-0.0168	0.0050	-0.0532	-0.0556	1.0000							
phaseofEdu	0.0030	-0.0563	0.0106	0.0204	-0.0417	0.0060	1.0000						
urbind	0.0500	-0.1683	-0.0618	0.0764	0.0069	-0.0201	-0.0056	1.0000					
KS4_IDACI_~A	0.0124	-0.3521	-0.0869	0.1144	0.0989	0.0191	0.0631	0.2604	1.0000				
S_Trelatio~A	0.0149	0.0920	-0.0625	-0.1494	0.0744	-0.0103	-0.0478	-0.0515	-0.1273	1.0000			
teacherqua~A	0.0089	0.0340	-0.2858	-0.1120	0.2267	0.0003	-0.0439	-0.0096	0.0244	0.2753	1.0000		
teachereff~A	0.0138	0.0688	-0.2484	-0.1552	0.2084	-0.0045	-0.0559	-0.0312	-0.0403	0.6751	0.8951	1.0000	
Squality_A	-0.0067	0.0555	-0.3003	-0.0450	0.1667	-0.0174	-0.0636	0.0989	0.1926	-0.0679	0.1710	0.0998	1.0000
SchOE_A	-0.0076	0.0521	-0.2537	-0.0408	0.1462	-0.0163	-0.0393	0.0701	0.1551	-0.0462	0.1395	0.0857	0.9472
SchAS_A	-0.0133	0.0347	-0.2916	-0.0406	0.1652	0.0547	-0.0088	0.1014	0.2426	-0.1036	0.1683	0.0811	0.9023
SchPDW_A	-0.0120	0.0394	-0.3092	-0.0454	0.1743	0.0104	-0.1052	0.1060	0.1990	-0.0685	0.1824	0.1082	0.9152
SchQP_A	-0.0041	0.0762	-0.2799	-0.0586	0.1556	-0.0241	-0.0104	0.0715	0.1345	-0.0734	0.1653	0.0928	0.9232
SchLM_A	0.0023	0.1019	-0.2500	-0.0736	0.1529	-0.1215	-0.1081	0.0957	0.1335	-0.0425	0.1614	0.1041	0.9055
SchESELH_A	0.0030	-0.0055	-0.1450	0.0090	0.0479	0.0060	-0.0135	0.0453	0.1300	-0.0174	0.0618	0.0394	0.3900
SchEPELS_A	0.0015	0.0205	-0.0839	0.0188	0.0384	0.0030	-0.0067	0.0224	0.0356	-0.0146	0.0310	0.0170	0.3748
SchELMPC_A	0.0027	-0.0241	-0.1089	0.0474	0.0344	0.0055	-0.0124	0.0418	0.0837	-0.0133	0.0263	0.0140	0.4629
SchESELEW_A	0.0033	-0.0312	-0.1168	0.0300	0.0364	0.0066	-0.0150	0.0503	0.0949	-0.0048	0.0326	0.0228	0.4794

	SchOE_A	SchAS_A	SchPDW_A	SchQP_A	SchLM_A	SchE~H_A	SchEPE~A	SchELM~A	SchE~W_A
SchOE_A	1.0000								
SchAS_A	0.8371	1.0000							
SchPDW_A	0.8032	0.8322	1.0000						
SchQP_A	0.8526	0.8720	0.8482	1.0000					
SchLM_A	0.8558	0.8193	0.8100	0.8763	1.0000				
SchESELH_A	0.3456	0.1827	0.2301	0.2183	0.1785	1.0000			
SchEPELS_A	0.3734	0.1442	0.1779	0.1989	0.1504	0.8375	1.0000		
SchELMPC_A	0.4665	0.2168	0.2777	0.2397	0.2214	0.7643	0.8394	1.0000	
SchESELEW_A	0.5070	0.2524	0.2766	0.2748	0.2642	0.6228	0.7505	0.8617	1.0000

.

Number of obs=1520.

Table B.3: School Quality Effect on Cognitive Outcome

VARIABLES	(1) IRR	(2) IRR	(3) IRR	(4) IRR	(5) IRR	(6) IRR	(7) IRR	(8) IRR	(9) IRR	(10) IRR
School Process										
SchOE_A	1.009***									
	(0.00261)									
SchAS_A		1.007***								
		(0.00250)								
SchPDW_A			1.005***							
			(0.00153)							
SchQP_A				1.011***						
				(0.00317)						
SchLM_A					1.007***					
					(0.00231)					
SchESELH_A						1.010				
						(0.00690)				
SchEPELS_A							1.024***			
							(0.00461)			
SchELMPC_A								1.007		
								(0.00592)		
SchESELEW_A									1.016**	
									(0.00695)	
Overall school quality										1.002***
										(0.000432)
Overall teacher index	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***	1.005***
	(0.00149)	(0.00153)	(0.00150)	(0.00150)	(0.00149)	(0.00157)	(0.00156)	(0.00157)	(0.00155)	(0.00149)
School Context										
Independent school	1.293***	1.213**	1.274***	1.293***	1.401***	1.209**	1.210**	1.209**	1.213**	1.302***
	(0.111)	(0.103)	(0.102)	(0.107)	(0.133)	(0.0957)	(0.0963)	(0.0959)	(0.0966)	(0.110)
Phase of education (reference level: secondary)										
Academies	1.359***	1.372***	1.271***	1.339***	1.280***	1.359***	1.361***	1.360***	1.355***	1.309***

	(0.0916)	(0.0926)	(0.0890)	(0.0858)	(0.0858)	(0.0965)	(0.0964)	(0.0964)	(0.0959)	(0.0870)
Middle deemed Secondary	0.974	0.992	0.984	1.005	0.974	1.004	1.004	1.004	1.004	0.981
	(0.0250)	(0.0254)	(0.0254)	(0.0293)	(0.0269)	(0.0501)	(0.0499)	(0.0497)	(0.0489)	(0.0253)
Student Inputs										
KS3 score (Z)	1.382***	1.382***	1.381***	1.382***	1.386***	1.391***	1.392***	1.392***	1.391***	1.381***
	(0.0315)	(0.0317)	(0.0318)	(0.0315)	(0.0318)	(0.0323)	(0.0323)	(0.0324)	(0.0322)	(0.0316)
Likelihood of the young person applying to university (reference level: not at all likely)										
Not very likely	1.161**	1.153**	1.153**	1.157**	1.152**	1.149**	1.151**	1.149**	1.153**	1.157**
	(0.0666)	(0.0655)	(0.0657)	(0.0662)	(0.0653)	(0.0655)	(0.0657)	(0.0654)	(0.0660)	(0.0661)
Fairly likely	1.228***	1.218***	1.222***	1.222***	1.218***	1.211***	1.212***	1.211***	1.216***	1.224***
	(0.0668)	(0.0660)	(0.0669)	(0.0672)	(0.0664)	(0.0657)	(0.0658)	(0.0656)	(0.0659)	(0.0671)
Very likely	1.203***	1.198***	1.197***	1.199***	1.197***	1.190***	1.190***	1.190***	1.192***	1.200***
	(0.0642)	(0.0643)	(0.0647)	(0.0651)	(0.0648)	(0.0642)	(0.0639)	(0.0638)	(0.0638)	(0.0647)
Highest qualification of family (reference level: Degree or equivalent)										
Higher education below degree level	0.995	0.995	0.996	0.998	0.992	0.993	0.993	0.993	0.993	0.996
	(0.0236)	(0.0236)	(0.0241)	(0.0240)	(0.0238)	(0.0239)	(0.0239)	(0.0239)	(0.0240)	(0.0239)
GCE A Level or equiv	1.045*	1.046*	1.046*	1.050*	1.044*	1.043	1.042	1.041	1.042	1.047*
	(0.0269)	(0.0269)	(0.0274)	(0.0277)	(0.0271)	(0.0267)	(0.0269)	(0.0269)	(0.0268)	(0.0272)
GCSE grades A-C or equiv	1.027	1.026	1.024	1.028	1.024	1.017	1.015	1.016	1.016	1.027
	(0.0283)	(0.0281)	(0.0286)	(0.0287)	(0.0288)	(0.0284)	(0.0283)	(0.0284)	(0.0283)	(0.0283)
Qualifications at level 1 and below	1.025	1.028	1.027	1.029	1.023	1.024	1.023	1.021	1.023	1.029
	(0.0530)	(0.0534)	(0.0534)	(0.0531)	(0.0530)	(0.0538)	(0.0534)	(0.0534)	(0.0535)	(0.0532)
Other qualifications	0.998	1.001	1.005	1.010	0.999	0.986	0.986	0.986	0.987	1.002
	(0.0733)	(0.0755)	(0.0766)	(0.0763)	(0.0748)	(0.0754)	(0.0751)	(0.0752)	(0.0742)	(0.0749)
No qualification	0.964	0.965	0.964	0.967	0.961	0.955	0.954	0.954	0.958	0.964
	(0.0571)	(0.0583)	(0.0575)	(0.0574)	(0.0573)	(0.0576)	(0.0576)	(0.0576)	(0.0581)	(0.0573)
Family NS-SEC class (reference level: Higher										

Managerial and professional occupations)										
Lower managerial and professional occupations	1.036*	1.030	1.032	1.035*	1.036*	1.028	1.029	1.028	1.028	1.035*
	(0.0212)	(0.0207)	(0.0206)	(0.0209)	(0.0214)	(0.0207)	(0.0208)	(0.0208)	(0.0209)	(0.0209)
Intermediate occupations	1.087**	1.089**	1.088**	1.087**	1.090**	1.081*	1.083**	1.082*	1.079*	1.087**
	(0.0436)	(0.0435)	(0.0432)	(0.0432)	(0.0435)	(0.0435)	(0.0435)	(0.0436)	(0.0434)	(0.0432)
Small employers and own account workers	1.023	1.019	1.020	1.022	1.026	1.016	1.018	1.016	1.015	1.022
	(0.0346)	(0.0342)	(0.0334)	(0.0344)	(0.0349)	(0.0342)	(0.0344)	(0.0343)	(0.0341)	(0.0341)
Lower supervisory and technical occupations	1.025	1.023	1.023	1.020	1.026	1.019	1.020	1.021	1.018	1.023
	(0.0343)	(0.0344)	(0.0340)	(0.0335)	(0.0343)	(0.0351)	(0.0351)	(0.0352)	(0.0354)	(0.0339)
Semi-routine occupations	1.001	0.994	0.995	0.997	0.999	0.986	0.987	0.986	0.985	0.998
	(0.0429)	(0.0432)	(0.0431)	(0.0433)	(0.0431)	(0.0435)	(0.0437)	(0.0437)	(0.0435)	(0.0431)
Routine occupations	0.999	0.994	0.993	0.998	1.001	0.984	0.985	0.984	0.983	0.996
	(0.0433)	(0.0437)	(0.0434)	(0.0436)	(0.0435)	(0.0445)	(0.0443)	(0.0446)	(0.0444)	(0.0433)
Never worked/long term unemployed	0.941	0.932	0.928	0.935	0.936	0.924	0.930	0.926	0.932	0.938
	(0.102)	(0.102)	(0.101)	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)
Mean income (Z)	0.983*	0.982*	0.984*	0.983*	0.984*	0.983*	0.983*	0.983*	0.983*	0.983*
	(0.00931)	(0.00944)	(0.00928)	(0.00947)	(0.00945)	(0.00904)	(0.00905)	(0.00907)	(0.00904)	(0.00942)
IDACI score (Z)	1.026	1.025	1.026	1.029	1.027	1.028	1.029	1.029	1.028	1.025
	(0.0180)	(0.0185)	(0.0185)	(0.0179)	(0.0178)	(0.0190)	(0.0187)	(0.0187)	(0.0188)	(0.0182)
Type of household tenure										

(reference level: Owned outright)										
Being bought on a mortgage/ bank loan	0.989	0.989	0.990	0.993	0.991	0.987	0.988	0.987	0.989	0.991
	(0.0220)	(0.0218)	(0.0218)	(0.0216)	(0.0219)	(0.0225)	(0.0225)	(0.0225)	(0.0225)	(0.0218)
Shared ownership (owns & rents property)	1.177	1.167	1.186	1.166	1.173	1.152	1.153	1.154	1.159	1.178
	(0.210)	(0.212)	(0.215)	(0.210)	(0.212)	(0.207)	(0.207)	(0.207)	(0.201)	(0.212)
Rented from a Council or New Town	0.940	0.943	0.947	0.948	0.944	0.943	0.943	0.944	0.943	0.944
	(0.0504)	(0.0497)	(0.0501)	(0.0499)	(0.0499)	(0.0498)	(0.0499)	(0.0500)	(0.0500)	(0.0500)
Rented from a Housing Association	0.916	0.914	0.920	0.919	0.917	0.917	0.914	0.917	0.917	0.919
	(0.0634)	(0.0634)	(0.0633)	(0.0634)	(0.0631)	(0.0633)	(0.0639)	(0.0633)	(0.0641)	(0.0636)
Rented privately	1.009	1.013	1.018	1.018	1.019	1.017	1.014	1.015	1.012	1.016
	(0.0520)	(0.0527)	(0.0529)	(0.0527)	(0.0532)	(0.0537)	(0.0535)	(0.0536)	(0.0534)	(0.0525)
Rent free	1.047	1.028	1.022	1.040	1.030	1.002	1.002	1.002	0.998	1.033
	(0.0767)	(0.0737)	(0.0730)	(0.0783)	(0.0798)	(0.0741)	(0.0741)	(0.0740)	(0.0730)	(0.0748)
Some other arrangement	1.046	1.048	1.040	1.046	1.029	1.043	1.043	1.043	1.044	1.042
	(0.165)	(0.174)	(0.163)	(0.160)	(0.161)	(0.182)	(0.183)	(0.182)	(0.183)	(0.163)
Urban/Rural Indicator (reference level: Urban-sparse)										
Village-sparse	0.879*	0.873*	0.870*	0.886	0.878*	0.867*	0.867*	0.867*	0.866*	0.877*
	(0.0676)	(0.0673)	(0.0655)	(0.0675)	(0.0668)	(0.0659)	(0.0653)	(0.0663)	(0.0648)	(0.0663)
Hamlet and Isolated Dwelling-sparse	0.998	0.986	0.971	1.017	0.989	0.973	0.976	0.974	0.974	0.990
	(0.0552)	(0.0544)	(0.0545)	(0.0621)	(0.0587)	(0.0607)	(0.0610)	(0.0609)	(0.0601)	(0.0553)
Urban-less sparse	1.062*	1.049	1.032	1.064*	1.059**	1.019	1.019	1.019	1.020	1.055*

	(0.0364)	(0.0329)	(0.0284)	(0.0362)	(0.0305)	(0.0393)	(0.0394)	(0.0392)	(0.0386)	(0.0308)
Town & Fringe-less sparse	1.051	1.038	1.023	1.056	1.046	1.018	1.019	1.018	1.018	1.042
	(0.0390)	(0.0359)	(0.0320)	(0.0389)	(0.0347)	(0.0427)	(0.0428)	(0.0426)	(0.0421)	(0.0340)
Village-less sparse	1.027	1.016	1.002	1.025	1.019	0.998	0.998	0.998	0.997	1.017
	(0.0477)	(0.0439)	(0.0412)	(0.0474)	(0.0439)	(0.0465)	(0.0467)	(0.0465)	(0.0461)	(0.0437)
Hamlet & Isolated Dwelling-less sparse	1.073	1.063	1.043	1.074	1.065	1.041	1.041	1.041	1.041	1.063
	(0.0471)	(0.0445)	(0.0424)	(0.0466)	(0.0449)	(0.0476)	(0.0476)	(0.0476)	(0.0470)	(0.0440)
MP: How the young person's expenses would be paid if stayed on in education-Parent(s) will support or give money	1.064	1.060	1.060	1.061	1.061	1.064	1.063	1.062	1.061	1.061
	(0.0497)	(0.0502)	(0.0497)	(0.0500)	(0.0499)	(0.0508)	(0.0507)	(0.0506)	(0.0507)	(0.0498)
MP: How involved is the MP in the young person's school life? (reference level: very involved)										
Fairly involved	1.038	1.038	1.039	1.039	1.040	1.038	1.036	1.037	1.035	1.038
	(0.0279)	(0.0281)	(0.0278)	(0.0279)	(0.0279)	(0.0285)	(0.0285)	(0.0286)	(0.0281)	(0.0279)
Not very involved	1.018	1.018	1.019	1.021	1.023	1.015	1.014	1.014	1.014	1.019
	(0.0309)	(0.0307)	(0.0311)	(0.0308)	(0.0308)	(0.0316)	(0.0317)	(0.0318)	(0.0317)	(0.0310)
Not at all involved	1.170***	1.177***	1.174***	1.175***	1.175***	1.177***	1.174***	1.173***	1.171***	1.172***
	(0.0596)	(0.0598)	(0.0595)	(0.0595)	(0.0593)	(0.0615)	(0.0610)	(0.0612)	(0.0604)	(0.0595)
Whether or not there is internet access from home	0.998	0.996	0.999	0.997	0.997	1.001	1.001	1.002	1.002	0.998
	(0.0471)	(0.0484)	(0.0481)	(0.0479)	(0.0477)	(0.0490)	(0.0489)	(0.0490)	(0.0482)	(0.0477)
Whether or not	1.103	1.107	1.108	1.104	1.100	1.096	1.097	1.100	1.097	1.102

there is home computer in the household										
	(0.0767)	(0.0757)	(0.0772)	(0.0760)	(0.0763)	(0.0773)	(0.0767)	(0.0768)	(0.0767)	(0.0767)
Family structure (reference level: married couple)										
Cohabiting couple	1.044	1.038	1.035	1.040	1.040	1.036	1.037	1.037	1.038	1.039
	(0.0411)	(0.0415)	(0.0422)	(0.0411)	(0.0417)	(0.0416)	(0.0416)	(0.0416)	(0.0409)	(0.0415)
Lone father	1.045	1.053	1.053	1.056	1.060	1.045	1.045	1.044	1.042	1.054
	(0.0779)	(0.0819)	(0.0803)	(0.0812)	(0.0811)	(0.0800)	(0.0801)	(0.0799)	(0.0796)	(0.0805)
Lone mother	0.909**	0.906**	0.908**	0.906**	0.909**	0.908**	0.909**	0.909**	0.908**	0.908**
	(0.0344)	(0.0343)	(0.0348)	(0.0348)	(0.0347)	(0.0345)	(0.0347)	(0.0346)	(0.0343)	(0.0346)
No parents in the household	0.986	0.970	0.967	0.959	0.970	0.957	0.960	0.960	0.962	0.972
	(0.0596)	(0.0644)	(0.0624)	(0.0579)	(0.0607)	(0.0674)	(0.0676)	(0.0679)	(0.0687)	(0.0605)
Young person's religion (reference level: Christian)										
None	0.972	0.970	0.970	0.970	0.968	0.966	0.967	0.967	0.968	0.971
	(0.0216)	(0.0212)	(0.0207)	(0.0209)	(0.0211)	(0.0217)	(0.0218)	(0.0218)	(0.0217)	(0.0212)
Buddhist	1.098	1.091	1.108	1.081	1.089	1.106	1.077	1.096	1.078	1.108
	(0.163)	(0.163)	(0.173)	(0.163)	(0.164)	(0.168)	(0.156)	(0.164)	(0.157)	(0.171)
Hindu	0.887	0.881	0.887	0.881	0.884	0.897	0.897	0.897	0.898	0.883
	(0.0866)	(0.0880)	(0.0903)	(0.0901)	(0.0868)	(0.0854)	(0.0849)	(0.0850)	(0.0847)	(0.0889)
Jewish	0.859*	0.862*	0.848**	0.862**	0.862*	0.896	0.895	0.896	0.893	0.851**
	(0.0688)	(0.0700)	(0.0631)	(0.0646)	(0.0670)	(0.0661)	(0.0665)	(0.0664)	(0.0668)	(0.0664)
Muslim	1.133*	1.130*	1.129*	1.132*	1.123	1.121	1.122	1.122*	1.122	1.128*
	(0.0831)	(0.0814)	(0.0817)	(0.0808)	(0.0809)	(0.0781)	(0.0780)	(0.0781)	(0.0781)	(0.0820)
Sikh	0.978	0.962	0.982	0.975	0.970	0.968	0.968	0.968	0.970	0.975
	(0.0998)	(0.0990)	(0.103)	(0.104)	(0.0990)	(0.0959)	(0.0954)	(0.0955)	(0.0953)	(0.102)
Another religion	0.860	0.848	0.835	0.843	0.849	0.839	0.840	0.839	0.846	0.847
	(0.257)	(0.261)	(0.257)	(0.256)	(0.263)	(0.259)	(0.259)	(0.259)	(0.261)	(0.259)
Young person’s ethnicity (reference level: White)										
Mixed	1.110*	1.110*	1.112*	1.109*	1.107*	1.123*	1.123*	1.121*	1.120*	1.109*

	(0.0655)	(0.0660)	(0.0663)	(0.0658)	(0.0651)	(0.0661)	(0.0660)	(0.0660)	(0.0658)	(0.0659)
Indian	1.198*	1.221*	1.207*	1.207*	1.208*	1.225**	1.225**	1.224**	1.220**	1.206*
	(0.120)	(0.125)	(0.127)	(0.128)	(0.122)	(0.118)	(0.118)	(0.118)	(0.117)	(0.125)
Pakistani	1.079	1.075	1.081	1.073	1.078	1.096	1.094	1.100	1.108	1.078
	(0.0947)	(0.0939)	(0.0951)	(0.0937)	(0.0940)	(0.0946)	(0.0943)	(0.0952)	(0.0960)	(0.0947)
Bangladeshi	1.097	1.099	1.111	1.096	1.092	1.123	1.119	1.117	1.112	1.098
	(0.113)	(0.118)	(0.119)	(0.116)	(0.114)	(0.119)	(0.117)	(0.118)	(0.117)	(0.116)
Black Caribbean	1.109	1.113	1.111	1.113	1.109	1.121	1.121	1.121	1.123	1.108
	(0.101)	(0.103)	(0.103)	(0.102)	(0.102)	(0.105)	(0.105)	(0.105)	(0.104)	(0.102)
Black African	1.191***	1.198***	1.203***	1.203***	1.189***	1.222***	1.222***	1.221***	1.218***	1.193***
	(0.0750)	(0.0744)	(0.0743)	(0.0744)	(0.0730)	(0.0781)	(0.0780)	(0.0782)	(0.0778)	(0.0737)
Other	1.119	1.127	1.133	1.124	1.125	1.157	1.158	1.158	1.156	1.123
	(0.125)	(0.128)	(0.129)	(0.124)	(0.126)	(0.136)	(0.136)	(0.135)	(0.135)	(0.126)
Female	1.050**	1.051**	1.050**	1.051**	1.049**	1.051**	1.051**	1.051**	1.050**	1.050**
	(0.0211)	(0.0211)	(0.0212)	(0.0212)	(0.0211)	(0.0214)	(0.0213)	(0.0213)	(0.0215)	(0.0211)
Young person has Special educational needs	0.933	0.936	0.930	0.927	0.930	0.944	0.944	0.944	0.943	0.929
	(0.0876)	(0.0893)	(0.0884)	(0.0885)	(0.0889)	(0.0898)	(0.0897)	(0.0899)	(0.0895)	(0.0882)
Young person's age when started KS4	0.463***	0.463***	0.464***	0.466***	0.465***	0.454***	0.453***	0.453***	0.453***	0.466***
	(0.0507)	(0.0519)	(0.0504)	(0.0521)	(0.0565)	(0.0540)	(0.0536)	(0.0538)	(0.0535)	(0.0520)
Constant	2.262e+07***	2.317e+07***	2.262e+07***	2.075e+07***	2.130e+07***	3.296e+07***	3.365e+07***	3.357e+07***	3.364e+07***	2.112e+07***
	(3.709e+07)	(3.892e+07)	(3.681e+07)	(3.483e+07)	(3.880e+07)	(5.882e+07)	(5.963e+07)	(5.976e+07)	(5.957e+07)	(3.531e+07)

Standard error (Eform) in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B.4: School Quality Effect on Affective Outcome

VARIABLES	(1) OR	(2) OR	(3) OR	(4) OR	(5) OR	(6) OR	(7) OR	(8) OR	(9) OR	(10) OR
School Process										
SchOE_A	1.015									
	(0.0145)									
SchAS_A		1.031**								
		(0.0152)								
SchPDW_A			1.007							
			(0.00966)							
SchQP_A				1.043**						
				(0.0182)						
SchLM_A					1.024*					
					(0.0142)					
SchESELH_A						0.967				
						(0.0254)				
SchEPELS_A							0.970			
							(0.0218)			
SchELMPC_A								0.959		
								(0.0348)		
SchESELEW_A									0.993	
									(0.0311)	
Overall school quality										1.003
										(0.00281)
Overall teacher index	1.067***	1.067***	1.067***	1.067***	1.067***	1.068***	1.068***	1.068***	1.068***	1.067***
	(0.00608)	(0.00613)	(0.00612)	(0.00609)	(0.00610)	(0.00620)	(0.00619)	(0.00622)	(0.00618)	(0.00609)
School context										
Independent school	0.164*	0.154**	0.160**	0.193*	0.242	0.149**	0.149**	0.151**	0.148**	0.173*
	(0.151)	(0.143)	(0.147)	(0.180)	(0.233)	(0.136)	(0.136)	(0.138)	(0.135)	(0.160)
Phase of education										
Academies	0.848	0.894	0.775	0.810	0.703	0.857	0.854	0.860	0.855	0.791
	(0.351)	(0.370)	(0.339)	(0.344)	(0.311)	(0.353)	(0.352)	(0.353)	(0.352)	(0.335)
Middle	1.029	1.035	1.042	1.103	0.977	1.070	1.068	1.065	1.069	1.032

deemed Secondary										
	(0.262)	(0.196)	(0.280)	(0.202)	(0.228)	(0.339)	(0.338)	(0.342)	(0.339)	(0.244)
Student's inputs										
KS3 score (Z)	1.316**	1.291**	1.322***	1.286**	1.311**	1.353***	1.347***	1.358***	1.345***	1.309**
	(0.140)	(0.138)	(0.140)	(0.137)	(0.137)	(0.144)	(0.143)	(0.144)	(0.143)	(0.138)
Likelihood of the young person applying to university										
Not very likely	1.893**	1.925**	1.891**	1.937**	1.896**	1.880**	1.875**	1.893**	1.871**	1.896**
	(0.544)	(0.554)	(0.539)	(0.553)	(0.544)	(0.541)	(0.538)	(0.545)	(0.537)	(0.543)
Fairly likely	2.110***	2.160***	2.105***	2.173***	2.133***	2.072**	2.070**	2.071**	2.066**	2.123***
	(0.602)	(0.620)	(0.599)	(0.620)	(0.606)	(0.591)	(0.590)	(0.590)	(0.589)	(0.606)
Very likely	2.236***	2.298***	2.228***	2.298***	2.265***	2.201**	2.201**	2.211**	2.196**	2.247***
	(0.686)	(0.706)	(0.683)	(0.703)	(0.693)	(0.678)	(0.678)	(0.682)	(0.677)	(0.688)
Highest qualification of family										
Higher education below degree level	0.796	0.804	0.797	0.814	0.794	0.790	0.791	0.790	0.792	0.799
	(0.192)	(0.194)	(0.192)	(0.199)	(0.193)	(0.190)	(0.190)	(0.190)	(0.191)	(0.193)
GCE A Level or equiv	1.028	1.045	1.026	1.057	1.029	1.013	1.017	1.012	1.020	1.034
	(0.252)	(0.257)	(0.251)	(0.262)	(0.254)	(0.246)	(0.247)	(0.246)	(0.248)	(0.254)
GCSE grades A-C or equiv	0.834	0.861	0.831	0.862	0.841	0.825	0.825	0.828	0.823	0.838
	(0.212)	(0.220)	(0.211)	(0.223)	(0.215)	(0.209)	(0.209)	(0.211)	(0.208)	(0.213)
Qualifications at level 1 and below	0.831	0.854	0.842	0.849	0.839	0.841	0.843	0.854	0.842	0.839
	(0.292)	(0.303)	(0.296)	(0.303)	(0.297)	(0.295)	(0.295)	(0.300)	(0.295)	(0.296)
Other qualifications	0.811	0.847	0.814	0.865	0.830	0.808	0.799	0.818	0.794	0.820
	(0.429)	(0.452)	(0.434)	(0.462)	(0.439)	(0.432)	(0.426)	(0.438)	(0.424)	(0.435)
No qualification	0.941	0.966	0.943	0.966	0.947	0.953	0.946	0.970	0.940	0.942

	(0.350)	(0.361)	(0.351)	(0.362)	(0.353)	(0.356)	(0.353)	(0.363)	(0.350)	(0.351)
Family NS-SEC class										
Lower managerial and professional occupations	0.976	0.975	0.966	0.996	0.995	0.955	0.955	0.956	0.955	0.977
	(0.193)	(0.191)	(0.190)	(0.196)	(0.196)	(0.188)	(0.188)	(0.188)	(0.188)	(0.193)
Intermediate occupations	1.069	1.093	1.071	1.083	1.093	1.070	1.063	1.076	1.063	1.074
	(0.316)	(0.322)	(0.317)	(0.318)	(0.324)	(0.316)	(0.314)	(0.317)	(0.314)	(0.317)
Small employers and own account workers	0.880	0.880	0.873	0.888	0.900	0.874	0.870	0.876	0.870	0.879
	(0.268)	(0.267)	(0.266)	(0.270)	(0.273)	(0.267)	(0.266)	(0.268)	(0.265)	(0.268)
Lower supervisory and technical occupations	0.971	0.976	0.967	0.967	0.989	0.966	0.962	0.964	0.961	0.970
	(0.250)	(0.251)	(0.248)	(0.251)	(0.257)	(0.246)	(0.246)	(0.247)	(0.245)	(0.250)
Semi-routine occupations	1.457	1.489	1.439	1.500	1.498	1.417	1.413	1.419	1.415	1.462
	(0.434)	(0.442)	(0.425)	(0.449)	(0.448)	(0.418)	(0.417)	(0.418)	(0.417)	(0.434)
Routine occupations	0.683	0.695	0.674	0.699	0.703	0.659	0.659	0.659	0.662	0.685
	(0.188)	(0.193)	(0.185)	(0.194)	(0.196)	(0.181)	(0.181)	(0.181)	(0.182)	(0.189)
Never worked/long term unemployed	0.919	0.941	0.914	0.945	0.945	0.908	0.906	0.916	0.902	0.924
	(0.504)	(0.520)	(0.500)	(0.524)	(0.527)	(0.497)	(0.495)	(0.500)	(0.494)	(0.508)
Mean income (Z)	0.848*	0.846*	0.850*	0.849*	0.850*	0.850*	0.850*	0.852*	0.850*	0.849*
	(0.0800)	(0.0798)	(0.0806)	(0.0796)	(0.0804)	(0.0804)	(0.0804)	(0.0806)	(0.0805)	(0.0802)

IDACI score (Z)	1.252**	1.233*	1.253**	1.254**	1.249**	1.267**	1.259**	1.264**	1.259**	1.248**
	(0.134)	(0.133)	(0.134)	(0.137)	(0.137)	(0.134)	(0.133)	(0.134)	(0.133)	(0.134)
Type of household tenure										
Being bought on a mortgage/ bank loan	0.990	0.995	0.990	1.012	1.002	0.985	0.983	0.984	0.983	0.995
	(0.186)	(0.187)	(0.186)	(0.192)	(0.190)	(0.184)	(0.184)	(0.184)	(0.184)	(0.187)
Shared ownership (owns & rents property)	0.938	0.958	0.941	0.974	0.968	0.912	0.906	0.917	0.894	0.950
	(0.675)	(0.696)	(0.676)	(0.700)	(0.697)	(0.649)	(0.647)	(0.651)	(0.641)	(0.683)
Rented from a Council or New Town	0.994	1.003	1.002	1.020	1.004	0.997	0.994	0.994	0.993	1.000
	(0.308)	(0.312)	(0.312)	(0.320)	(0.314)	(0.308)	(0.307)	(0.306)	(0.307)	(0.311)
Rented from a Housing Association	1.049	1.032	1.044	1.049	1.046	1.015	1.028	0.991	1.030	1.053
	(0.373)	(0.367)	(0.371)	(0.374)	(0.371)	(0.364)	(0.365)	(0.353)	(0.366)	(0.375)
Rented privately	1.119	1.117	1.135	1.139	1.150	1.117	1.123	1.114	1.123	1.132
	(0.423)	(0.424)	(0.430)	(0.433)	(0.438)	(0.424)	(0.426)	(0.422)	(0.426)	(0.429)
Rent free	7.890**	8.308**	7.503**	8.594**	8.098**	7.247**	7.223**	7.259**	7.246**	7.845**
	(6.845)	(7.228)	(6.381)	(7.421)	(6.948)	(6.095)	(6.074)	(6.092)	(6.092)	(6.740)
Some other arrangement	7.581	7.891	7.468	7.901	7.382	7.370	7.378	7.341	7.383	7.571
	(11.49)	(12.37)	(11.21)	(12.85)	(11.71)	(10.66)	(10.71)	(10.60)	(10.73)	(11.64)
Urban/Rural Indicator										
Village-sparse	0.437	0.436	0.425	0.467	0.447	0.420	0.421	0.418	0.423	0.437
	(0.420)	(0.426)	(0.407)	(0.455)	(0.432)	(0.398)	(0.400)	(0.394)	(0.401)	(0.421)
Hamlet and Isolated	1.598	1.609	1.525	1.822	1.641	1.526	1.526	1.518	1.531	1.594

Dwelling-sparse										
	(1.160)	(1.178)	(1.111)	(1.385)	(1.246)	(1.098)	(1.098)	(1.084)	(1.103)	(1.175)
Urban-less sparse	0.682	0.723	0.651	0.753	0.726	0.630	0.633	0.623	0.635	0.688
	(0.399)	(0.430)	(0.387)	(0.440)	(0.447)	(0.363)	(0.367)	(0.356)	(0.368)	(0.411)
Town & Fringe-less sparse	0.992	1.022	0.947	1.083	1.035	0.933	0.935	0.927	0.937	0.991
	(0.606)	(0.634)	(0.587)	(0.657)	(0.660)	(0.562)	(0.566)	(0.554)	(0.567)	(0.616)
Village-less sparse	0.601	0.618	0.578	0.633	0.619	0.572	0.573	0.569	0.574	0.599
	(0.349)	(0.363)	(0.341)	(0.362)	(0.374)	(0.330)	(0.332)	(0.326)	(0.333)	(0.354)
Hamlet & Isolated Dwelling-less sparse	0.329	0.340	0.314*	0.354	0.341	0.312*	0.313*	0.310*	0.314*	0.328
	(0.221)	(0.233)	(0.214)	(0.239)	(0.238)	(0.208)	(0.209)	(0.205)	(0.210)	(0.224)
MP: How the young person's expenses would be paid if stayed on in education-Parent(s) will support or give money	1.211	1.206	1.199	1.205	1.207	1.196	1.202	1.201	1.204	1.207
	(0.284)	(0.283)	(0.282)	(0.283)	(0.283)	(0.283)	(0.283)	(0.282)	(0.284)	(0.283)
MP: How involved is the MP in the young person's school life?										
Fairly involved	0.836	0.838	0.837	0.842	0.841	0.831	0.833	0.836	0.835	0.837
	(0.167)	(0.167)	(0.167)	(0.168)	(0.169)	(0.165)	(0.166)	(0.166)	(0.167)	(0.167)
Not very involved	0.620**	0.625**	0.618**	0.633**	0.631**	0.612**	0.614**	0.619**	0.615**	0.622**
	(0.140)	(0.139)	(0.139)	(0.142)	(0.143)	(0.137)	(0.138)	(0.139)	(0.139)	(0.140)
Not at all involved	0.629	0.634	0.635	0.628	0.631	0.637	0.639	0.645	0.639	0.631

	(0.203)	(0.205)	(0.205)	(0.205)	(0.204)	(0.206)	(0.206)	(0.208)	(0.206)	(0.204)
Whether or not there is internet access from home	1.379	1.375	1.381	1.371	1.372	1.374	1.381	1.368	1.381	1.380
	(0.360)	(0.359)	(0.361)	(0.361)	(0.358)	(0.360)	(0.362)	(0.358)	(0.362)	(0.361)
Whether or not there is home computer in the household	0.900	0.897	0.897	0.897	0.891	0.907	0.897	0.906	0.894	0.891
	(0.302)	(0.304)	(0.303)	(0.306)	(0.302)	(0.307)	(0.303)	(0.307)	(0.303)	(0.300)
Family structure										
Cohabiting couple	0.780	0.776	0.769	0.778	0.780	0.783	0.778	0.784	0.775	0.773
	(0.216)	(0.218)	(0.214)	(0.218)	(0.218)	(0.216)	(0.215)	(0.217)	(0.215)	(0.216)
Lone father	0.466	0.486	0.473	0.496	0.491	0.471	0.467	0.477	0.467	0.475
	(0.321)	(0.340)	(0.328)	(0.343)	(0.342)	(0.325)	(0.323)	(0.331)	(0.322)	(0.329)
Lone mother	1.022	1.011	1.017	1.016	1.027	1.018	1.014	1.019	1.015	1.019
	(0.210)	(0.206)	(0.208)	(0.208)	(0.211)	(0.208)	(0.207)	(0.208)	(0.207)	(0.209)
No parents in the household	0.634	0.638	0.615	0.593	0.623	0.618	0.614	0.613	0.613	0.621
	(0.494)	(0.494)	(0.478)	(0.463)	(0.478)	(0.479)	(0.476)	(0.473)	(0.475)	(0.482)
Young person's religion										
None	1.095	1.107	1.090	1.104	1.090	1.082	1.082	1.079	1.082	1.096
	(0.164)	(0.166)	(0.163)	(0.163)	(0.161)	(0.162)	(0.162)	(0.161)	(0.162)	(0.164)
Buddhist	1.139	1.127	1.154	1.054	1.102	1.074	1.137	1.060	1.141	1.145
	(0.979)	(0.981)	(1.006)	(0.903)	(0.945)	(0.917)	(0.987)	(0.898)	(0.990)	(0.994)
Hindu	0.738	0.680	0.744	0.683	0.709	0.758	0.760	0.766	0.758	0.723
	(0.383)	(0.343)	(0.385)	(0.344)	(0.365)	(0.398)	(0.398)	(0.403)	(0.398)	(0.372)
Jewish	0.952	0.845	0.939	0.867	0.887	1.021	1.019	1.015	1.021	0.914
	(0.857)	(0.770)	(0.843)	(0.786)	(0.793)	(0.913)	(0.913)	(0.909)	(0.915)	(0.823)
Muslim	1.478	1.473	1.475	1.485	1.441	1.486	1.480	1.487	1.479	1.469
	(0.955)	(0.932)	(0.950)	(0.963)	(0.940)	(0.951)	(0.947)	(0.950)	(0.948)	(0.948)
Sikh	2.485	2.388	2.525	2.499	2.471	2.507	2.488	2.523	2.477	2.480
	(1.528)	(1.400)	(1.539)	(1.468)	(1.495)	(1.556)	(1.540)	(1.568)	(1.534)	(1.496)

Another religion	0.270**	0.268***	0.257***	0.266***	0.275**	0.261***	0.260***	0.262***	0.259***	0.264***
	(0.136)	(0.135)	(0.127)	(0.133)	(0.139)	(0.129)	(0.128)	(0.129)	(0.127)	(0.132)
Young person's ethnicity										
Mixed	0.770	0.751	0.776	0.745	0.754	0.790	0.789	0.794	0.791	0.765
	(0.301)	(0.291)	(0.306)	(0.295)	(0.298)	(0.308)	(0.307)	(0.309)	(0.307)	(0.300)
Indian	1.518	1.568	1.530	1.496	1.510	1.563	1.561	1.560	1.564	1.524
	(0.803)	(0.792)	(0.805)	(0.746)	(0.787)	(0.841)	(0.839)	(0.840)	(0.841)	(0.793)
Pakistani	1.701	1.647	1.704	1.618	1.669	1.732	1.730	1.677	1.718	1.692
	(1.092)	(1.044)	(1.094)	(1.044)	(1.079)	(1.104)	(1.104)	(1.070)	(1.100)	(1.087)
Bangladeshi	0.581	0.547	0.584	0.544	0.557	0.585	0.591	0.594	0.592	0.572
	(0.461)	(0.441)	(0.464)	(0.443)	(0.447)	(0.463)	(0.468)	(0.471)	(0.469)	(0.456)
Black Caribbean	2.206**	2.159**	2.230**	2.134**	2.158**	2.326**	2.298**	2.356***	2.284**	2.181**
	(0.731)	(0.739)	(0.740)	(0.751)	(0.726)	(0.758)	(0.753)	(0.769)	(0.747)	(0.731)
Black African	2.272	2.162	2.302	2.233	2.186	2.376	2.366	2.389	2.365	2.246
	(1.292)	(1.234)	(1.312)	(1.259)	(1.255)	(1.362)	(1.354)	(1.371)	(1.354)	(1.279)
Other	1.523	1.425	1.541	1.441	1.467	1.624	1.612	1.617	1.611	1.500
	(0.745)	(0.677)	(0.766)	(0.670)	(0.695)	(0.816)	(0.811)	(0.813)	(0.810)	(0.728)
Female	1.179	1.185	1.176	1.185	1.170	1.169	1.171	1.161	1.175	1.180
	(0.153)	(0.154)	(0.153)	(0.155)	(0.152)	(0.152)	(0.153)	(0.151)	(0.153)	(0.154)
Young person has Special educational needs	0.482	0.466	0.470	0.464	0.467	0.455	0.464	0.437	0.472	0.479
	(0.255)	(0.243)	(0.245)	(0.244)	(0.243)	(0.240)	(0.245)	(0.232)	(0.249)	(0.254)
Young person's age when started KS4	0.743	0.804	0.763	0.785	0.759	0.771	0.755	0.809	0.743	0.751
	(0.514)	(0.548)	(0.528)	(0.538)	(0.515)	(0.541)	(0.531)	(0.573)	(0.522)	(0.521)

Standard error (Eform) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

C. Adjusted Wald Test for Survey Data

The predictive value of the model or what is also known as goodness of fit is tested using adjusted Wald test for survey data to test the joint significance of the parameters of the model, where the test is carried out as:

$$(d-k+1)W/(kd) \sim F(k, d-k+1)$$
$$\text{where } W = (Rb-r)'(RVR')^{-1}(Rb-r) \tag{C.1}$$

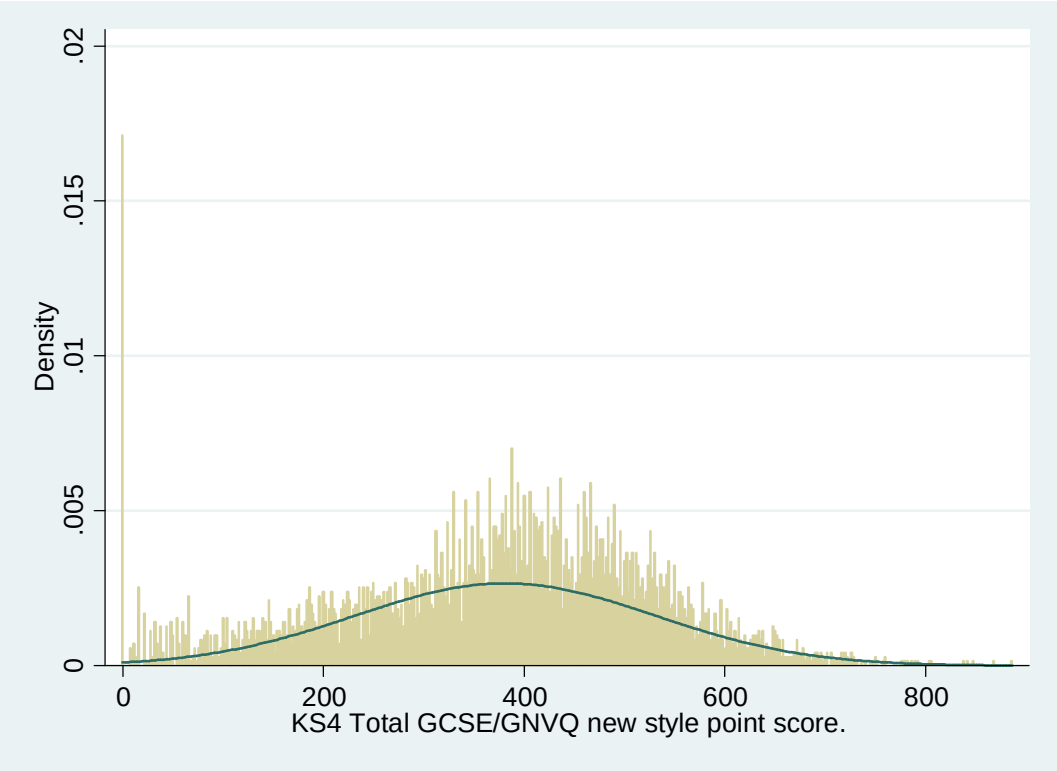
With an *F* statistics:

$$F = \frac{1}{q}W \tag{C.2}$$

where *b* is the estimated coefficient vector, *V* is the estimated variance-covariance matrix, $Rb=r$ denotes the set of q linear hypotheses to be tested jointly, *k* = the dimension of the test and *d*= the total number of PSUs minus the total number of strata (Judge, et al., 1985).

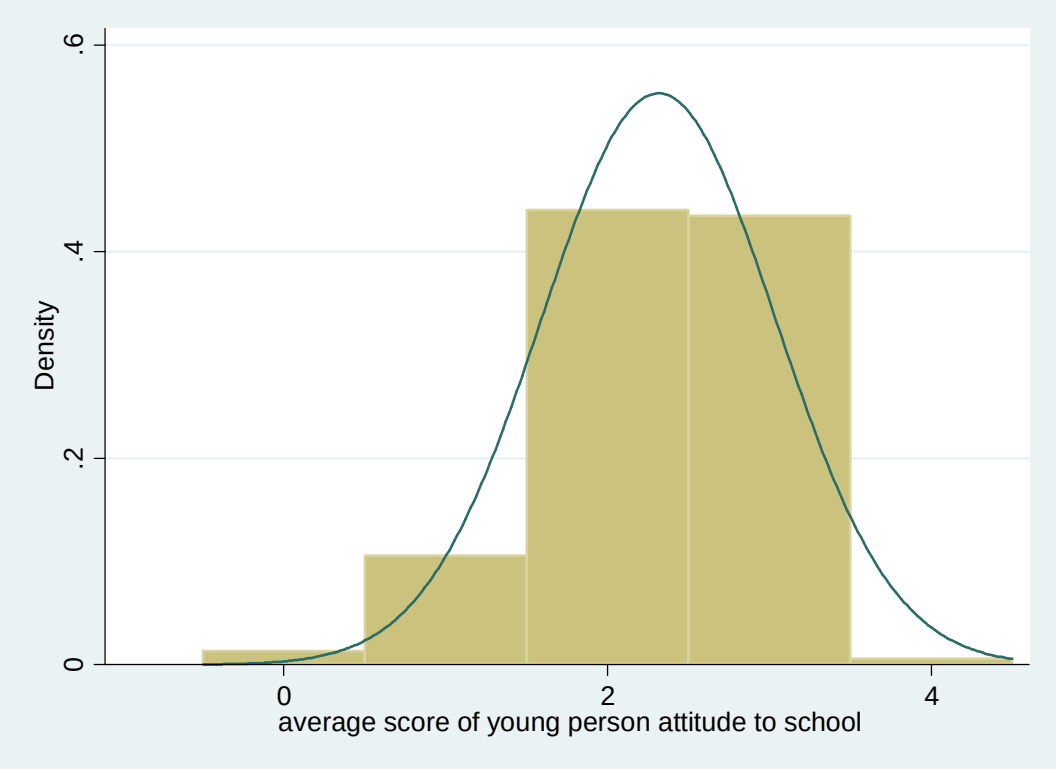
D. Chapter 3 Related Statistical Figures and Tables

Figure D.1: Histogram of key stage 4 total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG)



Shapiro-Wilk W test for normality rejected at W= 0.98451 and P-value=0.000

Figure D.2: Histogram of attitude towards school score at wave three (W3avatt)



Shapiro-Wilk W test for normality rejected at W= 0.99237 and P-value=0.000

Table D.1: Correlation Matrix of Cognitive Outcome Models

	KS4_PT~G	W2famt~R	W2famt~F	W2nss~am	FamInc~Z	KS4_ID~Z	W2schl~P	W2pa~2MP	W2FeF~0c	IndSch~l	teac~t_A	KS4_CV~Z	W2hepo~P
KS4_PTSTNEWG	1.0000												
W2famtyp_R	-0.2392	1.0000											
W2famtyp_F	-0.2417	0.9945	1.0000										
W2nssecfam	-0.3205	0.2212	0.2203	1.0000									
FamIncome_Z	0.2077	-0.1913	-0.1885	-0.3821	1.0000								
KS4_IDACI_Z	-0.2525	0.2696	0.2672	0.4078	-0.2950	1.0000							
W2schlifMP	-0.0326	0.0392	0.0421	-0.0223	0.0634	-0.1013	1.0000						
W2parasp2MP	-0.3095	0.0511	0.0533	0.1202	-0.0667	0.0301	0.0726	1.0000					
W2FeFinMP0c	0.1769	-0.1746	-0.1747	-0.2431	0.1535	-0.2083	0.0060	-0.1531	1.0000				
IndSchool	0.0027	-0.0212	-0.0213	-0.0255	0.0092	-0.0182	-0.0260	-0.0114	0.0107	1.0000			
teachereff~A	0.1207	-0.0664	-0.0686	0.0185	-0.0218	0.0393	-0.1351	-0.0748	-0.0001	0.0116	1.0000		
KS4_CVAP3A~Z	0.7982	-0.2145	-0.2159	-0.3797	0.2731	-0.3191	0.0157	-0.2834	0.2043	-0.0006	0.0332	1.0000	
W2heposs9YP	0.5286	-0.1148	-0.1186	-0.2014	0.1240	-0.0612	-0.1122	-0.3853	0.1124	-0.0113	0.1901	0.4900	1.0000
W1ethgrpYP	0.0113	0.1014	0.0954	0.1639	-0.1557	0.3429	-0.1800	-0.1371	-0.1405	-0.0117	0.0935	-0.1182	0.2268
W1sexYP	0.1217	0.0305	0.0290	0.0014	-0.0090	0.0262	-0.0132	-0.1646	0.0158	0.0098	-0.0667	0.0529	0.1279
W1chea1HS	0.1336	-0.0366	-0.0376	-0.0214	0.0126	-0.0020	-0.0055	-0.0481	0.0224	-0.0027	0.0266	0.1112	0.1061
KS4_AGE_ST~T	-0.0346	0.0057	0.0042	0.0072	-0.0142	-0.0251	-0.0006	-0.0008	0.0242	-0.0004	0.0082	-0.0164	-0.0235
W2hiqualgfam	-0.3352	0.2622	0.2616	0.5620	-0.3371	0.3998	-0.0190	0.1172	-0.2666	-0.0276	0.0365	-0.4037	-0.1952
W2Ben3QMP0a	-0.0220	-0.0143	-0.0124	0.1044	-0.0524	0.1000	-0.0305	-0.0092	-0.0417	-0.0026	0.0245	-0.0601	0.0118
W2sibs2	-0.1652	0.0268	0.0253	0.2554	-0.2476	0.2549	-0.0407	0.0092	-0.1412	0.0425	0.0587	-0.2155	-0.0418
W1NoldBroHS	-0.0625	0.0115	0.0127	0.1609	-0.1951	0.1696	-0.0242	-0.0107	-0.0731	0.0103	0.0744	-0.1048	-0.0056

	W1ethg~P	W1sexYP	W1chea~S	KS4_AG~T	W2hiq~am	W2B~MP0a	W2sibs2	W1No~oHS
W1ethgrpYP	1.0000							
W1sexYP	0.0356	1.0000						
W1chea1HS	0.0851	0.0483	1.0000					
KS4_AGE_ST~T	-0.0329	-0.0126	-0.0414	1.0000				
W2hiqualgfam	0.1846	0.0163	-0.0003	-0.0081	1.0000			
W2Ben3QMP0a	0.0900	0.0083	0.0159	-0.0011	0.0673	1.0000		
W2sibs2	0.2350	0.0146	0.0061	0.0097	0.2530	0.1010	1.0000	
W1NoldBroHS	0.1443	0.0017	0.0096	0.0035	0.1168	0.0671	0.6014	1.0000

.

Number of obs=7128.

Table D.2: Correlation Matrix of Affective Outcome Models

	W3avatt	W2famt~R	W2famt~F	W2nss~am	FamInc~Z	KS4_ID~Z	W2schl~P	W2pa~2MP	W2FeF~0c	IndSch~l	teac~t_A	KS4_CV~Z	W2hepo~P
W3avatt	1.0000												
W2famtyp_R	-0.1168	1.0000											
W2famtyp_F	-0.1194	0.9945	1.0000										
W2nssecfam	-0.0814	0.2206	0.2197	1.0000									
FamIncome_Z	0.0317	-0.1935	-0.1910	-0.3808	1.0000								
KS4_IDACI_Z	-0.0362	0.2691	0.2667	0.4059	-0.2955	1.0000							
W2schlifMP	-0.1161	0.0369	0.0399	-0.0249	0.0661	-0.1047	1.0000						
W2parasp2MP	-0.2105	0.0507	0.0527	0.1164	-0.0645	0.0272	0.0681	1.0000					
W2FeFinMP0c	0.0639	-0.1746	-0.1746	-0.2396	0.1522	-0.2107	0.0055	-0.1509	1.0000				
IndSchool	-0.0060	-0.0213	-0.0214	-0.0257	0.0094	-0.0182	-0.0262	-0.0115	0.0107	1.0000			
teachereff~A	0.3816	-0.0644	-0.0663	0.0208	-0.0242	0.0449	-0.1350	-0.0724	-0.0015	0.0117	1.0000		
KS4_CVAP3A~Z	0.2499	-0.2126	-0.2140	-0.3754	0.2705	-0.3171	0.0184	-0.2802	0.2011	-0.0010	0.0292	1.0000	
W2heposs9YP	0.3491	-0.1143	-0.1177	-0.1976	0.1216	-0.0576	-0.1114	-0.3845	0.1090	-0.0118	0.1887	0.4844	1.0000
W1ethgrpYP	0.1000	0.1019	0.0961	0.1638	-0.1590	0.3462	-0.1797	-0.1358	-0.1404	-0.0118	0.0945	-0.1192	0.2275
W1sexYP	0.0350	0.0324	0.0309	0.0037	-0.0112	0.0288	-0.0131	-0.1663	0.0152	0.0098	-0.0679	0.0515	0.1281
W1chea1HS	0.0572	-0.0377	-0.0390	-0.0211	0.0112	-0.0033	-0.0052	-0.0490	0.0236	-0.0028	0.0283	0.1050	0.1040
KS4_AGE_ST~T	-0.0056	0.0058	0.0043	0.0073	-0.0145	-0.0253	-0.0005	-0.0007	0.0245	-0.0004	0.0082	-0.0169	-0.0239
W2hiqualgfam	-0.0740	0.2608	0.2604	0.5598	-0.3366	0.3978	-0.0201	0.1148	-0.2655	-0.0278	0.0385	-0.4004	-0.1934
W2Ben3QMP0a	0.0190	-0.0139	-0.0120	0.1021	-0.0519	0.0970	-0.0311	-0.0078	-0.0395	-0.0026	0.0291	-0.0595	0.0142
W2sibs2	-0.0143	0.0282	0.0268	0.2542	-0.2485	0.2533	-0.0377	0.0092	-0.1419	0.0435	0.0601	-0.2160	-0.0398
W1NoldBroHS	0.0313	0.0144	0.0156	0.1605	-0.1969	0.1680	-0.0200	-0.0076	-0.0728	0.0106	0.0765	-0.1063	-0.0061

	W1ethg~P	W1sexYP	W1chea~S	KS4_AG~T	W2hiq~am	W2B~MP0a	W2sibs2	W1No~oHS
W1ethgrpYP	1.0000							
W1sexYP	0.0377	1.0000						
W1chea1HS	0.0861	0.0487	1.0000					
KS4_AGE_ST~T	-0.0331	-0.0128	-0.0418	1.0000				
W2hiqualgfam	0.1840	0.0203	-0.0004	-0.0081	1.0000			
W2Ben3QMP0a	0.0905	0.0116	0.0150	-0.0011	0.0643	1.0000		
W2sibs2	0.2336	0.0176	0.0066	0.0099	0.2473	0.1017	1.0000	
W1NoldBroHS	0.1411	0.0025	0.0101	0.0036	0.1136	0.0697	0.5968	1.0000

.

Number of obs=7009.

Table D.3: Family Structure Influence on Cognitive Outcome						
	Reduced Family Structure			Full Family Structure		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IRR	IRR	IRR	IRR	IRR	IRR
Family Structure (reference level: married natural couple)						
Other Married couple (OM)	0.963**	0.965**	0.965**	n.a	n.a	n.a
	(0.0167)	(0.0168)	(0.0169)			
Other Married couple (OM)	n.a	n.a	n.a	0.898***	0.902***	0.905***
				(0.0334)	(0.0339)	(0.0346)
Married with one or both step-parent (MS)	n.a	n.a	n.a	0.988	0.989	0.988
	n.a	n.a	n.a	(0.0194)	(0.0193)	(0.0193)
Cohabiting couple (CC)	0.964*	0.968	0.970	n.a	n.a	n.a
	(0.0195)	(0.0198)	(0.0203)	n.a	n.a	n.a
Cohabiting two biological parents (CB)	n.a	n.a	n.a	0.973	0.982	0.987
	n.a	n.a	n.a	(0.0374)	(0.0381)	(0.0382)
Other Cohabiting couple (OC)	n.a	n.a	n.a	0.960*	0.962	0.962
	n.a	n.a	n.a	(0.0236)	(0.0240)	(0.0247)
Lone father (LF)	0.897**	0.898**	0.901**	0.896**	0.897**	0.901**
	(0.0411)	(0.0408)	(0.0411)	(0.0411)	(0.0408)	(0.0411)
Lone mother (LM)	0.912***	0.915***	0.914***	0.912***	0.915***	0.914***
	(0.0135)	(0.0140)	(0.0143)	(0.0135)	(0.0140)	(0.0142)
No parents in the household (NP)	0.913	0.929	0.937	0.912	0.928	0.936
	(0.0806)	(0.0845)	(0.0851)	(0.0805)	(0.0843)	(0.0849)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)						
Lower managerial and professional occupations		1.033**	1.035***		1.033***	1.035***
		(0.0130)	(0.0130)		(0.0130)	(0.0130)
Intermediate occupations		1.034	1.037*		1.034	1.037*
		(0.0223)	(0.0227)		(0.0223)	(0.0226)
Small employers and own account workers		1.038*	1.040**		1.037*	1.039**

	(0.0201)	(0.0201)	(0.0200)	(0.0200)
Lower supervisory and technical occupations	1.042**	1.044**	1.040**	1.042**
	(0.0209)	(0.0204)	(0.0207)	(0.0202)
Semi-routine occupations	1.040	1.045*	1.040	1.045*
	(0.0257)	(0.0256)	(0.0258)	(0.0257)
Routine occupations	0.974	0.979	0.974	0.979
	(0.0214)	(0.0214)	(0.0214)	(0.0215)
Never worked/long term unemployed	0.948	0.952	0.949	0.953
	(0.0457)	(0.0458)	(0.0458)	(0.0459)
Mean income (Z)	0.987***	0.986***	0.987***	0.986***
	(0.00455)	(0.00451)	(0.00456)	(0.00452)
IDACI score (Z)	0.980**	0.982**	0.980**	0.981**
	(0.00790)	(0.00784)	(0.00789)	(0.00784)
MP: How involved is the MP in the young person's school life? (reference level: very involved)				
Fairly involved		1.028**		1.027**
		(0.0133)		(0.0133)
Not very involved		1.031**		1.030*
		(0.0157)		(0.0157)
Not at all involved		1.050		1.050
		(0.0365)		(0.0363)
MP's educational aspiration for young person (reference level: continue in full time education)				
Start learning a trade / get a place on a training course		0.970		0.970
		(0.0242)		(0.0241)
Start an apprenticeship		0.992		0.992
		(0.0298)		(0.0299)
Get a full-time paid job		0.889**		0.888**
		(0.0445)		(0.0444)
Something else		0.914		0.914
		(0.0744)		(0.0743)
MP: How the young person's expenses would be paid if stayed on in education-		1.048**		1.046*

Parent(s) will support or give money						
			(0.0243)			(0.0243)
Independent school	1.141***	1.127***	1.131***	1.141***	1.127***	1.131***
	(0.0217)	(0.0225)	(0.0261)	(0.0217)	(0.0225)	(0.0260)
Overall teacher index	1.003***	1.003***	1.003***	1.003***	1.003***	1.003***
	(0.000728)	(0.000730)	(0.000727)	(0.000724)	(0.000727)	(0.000724)
KS3 score (Z)	1.499***	1.496***	1.491***	1.500***	1.496***	1.491***
	(0.0254)	(0.0256)	(0.0265)	(0.0254)	(0.0256)	(0.0265)
Likelihood of the young person applying to university (reference level: very likely)						
Not at all likely	0.852***	0.850***	0.860***	0.853***	0.851***	0.861***
	(0.0196)	(0.0197)	(0.0217)	(0.0195)	(0.0197)	(0.0217)
Not very likely	0.985	0.982	0.987	0.986	0.982	0.987
	(0.0156)	(0.0152)	(0.0149)	(0.0157)	(0.0152)	(0.0149)
Fairly likely	1.039***	1.037***	1.036***	1.039***	1.037***	1.036***
	(0.0116)	(0.0114)	(0.0112)	(0.0116)	(0.0114)	(0.0113)
Young person's ethnicity (reference level: White)						
Mixed	1.045*	1.050*	1.050*	1.048*	1.053*	1.053*
	(0.0279)	(0.0283)	(0.0283)	(0.0281)	(0.0285)	(0.0286)
Indian	1.128***	1.130***	1.129***	1.128***	1.130***	1.129***
	(0.0299)	(0.0303)	(0.0310)	(0.0299)	(0.0303)	(0.0310)
Pakistani	1.184***	1.207***	1.204***	1.186***	1.209***	1.205***
	(0.0439)	(0.0464)	(0.0471)	(0.0442)	(0.0467)	(0.0474)
Bangladeshi	1.217***	1.259***	1.271***	1.221***	1.263***	1.275***
	(0.0550)	(0.0628)	(0.0650)	(0.0555)	(0.0632)	(0.0653)
Black Caribbean	1.123***	1.142***	1.148***	1.123***	1.142***	1.149***
	(0.0380)	(0.0392)	(0.0397)	(0.0380)	(0.0393)	(0.0398)
Black African	1.213***	1.238***	1.249***	1.216***	1.240***	1.251***
	(0.0435)	(0.0455)	(0.0475)	(0.0438)	(0.0458)	(0.0477)
Other	1.170***	1.185***	1.191***	1.173***	1.188***	1.194***
	(0.0522)	(0.0540)	(0.0550)	(0.0520)	(0.0539)	(0.0549)
Female	1.094***	1.095***	1.092***	1.094***	1.095***	1.092***
	(0.0111)	(0.0112)	(0.0115)	(0.0111)	(0.0112)	(0.0115)
Whether young person has disability	0.912***	0.913***	0.914***	0.912***	0.913***	0.914***
	(0.0226)	(0.0226)	(0.0223)	(0.0226)	(0.0226)	(0.0224)
Young person's age when started KS4	0.714**	0.710**	0.704**	0.711**	0.707**	0.702**
	(0.116)	(0.115)	(0.116)	(0.116)	(0.115)	(0.116)
Highest qualification of family (reference level: Degree or equivalent)						

Higher education below degree level	1.029**	1.021*	1.022*	1.029**	1.022*	1.023*
	(0.0128)	(0.0126)	(0.0126)	(0.0127)	(0.0126)	(0.0125)
GCE A Level or equiv	1.065***	1.059***	1.059***	1.065***	1.059***	1.060***
	(0.0169)	(0.0159)	(0.0155)	(0.0168)	(0.0159)	(0.0154)
GCSE grades A-C or equiv	1.053***	1.049***	1.050***	1.053***	1.050***	1.051***
	(0.0181)	(0.0174)	(0.0171)	(0.0180)	(0.0174)	(0.0170)
Qualifications at level 1 and below	1.027	1.029	1.033	1.029	1.032	1.035
	(0.0313)	(0.0309)	(0.0310)	(0.0316)	(0.0312)	(0.0314)
Other qualifications	0.969	0.978	0.981	0.970	0.979	0.982
	(0.0368)	(0.0373)	(0.0369)	(0.0367)	(0.0372)	(0.0368)
No qualification	0.927***	0.948**	0.956	0.929***	0.950*	0.958
	(0.0241)	(0.0254)	(0.0261)	(0.0241)	(0.0255)	(0.0262)
Whether the main parent is currently receiving job seeker allowance	1.081	1.122	1.120	1.081	1.121	1.119
	(0.119)	(0.129)	(0.128)	(0.119)	(0.128)	(0.126)
Number of siblings	0.986**	0.987**	0.987**	0.986***	0.987**	0.987**
	(0.00532)	(0.00535)	(0.00538)	(0.00529)	(0.00532)	(0.00535)
Number of younger siblings	1.002	1.003	1.004	1.002	1.003	1.004
	(0.00686)	(0.00689)	(0.00682)	(0.00686)	(0.00690)	(0.00682)
Constant	50,564***	53,502***	56,863***	53,498***	56,484***	59,744***
	(123,330)	(130,334)	(140,886)	(131,006)	(138,160)	(148,635)

Standard error (Eform) in parentheses. n.a means category not available since it is not defined as a structure.
*** p<0.01, ** p<0.05, * p<0.1

Table D.4: Family Structure Influence on Affective Outcome						
	Reduced Family Structure			Full Family Structure		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	OR	OR	OR	OR	OR	OR
Family Structure (reference level: married natural couple)						
Other Married couple (OM)	0.800**	0.806**	0.804**	n.a	n.a	n.a
	(0.0739)	(0.0751)	(0.0751)			
Other Married couple (OM)	n.a	n.a	n.a	0.673**	0.686**	0.674**
				(0.122)	(0.125)	(0.121)
Married with one or both step-parent (MS)	n.a	n.a	n.a	0.853	0.856	0.858
	n.a	n.a	n.a	(0.0920)	(0.0926)	(0.0932)
Cohabiting couple (CC)	0.840	0.843	0.849	n.a	n.a	n.a
	(0.0943)	(0.0967)	(0.0981)	n.a	n.a	n.a
Cohabiting two biological parents (CB)	n.a	n.a	n.a	0.793	0.796	0.797
	n.a	n.a	n.a	(0.161)	(0.163)	(0.162)
Other Cohabiting couple (OC)	n.a	n.a	n.a	0.861	0.864	0.874
	n.a	n.a	n.a	(0.113)	(0.116)	(0.118)
Lone father (LF)	0.748	0.751	0.784	0.746	0.750	0.782
	(0.151)	(0.150)	(0.152)	(0.150)	(0.150)	(0.151)
Lone mother (LM)	0.771***	0.765***	0.769***	0.770***	0.764***	0.767***
	(0.0583)	(0.0600)	(0.0610)	(0.0582)	(0.0599)	(0.0609)
No parents in the household (NP)	1.352	1.374	1.327	1.348	1.370	1.322
	(0.476)	(0.488)	(0.473)	(0.475)	(0.486)	(0.471)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)						
Lower managerial and professional occupations		0.951	0.954		0.951	0.953
		(0.0841)	(0.0846)		(0.0842)	(0.0847)
Intermediate occupations		0.988	0.994		0.987	0.993
		(0.130)	(0.131)		(0.130)	(0.131)

Small employers and own account workers	0.951	0.955	0.950	0.953
	(0.134)	(0.135)	(0.134)	(0.135)
Lower supervisory and technical occupations	0.962	0.993	0.957	0.988
	(0.108)	(0.111)	(0.108)	(0.111)
Semi-routine occupations	1.006	1.029	1.007	1.030
	(0.127)	(0.131)	(0.127)	(0.131)
Routine occupations	0.895	0.919	0.894	0.918
	(0.110)	(0.113)	(0.110)	(0.113)
Never worked/long term unemployed	0.810	0.822	0.811	0.822
	(0.155)	(0.156)	(0.155)	(0.156)
Mean income (Z)	0.932*	0.938*	0.934*	0.940
	(0.0360)	(0.0362)	(0.0362)	(0.0363)
IDACI score (Z)	0.972	0.963	0.972	0.963
	(0.0392)	(0.0385)	(0.0392)	(0.0385)
MP: How involved is the MP in the young person's school life? (reference level: very involved)				
Fairly involved		0.863**		0.860**
		(0.0648)		(0.0647)
Not very involved		0.867*		0.863*
		(0.0731)		(0.0729)
Not at all involved		0.561***		0.559***
		(0.0863)		(0.0862)
MP's educational aspiration for young person (reference level: continue in full time education)				
Start learning a trade / get a place on a training course		0.691***		0.690***
		(0.0824)		(0.0822)
Start an apprenticeship		0.656***		0.656***
		(0.0808)		(0.0809)
Get a full-time paid job		0.442***		0.440***
		(0.0944)		(0.0936)
Something else		0.855		0.852
		(0.240)		(0.237)
MP: How the		1.029		1.023

young person's expenses would be paid if stayed on in education-Parent(s) will support or give money			(0.0934)			(0.0930)
Independent school	0.522***	0.523***	0.492***	0.522***	0.523***	0.491***
	(0.0418)	(0.0438)	(0.0423)	(0.0419)	(0.0437)	(0.0423)
Overall teacher index	1.072***	1.072***	1.071***	1.072***	1.072***	1.071***
	(0.00300)	(0.00301)	(0.00304)	(0.00299)	(0.00300)	(0.00303)
KS3 score (Z)	1.441***	1.440***	1.402***	1.441***	1.440***	1.402***
	(0.0543)	(0.0553)	(0.0534)	(0.0542)	(0.0552)	(0.0533)
Likelihood of the young person applying to university (reference level: very likely)						
Not at all likely	0.316***	0.314***	0.361***	0.316***	0.314***	0.361***
	(0.0349)	(0.0351)	(0.0411)	(0.0349)	(0.0351)	(0.0410)
Not very likely	0.421***	0.417***	0.457***	0.421***	0.417***	0.457***
	(0.0383)	(0.0381)	(0.0425)	(0.0381)	(0.0380)	(0.0423)
Fairly likely	0.702***	0.700***	0.712***	0.702***	0.699***	0.712***
	(0.0490)	(0.0491)	(0.0502)	(0.0490)	(0.0492)	(0.0503)
Young person's ethnicity (reference level: White)						
Mixed	0.985	0.986	0.946	0.990	0.992	0.951
	(0.142)	(0.143)	(0.138)	(0.142)	(0.144)	(0.138)
Indian	2.175***	2.154***	2.041***	2.170***	2.150***	2.036***
	(0.306)	(0.305)	(0.292)	(0.305)	(0.304)	(0.291)
Pakistani	1.238	1.267	1.170	1.238	1.266	1.169
	(0.199)	(0.209)	(0.191)	(0.199)	(0.209)	(0.191)
Bangladeshi	1.739***	1.830***	1.675**	1.744***	1.835***	1.677**
	(0.364)	(0.398)	(0.363)	(0.365)	(0.399)	(0.364)
Black Caribbean	0.976	0.994	0.928	0.977	0.995	0.929
	(0.168)	(0.174)	(0.158)	(0.169)	(0.174)	(0.158)
Black African	1.827***	1.870***	1.669***	1.838***	1.880***	1.676***
	(0.344)	(0.363)	(0.328)	(0.346)	(0.365)	(0.330)
Other	1.240	1.256	1.188	1.243	1.259	1.190
	(0.280)	(0.283)	(0.274)	(0.280)	(0.283)	(0.274)
Female	1.172***	1.172***	1.118**	1.171***	1.171***	1.117**
	(0.0639)	(0.0641)	(0.0628)	(0.0639)	(0.0641)	(0.0628)
Whether young person has disability	1.028	1.029	1.023	1.026	1.027	1.021
	(0.0864)	(0.0866)	(0.0843)	(0.0866)	(0.0868)	(0.0845)
Young person's age when started KS4	1.352	1.319	1.217	1.344	1.313	1.211
	(0.628)	(0.622)	(0.598)	(0.621)	(0.616)	(0.593)

Highest qualification of family (reference level: Degree or equivalent)						
Higher education below degree level	1.173*	1.162*	1.189*	1.173*	1.163*	1.190*
	(0.105)	(0.106)	(0.109)	(0.105)	(0.106)	(0.110)
GCE A Level or equiv	1.194**	1.178*	1.198*	1.193**	1.178*	1.198*
	(0.106)	(0.112)	(0.114)	(0.107)	(0.112)	(0.115)
GCSE grades A-C or equiv	1.048	1.034	1.065	1.048	1.036	1.066
	(0.0895)	(0.0982)	(0.102)	(0.0895)	(0.0985)	(0.103)
Qualifications at level 1 and below	1.099	1.090	1.144	1.104	1.096	1.151
	(0.160)	(0.168)	(0.177)	(0.161)	(0.168)	(0.178)
Other qualifications	1.032	1.037	1.086	1.039	1.045	1.095
	(0.200)	(0.206)	(0.216)	(0.200)	(0.206)	(0.216)
No qualification	0.994	1.020	1.077	1.000	1.028	1.085
	(0.119)	(0.135)	(0.144)	(0.121)	(0.137)	(0.145)
Whether the main parent is currently receiving job seeker allowance	0.873	0.916	0.979	0.875	0.918	0.981
	(0.373)	(0.401)	(0.397)	(0.376)	(0.405)	(0.401)
Number of siblings	0.939**	0.938**	0.935**	0.938**	0.937**	0.935**
	(0.0279)	(0.0281)	(0.0276)	(0.0279)	(0.0281)	(0.0277)
Number of younger siblings	1.100***	1.099***	1.104***	1.100***	1.098***	1.103***
	(0.0367)	(0.0368)	(0.0364)	(0.0366)	(0.0368)	(0.0364)

Standard error (Eform) in parentheses. n.a means category not available since it is not defined as a structure.
*** p<0.01, ** p<0.05, * p<0.1

Table D.5: Family Structure Influence on Cognitive Outcome with Interaction Effects

	Reduced Family Structure		Full Family Structure	
	(1)	(2)	(3)	(4)
VARIABLES	IRR	IRR	IRR	IRR
Family Structure (reference level: married natural couple)				
Other Married couple (OM)	0.978	0.938		
	(0.0432)	(0.112)		
Other Married couple (OM)			0.895	0.859
			(0.0843)	(0.249)
Married with one or both step-parent (MS)			1.009	1.013
			(0.0471)	(0.109)
Cohabiting couple (CC)	0.972	0.864		
	(0.0438)	(0.0921)		
Cohabiting two biological parents (CB)			0.963	0.696**
			(0.0728)	(0.124)
Other Cohabiting couple (OC)			0.975	0.984
			(0.0519)	(0.130)
Lone father (LF)	0.766*	0.738	0.768*	0.737
	(0.119)	(0.252)	(0.120)	(0.251)
Lone mother (LM)	0.981	0.944	0.981	0.943
	(0.0377)	(0.0618)	(0.0377)	(0.0617)
No parents in the household (NP)	0.885	1.138	0.886	1.141
	(0.141)	(0.317)	(0.141)	(0.318)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)				
Lower managerial and professional occupations	1.020	1.018	1.020	1.018
	(0.0147)	(0.0146)	(0.0147)	(0.0146)
Intermediate occupations	1.024	1.023	1.024	1.022
	(0.0267)	(0.0264)	(0.0268)	(0.0265)
Small employers and own account workers	1.028	1.024	1.028	1.025
	(0.0223)	(0.0220)	(0.0224)	(0.0221)
Lower supervisory and technical occupations	1.067***	1.060***	1.067***	1.060***
	(0.0221)	(0.0216)	(0.0222)	(0.0217)
Semi-routine occupations	1.041	1.037	1.041	1.037
	(0.0281)	(0.0276)	(0.0282)	(0.0276)
Routine occupations	1.006	0.999	1.007	1.000
	(0.0244)	(0.0238)	(0.0244)	(0.0239)
Never worked/long term unemployed	1.076	1.084	1.083	1.090
	(0.0696)	(0.0697)	(0.0700)	(0.0703)
Mean income (Z)	0.983***	0.984***	0.983***	0.984***
	(0.00537)	(0.00530)	(0.00537)	(0.00530)
IDACI score (Z)	0.985	0.985	0.985	0.985
	(0.00964)	(0.00964)	(0.00965)	(0.00964)

MP: How involved is the MP in the young person's school life? (reference level: very involved)				
Fairly involved		0.994		0.994
		(0.0142)		(0.0142)
Not very involved		1.004		1.004
		(0.0161)		(0.0161)
Not at all involved		1.027		1.027
		(0.0347)		(0.0347)
MP's educational aspiration for young person (reference level: continue in full time education)				
Start learning a trade / get a place on a training course		1.012		1.013
		(0.0305)		(0.0306)
Start an apprenticeship		1.069**		1.071**
		(0.0324)		(0.0325)
Get a full-time paid job		0.970		0.970
		(0.0679)		(0.0680)
Something else		1.059		1.060
		(0.0911)		(0.0913)
MP: How the young person's expenses would be paid if stayed on in education-Parent(s) will support or give money		1.038		1.038
		(0.0330)		(0.0330)
MP's NS-SEC class # Family structure				
Lower managerial and professional occupations#OM	1.030	1.037		
	(0.0573)	(0.0563)		
Lower managerial and professional occupations#OM			1.130	1.157
			(0.134)	(0.151)
Lower managerial and professional occupations#MS			0.997	1.008
			(0.0517)	(0.0505)
Lower managerial and professional occupations#CC	1.035	1.031		
	(0.0514)	(0.0515)		
Lower managerial and professional occupations#CB			1.007	1.024
			(0.0997)	(0.106)
Lower managerial and professional occupations#OC			1.044	1.041
			(0.0563)	(0.0565)
Lower managerial and professional occupations#LF	1.351*	1.314	1.349*	1.313
	(0.232)	(0.266)	(0.232)	(0.265)
Lower managerial and professional occupations#LM	0.970	0.976	0.970	0.977
	(0.0412)	(0.0436)	(0.0412)	(0.0436)
Lower managerial and professional occupations#NP	0.915	1.168	0.916	1.167

	(0.109)	(0.395)	(0.109)	(0.394)
Intermediate occupations#OM	1.020	1.013		
	(0.0930)	(0.0914)		
Intermediate occupations#OM			0.920	0.924
			(0.176)	(0.178)
Intermediate occupations#MS			1.063	1.061
			(0.101)	(0.0999)
Intermediate occupations#CC	1.035	1.027		
	(0.0707)	(0.0733)		
Intermediate occupations#CB			1.171	1.296*
			(0.165)	(0.200)
Intermediate occupations#OC			1.001	0.985
			(0.0730)	(0.0749)
Intermediate occupations#LF	1.456*	1.386	1.452*	1.384
	(0.303)	(0.341)	(0.302)	(0.340)
Intermediate occupations#LM	0.943	0.949	0.944	0.950
	(0.0504)	(0.0514)	(0.0505)	(0.0514)
Intermediate occupations#NP	1.460**	2.261	1.458**	2.257
	(0.265)	(2.737)	(0.268)	(2.737)
Small employers and own account workers#OM	1.084	1.082		
	(0.0688)	(0.0693)		
Small employers and own account workers#OM			1.079	1.065
			(0.139)	(0.164)
Small employers and own account workers#MS			1.081	1.082
			(0.0707)	(0.0727)
Small employers and own account workers#CC	1.025	1.014		
	(0.0961)	(0.0979)		
Small employers and own account workers#CB			1.045	1.156
			(0.131)	(0.166)
Small employers and own account workers#OC			1.021	0.995
			(0.114)	(0.116)
Small employers and own account workers#LF	1.018	1.039	1.019	1.041
	(0.227)	(0.251)	(0.227)	(0.251)
Small employers and own account workers#LM	1.019	1.015	1.019	1.015
	(0.0704)	(0.0729)	(0.0704)	(0.0729)
Small employers and own account workers#NP	0.834	0.748	0.833	0.745
	(0.0941)	(0.288)	(0.0933)	(0.287)
Lower supervisory and technical occupations#OM	0.916	0.937		
	(0.0559)	(0.0592)		
Lower supervisory and technical occupations#OM			0.995	1.001
			(0.144)	(0.151)
Lower supervisory and technical occupations#MS			0.890	0.917
			(0.0674)	(0.0727)
Lower supervisory and technical occupations#CC	0.965	0.972		
	(0.0618)	(0.0625)		

Lower supervisory and technical occupations#CB			0.916	0.979
			(0.115)	(0.125)
Lower supervisory and technical occupations#OC			0.993	0.979
			(0.0711)	(0.0727)
Lower supervisory and technical occupations#LF	1.054	1.022	1.052	1.021
	(0.184)	(0.221)	(0.184)	(0.221)
Lower supervisory and technical occupations#LM	0.888*	0.897	0.888*	0.898
	(0.0588)	(0.0603)	(0.0589)	(0.0603)
Lower supervisory and technical occupations#NP	0.879	0.975	0.877	0.973
	(0.140)	(0.341)	(0.139)	(0.341)
Semi-routine occupations#OM	1.019	1.040		
	(0.0623)	(0.0623)		
Semi-routine occupations#OM			0.979	0.979
			(0.117)	(0.106)
Semi-routine occupations#MS			1.059	1.087
			(0.0684)	(0.0718)
Semi-routine occupations#CC	0.976	0.992		
	(0.0728)	(0.0763)		
Semi-routine occupations#CB			0.957	1.160
			(0.133)	(0.178)
Semi-routine occupations#OC			0.990	0.963
			(0.0789)	(0.0789)
Semi-routine occupations#LF	1.342	1.293	1.339	1.290
	(0.272)	(0.307)	(0.272)	(0.306)
Semi-routine occupations#LM	0.935	0.954	0.935	0.954
	(0.0505)	(0.0525)	(0.0505)	(0.0525)
Semi-routine occupations#NP	0.651**	0.638**	0.649**	0.636**
	(0.140)	(0.129)	(0.139)	(0.128)
Routine occupations#OM	0.842**	0.850**		
	(0.0652)	(0.0674)		
Routine occupations#OM			0.891	0.901
			(0.119)	(0.145)
Routine occupations#MS			0.827*	0.841*
			(0.0824)	(0.0834)
Routine occupations#CC	0.967	0.973		
	(0.0791)	(0.0819)		
Routine occupations#CB			1.063	1.123
			(0.129)	(0.145)
Routine occupations#OC			0.913	0.887
			(0.0975)	(0.0981)
Routine occupations#LF	1.223	1.276	1.223	1.276
	(0.284)	(0.378)	(0.284)	(0.378)
Routine occupations#LM	0.896*	0.919	0.896*	0.919
	(0.0532)	(0.0552)	(0.0532)	(0.0552)
Routine occupations#NP	1.107	1.000	1.104	0.997
	(0.164)	(0.183)	(0.163)	(0.182)
Never worked/long term unemployed#OM	0.871	0.880		
	(0.113)	(0.120)		
Never worked/long term			0.915	0.948

unemployed#OM				
			(0.180)	(0.213)
Never worked/long term unemployed#MS			0.841	0.871
			(0.132)	(0.143)
Never worked/long term unemployed#CC	0.784	0.828		
	(0.155)	(0.166)		
Never worked/long term unemployed#CB			1.132	1.185
			(0.513)	(0.557)
Never worked/long term unemployed#OC			0.686	0.688*
			(0.158)	(0.152)
Never worked/long term unemployed#LF	1.026	1.013	1.018	1.006
	(0.320)	(0.354)	(0.317)	(0.352)
Never worked/long term unemployed#LM	0.780***	0.772***	0.775***	0.768***
	(0.0734)	(0.0717)	(0.0729)	(0.0715)
Never worked/long term unemployed#NP	0.920	0.804	0.911	0.796
	(0.212)	(0.288)	(0.211)	(0.285)
Family income # Family structure				
OM#Family income	0.994	0.996		
	(0.0128)	(0.0140)		
OM#Family income			0.983	0.971
			(0.0214)	(0.0263)
MS#Family income			1.007	1.013
			(0.0131)	(0.0141)
CC#Family income	1.016	1.006		
	(0.0247)	(0.0263)		
CB#Family income			0.978	0.932
			(0.0570)	(0.0590)
OC#Family income			1.026	1.013
			(0.0263)	(0.0260)
LF#Family income	1.153	1.163	1.153	1.163
	(0.108)	(0.107)	(0.108)	(0.107)
LM#Family income	1.011	1.002	1.011	1.002
	(0.0164)	(0.0161)	(0.0164)	(0.0161)
NP#Family income	0.701	0.823	0.700	0.823
	(0.200)	(0.397)	(0.200)	(0.396)
IDACI score # Family structure				
OM#IDACI score	0.991	0.989		
	(0.0243)	(0.0271)		
OM#IDACI score			1.015	1.005
			(0.0520)	(0.0646)
MS#IDACI score			0.979	0.977
			(0.0255)	(0.0269)
CC#IDACI score	1.014	1.020		
	(0.0293)	(0.0284)		
CB#IDACI score			0.996	0.995
			(0.0612)	(0.0604)
OC#IDACI score			1.014	1.015
			(0.0330)	(0.0307)
LF#IDACI score	0.894	0.890	0.895	0.890

	(0.0773)	(0.0765)	(0.0774)	(0.0765)
LM#IDACI score	0.989	0.991	0.989	0.991
	(0.0162)	(0.0167)	(0.0162)	(0.0167)
NP#IDACI score	0.946	1.006	0.947	1.006
	(0.0718)	(0.101)	(0.0718)	(0.101)
MP: How involved is the MP in the young person's school life? # Family Structure				
Fairly involved#OM		1.107*		
		(0.0607)		
Fairly involved#OM				1.045
				(0.127)
Fairly involved#MS				1.117*
				(0.0655)
Fairly involved#CC		1.054		
		(0.0686)		
Fairly involved#CB				1.097
				(0.103)
Fairly involved#OC				1.058
				(0.0939)
Fairly involved#LF		1.347**		1.351**
		(0.192)		(0.193)
Fairly involved#LM		1.061*		1.061*
		(0.0367)		(0.0367)
Fairly involved#NP		1.044		1.044
		(0.210)		(0.210)
Not very involved#OM		1.078		
		(0.0640)		
Not very involved#OM				1.026
				(0.124)
Not very involved#MS				1.070
				(0.0726)
Not very involved#CC		1.098		
		(0.0800)		
Not very involved#CB				1.047
				(0.138)
Not very involved#OC				1.130
				(0.108)
Not very involved#LF		0.975		0.975
		(0.157)		(0.157)
Not very involved#LM		1.040		1.041
		(0.0420)		(0.0420)
Not very involved#NP		0.954		0.954
		(0.173)		(0.173)
Not at all involved#OM		1.180		
		(0.146)		
Not at all involved#OM				1.048
				(0.271)
Not at all involved#MS				1.213
				(0.179)
Not at all involved#CC		0.934		
		(0.138)		
Not at all involved#CB				0.932
				(0.0950)
Not at all involved#OC				0.930
				(0.175)
Not at all involved#LF		1.161		1.164

	(0.291)	(0.292)
Not at all involved#LM	1.071	1.072
	(0.0782)	(0.0783)
Not at all involved#NP	0.595	0.596
	(0.230)	(0.231)
MP's educational aspiration for young person # Family structure		
Start learning a trade / get a place on a training course#OM	0.902	
	(0.0885)	
Start learning a trade / get a place on a training course#OM		0.831
		(0.199)
Start learning a trade / get a place on a training course#MS		0.938
		(0.0998)
Start learning a trade / get a place on a training course#CC	0.945	
	(0.0801)	
Start learning a trade / get a place on a training course#CB		0.881
		(0.152)
Start learning a trade / get a place on a training course#OC		0.963
		(0.0901)
Start learning a trade / get a place on a training course#LF	1.069	1.070
	(0.120)	(0.120)
Start learning a trade / get a place on a training course#LM	0.899	0.899
	(0.0620)	(0.0621)
Start learning a trade / get a place on a training course#NP	0.781	0.781
	(0.280)	(0.281)
Start an apprenticeship#OM	0.878*	
	(0.0606)	
Start an apprenticeship#OM		0.911
		(0.115)
Start an apprenticeship#MS		0.866*
		(0.0678)
Start an apprenticeship#CC	0.927	
	(0.0827)	
Start an apprenticeship#CB		0.849
		(0.144)
Start an apprenticeship#OC		0.930
		(0.0948)
Start an apprenticeship#LF	0.794	0.796
	(0.133)	(0.133)
Start an apprenticeship#LM	0.845**	0.845**
	(0.0558)	(0.0558)
Start an apprenticeship#NP	0.794	0.793
	(0.288)	(0.288)
Get a full-time paid job#OM	0.764	
	(0.175)	

Get a full-time paid job#OM		0.389
		(0.356)
Get a full-time paid job#MS		0.789
		(0.183)
Get a full-time paid job#CC	1.033	
	(0.169)	
Get a full-time paid job#CB		0.804
		(0.258)
Get a full-time paid job#OC		1.161
		(0.257)
Get a full-time paid job#LF	0.781	0.782
	(0.323)	(0.323)
Get a full-time paid job#LM	0.841	0.842
	(0.116)	(0.116)
Get a full-time paid job#NP	1	1
	(0)	(0)
Something else#OM	1.069	
	(0.147)	
Something else#OM		1.089
		(0.419)
Something else#MS		1.076
		(0.124)
Something else#CC	0.284***	
	(0.0640)	
Something else#CB		1
		(0)
Something else#OC		0.291***
		(0.0740)
Something else#LF	0.795	0.794
	(0.330)	(0.329)
Something else#LM	0.630*	0.630*
	(0.154)	(0.154)
Something else#NP	0.560	0.559
	(0.708)	(0.708)
MP financially supportive # family structure		
MP financially supportive#OM	0.980	
	(0.0869)	
MP financially supportive#OM		1.042
		(0.183)
MP financially supportive#MS		0.918
		(0.0839)
MP financially supportive#CC	1.095	
	(0.0995)	
MP financially supportive#CB		1.334*
		(0.208)
MP financially supportive#OC		0.946
		(0.112)
MP financially supportive#LF	0.936	0.936
	(0.180)	(0.181)
MP financially supportive#LM	1.017	1.017

		(0.0529)		(0.0529)
MP financially supportive#NP		0.785		0.783
		(0.218)		(0.217)
Independent school	1.142***	1.148***	1.141***	1.147***
	(0.0227)	(0.0251)	(0.0225)	(0.0247)
Overall teacher index	1.003***	1.003***	1.003***	1.003***
	(0.000727)	(0.000737)	(0.000724)	(0.000728)
KS3 score (Z)	1.496***	1.492***	1.497***	1.493***
	(0.0256)	(0.0268)	(0.0256)	(0.0274)
Likelihood of the young person applying to university (reference level: very likely)				
Not at all likely	0.852***	0.856***	0.852***	0.856***
	(0.0200)	(0.0208)	(0.0198)	(0.0205)
Not very likely	0.979	0.982	0.980	0.982
	(0.0149)	(0.0151)	(0.0151)	(0.0153)
Fairly likely	1.036***	1.035***	1.036***	1.035***
	(0.0111)	(0.0112)	(0.0112)	(0.0113)
Young person's ethnicity (reference level: White)				
Mixed	1.045*	1.046*	1.049*	1.049*
	(0.0278)	(0.0280)	(0.0280)	(0.0287)
Indian	1.126***	1.132***	1.126***	1.132***
	(0.0305)	(0.0309)	(0.0303)	(0.0310)
Pakistani	1.202***	1.198***	1.203***	1.198***
	(0.0474)	(0.0478)	(0.0482)	(0.0492)
Bangladeshi	1.232***	1.235***	1.235***	1.236***
	(0.0615)	(0.0636)	(0.0621)	(0.0641)
Black Caribbean	1.139***	1.148***	1.139***	1.148***
	(0.0395)	(0.0398)	(0.0397)	(0.0402)
Black African	1.251***	1.249***	1.256***	1.252***
	(0.0489)	(0.0511)	(0.0494)	(0.0513)
Other	1.171***	1.175***	1.173***	1.176***
	(0.0516)	(0.0513)	(0.0519)	(0.0526)
Female	1.095***	1.093***	1.096***	1.095***
	(0.0113)	(0.0117)	(0.0114)	(0.0121)
Whether young person has disability	0.914***	0.915***	0.914***	0.916***
	(0.0228)	(0.0225)	(0.0231)	(0.0228)
Young person's age when started KS4	0.719**	0.718**	0.719**	0.719**
	(0.114)	(0.117)	(0.114)	(0.117)
Highest qualification of family (reference level: Degree or equivalent)				
Higher education below degree level	1.018	1.017	1.019	1.019
	(0.0124)	(0.0123)	(0.0122)	(0.0124)
GCE A Level or equiv	1.058***	1.059***	1.059***	1.059***
	(0.0159)	(0.0156)	(0.0156)	(0.0155)
GCSE grades A-C or equiv	1.046***	1.045***	1.047***	1.046***
	(0.0170)	(0.0166)	(0.0169)	(0.0167)
Qualifications at level 1 and below	1.035	1.033	1.036	1.034
	(0.0318)	(0.0307)	(0.0320)	(0.0314)

Other qualifications	0.979	0.974	0.975	0.971
	(0.0374)	(0.0358)	(0.0376)	(0.0359)
No qualification	0.945**	0.961	0.948*	0.963
	(0.0261)	(0.0277)	(0.0267)	(0.0282)
Whether the main parent is currently receiving job seeker allowance	1.112	1.087	1.059	1.042
	(0.132)	(0.123)	(0.128)	(0.123)
Number of siblings	0.987**	0.986**	0.987**	0.987**
	(0.00553)	(0.00552)	(0.00546)	(0.00564)
Number of younger siblings	1.003	1.004	1.003	1.003
	(0.00718)	(0.00719)	(0.00713)	(0.00739)
Constant	44,482***	43,672***	43,933***	42,189***
	(105,917)	(106,851)	(104,647)	(103,068)

Standard error (Eform) in parentheses. (-) means omitted because of collinearity.

*** p<0.01, ** p<0.05, * p<0.1

Table D.6: Family Structure Influence on Affective Outcome with Interaction Effects				
	Reduced Family Structure		Full Family Structure	
	(1)	(2)	(3)	(4)
VARIABLES	OR	OR	OR	OR
Family Structure (reference level: married natural couple)				
Other Married couple (OM)	0.765	0.455		
	(0.196)	(0.226)		
Other Married couple (OM)			0.435**	0.637
			(0.175)	(0.512)
Married with one or both step-parent (MS)			1.007	0.391
			(0.307)	(0.232)
Cohabiting couple (CC)	0.639	0.622		
	(0.245)	(0.394)		
Cohabiting two biological parents (CB)			0.646	0.331
			(0.304)	(0.310)
Other Cohabiting couple (OC)			0.650	1.033
			(0.319)	(0.810)
Lone father (LF)	0.969	1.858	0.968	1.861
	(0.461)	(1.307)	(0.461)	(1.320)
Lone mother (LM)	0.625	0.738	0.625	0.738
	(0.200)	(0.283)	(0.201)	(0.284)
No parents in the household (NP)	20.56***	8.935*	20.92***	9.051*
	(10.14)	(11.47)	(10.33)	(11.71)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)				
Lower managerial and professional occupations	0.952	0.948	0.953	0.950
	(0.0993)	(0.0993)	(0.0997)	(0.0999)
Intermediate occupations	0.939	0.919	0.941	0.924
	(0.169)	(0.167)	(0.170)	(0.169)
Small employers and own account workers	0.829	0.828	0.833	0.832
	(0.132)	(0.132)	(0.133)	(0.133)
Lower supervisory and technical occupations	0.909	0.929	0.912	0.934
	(0.117)	(0.121)	(0.118)	(0.122)
Semi-routine occupations	1.136	1.157	1.141	1.162
	(0.188)	(0.200)	(0.189)	(0.202)
Routine occupations	0.912	0.913	0.915	0.916
	(0.140)	(0.144)	(0.142)	(0.146)
Never worked/long term unemployed	0.964	0.961	0.964	0.964
	(0.315)	(0.307)	(0.317)	(0.313)
Mean income (Z)	0.919**	0.927*	0.918**	0.927*
	(0.0384)	(0.0390)	(0.0384)	(0.0391)
IDACI score (Z)	0.954	0.943	0.954	0.941
	(0.0481)	(0.0491)	(0.0482)	(0.0492)

MP: How involved is the MP in the young person's school life? (reference level: very involved)				
Fairly involved		0.870		0.870
		(0.0840)		(0.0844)
Not very involved		0.837		0.837
		(0.0911)		(0.0916)
Not at all involved		0.435***		0.433***
		(0.0950)		(0.0950)
MP's educational aspiration for young person (reference level: continue in full time education)				
Start learning a trade / get a place on a training course		0.817		0.815
		(0.130)		(0.131)
Start an apprenticeship		0.669**		0.668**
		(0.113)		(0.114)
Get a full-time paid job		0.527**		0.522**
		(0.162)		(0.162)
Something else		0.934		0.934
		(0.322)		(0.324)
MP: How the young person's expenses would be paid if stayed on in education-Parent(s) will support or give money		1.002		1.004
		(0.159)		(0.160)
MP's NS-SEC class # Family structure				
Lower managerial and professional occupations#OM	0.994	0.998		
	(0.290)	(0.297)		
Lower managerial and professional occupations#OM			1.581	1.334
			(0.719)	(0.624)
Lower managerial and professional occupations#MS			0.778	0.779
			(0.277)	(0.284)
Lower managerial and professional occupations#CC	1.417	1.324		
	(0.616)	(0.615)		
Lower managerial and professional occupations#CB			0.827	0.780
			(0.484)	(0.534)
Lower managerial and professional occupations#OC			1.732	1.746
			(0.950)	(0.982)
Lower managerial and professional occupations#LF	0.359	0.343	0.358	0.341
	(0.275)	(0.255)	(0.275)	(0.256)
Lower managerial and professional occupations#LM	1.229	1.250	1.228	1.250
	(0.428)	(0.439)	(0.430)	(0.440)

Lower managerial and professional occupations#NP	0.0542***	0.0637***	0.0533***	0.0640***
	(0.0432)	(0.0544)	(0.0426)	(0.0549)
Intermediate occupations#OM	1.054	1.086		
	(0.466)	(0.498)		
Intermediate occupations#OM			2.827	2.624
			(2.301)	(2.436)
Intermediate occupations#MS			0.663	0.606
			(0.339)	(0.314)
Intermediate occupations#CC	1.245	1.281		
	(0.678)	(0.716)		
Intermediate occupations#CB			2.919	3.679
			(3.605)	(4.404)
Intermediate occupations#OC			1.024	1.002
			(0.633)	(0.647)
Intermediate occupations#LF	0.237	0.177*	0.237	0.174*
	(0.239)	(0.166)	(0.240)	(0.166)
Intermediate occupations#LM	1.476	1.554	1.478	1.555
	(0.574)	(0.611)	(0.577)	(0.614)
Intermediate occupations#NP	0.0543***	0.00593***	0.0537***	0.00583***
	(0.0211)	(0.00731)	(0.0209)	(0.00716)
Small employers and own account workers#OM	1.214	1.313		
	(0.482)	(0.517)		
Small employers and own account workers#OM			2.211	2.368
			(1.468)	(1.503)
Small employers and own account workers#MS			0.917	0.913
			(0.415)	(0.415)
Small employers and own account workers#CC	1.942	1.864		
	(1.216)	(1.186)		
Small employers and own account workers#CB			0.800	1.125
			(0.609)	(0.957)
Small employers and own account workers#OC			2.544	2.532
			(1.871)	(1.880)
Small employers and own account workers#LF	0.881	0.904	0.880	0.901
	(0.612)	(0.674)	(0.612)	(0.676)
Small employers and own account workers#LM	3.108**	3.158**	3.116**	3.166**
	(1.490)	(1.539)	(1.497)	(1.547)
Small employers and own account workers#NP	0.257**	0.418	0.251**	0.409
	(0.167)	(0.611)	(0.163)	(0.602)
Lower supervisory and technical occupations#OM	1.324	1.402		
	(0.493)	(0.539)		
Lower supervisory and technical occupations#OM			1.680	1.520

			(2.100)	(1.944)
Lower supervisory and technical occupations#MS			1.044	1.087
			(0.431)	(0.473)
Lower supervisory and technical occupations#CC	1.593	1.559		
	(0.811)	(0.844)		
Lower supervisory and technical occupations#CB			1.404	1.769
			(1.094)	(1.458)
Lower supervisory and technical occupations#OC			1.634	1.508
			(1.015)	(0.965)
Lower supervisory and technical occupations#LF	1.252	1.506	1.251	1.510
	(0.686)	(0.901)	(0.687)	(0.907)
Lower supervisory and technical occupations#LM	1.179	1.202	1.178	1.200
	(0.465)	(0.476)	(0.466)	(0.478)
Lower supervisory and technical occupations#NP	0.0488**	0.00368**	0.0477**	0.00352**
	(0.0649)	(0.00979)	(0.0634)	(0.00953)
Semi-routine occupations#OM	0.888	0.972		
	(0.340)	(0.380)		
Semi-routine occupations#OM			1.154	0.986
			(0.764)	(0.665)
Semi-routine occupations#MS			0.780	0.845
			(0.332)	(0.380)
Semi-routine occupations#CC	0.635	0.551		
	(0.295)	(0.275)		
Semi-routine occupations#CB			0.509	0.557
			(0.301)	(0.400)
Semi-routine occupations#OC			0.688	0.588
			(0.416)	(0.373)
Semi-routine occupations#LF	1.853	2.615	1.856	2.627
	(1.492)	(1.897)	(1.497)	(1.920)
Semi-routine occupations#LM	1.132	1.134	1.131	1.130
	(0.444)	(0.448)	(0.446)	(0.449)
Semi-routine occupations#NP	0.0120***	0.0134***	0.0118***	0.0133***
	(0.00449)	(0.00699)	(0.00440)	(0.00692)
Routine occupations#OM	1.152	1.306		
	(0.447)	(0.523)		
Routine occupations#OM			1.677	1.856
			(1.278)	(1.388)
Routine occupations#MS			0.946	1.044
			(0.428)	(0.486)
Routine occupations#CC	1.417	1.229		
	(0.691)	(0.628)		
Routine occupations#CB			2.885	2.438
			(2.081)	(1.958)
Routine occupations#OC			0.924	0.802

			(0.550)	(0.495)
Routine occupations#LF	0.950	0.951	0.947	0.949
	(0.656)	(0.604)	(0.657)	(0.607)
Routine occupations#LM	1.077	1.133	1.075	1.125
	(0.438)	(0.464)	(0.439)	(0.463)
Routine occupations#NP	0.0564***	0.0831***	0.0549***	0.0800***
	(0.0462)	(0.0629)	(0.0450)	(0.0610)
Never worked/long term unemployed#OM	0.591	0.695		
	(0.446)	(0.461)		
Never worked/long term unemployed#OM			1.511	0.997
			(1.614)	(1.018)
Never worked/long term unemployed#MS			0.317	0.361
			(0.351)	(0.310)
Never worked/long term unemployed#CC	4.918**	4.378*		
	(3.502)	(3.750)		
Never worked/long term unemployed#CB			3.395*	1.328
			(2.397)	(1.331)
Never worked/long term unemployed#OC			5.476*	4.028
			(4.787)	(4.117)
Never worked/long term unemployed#LF	0.101**	0.0633***	0.101**	0.0620***
	(0.0990)	(0.0618)	(0.0993)	(0.0612)
Never worked/long term unemployed#LM	0.926	0.944	0.929	0.936
	(0.508)	(0.514)	(0.512)	(0.514)
Never worked/long term unemployed#NP	0.0168***	0.0465**	0.0165***	0.0456**
	(0.0174)	(0.0610)	(0.0171)	(0.0603)
Family income # Family structure				
OM#Family income	0.971	0.958		
	(0.101)	(0.0989)		
OM#Family income			1.012	0.963
			(0.161)	(0.186)
MS#Family income			0.941	0.927
			(0.136)	(0.132)
CC#Family income	1.221	1.190		
	(0.233)	(0.241)		
CB#Family income			0.857	0.777
			(0.279)	(0.228)
OC#Family income			1.338	1.363
			(0.259)	(0.273)
LF#Family income	1.209	1.171	1.211	1.177
	(0.404)	(0.481)	(0.407)	(0.486)
LM#Family income	1.118	1.121	1.118	1.123
	(0.136)	(0.137)	(0.137)	(0.138)
NP#Family income	0.406	0.241	0.404	0.243
	(0.336)	(0.286)	(0.335)	(0.290)
IDACI score # Family structure				
OM#IDACI score	1.016	1.040		
	(0.112)	(0.114)		

OM#IDACI score			0.926	0.900
			(0.212)	(0.189)
MS#IDACI score			1.057	1.111
			(0.129)	(0.141)
CC#IDACI score	0.940	0.985		
	(0.112)	(0.131)		
CB#IDACI score			0.832	0.962
			(0.181)	(0.204)
OC#IDACI score			0.959	0.967
			(0.138)	(0.149)
LF#IDACI score	0.926	0.926	0.924	0.924
	(0.213)	(0.197)	(0.213)	(0.198)
LM#IDACI score	1.075	1.081	1.075	1.080
	(0.0820)	(0.0840)	(0.0822)	(0.0843)
NP#IDACI score	1.399	1.363	1.403	1.380
	(0.534)	(0.499)	(0.536)	(0.510)
MP: How involved is the MP in the young person's school life? # Family Structure				
Fairly involved#OM		1.238		
		(0.338)		
Fairly involved#OM				1.306
				(0.632)
Fairly involved#MS				1.066
				(0.327)
Fairly involved#CC		0.772		
		(0.212)		
Fairly involved#CB				0.572
				(0.252)
Fairly involved#OC				0.997
				(0.384)
Fairly involved#LF		1.312		1.316
		(0.589)		(0.595)
Fairly involved#LM		0.893		0.892
		(0.168)		(0.169)
Fairly involved#NP		0.810		0.805
		(0.837)		(0.836)
Not very involved#OM		1.521		
		(0.433)		
Not very involved#OM				1.568
				(0.811)
Not very involved#MS				1.307
				(0.443)
Not very involved#CC		1.104		
		(0.365)		
Not very involved#CB				1.222
				(0.657)
Not very involved#OC				1.155
				(0.519)
Not very involved#LF		1.439		1.433
		(0.725)		(0.725)
Not very involved#LM		0.840		0.839
		(0.183)		(0.183)
Not very involved#NP		1.867		1.869
		(2.002)		(2.011)
Not at all involved#OM		4.160***		
		(1.889)		

Not at all involved#OM		3.585
		(3.611)
Not at all involved#MS		4.047***
		(1.854)
Not at all involved#CC	1.832	
	(1.004)	
Not at all involved#CB		2.802
		(2.867)
Not at all involved#OC		1.448
		(0.930)
Not at all involved#LF	0.590	0.590
	(0.664)	(0.665)
Not at all involved#LM	1.196	1.197
	(0.430)	(0.432)
Not at all involved#NP	0.0830**	0.0810**
	(0.0959)	(0.0939)
MP's educational aspiration for young person # Family structure		
Start learning a trade / get a place on a training course#OM	0.659	
	(0.241)	
Start learning a trade / get a place on a training course#OM		0.404
		(0.306)
Start learning a trade / get a place on a training course#MS		0.741
		(0.279)
Start learning a trade / get a place on a training course#CC	0.703	
	(0.258)	
Start learning a trade / get a place on a training course#CB		0.430
		(0.235)
Start learning a trade / get a place on a training course#OC		0.884
		(0.369)
Start learning a trade / get a place on a training course#LF	0.232**	0.229**
	(0.141)	(0.140)
Start learning a trade / get a place on a training course#LM	0.771	0.767
	(0.211)	(0.211)
Start learning a trade / get a place on a training course#NP	57.72	58.99
	(157.7)	(163.3)
Start an apprenticeship#OM	0.774	
	(0.275)	
Start an apprenticeship#OM		0.836
		(0.500)
Start an apprenticeship#MS		0.746

		(0.308)
Start an apprenticeship#CC	1.741	
	(1.010)	
Start an apprenticeship#CB		0.666
		(0.621)
Start an apprenticeship#OC		2.110
		(1.220)
Start an apprenticeship#LF	0.392	0.391
	(0.246)	(0.246)
Start an apprenticeship#LM	0.956	0.956
	(0.272)	(0.274)
Start an apprenticeship#NP	0.153	0.152
	(0.195)	(0.195)
Get a full-time paid job#OM	0.564	
	(0.411)	
Get a full-time paid job#OM		0.104**
		(0.0985)
Get a full-time paid job#MS		0.923
		(0.814)
Get a full-time paid job#CC	2.012	
	(1.240)	
Get a full-time paid job#CB		1.795
		(2.111)
Get a full-time paid job#OC		2.218
		(1.984)
Get a full-time paid job#LF	0.326	0.323
	(0.249)	(0.249)
Get a full-time paid job#LM	0.462	0.460
	(0.288)	(0.289)
Get a full-time paid job#NP	1	1
	(0)	(0)
Something else#OM	0.244	
	(0.269)	
Something else#OM		0.0254***
		(0.0152)
Something else#MS		0.885
		(1.149)
Something else#CC	0.976	
	(0.828)	
Something else#CB		1
		(0)
Something else#OC		0.637
		(0.602)
Something else#LF	0.192	0.189
	(0.220)	(0.220)
Something else#LM	1.453	1.443
	(0.688)	(0.687)
Something else#NP	19.68**	19.69**
	(25.22)	(25.21)
MP financially supportive # family structure		
MP financially supportive#OM	1.422	
	(0.538)	
MP financially supportive#OM		0.646

				(0.383)
MP financially supportive#MS				2.511**
				(1.140)
MP financially supportive#CC		1.173		
		(0.489)		
MP financially supportive#CB				2.942**
				(1.497)
MP financially supportive#OC				0.558
				(0.300)
MP financially supportive#LF		0.633		0.628
		(0.314)		(0.314)
MP financially supportive#LM		0.946		0.946
		(0.200)		(0.201)
MP financially supportive#NP		1.637		1.640
		(1.629)		(1.642)
Independent school	0.517***	0.482***	0.514***	0.477***
	(0.0445)	(0.0438)	(0.0443)	(0.0436)
Overall teacher index	1.072***	1.073***	1.073***	1.073***
	(0.00302)	(0.00308)	(0.00303)	(0.00308)
KS3 score (Z)	1.444***	1.412***	1.442***	1.405***
	(0.0561)	(0.0545)	(0.0561)	(0.0547)
Likelihood of the young person applying to university (reference level: very likely)				
Not at all likely	0.313***	0.354***	0.311***	0.351***
	(0.0349)	(0.0394)	(0.0348)	(0.0395)
Not very likely	0.413***	0.451***	0.413***	0.448***
	(0.0371)	(0.0407)	(0.0371)	(0.0408)
Fairly likely	0.698***	0.712***	0.695***	0.712***
	(0.0497)	(0.0507)	(0.0496)	(0.0511)
Young person's ethnicity (reference level: White)				
Mixed	0.985	0.938	0.998	0.933
	(0.145)	(0.141)	(0.147)	(0.140)
Indian	2.138***	2.046***	2.135***	2.044***
	(0.306)	(0.299)	(0.306)	(0.300)
Pakistani	1.271	1.192	1.264	1.179
	(0.213)	(0.200)	(0.212)	(0.199)
Bangladeshi	1.755**	1.674**	1.740**	1.661**
	(0.396)	(0.389)	(0.396)	(0.391)
Black Caribbean	0.991	0.905	0.987	0.901
	(0.180)	(0.165)	(0.181)	(0.166)
Black African	1.884***	1.608**	1.871***	1.592**
	(0.370)	(0.321)	(0.369)	(0.321)
Other	1.280	1.180	1.260	1.133
	(0.290)	(0.268)	(0.285)	(0.262)
Female	1.184***	1.122**	1.188***	1.125**
	(0.0655)	(0.0640)	(0.0657)	(0.0651)
Whether young person has disability	1.034	1.024	1.029	1.033

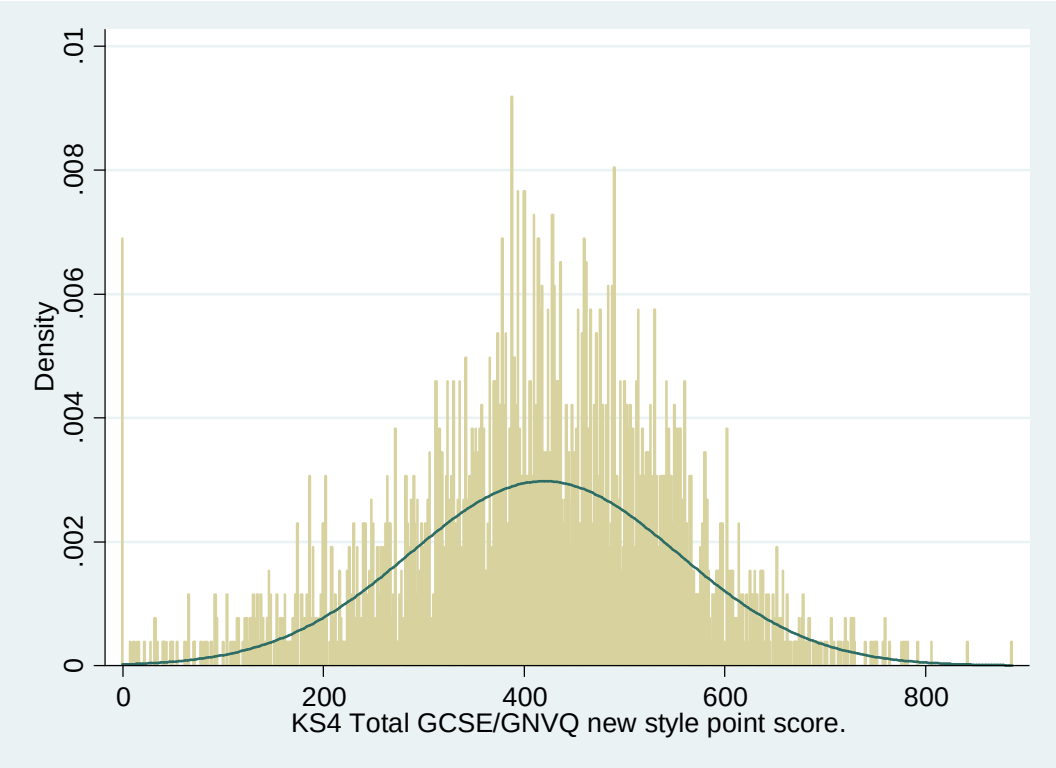
	(0.0873)	(0.0851)	(0.0875)	(0.0861)
Young person's age when started KS4	1.313	1.198	1.310	1.190
	(0.616)	(0.587)	(0.604)	(0.577)
Highest qualification of family (reference level: Degree or equivalent)				
Higher education below degree level	1.163	1.190*	1.149	1.168*
	(0.107)	(0.110)	(0.106)	(0.108)
GCE A Level or equiv	1.179*	1.197*	1.170	1.176
	(0.113)	(0.117)	(0.114)	(0.117)
GCSE grades A-C or equiv	1.031	1.056	1.016	1.028
	(0.0983)	(0.103)	(0.0970)	(0.100)
Qualifications at level 1 and below	1.112	1.151	1.089	1.121
	(0.173)	(0.180)	(0.170)	(0.178)
Other qualifications	1.028	1.086	1.022	1.102
	(0.202)	(0.215)	(0.200)	(0.215)
No qualification	1.038	1.067	1.032	1.067
	(0.138)	(0.145)	(0.137)	(0.147)
Whether the main parent is currently receiving job seeker allowance	0.846	0.924	0.860	0.893
	(0.370)	(0.368)	(0.395)	(0.386)
Number of siblings	0.936**	0.933**	0.935**	0.932**
	(0.0278)	(0.0273)	(0.0274)	(0.0272)
Number of younger siblings	1.107***	1.108***	1.108***	1.111***
	(0.0372)	(0.0367)	(0.0375)	(0.0375)

Standard error (Eform) in parentheses. (-) means omitted because of collinearity.

*** p<0.01, ** p<0.05, * p<0.1

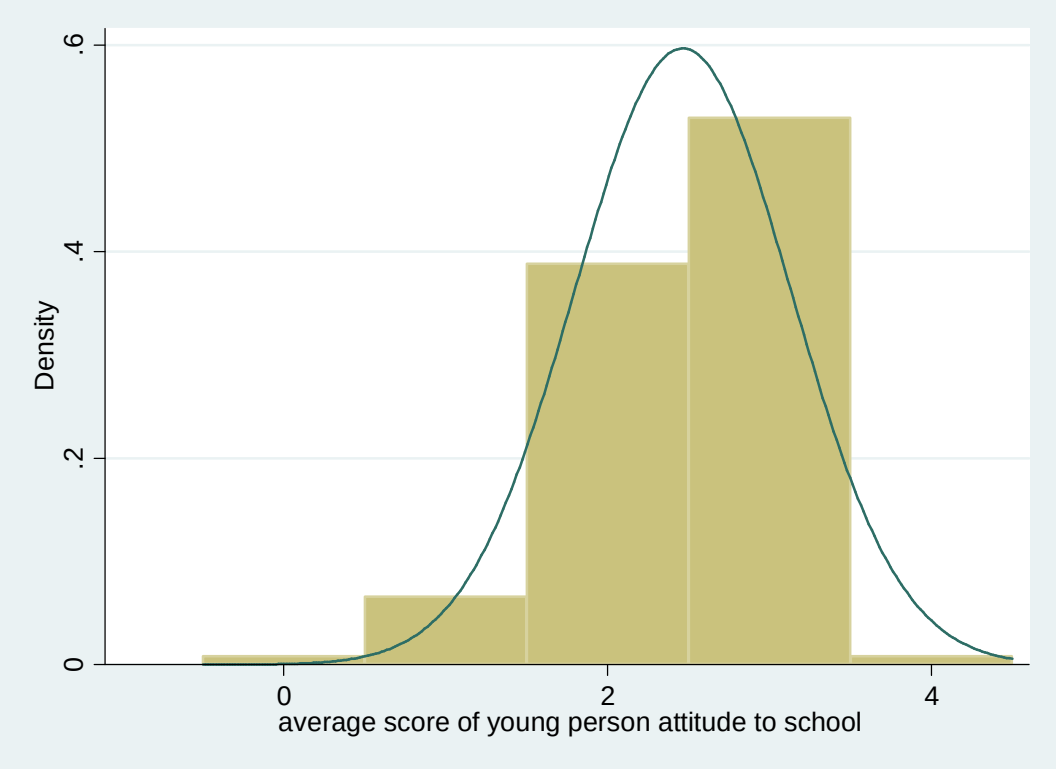
E. Chapter 4 Related Statistical Figures and Tables

Figure E.1: Histogram of key stage 4 total GCSE/GNVQ new style point score for the year 2005/2006 (KS4_PTSTNEWG)



Shapiro-Wilk W test for normality rejected at W= 0.98785 and P-value=0.000

Figure E.2: Histogram of attitude towards school score at wave three (W3yschat1)



Shapiro-Wilk W test for normality rejected at W= 0.98887 and P-value=0.000

Table E.1: Correlation Matrix of Cognitive Outcome Models

	KS4_PT~G	W1reli~N	religi~1	W2ALe~0c	W2ALe~0a	W2~2YP0b	W2palh~P	W1quah~P	W2tmee~P	W2nss~MP	FamInc~Z	KS4_ID~Z	W2BenAny
KS4_PTSTNEWG	1.0000												
W1relig1YP_N	-0.0213	1.0000											
religiosity1	-0.0639	-0.4910	1.0000										
W2ALei2YP0c	0.0570	-0.0509	-0.1412	1.0000									
W2ALei2YP0a	0.0120	0.0698	-0.0987	0.0443	1.0000								
W2ALei2YP0b	0.0814	-0.0084	-0.0698	0.1436	0.1207	1.0000							
W2palhomeYP	-0.1572	-0.1293	0.1350	0.0285	0.0023	0.0187	1.0000						
W1quahelpYP	0.0479	-0.1304	0.1756	-0.0666	-0.0864	-0.0205	-0.0052	1.0000					
W2tmeetfMP	-0.2060	-0.0113	-0.0273	0.0637	0.0180	0.0082	0.0674	0.0073	1.0000				
W2nssecMP	-0.2222	0.3153	-0.1365	-0.0263	0.0105	-0.0052	0.0201	-0.1050	0.0247	1.0000			
FamIncome_Z	0.1813	-0.2537	0.1512	0.0185	-0.0378	-0.0212	0.0216	0.0797	-0.0520	-0.3179	1.0000		
KS4_IDACI_Z	-0.2207	0.3675	-0.2490	-0.0054	0.0309	-0.0516	-0.0077	-0.1305	0.0943	0.3754	-0.2976	1.0000	
W2BenAny	-0.0165	0.0076	0.0474	0.0078	0.0151	0.0275	0.0110	0.0439	-0.0385	0.0385	-0.0439	-0.0201	1.0000
W2famtyp	-0.0801	-0.1090	0.1128	-0.0037	-0.0209	-0.0256	0.0725	0.0369	0.0397	-0.0059	-0.0287	0.0775	0.0085
urbind	0.0360	-0.1548	0.1219	0.0000	-0.0238	0.0208	0.0059	0.0302	-0.0199	-0.0811	0.0986	-0.2054	0.0053
W2hiqualgfam	-0.2841	0.3695	-0.1303	-0.0701	0.0356	-0.0415	0.0411	-0.0478	0.0458	0.5182	-0.3097	0.3956	0.0287
W1prelig1M~D	0.0061	0.1421	-0.1359	0.0019	-0.0117	-0.0101	-0.0144	-0.0398	-0.0128	0.0286	-0.0436	0.0321	-0.0254
KS4_CVAP3A~Z	0.7882	-0.1467	0.0349	0.0684	-0.0068	0.0716	-0.1229	0.1133	-0.1888	-0.2966	0.2491	-0.3088	-0.0022
W2heposs9YP	0.4692	0.2087	-0.2468	0.0276	0.0345	0.0480	-0.1425	-0.0678	-0.1029	-0.1145	0.0995	0.0018	-0.0353
W1ethgrpYP	-0.0202	0.5724	-0.4893	0.0014	0.0691	-0.0292	-0.1379	-0.1369	0.0408	0.2040	-0.2000	0.4321	-0.1049
W1sexYP	0.1346	-0.0282	0.0233	-0.0021	-0.0237	0.0272	0.0219	-0.1875	-0.0953	0.0369	0.0044	0.0073	0.0301
W1chea1HS	0.0935	0.0706	-0.0414	0.0090	-0.0049	-0.0079	-0.0274	0.0033	-0.0751	0.0057	-0.0243	0.0164	-0.0175
KS4_AGE_ST~T	-0.0378	-0.0103	-0.0001	-0.0099	-0.0028	0.0351	-0.0407	0.0090	0.0147	0.0128	-0.0124	-0.0294	0.0955
W2usefulYP	-0.0301	-0.0703	0.0696	-0.0209	-0.0383	-0.0050	-0.0042	-0.0062	0.0052	-0.0174	0.0262	-0.0678	0.0482
W2risk_Z	-0.2140	-0.1454	0.1365	0.0322	-0.0034	-0.0769	0.1920	0.0573	0.1710	0.0106	0.0340	-0.0064	0.0218
W2Fat2YP	0.1618	-0.0600	0.0061	0.0310	0.0222	0.0347	-0.0295	0.0039	-0.0247	-0.0927	0.0390	-0.0743	-0.0177
IndSchool	-0.0089	0.0229	-0.0296	-0.0171	-0.0048	-0.0088	0.0184	-0.0202	0.0114	-0.0330	0.0128	-0.0232	0.0036
teachereff~A	0.0944	0.1448	-0.1795	0.0501	0.0412	0.0444	-0.0208	-0.1309	-0.0394	0.0516	-0.0248	0.0797	-0.0066

	W2famtyp	urbind	W2hiq~am	W1prel~D	KS4_CV~Z	W2hepo~P	W1ethg~P	W1sexYP	W1chea~S	KS4_AG~T	W2usef~P	W2risk_Z	W2Fat2YP
W2famtyp	1.0000												
urbind	-0.0106	1.0000											
W2hiqualgfam	0.0222	-0.0907	1.0000										
W1prelig1M~D	-0.0963	-0.0561	0.0653	1.0000									
KS4_CVAP3A~Z	-0.0766	0.0630	-0.3709	-0.0242	1.0000								
W2heposs9YP	-0.0820	-0.0370	-0.1588	0.0632	0.4335	1.0000							
W1ethgrpYP	-0.0471	-0.1638	0.2366	0.0920	-0.1439	0.2289	1.0000						
W1sexYP	0.0295	0.0214	-0.0160	-0.0300	0.0883	0.1138	0.0095	1.0000					
W1chea1HS	-0.0610	-0.0219	0.0463	0.0070	0.0911	0.0902	0.0889	0.0462	1.0000				
KS4_AGE_ST~T	-0.0045	0.0313	-0.0127	-0.0245	-0.0115	-0.0227	-0.0483	0.0005	-0.0224	1.0000			
W2usefulYP	0.0033	0.0286	-0.0175	-0.0214	0.0072	-0.0647	-0.0692	0.1328	-0.0322	-0.0294	1.0000		
W2risk_Z	0.0529	0.0220	0.0125	-0.0214	-0.0864	-0.2378	-0.1038	-0.0438	0.0108	-0.0127	0.0495	1.0000	
W2Fat2YP	-0.0351	0.0200	-0.1057	-0.0211	0.1652	0.0786	-0.0883	0.0375	0.0139	-0.0289	-0.0463	-0.0873	1.0000
IndSchool	-0.0078	0.0326	-0.0407	0.0119	-0.0045	-0.0273	-0.0189	0.0122	0.0127	-0.0007	-0.0128	-0.0144	0.0163
teachereff~A	-0.0526	-0.0154	0.0507	0.0627	0.0010	0.2033	0.1277	-0.0921	0.0320	0.0079	-0.1724	-0.2635	0.0844

	IndSch~l	teac~t_A
IndSchool	1.0000	
teachereff~A	0.0079	1.0000

.

Number of obs=2612.

Table E.2: Correlation Matrix of Affective Outcome Models

	W3avatt	W1reli~N	religi~1	W2ALe~0c	W2ALe~0a	W2~2YP0b	W2palh~P	W1quah~P	W2tmee~P	W2nss~MP	FamInc~Z	KS4_ID~Z	W2BenAny
W3avatt	1.0000												
W1relig1YP_N	0.1117	1.0000											
religiosity1	-0.1501	-0.4904	1.0000										
W2ALei2YP0c	0.0107	-0.0519	-0.1382	1.0000									
W2ALei2YP0a	0.0075	0.0620	-0.0986	0.0416	1.0000								
W2ALei2YP0b	0.0233	-0.0063	-0.0689	0.1425	0.1247	1.0000							
W2palhomeYP	-0.1032	-0.1305	0.1376	0.0271	0.0016	0.0171	1.0000						
W1quahelpYP	-0.0904	-0.1274	0.1738	-0.0636	-0.0833	-0.0206	-0.0037	1.0000					
W2tmeetfMP	-0.1062	-0.0148	-0.0278	0.0639	0.0150	0.0104	0.0628	0.0116	1.0000				
W2nssecMP	-0.0243	0.3149	-0.1357	-0.0236	0.0057	-0.0039	0.0185	-0.1042	0.0219	1.0000			
FamIncome_Z	0.0038	-0.2557	0.1486	0.0217	-0.0344	-0.0208	0.0218	0.0789	-0.0475	-0.3168	1.0000		
KS4_IDACI_Z	0.0046	0.3660	-0.2494	-0.0080	0.0295	-0.0498	-0.0121	-0.1275	0.0882	0.3760	-0.2990	1.0000	
W2BenAny	-0.0084	0.0071	0.0481	0.0077	0.0150	0.0277	0.0110	0.0449	-0.0395	0.0389	-0.0445	-0.0207	1.0000
W2famtyp	-0.0648	-0.1082	0.1119	-0.0024	-0.0202	-0.0256	0.0751	0.0350	0.0422	-0.0053	-0.0305	0.0806	0.0086
urbind	-0.0151	-0.1534	0.1216	0.0024	-0.0226	0.0215	0.0068	0.0292	-0.0205	-0.0803	0.1000	-0.2044	0.0053
W2hiqualgfam	-0.0419	0.3676	-0.1282	-0.0691	0.0346	-0.0391	0.0405	-0.0452	0.0430	0.5167	-0.3099	0.3928	0.0285
W1prelig1M~D	0.0073	0.1412	-0.1342	0.0005	-0.0135	-0.0100	-0.0119	-0.0392	-0.0122	0.0303	-0.0452	0.0333	-0.0257
KS4_CVAP3A~Z	0.2033	-0.1401	0.0338	0.0651	-0.0079	0.0705	-0.1244	0.1101	-0.1879	-0.2949	0.2479	-0.3054	-0.0019
W2heposs9YP	0.3204	0.2114	-0.2489	0.0294	0.0355	0.0478	-0.1438	-0.0710	-0.1006	-0.1152	0.0978	0.0025	-0.0352
W1ethgrpYP	0.0991	0.5696	-0.4867	-0.0012	0.0636	-0.0278	-0.1400	-0.1350	0.0398	0.2030	-0.2002	0.4310	-0.1058
W1sexYP	0.0255	-0.0246	0.0227	-0.0001	-0.0244	0.0260	0.0212	-0.1878	-0.0938	0.0346	0.0048	0.0076	0.0302
W1chea1HS	0.0401	0.0708	-0.0412	0.0118	-0.0072	-0.0087	-0.0314	0.0024	-0.0805	0.0064	-0.0237	0.0133	-0.0176
KS4_AGE_ST~T	0.0010	-0.0103	-0.0002	-0.0099	-0.0028	0.0352	-0.0410	0.0089	0.0150	0.0129	-0.0125	-0.0295	0.0955
W2usefulYP	-0.1502	-0.0679	0.0653	-0.0180	-0.0404	-0.0054	-0.0032	-0.0039	0.0080	-0.0182	0.0257	-0.0672	0.0485
W2risk_Z	-0.3422	-0.1465	0.1394	0.0296	0.0003	-0.0773	0.1939	0.0577	0.1685	0.0148	0.0355	-0.0082	0.0218
W2Fat2YP	0.1577	-0.0580	0.0059	0.0298	0.0239	0.0368	-0.0281	0.0055	-0.0267	-0.0910	0.0417	-0.0731	-0.0179
IndSchool	0.0273	0.0233	-0.0299	-0.0171	-0.0048	-0.0089	0.0185	-0.0206	0.0116	-0.0333	0.0130	-0.0232	0.0036
teachereff~A	0.3786	0.1472	-0.1804	0.0510	0.0454	0.0453	-0.0194	-0.1298	-0.0358	0.0538	-0.0272	0.0836	-0.0067

	W2famtyp	urbind	W2hiq~am	W1prel~D	KS4_CV~Z	W2hepo~P	W1ethg~P	W1sexYP	W1chea~S	KS4_AG~T	W2usef~P	W2risk_Z	W2Fat2YP
W2famtyp	1.0000												
urbind	-0.0123	1.0000											
W2hiqualgfam	0.0234	-0.0909	1.0000										
W1prelig1M~D	-0.0968	-0.0569	0.0653	1.0000									
KS4_CVAP3A~Z	-0.0790	0.0625	-0.3681	-0.0253	1.0000								
W2heposs9YP	-0.0814	-0.0368	-0.1591	0.0632	0.4348	1.0000							
W1ethgrpYP	-0.0459	-0.1626	0.2352	0.0910	-0.1416	0.2291	1.0000						
W1sexYP	0.0281	0.0232	-0.0154	-0.0292	0.0897	0.1158	0.0110	1.0000					
W1chea1HS	-0.0572	-0.0221	0.0445	0.0077	0.0938	0.0892	0.0875	0.0466	1.0000				
KS4_AGE_ST~T	-0.0046	0.0314	-0.0128	-0.0245	-0.0116	-0.0228	-0.0486	0.0005	-0.0226	1.0000			
W2usefulYP	0.0029	0.0305	-0.0165	-0.0211	0.0067	-0.0672	-0.0671	0.1291	-0.0315	-0.0296	1.0000		
W2risk_Z	0.0547	0.0221	0.0158	-0.0203	-0.0893	-0.2388	-0.1047	-0.0435	0.0090	-0.0127	0.0535	1.0000	
W2Fat2YP	-0.0358	0.0171	-0.1074	-0.0230	0.1634	0.0798	-0.0874	0.0381	0.0156	-0.0290	-0.0485	-0.0910	1.0000
IndSchool	-0.0079	0.0327	-0.0409	0.0120	-0.0046	-0.0276	-0.0189	0.0123	0.0128	-0.0007	-0.0129	-0.0144	0.0165
teachereff~A	-0.0528	-0.0182	0.0518	0.0612	-0.0017	0.2030	0.1304	-0.0923	0.0363	0.0080	-0.1755	-0.2657	0.0800

	IndSch~l	teac~t_A
IndSchool	1.0000	
teachereff~A	0.0079	1.0000

.

Number of obs=2583.

Table E.3: Religion and Religiosity Influence on Cognitive Outcome			
	(1)	(2)	(3)
VARIABLES	IRR	IRR	IRR
Young person's religion (reference level: Christian)			
Buddhist	1.255**	1.253**	1.239**
	(0.125)	(0.125)	(0.119)
Hindu	1.050	1.051	1.056
	(0.0511)	(0.0513)	(0.0515)
Jewish	0.992	0.990	0.999
	(0.0511)	(0.0510)	(0.0548)
Muslim	1.124**	1.122**	1.117**
	(0.0623)	(0.0632)	(0.0621)
Sikh	1.121**	1.121**	1.125**
	(0.0597)	(0.0597)	(0.0609)
Another religion	1.137	1.137	1.141*
	(0.0899)	(0.0896)	(0.0909)
Religiosity index		0.999	0.999
		(0.00210)	(0.00223)
Organizational Life			1.003
			(0.0151)
Engagement in public affairs			1.026
			(0.0332)
Volunteerism			1.015
			(0.0248)
Informal sociability (reference level: 6 or more times)			
None			0.997
			(0.0357)
once or twice			0.997
			(0.0397)
3-5 times			0.996
			(0.0348)
Social Trust (reference level: matters a lot to me)			
matters a little to me			0.991
			(0.0147)
doesn't matter			0.959*
			(0.0218)
Parental involvement			0.942***
			(0.0173)
KS3 score (Z)	1.411***	1.411***	1.407***
	(0.0327)	(0.0328)	(0.0323)
Likelihood of the young person applying to university (reference level: very likely)			
Not at all likely	0.892***	0.893***	0.892***
	(0.0282)	(0.0283)	(0.0285)
Not very likely	0.978	0.979	0.976
	(0.0182)	(0.0182)	(0.0183)
Fairly likely	1.021	1.021	1.020
	(0.0142)	(0.0142)	(0.0140)
Young person’s ethnicity (reference level: White)			
Mixed	1.051	1.050	1.049
	(0.0433)	(0.0436)	(0.0441)
Indian	1.007	1.004	0.997
	(0.0476)	(0.0482)	(0.0476)
Pakistani	0.943	0.940	0.944
	(0.0555)	(0.0555)	(0.0550)
Bangladeshi	1.017	1.015	1.015
	(0.0680)	(0.0679)	(0.0679)
Black Caribbean	1.037	1.034	1.043

	(0.0444)	(0.0444)	(0.0439)
Black African	1.132***	1.128***	1.128***
	(0.0453)	(0.0468)	(0.0472)
Other	1.045	1.043	1.045
	(0.0713)	(0.0712)	(0.0702)
Female	1.069***	1.069***	1.060***
	(0.0136)	(0.0136)	(0.0137)
Whether young person has disability	0.938**	0.938**	0.942*
	(0.0294)	(0.0293)	(0.0296)
Young person's age when started KS4	0.517	0.517	0.519
	(0.222)	(0.223)	(0.228)
Adolescent's self-image (reference level: more than usual)			
Same as usual	0.989	0.989	0.988
	(0.0154)	(0.0154)	(0.0156)
Less useful than usual	0.940**	0.940**	0.940**
	(0.0280)	(0.0280)	(0.0282)
Much less useful	0.974	0.975	0.973
	(0.0533)	(0.0533)	(0.0526)
Adolescent's risk factor (Z)	0.962***	0.962***	0.966***
	(0.00819)	(0.00818)	(0.00823)
Adolescent's perception of future success (reference level: strongly agree)			
Agree	1.032	1.032	1.035
	(0.0321)	(0.0320)	(0.0321)
Disagree	1.028	1.027	1.030
	(0.0283)	(0.0283)	(0.0284)
Strongly disagree	1.020	1.020	1.022
	(0.0326)	(0.0326)	(0.0327)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)			
Lower managerial and professional occupations	1.010	1.010	1.009
	(0.0225)	(0.0226)	(0.0224)
Intermediate occupations	1.005	1.006	1.001
	(0.0267)	(0.0268)	(0.0265)
Small employers and own account workers	0.996	0.996	0.999
	(0.0323)	(0.0324)	(0.0324)
Lower supervisory and technical occupations	0.994	0.994	0.989
	(0.0305)	(0.0305)	(0.0306)
Semi-routine occupations	0.982	0.982	0.978
	(0.0273)	(0.0274)	(0.0272)
Routine occupations	0.932	0.932	0.928
	(0.0482)	(0.0483)	(0.0480)
Never worked/long term unemployed	1.080	1.080	1.077
	(0.0646)	(0.0644)	(0.0632)
Mean income (Z)	0.995	0.995	0.995
	(0.00570)	(0.00576)	(0.00585)
IDACI score (Z)	0.982*	0.982*	0.983*
	(0.00984)	(0.00982)	(0.00969)
Whether the parents receive benefit (reference level: no)	1.047	1.047	1.037
	(0.0571)	(0.0571)	(0.0605)
Family structure (reference level: married couple)			

Cohabiting couple	1.011	1.011	1.013
	(0.0328)	(0.0329)	(0.0325)
Lone mother	0.857*	0.861	0.899
	(0.0797)	(0.0799)	(0.0838)
Urban/Rural Indicator (reference level: Urban-sparse)			
Town & Fringe-sparse	1.167***	1.169***	1.158***
	(0.0659)	(0.0657)	(0.0652)
Village-sparse	1.178*	1.178*	1.149
	(0.106)	(0.106)	(0.105)
Hamlet and Isolated Dwelling-sparse	1.073	1.074	1.062
	(0.0715)	(0.0715)	(0.0758)
Urban-less sparse	1.120***	1.121***	1.114***
	(0.0308)	(0.0305)	(0.0348)
Town & Fringe-less sparse	1.103***	1.104***	1.097***
	(0.0264)	(0.0263)	(0.0287)
Village-less sparse	1.131***	1.132***	1.123***
	(0.0394)	(0.0391)	(0.0419)
Hamlet & Isolated Dwelling-less sparse	1.172***	1.173***	1.165***
	(0.0568)	(0.0564)	(0.0580)
Highest qualification of family (reference level: Degree or equivalent)			
Higher education below degree level	0.993	0.994	0.994
	(0.0162)	(0.0159)	(0.0160)
GCE A Level or equiv	1.029*	1.030*	1.032*
	(0.0174)	(0.0172)	(0.0172)
GCSE grades A-C or equiv	1.040*	1.041*	1.043**
	(0.0225)	(0.0219)	(0.0219)
Qualifications at level 1 and below	1.003	1.005	1.005
	(0.0488)	(0.0485)	(0.0503)
Other qualifications	0.872*	0.873*	0.873*
	(0.0668)	(0.0671)	(0.0679)
No qualification	0.954	0.955	0.960
	(0.0332)	(0.0332)	(0.0339)
Religion difference between MP/SP (reference level: no)	1.002	1.001	1.000
	(0.0189)	(0.0189)	(0.0190)
Independent school	1.035	1.034	1.039
	(0.0498)	(0.0503)	(0.0523)
Overall teacher index	1.001	1.001	1.001
	(0.000992)	(0.000983)	(0.00103)
Constant	5.621e+06**	5.584e+06**	5.460e+06**
	(3.633e+07)	(3.615e+07)	(3.606e+07)

Standard error (Eform) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table E.4: Religion and Religiosity Influence on Affective Outcome			
	(1)	(2)	(3)
VARIABLES	OR	OR	OR
Young person's religion (reference level: Christian)			
Buddhist	0.614	0.597	0.520
	(0.536)	(0.517)	(0.465)
Hindu	1.235	1.283	1.321
	(0.671)	(0.693)	(0.713)
Jewish	1.391	1.270	1.156
	(1.078)	(0.982)	(0.906)
Muslim	0.870	0.812	0.779
	(0.354)	(0.329)	(0.322)
Sikh	1.279	1.265	1.287
	(0.733)	(0.724)	(0.735)
Another religion	0.463	0.464	0.453
	(0.295)	(0.296)	(0.287)
Religiosity index		0.964**	0.962**
		(0.0173)	(0.0181)
Organizational Life			0.860
			(0.105)
Engagement in public affairs			0.783
			(0.271)
Volunteerism			0.768
			(0.136)
Informal sociability (reference level: 6 or more times)			
None			1.289
			(0.298)
once or twice			1.393
			(0.314)
3-5 times			1.408
			(0.337)
Social Trust (reference level: matters a lot to me)			
matters a little to me			0.884
			(0.0932)
doesn't matter			0.590***
			(0.100)
Parental involvement			0.963
			(0.120)
KS3 score (Z)	1.358***	1.358***	1.392***
	(0.0967)	(0.0968)	(0.105)
Likelihood of the young person applying to university (reference level: very likely)			
Not at all likely	0.316***	0.324***	0.333***
	(0.0636)	(0.0653)	(0.0676)
Not very likely	0.482***	0.489***	0.489***
	(0.0778)	(0.0797)	(0.0796)
Fairly likely	0.721***	0.728***	0.733***
	(0.0800)	(0.0809)	(0.0817)
Young person’s ethnicity (reference level: White)			
Mixed	2.026**	1.940*	1.927*
	(0.720)	(0.688)	(0.705)
Indian	1.394	1.250	1.196
	(0.725)	(0.645)	(0.601)
Pakistani	1.246	1.132	1.148
	(0.550)	(0.493)	(0.509)
Bangladeshi	1.723	1.593	1.535
	(0.761)	(0.701)	(0.682)

Black Caribbean	1.054	0.941	0.921
	(0.323)	(0.293)	(0.289)
Black African	1.475	1.308	1.323
	(0.426)	(0.389)	(0.390)
Other	1.459	1.351	1.409
	(0.682)	(0.630)	(0.669)
Female	1.153	1.151	1.087
	(0.111)	(0.110)	(0.107)
Whether young person has disability	1.064	1.055	1.087
	(0.154)	(0.152)	(0.158)
Young person's age when started KS4	0.888	0.845	0.790
	(0.528)	(0.522)	(0.504)
Adolescent's self-image (reference level: more than usual)			
Same as usual	0.980	0.979	0.971
	(0.122)	(0.122)	(0.123)
Less useful than usual	0.469***	0.464***	0.456***
	(0.114)	(0.113)	(0.112)
Much less useful	0.390***	0.391***	0.374***
	(0.118)	(0.118)	(0.114)
Adolescent's risk factor (Z)	0.619***	0.619***	0.623***
	(0.0354)	(0.0355)	(0.0375)
Adolescent's perception of future success (reference level: strongly agree)			
Agree	1.111	1.111	1.120
	(0.206)	(0.204)	(0.204)
Disagree	1.543**	1.532**	1.550**
	(0.295)	(0.290)	(0.291)
Strongly disagree	2.383***	2.381***	2.425***
	(0.625)	(0.620)	(0.626)
MP's NS-SEC class (reference level: Higher Managerial and professional occupations)			
Lower managerial and professional occupations	1.368	1.374	1.390*
	(0.267)	(0.269)	(0.274)
Intermediate occupations	1.667**	1.674**	1.714**
	(0.368)	(0.369)	(0.381)
Small employers and own account workers	1.132	1.144	1.206
	(0.304)	(0.306)	(0.321)
Lower supervisory and technical occupations	1.190	1.196	1.183
	(0.271)	(0.272)	(0.275)
Semi-routine occupations	1.270	1.274	1.276
	(0.268)	(0.268)	(0.270)
Routine occupations	1.220	1.219	1.206
	(0.343)	(0.343)	(0.341)
Never worked/long term unemployed	1.527	1.517	1.529
	(0.505)	(0.502)	(0.505)
Mean income (Z)	0.948	0.953	0.952
	(0.0494)	(0.0497)	(0.0502)
IDACI score (Z)	0.949	0.950	0.951
	(0.0653)	(0.0655)	(0.0652)
Whether the parents receive benefit (reference level: no)	1.271	1.296	1.411
	(0.621)	(0.642)	(0.697)
Family structure (reference			

level: married couple)			
Cohabiting couple	0.957	0.974	0.965
	(0.189)	(0.193)	(0.195)
Lone mother	0.0368***	0.0426***	0.0363***
	(0.0225)	(0.0259)	(0.0232)
Urban/Rural Indicator (reference level: Urban-sparse)			
Town & Fringe-sparse	1.245	1.313	1.397
	(0.944)	(0.978)	(0.975)
Village-sparse	1.478	1.501	1.595
	(1.075)	(1.079)	(1.199)
Hamlet and Isolated Dwelling-sparse	0.341*	0.352*	0.345*
	(0.188)	(0.195)	(0.200)
Urban-less sparse	0.705***	0.727**	0.738**
	(0.0908)	(0.0945)	(0.0973)
Town & Fringe-less sparse	0.725	0.757	0.780
	(0.143)	(0.150)	(0.153)
Village-less sparse	0.771	0.804	0.820
	(0.159)	(0.166)	(0.172)
Hamlet & Isolated Dwelling-less sparse	0.731	0.757	0.781
	(0.249)	(0.257)	(0.265)
Highest qualification of family (reference level: Degree or equivalent)			
Higher education below degree level	1.042	1.070	1.047
	(0.154)	(0.159)	(0.158)
GCE A Level or equiv	1.186	1.231	1.225
	(0.197)	(0.206)	(0.207)
GCSE grades A-C or equiv	1.120	1.167	1.169
	(0.176)	(0.185)	(0.186)
Qualifications at level 1 and below	1.075	1.133	1.108
	(0.314)	(0.332)	(0.323)
Other qualifications	1.290	1.333	1.429
	(0.552)	(0.568)	(0.620)
No qualification	0.951	0.978	1.013
	(0.282)	(0.288)	(0.298)
Religion difference between MP/SP (reference level: no)	0.820	0.810	0.800
	(0.135)	(0.133)	(0.132)
Independent school	11.95***	11.45***	10.54***
	(7.073)	(6.726)	(6.286)
Overall teacher index	1.064***	1.064***	1.063***
	(0.00607)	(0.00602)	(0.00604)

Standard error (Eform) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

REFERENCES

Aaronson, D., Barrow, L. and Sander, W., 2007. Teachers and Student Achievement in the Chicago Public High Schools. *Journal of Labor Economics*, 25(1), pp.95-136.

Acock, A.C. and Keicolt, K.J., 1989. Is It Family Structure or Socioeconomic Status? Family Structure during Adolescence and Adult Adjustment. *Social Forces*, 68 (2), pp.553–571.

Administrative Data Liaison Service, 2010. *National Pupil Database*. Available at: <http://adls.ac.uk/department-for-education/dcsf-npd/?detail> [accessed 05 September 2014].

Agresti, A., 2002. *Categorical data analysis*. 2nd ed. New York: Wiley.

Akerlof, G.A., Yellen, J.L. and Katz, M.L., 1996. An Analysis of Out-of-Wedlock Childbearing in the United States. *Quarterly Journal of Economics*, 111 (2), pp.278–317.

Amato, P.R., 1987. Family processes in one-parent, stepparent, and intact families: the child's point of view. *Journal of Marriage and the Family*, 49 (2), pp.327–337.

Amato, P.R., 1988. Long-Term Implications of Parental Divorce for Adult Self-Concept. *Journal of Family Issues*, 9 (2), pp.201-13.

Amato, P.R. and Booth, A., 1991. Consequences of Parental Divorce and Marital Unhappiness for Adult Well-Being. *Social Forces*, 69 (3), pp.895–914.

Amato, P.R., and Booth, A., 1997. *A generation at risk: Growing up in an era of family upheaval*. Cambridge, MA: Harvard University Press.

Amato, P.R. and Keith, B., 1991a. Parental Divorce and Adult Well-Being: A Meta-Analysis. *Journal of Marriage and the Family*, 53 (1), pp.43–58.

Amato, P.R. and Keith, B., 1991b. Separation from a Parent during Childhood and Adult Socioeconomic Attainment. *Social Forces*, 70 (1), pp.187–206.

Anderson, C.S., 1982. The search for school climate: A review of the research. *Review of Educational Research*, 52 (3), pp.368–420.

Angrist, J.D. and Lavy, V., 1999. Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement. *The Quarterly Journal of Economics*, 114 (2), pp.533-575

Angrist, J.D. and Lavy, V., 2001. Does Teacher Training Affect Pupil Learning? Evidence from Matched Comparisons in Jerusalem Public Schools. *Journal of Labor Economics*, 19 (2), pp.343-369.

Argys L.M, et al., 1998. The impact of child support on cognitive o outcomes of young children. *Demography*, 35 (2), pp.159–173.

Argys, L., Rees, D. and Brewer, D., 1996. Detracking America's schools: equity at zero cost? *Journal of Policy Analysis and Management*, 15 (4), pp.623-645.

Armor, D. et al., 1976. *Analysisof the reading program in selected Los Angeles minority schools*. Santa Monica: Rand.

Astone, N.M., and McLanahan, S.S., 1991. Family structure, parental practices, and high school completion. *American Sociological Review*, 56 (3), pp.309–320.

Bahr, S.J., Hawks, R.D. and Wang, G., 1993. Family and religious influences on adolescent substance abuse. *Youth and Society*, 24 (4), pp.443-465.

Baker, D.P. and Stevenson, D.S., 1986. Mother's Strategies for Children's School Achievement: Managing the Transition to High School. *Sociology of Education*, 59 (3), pp.156-66.

Balk, D., 1991. Sibling death, adolescent bereavement, and religion. *Death Studies*, 15 (1), pp.1-20.

Bankston, C.L.III. and Zhou, Min. 1996. The Ethnic Church, Ethnic Identification, and the Social Adjustment of Vietnamese Adolescents. *Review of Religious Research*, 38 (1), pp.18-37.

Bankston, C.L.III. and Zhou, M., 2002. Social Capital and Immigrant Children's Achievement. In Fuller, B. and Hannum, E. *Schooling and Social Capital in Diverse Cultures, Research in the Sociology of Education*, Vol. 13. Greenwich, CT: JAI Press. Pp 13–39.

Barrett, B.D., 2009. The "invisible institution" and a disappearing achievement gap. *Religion and Education*, 36 (3), pp.22-38.

Barrett, B., 2010. Religion and Habitus: Exploring the Relationship between Religious Involvement and Educational Outcomes and Orientations among Urban African American Students. *Urban Education*, 45 (4), pp.448-479.

Barro, R. and Lee, J., 2001. Schooling quality in a cross-section of countries". *Economica*, 68 (272), pp.465-488.

Beck, S.H., Cole, B.S. and Hammond, J.A., 1991. Religious heritage and premarital sex: Evidence from a national sample of adults. *Journal for the Scientific Study of Religion*, 30 (2), pp.173-180.

Becker, G.S., 1965. A theory of the allocation of time. *The Economic Journal*, 75 (299), pp.493-517.

Becker, G.S., 1967. *Human Capital and the Personal Distribution of Income: An Analytical Approach*. Ann Arbor, MI, University of Michigan Press.

Becker, G.S., 1975. *Human capital*. University of Chicago Press, Chicago.

Becker, G.S., 1981. *A treatise on the family*. Cambridge, MA: Harvard University Press.

Becker, G.S., 1991. *A treatise on the family: Enlarged edition*. Cambridge, MA: Harvard University Press.

Becker, G.S. and Chiswick, B.R., 1966. Education and the Distribution of Earnings. *American Economic Review*, 56 (1/2), pp.358–369.

Becker, G.S., Landes, E.M. and Michael, R.T., 1977. An Economic Analysis of Marital Instability. *Journal of Political Economy*, 85 (6), pp.1141-1187.

Becker, G.S. and Tomes, N., 1986. Human capital and the rise and fall of families. *Journal of Labor Economics*, 4 (3), pp.S1–S39.

Bell, L., 2001. Book review. *Educational Research Journal*, 27 (4), Educational Effectiveness and Improvement: Developing New Theories and Methods, pp. 512-515.

Belle, D., 1990. Poverty and women's mental health. *American Psychologist*, 45 (3), pp.385–389.

Bellei, C., 2009. Does lengthening the school day increase students' academic achievement? Results from a natural experiment in Chile. *Economics of Education Review*, 28 (2009), pp.629–640.

Beller, A.H. and Chung, S.S., 1992. Family structure and educational attainment of children effects of remarriage. *Journal of Population Economics,* 5 (1), pp.39–59.

Benson, P.L., 1990. Help-seeking for alcohol and drug problems: To whom do adolescents turn? *Journal of Adolescent Chemical Dependency*, 1 (1), pp.83-94.

Beshir, E., and Beshir, M. R., 2000. *Meeting the challenge of parenting in the West: An Islamic perspective* (2nd ed.). Beltsville, Maryland: Amana Publications.

Bianchi, S.M., and Casper, L.M., 2000. American families. *Population Bulletin*, 55 (4), pp.1–44.

Biblarz, T.J. and Gottainer, G., 2000. Family Structure and Children's Success: A Comparison of Widowed and Divorced Single Mother Families. *Journal of Marriage and the Family*, 62 (2), pp.533–548.

Biblarz, T.J. and Raftery, A.E., 1999. Family Structure, Educational Attainment, and Socioeconomic Success: Rethinking the 'Pathology of Matriarchy. *American Journal of Sociology*, 105 (2), pp.321–365.

Biblarz, T.J., Raftery, A.E. and Bucur, A., 1997. Family Structure and Social Mobility. *Social Forces*, 75 (4), pp.1319–1339.

Björklund, A. and Sundström, M., 2002. Parental Separation and Children's Educational Attainment: A Siblings Approach. IZA, Bonn, Germany. Discussion Paper No. 643. Available online at http://www.iza.org

Blake, J., 1981. Family size and the quality of children. *Demography*, 18 (4), pp.421-442.

Blake, J., 1989. *Family Size and Achievement*. Berkeley, Calif.: University of California Press.

Boggess, S., 1998. Family Structure, Economic Status, and Educational Attainment. *Journal of Population Economics,* 11 (2), pp.205–222.

Bourdieu, P., 1997. The forms of capital. In A. H. Halsey, H. Lauder, P. Brown, and A. S. Wells (Eds.), *Education, culture, economy, society*. New York: Oxford University Press. pp. 46-58.

Bowen, G.L., et al., 2008. The joint effects of neighborhoods, schools, peers, and families on changes in the school success of middle school students. *Family Relations*, 57 (October), pp.504–516.

Bowlby J, McMullen, K., 2002. At a crossroads: First results for the 18 to 20-year-old cohort of the youth in transition survey. HRDC Publications. Hull, Quebec, Can.

Bowles, S. and Nelson, V.I., 1974. The Inheritance of IQ and the Intergenerational Reproduction of Economic Inequality. *Review of Economics and Statistics*, 56 (1), pp.39–51.

Brenner, R. and Kiefer, N.M., 1981. The economics of the diaspora: Discrimination and occupational structure. *Economic Development and Cultural Change*, 29 (3), pp.517–533.

Brick, J.M., et al., 2000. 1999 variance estimation. NSAF Methodology Reports, No. 4.

Bridgeland, J.M., Dilulio, J.J., Jr. and Morison, K.B., 2006. *The silent epidemic: Perspectives of high school dropouts*. A report by Civic Enterprises, in association with Peter D. Hart Research Associates, for the Bill & Melinda Gates Foundation. Washington, DC: Civic Enterprises, LLC.

Brody, G., Stoneman, Z. and Flor, D., 1996. Parental religiosity, family processes, and youth competence in rural, two parent African American families. *Developmental Psychology*, 32 (4), pp.696-706.

Broh, B.A., 2002. Linking Extracurricular Programming to Academic Achievement: Who Benefits and Why? *Sociology of Education*, 75 (1), pp.69–91.

Brown, D.R. and Gary, L.E., 1991. Religious socialization and educational attainment among African Americans: An empirical assessment. *Journal of Negro Education*, 60 (3), ppp.411-426.

Brown, S.L., 2000. The effect of union type on psychological well-being: Depression among cohabitors versus marrieds. *Journal of Health and Social Behavior*, 41 (3), pp.244–255.

Brown, S.L., 2004. Family structure and child well-being: The significance of parental cohabitation. *Journal of Marriage and Family*, 66 (May), pp.351–367.

Brownfield, D. and Sorenson, A.M., 1991. Religion and drug use among adolescents: A social support conceptualization and interpretation. *Deviant Behavior*, 12 (3), pp.259-276.

Browning, M. and Heinesen, E., 2007. Class Size, Teacher Hours and Educational Attainment. *The Scandinavian Journal of Economics*, 109(2), pp.415–438.

Bryk, A.S., Lee, V.E. and Holland, P.B., 1993. *Catholic Schools and the Common Good*. Cambridge, MA: Harvard University Press.

Bumpass, L.L. and Sweet, J.A., 1972. Differentials in marital instability: 1970. American Sociological Review, 37 (6), pp.754-766.

Bumpass, L.L. and Sweet, J.A., 1989. Children's Experience in Single-Parent Families: Implications of Cohabitation and Marital Transitions. *Family Planning Perspectives*, 21 (6), pp.256–260.

Burkett, S.R., 1993. Perceived Parents' Religiosity, Friends' Drinking, and Hellfire: A Panel Study of Adolescent Drinking. *Review of Religious Research*, 35 (2): pp.134-154.

Caldwell, C.H., Green, A.D. and Billingsley, A., 1992. The Black Church as a Family Support System: Instrumental and Expressive Functions. *National Journal of Sociology*, 6 (1), pp.21-40.

Carbonaro, W.J., 1998. A little help from my friends' parents: Intergenerational closure and educational outcomes. *Sociology of Education*, 71 (4), pp.295-313.

Carlin, P.S., 1999. Economics and the Family. In *Handbook of Marriage and the Family*. 2nd ed. pp.525-552.

Carlson, M.J., and Corcoran, M.E., 2001. Family structure and children's behavioral and cognitive outcomes. *Journal of Marriage and Family*, 63 (3), pp.779–792.

Cavanagh, S.E., Schiller, K.S., and Riegle-Crumb, C., 2006. Marital transitions, parenting, and schooling: Exploring the link between family-structure history and adolescents' academic success. *Sociology of Education*, 79 (4), pp.329–354.

Cheng, Y.C., 1993. Profiles of organisational culture and effective schools. *School Effectiveness and School Improvement*, 4, pp.85-110.

Cherlin, A., 1978. Remarriage as an incomplete institution. *American Journal of Sociology*, 84 (3), pp.634–650.

Cherlin, A.J., 1992. *Marriage, divorce, remarriage*. Cambridge, MA: Harvard University Press.

Cherlin, A.J., 2009. *The Marriage-Go-Round: The State of Marriage and the Family in America Today*. New York: Alfred A. Knopf.

Cherlin, A.J. and Furstenberg, F.F., Jr., 1994. Stepfamilies in the United States: A Reconsideration. *Annual Review of Sociology*, 20, pp.359–381.

Chiswick, B., 1986. Labor Supply and Investments in Child Quality: A Study of Jewish and non-Jewish Women. *Review of Economics and Statistics*, 68 (4), pp.700–703.

Chiswick, B., 1988. Differences in education and earnings across racial and ethnic groups: Tastes, discrimination, and investments in child quality. *Quarterly Journal of Economics*, 103 (3), pp.571–597.

Chiswick, B., 1993. The skills and economic status of American Jewry: Trends over the last half-century. *Journal of Labor Economics*, 11(1), pp.229–242.

Chiswick, B. and Huang, J., 2008. The Earnings of American Jewish Men: Human Capital, Denomination, and Religiosity. *Journal for the Scientific Study of Religion*, 47 (4), pp.694-709.

Chiswick, C., 1999. An economic model of Jewish continuity. *Contemporary Jewry*, 20, pp.30–56.

Chiswick, C. and Lehrer, E., 1990. On marriage-specific human capital: Its role as a determinant of remarriage. *Journal of Population Economics*, 3, pp.193-213.

Chowdry, H., Crawford, C. and Goodman, A., 2009. *Drivers and Barriers to Educational Success Evidence from the Longitudinal Study of Young People in England*. London, Department for Children, Schools and Families.

Chowdry, H., Crawford, C. and Goodman, A., 2010. The role of attitudes and behaviours in explaining socio-economic differences in attainment at age 16. London: Institute for Fiscal Studies. Working Paper No.10/15.

Chowdry, H. et al., 2010. *Poorer children's educational attainment: how important are attitudes and behaviour?* York: Joseph Rowntree Foundation.

Cid, A. and Stokes. C.E., 2013. Family Structure and Children's Education Outcome: Evidence from Uruguay. *Journal of Family and Economic Issues, June*, 34 (2), pp. 185-199.

Cochran, J.K., 1992. The effect of religiosity on adolescent self-reported frequency of drug and alcohol use. *Journal of Drug Issues*, 22 (1), ppp.91-104.

Cochran, J.K., 1993. The variable effects of religiosity and denomination on adolescent self-reported alcohol use by beverage type. *Journal of Drug Issues*, 23 (3), pp.479-491.

Cochran, J.K., Wood, P.B. and Arneklev, B.J., 1994. Is the Religiosity-Delinquency Relationship Spurious? A Test of Arousal and Social Control Theories. *Journal of Research in Crime and Delinquency*, 31 (1), pp.92-123.

Coleman, J.S., 1961. *The Adolescent Society*. New York: Free Press of Glencoe.

Coleman, J.S., 1987. Families and Schools. *Educational Researcher*, 16 (6), pp.32-38.

Coleman, J.S., 1988. Social capital in the creation of human capital. *American Journal of Sociology*, 94 (Suppl), pp.S95–S120.

Coleman, J.S., 1990a. *Equality and achievement in education*. Boulder, CO: Westview.

Coleman, J.S., 1990b. *Foundations of Social Theory*. Cambridge, MA: Harvard University Press

Coleman, J.S. and Hoffer, T., 1987. *Public and Private High Schools: Impact of Communities*. New York: Basic Books.

Coleman, J.S. et al., 1966. *Equality of Educational Opportunity*. Washington, DC, Government Printing Office.

Conlisk, J., 1971. Bit of Evidence on the Income-Education-Ability Interrelation. *Journal of Human Resources*, 6 (3), pp.358–362.

Corak, M. 1999. Death and divorce: The long-term consequences of parental loss on adolescents. Family and Labour Studies. Statistics Canada.

Cronbach, L.J., 1951. Coefficient alpha and the internal structure of tests. *Psychometrika*, 16 (3), pp.297–334.

Crosnoe, R., 2004. Social capital and the interplay of families and schools. *Journal of Marriage and Family*, 66 (2), pp.267–280.

Daly, M. and Wilson, M.I., 1999. *The Truth about Cinderella: A Darwinian View of Parental Love*. New Haven, CT: Yale University Press.

Daly, P., 1991. How large are Secondary School Effects in Northern Ireland? *School Effectiveness and School Improvement*, 2(4), pp.305-323.

Darnell, A. and Sherkat, D., 1997. The impact of Protestant fundamentalism on educational attainment. *American Sociological Review*, 62 (2), pp.306-316.

Das, J., et al., 2007. Teacher Shocks and Student Learning: Evidence from Zambia. *The Journal of Human Resources*, 42 (4), pp.820-862.

Datcher-Loury, L. and Loury, G.C., 1985. The Effects of Attitudes and Aspirations on the Labor Supply of Young Black Men. National Bureau of Economic Research

DaVanzo, J. and Rahman, M.O., 1993. American Families: Trends and Correlates. *Population Index*, 59 (3), pp.350–386.

Dawson, D.A., 1991. Family Structure and Children's Health and Well-Being: Data from the 1988 National Health Interview Survey on Child Health. *Journal of Marriage and the Family*, 53 (3), pp.573–584.

Dearden, L., Ferri, J. and Meghir, C., 2000. The effects of school quality on educational attainment and wages. Institute for Fiscal Studies Working Paper W00/22, London.

Della Pergolla, S., 1980. Patterns of American Jewish fertility. *Demography*, 17 (3), pp.261–273.

Demo, D., and Acock, A.C., 1996. Singlehood, marriage, and remarriage: The effects of family structure and family relationships on mothers' well-being. *Journal of Family Issues*, 17 (3), pp.388–407.

Department for Children, Schools and Families, 2009. *Measuring Progress at Pupil, School and National levels*. London: Department for Children, Schools and Families.

Department for Education, 2011a. *LSYPE User Guide to the Datasets: Wave 1 to Wave 7*. London: Department for Education.

Department for Education, 2011b. *Technical Annex*. [online] Available at: <http://www.education.gov.uk/perfomrancetables/pilotks4_05/annex.shtml> [accessed 27 October 2011].

Department for Education, 2011c. *LSYPE wave one documentation*. London: Department for Education.

Department for Education, 2011d. *LSYPE wave four documentation*. London: Department for Education.

Department for Education, 2011e. *LSYPE wave four documentation*. London: Department for Education.

Department for Education, 2013a. Improving education for pupils outside mainstream school. [online] Available at: <https://www.gov.uk/government/policies/improving-education-for-pupils-outside-mainstream-school/supporting-pages/alternative-provision > [accessed 05 September 2014].

Department for Education, 2013b. Welcome to interactive LSYPE. [online] Available at: <https://www.education.gov.uk/ilsype/public/wiki/welcome> [accessed 05 September 2014].

Department for Environment, Food & Rural Affairs, 2012. Rural and Urban Statistics in England: Guidance Notes. [online] Available at: <http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/rural-urban-definition-and-la/rural-urban-definition--england-and-wales-/index.html> [accessed 27 September 2012].

Dobson, A.J., 2001. *An introduction to generalized linear models*. 2nd ed. New York: Chapman & Hall/CRC.

Dolton, P. and Vignoles, A., 1999. The impact of school quality on labour market success in the UK. Discussion Paper 98 (Newcastle, University of Newcastle).

Donahue, M.J. and Benson, P.L., 1995. Religion and the well-being of adolescents. *Journal of Social Issues*, 51 (2), pp.145-160.

Dornbusch, S.M., et al., 1985. Single Parents, Extended Households, and the Control of Adolescents. *Child Development,* 56 (2), pp.326-341.

Downey, D.B., 1995. Understanding academic performance among children in stephouseholds: The role of parental resources, sex of stepparent, and sex of child. *Social Forces*, 73 (3), pp.875–894.

Duckworth, et al., 2009. *Influences and leverages on low levels of attainment: a review of literature and policy initiatives*. London; Centre for Research on the Wider Benefits of Learning Institute of Education.

Duderija, A., 2007. Literature Review: Identity Construction in the Context of Being a Minority Immigrant Religion: The Case of Western born Muslims. *Immigrants and Minorities,* 25(2), pp.141-162.

Duflo, E., Pascaline D. and Michael, K., 2011. Peer Effects and the Impacts of Tracking: Evidence from a Randomized Evaluation in Kenya. *American Economic Review*, 101 (5), pp.1739–1774.

Duncan, G, and Brooks-Gunn, J., 1997. *The Consequences of Growing Up Poor*. Russell Sage Foundation, New York.

Duncan, G.J. and Hoffman, S.D., 1985. A Reconsideration of the Economic Consequences of Marital Dissolution. *Demography,* 22 (4), pp.485-497.

Dunifon, R., and Kowaleski-Jones, L., 2002. Who's in the house? Race differences in cohabitation, single parenthood, and child development. *Child Development*, 73 (4), pp.1249–1264.

Dunteman, G.H. and Ho, M.R., 2005. *An introduction to generalized linear models (quantitative applications in the social sciences).* California: Saga publication inc.

Duran, B.J. and Weffer, R.E., 1992. Immigrants' aspirations, high school process, and academic outcomes. *American Educational Research Journal*, 29 (1), pp.163–181.

Dustmann, C., Rajah, N. and van Soest, A., 1998. School quality, exam performance and career choice. Tilburg, University Centre for Economic Research, Discussion Paper 98/6.

Eccles, J.S. and Barber, B.L., 1999. Student Council, Volunteering, Basketball, or Marching Band: What Kind of Extracurricular Involvement Matters? *Journal of Adolescent Research*, 14 (1), pp.10–43.

Eccles, J.S., et al., 2003. Extracurricular Activities and Adolescent Development. *Journal of Social Issues*, 59 (4), pp.865–889.

Edmonds, R., 1979. Effective Schools for the Urban Poor. *Educational Leadership,* 37 (1), pp.15-27.

Eggebeen, D.J., and Lichter, D.T., 1991. Race, family structure, and changing poverty among American children. *American Sociological Review*, 56 (6), pp.801–817.

Elder, G.H. and Conger, R.D., 2000. *Children of the land: Adversity and success in rural America*. Chicago: University of Chicago Press.

Ellison, C.G., Bartkowski, J.P. and Segal, M.L., 1996. Conservative Protestantism and the Parental Use of Corporal Punishment. *Social Forces*, 74 (3), pp.1003-1028.

Ellison, C., Burr, J.A. and McCall, P.L., 1997. Religious Homogeneity and Metropolitan Suicide Rates. *Social Forces*, 76 (1), pp.273-299.

Ellison, C. and Shekat, D., 1993. Conservative Protestantism and support for corporal punishment. *American Sociological Review*, 58 (1), pp.131-145.

Faguet, J. and Sanchez, F., 2008. Decentralization's Effects on Educational Outcomes in Bolivia and Colombia. World Development, 36 (7), pp.1294-1316.

Fahrmeir, L. and Tutz, G., 2001. *Multivariate Statistical Modelling Based on Generalized Linear Models*. 2nd ed. New York: Springer-Verlag.

Fan, W., and Williams, C.M., 2010. The effects of parental involvement on students' academic self-efficacy, engagement, and intrinsic motivation. *Educational Psychology*, 30 (1), pp.53–74.

Featherman, D.L., 1971. The Socioeconomic Achievement of White Religion-Ethnic Subgroups: Social and Psychological Explanations. *American Sociological Review*, 36 (2), pp.207–222.

Feinstein, L. and Symons, J., 1999. Attainment in secondary school. *Oxford Economic Papers*, 51, pp.300–321.

Feld, S.L., 1981. The Focused Organization of Social Ties. *American Journal of Sociology*, 86 (5), pp.1015–1035.

Finn, J.D., 1989. Withdrawing from School. *Review of Educational Research*, 59 (2), pp.117–142.

Fischer, C.S., 1982. *To Dwell among Friends: Personal Networks in Town and City*. Chicago: University of Chicago.

Fredricks, J.A. and Eccles, J.S., 2005. Developmental Benefits of Extracurricular Involvement: Do Peer Characteristics Mediate the Link between Activities and Youth Outcomes? *Journal of Youth and Adolescence*, 34 (6), pp.507–520.

Freeman, R.B., 1985. Who escapes? The relation of churchgoing and other background factors to the socioeconomic performance of Black males from innercity poverty tracts. NBER Working Paper No. 1656.

Fuchs, T. and Woessmann, L., 2007. What accounts for international differences in student performance? A re-examination using PISA data. *Empirical Economics*, 32 (2-3), pp.433-462.

Furstenberg, F.F. and Hughes, M.E., 1995. Social Capital and Successful Development among At-Risk Youth. *Journal of Marriage and the Family*, 57 (3), pp.580–592.

Galiani, S., Gertler, P. and Schargrodsky, E., 2008. School Decentralization: Helping the good get better, but leaving the poor behind. *Journal of Public Economics*, 92, pp.2106-2120.

Galiani, S. and Perez-Truglia, R., 2011. School Management in Developing Countries. Paper presented at Education Policy in Developing Countries: What Do We Know, and

What Should We Do to Understand What We Don't Know?, February 4-5, at University of Minnesota.

Gamoran, A., 1987. The Stratification of High School Learning Opportunities. *Sociology of Education*, 60 (3), pp.61-77.

Garfinkel, I., and McLanahan, S S., 1986. *Single mothers and their children: A new American dilemma*. Washington, DC: Urban Institute Press.

Garg, R., Melanson, S., and Levin, E., 2007. Educational aspirations of male and female adolescents from single-parent and two biological parent families: A comparison of influential factors. *Journal of Youth and Adolescence*, 36, pp.1010–1023.

Gennetian, L., 2005. One or Two Parents? Half or Step Siblings? The Effect of Family Composition on Young Children's Achievement. *Journal of Population Economics*, 18 (3), pp.415-436.

Gibbons, S. and Silva, O., 2009. School Quality, Child Wellbeing and Parents' Satisfaction. *Economics of Education review*, 30 (2), pp.312-331.

Ginther, D.K., and Pollak, R.A., 2004. Family structure and children's educational outcomes: Blended families, stylized facts, and descriptive regressions. *Demography*, 41 (4), pp.671–696.

Glanville, J.L., Sikkink, D. and Hernandez, E., 2008. Religious involvement and educational outcomes: The role of social capital and extracurricular participation. *Sociological Quarterly*, 49 (1), pp.105-137.

Glewwe, et al., 2011. School resources and educational outcomes in developing countries: a review of the literature from 1990 to 2010. Massachusetts: National Bureau of Economic Research. Working Paper No.17554.

Glick, P. and Sahn, D.E., 2010. Early Academic Performance, Grade Repetition, and School Attainment in Senegal: A Panel Data Analysis. *The World Bank Economic Review*, 24 (1), pp.93–120.

Goddard, R.D., 2003. Relational Networks, Social Trust, and Norms: A Social Capital Perspective on Students' Chances of Academic Success. *Educational Evaluation and Policy Analysis*, 25 (1), pp.59–74.

Goldscheider, C., 1967. Fertility of the Jews. *Demography*, 4 (1), pp.196–209.

Gonzalez-DeHass, A.R.,Willems, P.P., and Doan Holbein, M.F., 2005. Examining the relationship between parental involvement and student motivation. *Educational Psychology Review*, 17 (2), pp.99–123.

Goreuch, R.L., 1995. Religious Aspects of Substance Abuse and Recovery. *Journal of Social Issues*, 51 (2), pp.65-84.

Greeley, A.M., 1981. Catholics and the Upper Middle Class: A Comment on Roof. *Social Forces*, 59 (3), 824–830.

Greene, W.H. and Quester, A.O., 1982. Divorce risk and wives' labor supply behavior. *Social Science Quarterly*, 63 (1), pp.16-27.

Gregg, P. and Macmillan, L., 2009. Family Income and Education in the Next Generation: Exploring income gradients in education for current cohorts of youth. Bristol: Centre for Market and Public Organization. Working Paper No.09/223.

Gregg, P., and Washbrook, E., 2009. *The socio-economic gradient in child outcomes: the role of attitudes, behaviours and beliefs*. Bristol: University of Bristol.

Gruber, J., 2005. Religious market structure, religious participation, and outcomes: is religion good for you? NBER working paper series. Working Paper 11377.

Gutman, L.M., McLoyd, V.C., and Tokoyawa, T., 2005. Financial strain, neighborhood stress, parenting behaviors, and adolescent adjustment in urban African American families. *Journal of Research on Adolescence*, 15 (4), pp.425–449.

Hakkinen, I., Kirjavainen, T. and Uusitalo, R., 2003. School resources and student achievement revisited: new evidence from panel data. *Economics of Education Review*, 22 (3), pp.329–335.

Hammond, J.L., 1974. Revival religion and antislavery politics. *American Sociological Review*, 39 (2), pp.175-186.

Hampden-Thompson, G. and Galindo, C., 2015. Family structure instability and the educational persistence of young people in England. *British Educational Research Journal*.

Hanson, S.L., 1994. Lost Talent: Unrealized Educational Aspirations and Expectations among U.S. Youths. *Sociology of Education*, 67 (3), pp.159-183.

Hanson, T.L., McLanahan, S., and Thomson, E., 1997. Economic resources, parental practices, and children's well-being. In G. J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of growing up poor* (pp. 190–238). New York: Russell Sage Foundation.

Hanushek, E.A., 1971. Teacher characteristics and gains in student achievement: Estimation using micro-data. *American Economic Review*, 61 (2), pp.280-288.

Hanushek, E.A., 1981. Throwing money at schools. *Journal of Policy Analysis and Management*, 1 (1), pp.19-41.

Hanushek, E.A., 1986. The Economics of Schooling: Production and Efficiency in Public Schools. *Journal of Economic Literature*, 24 (September), pp.1141-1177.

Hanushek, E.A., 1989. The Impact of Differential Expenditures on School Performance. *Educational Researcher*, 18 (May), pp.45-62.

Hanushek, E.A., 1991. When school finance "reform" may not be a good policy. *Harvard Journal on Legislation*, 28, pp.423-456

Hanushek, E.A., 2008. Incentives for efficiency and equity in the school system. *Perspektiven der Wirtschaftspolitik*, 9, (Special Issue), pp.5-27.

Hanushek, E. and Kimko, D. 2000. Schooling, labor force quality, and the growth of nations. *American Economic Review*, 90 (5), pp.1184-1208.

Hanushek, E. and Luque, J., 2003. Efficiency and equity in schools around the world. *Economics of Education Review*, 22 (5), pp.481-502.

Hanushek, E.A. and Woessmann, L., 2006. Does educational tracking affect performance and inequality? Differences-in-differences evidence across countries. *Economic Journal*, 116 (510), pp.C63-C76.

Hartman, M. and Hartman, H., 1996. *Gender Equality and American Jews*. Albany, NY: State University of New York Press.

Haveman, R. And Wolfe, B., 1995. The determinants of children's attainments: A review of methods and findings. *Journal of Economic Literature*, 33 (December), pp.1829–1979.

Heaton, T.B. and Cornwall, M. 1989. Religious Group Variation in the Socioeconomic Status and Family Behavior of Women. *Journal for the Scientific Study of Religion*, 28 (3), pp.283-299.

Heaton, T.B., and Goodman, K.L., 1985. Religion and family formation. *Review of Religious Research*, 26 (4), pp.343–359.

Hedges, L.V., Laine, R.D., and Greenwald, R., 1994a. When Reinventing the Wheel Is Not Necessary: A Case Study in the Use of Meta-Analysis in Education Finance. *Journal of Education Finance*, 20 (1), pp.1-20.

Hedges, L.V., Laine, R.D., and Greenwald, R., 1994b. An Exchange: Part I: Does Money Matter? A Meta-Analysis of Studies of the Effects of Differential School Inputs on Student Outcomes. *Educational Researcher*, 23 (3), pp. 5-14.

Hedges, L.V. and Nowell, A., 1995. Sex Differences in Mental Test Scores, Variability, and Numbers of High Scoring Individuals. *Science*, 269 (5220), pp.41-45.

Hetherington, E.M., Bridges, M. and Isabella, G.M., 1998. What matters? What does not? Five perspectives on the association between marital transitions and children's adjustment. *American Psychologist*, 53 (2), pp.167–184.

Hetherington, E.M. and Jodl, K.M., 1994. Stepfamilies as Settings for Child Development. In: Booth, A. and Dunn, J. *Stepfamilies: Who Benefits? Who Does Not?* Lawrence Erlbawn Associates, Hillsdale.

Hilbe, J.M., 1994. Generalized linear models. *The American Statistician*, 48 (3), pp.259-286.

Hill, M.S. and Duncan, G.J., 1987. Parental family income and the socioeconomic attainment of children. *Social Science Research*. 16 (1), pp.39-73.

Hill, M., Yeung, W. and Duncan, G., 2001. Childhood Family Structure and Young Adult Behaviors. *Journal of Population Economics*, 14 (2), pp.271–299.

Hill, N.E., et al., 2004. Parent academic involvement as related to school behavior, achievement, and aspirations: Demographic variations across adolescence. *Child Development*, 75 (5), pp.1491–1509.

Hochschild, J.L., 1988. Review of Ain't No Makin' It: Leveled Aspirations in a Low-Income Neighborhood Book. *American Journal of Sociology*, 94 (1), pp. 182-184.

Hoffer, T.B., 1992. Middle school ability grouping and student achievement in science and mathematics. *Educational Evaluation and Policy Analysis*, 14 (3), pp.205-227.

Hofferth, S.L. and Anderson, K.G., 2003. Are all dads equal? Biology versus marriage as a basis for paternal investment. *Journal of Marriage and the Family*, 65 (1), pp.213–232.

Hoffman, S.D. and Duncan, G.J., 1988. What are the economic consequences of divorce? *Demography,* 25 (4), pp.641–645.

Hoffmann, J.P. and Johnson, R.A., 1998. A National Portrait of Family Structure and Adolescent Drug Use. *Journal of Marriage and the Family,* 60 (3), pp.633–645.

Hofman, R.H., Hofman, W.H. A., and Guldemond, H., 1999. Social and cognitive outcomes: A comparison of context and learning. *School Effectiveness And School Improvement*, 10, pp.352-366.

Holden, K.C. and Smock, P.J., 1991. The Economic Costs of Marital Dissolution: Why Do Women Bear a Disproportionate Cost? *Annual Review of Sociology,* 17(1991), pp.51–78.

Holland, A. and Andre, T., 1987. Participation in Extracurricular Activities in Secondary School: What Is Known, What Needs to Be Known? *Review of Educational Research,* 57 (4), pp.437–466.

Holman, T.B. and Harding, J.R., 1996. The teaching of nonmarital sexual abstinence and members' sexual attitudes and behaviors: The case of the Latter-day Saints. *Review of Religious Research,* 38 (1), pp.51-60.

Iannaccone, L.R., 1990. Religious Practice: A Human Capital Approach. *Journal for the Scientific Study of Religion,* 29 (3), pp.297–314.

Jenssen, S.G. and Hauser, R.M., 1982. Religion, socialization, and fertility. *Demography*, 18 (4), pp.511-528.

Jeynes, W., 1999. The effects of religious commitment on the academic achievement of black and Hispanic children. *Urban Education*, 34 (4), pp.458-479.

Jeynes, W., 2002."A Meta-Analysis of the Effects of Attending Religious Schools and Religiosity on Black and Hispanic Academic Achievement. *Education and Urban Society*, 35 (1), pp.27-49.

Jeynes, W., 2003. The Effects of Black and Hispanic Twelfth Graders Living in Intact Families and being Religious on their Academic Achievement. *Urban Education*, 38 (1), pp.35-57.

Jeynes, W., 2005. The Relationship between Urban Students Attending Religious Revival Services and Academic and Social Outcomes. *Education and Urban Society,* 38 (1), pp.3-20.

Jeynes, W., 2006. Adolescent Religious Commitment and Their Consumption of Marijuana, Cocaine, and Alcohol. *Journal of Health and Social Policy,* 21 (4).

Jeynes, W., 2010. The Relationship between Bible Literacy and Behavioral and Academic Outcomes in Urban Areas: A Meta-Analysis. *Education and Urban Society*, 42 (5), pp.522-544.

Jimenez, E. and Sawada, Y., 1999. Do Community-Managed Schools Work? An Evaluation of El Salvador's EDUCO Program. *World Bank Economic Review,* 13 (3), pp.415-441.

Jimenez, E. and Sawada, Y., 2003. Does Community Management Help Keep Kids in Schools? Evidence Using Panel Data from El Salvador's EDUCO Program. CIRJE F-Series CIRJE-F-236, CIRJE, Faculty of Economics, University of Tokyo.

Johnson, W.R. and Skinner, J., 1986. Labor Supply and Marital Separation. *The American Economic Review*, 76 (3), pp.455-469.

Judge, G.G., et al., 1985. *The Theory and Practice of Econometrics*. 2nd ed. New York: Wiley.

Kao, G., and Tienda, M., 1998. Educational aspirations of minority youth. *American Journal of Education*, 106 (3), pp.349–384.

Kaufman, P., McMillen, M.M. and Sweet. D., 1996. A Comparison of High School Dropout Rates in 1982 and 1992. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. ISBN-0-16-048841-9; NCES-96-893.

Keister, L.A., 2003. Religion and Wealth: The Role of Religious Affiliation and Participation in Early Adult Asset Accumulation. *Social Forces*, 82 (1), pp.173–205.

Keister, L.A., 2005. *Getting Rich: America's New Rich and How They Got that Way*. Cambridge: Cambridge University Press.

Keister, L.A., 2009. Childhood Religious Denomination and Early Adult Asset Accumulation. In Ellison, C. and Hummer, R. *Religion, Family Life, and Health in the United States*, Rutgers University Press.

Kerckhoff, A.C., 1986. Effects of ability grouping in British secondary schools. *American Sociological Review*, 51 (6), pp.842-858.

Kiernan, K., 1997. The Legacy of Parental Divorce: Social, Economic and Demographic Experiences in Adulthood." London School of Economics, Centre for Analysis of Social Exclusion. Working paper.

Kish, L., 1959. Some statistical problems in research design. American Sociological Review, 24 (3), pp.328–338.

Knoeppel, R.C., Verstegen, D.A. and Rinehart, J.S., 2007. What Is the Relationship Between Resources and Student Achievement? A Canonical Analysis. *Journal of Education Finance*, 33 (2), pp.183-202.

Knuver, A.W.M. and Brandsma, H.P., 1993. Cognitive and affective outcomes in school effectiveness research. *School effectiveness and school improvement*, 4(3), pp.189-204.

Krein, S.F. and Beller, A.H., 1988. Educational Attainment of Children from Single Parent Families: Differences by Exposure, Gender and Race. *Demography*, 25 (2), pp.221-234.

Kyriakides, L., 2005. Extending the Comprehensive Model of Educational Effectiveness by an Empirical Investigation. *School Effectiveness and School Improvement*, 16 (2), pp.103-152.

Lam, P., 2002. As the Flocks Gather: How Religion Affects Voluntary Association Participation. *Journal for the Scientific Study of Religion*, 41 (3), pp.405–422.

Lehrer, E., 1995. The effects of religion on labor supply of married women. *Social Science Research*, 24, pp.281-301.

Lehrer, E., 1996. Religion as a determinant of marital fertility. *Journal of Population Economics*, 9 (2), pp.173–196.

Lehrer, E., 1999. Religion as a Determinant of Educational Attainment: An Economic Perspective. *Social Science Research*, 28, pp.358–379.

Lehrer, E., 2003. The Economics of Divorce. In Grossbard-Shechtman, S.A. *Marriage and the Economy: Theory and Evidence from Industrialized Societies*. Cambridge: Cambridge University Press. Pp.55-74.

Lehrer, E., 2004a. Religiosity as a Determinant of Educational Attainment: The Case of Conservative Protestant Women in the United States. *Review of Economics of the Household*, 2, pp.203–219.

Lehrer, E., 2004b. Religion as a Determinant of Economic and Demographic Behavior in the United States. Population and Development Review, 30 (4), pp.707–726.

Lehrer, E., 2005. Religious affiliation and participation as determinants of women's educational attainment and wages. The Institute for the Study of Labor (IZA). Discussion Paper No. 1725.

Lehrer, E., 2009. Religion, Human Capital Investments and the Family in the United States. The Institute for the Study of Labor (IZA). Discussion Paper No. 4279.

Lenski, G. 1963. *The Religious Factor: a sociological study of religion's impact on politics, economics, and family life*. Garden City, NY: Doubleday.

Lesthaege, R.J. and Neidert, L., 2006. The Second Demographic Transition in the United States: Exception or Textbook Example? *Population and Development Review*, 32 (4), pp.669-698.

Levaччićć, R. and Vignoles, A., 2002. Researching the Links between School Resources and Student Outcomes in the UK: A Review of Issues and Evidence. Education *Economics*, 10 (3) pp.313-331.

Leventhal, T. and Brooks-Gunn, J., 2004. A randomized study of neighborhood effects on low-income children's educational outcomes. *Developmental Psychology*, 40 (4), pp.488-507.

Leibowitz, A., 1974. Home Investments in Children. Journal of Political Economy, 82 (2), pp. S111-31.

Lin, N., 2001. *Social Capital: A Theory of Social Structure and Action*. Cambridge: Cambridge University Press.

Lindsey, J.K., 2000. *Applying Generalized Linear Models*. New York: Springer-Verlag.

Link, C.R. and Ratledge, E.C., 1979. Student perceptions, IQ, and achievement. *The Journal of Human Resources*, 14 (1), pp.98-111.

Liu, Q.Q., et al., 1998. The Influence of Local Church Participation on Rural Community Attachment. *Rural Sociology*, 63 (3), pp.432–450.

Madeira, R., 2012. The Effects of Decentralization on Schooling: Evidence From the Sao Paulo State Education Reform. Department of economics, fea-usp working paper nº 2012-26.

Magnuson, K., and Berger, L.M., 2009. Family structure states and transitions: Associations with children's well-being during middle childhood. *Journal of Marriage and Family,* 71 (3), pp.575–591.

Mah, A., O'Neill, M. and Chapman, A., 2012. Successful Parenting in the Eyes of Orthodox/Moderate Migrant Muslims in Australia. *The International Journal of Diversity in Organisations, Communities and Nations,* 11 (3), pp.85-102.

Manning, W.D., and Brown, S.L., 2003. Children's economic well-being in cohabiting parent families: An update and extension. Paper presented at the annual meeting of the Population Association of America, Minneapolis, MN.

Manning, W.D., and Brown, S.L., 2006. Children's economic well-being in marriage and cohabiting parent families. *Journal of Marriage and Family,* 68 (2), pp.345–362.

Marchant, G.J., Paulson, S.E., and Rothlisberg, B.A., 2001. Relations of middle school students' perceptions of family and school contexts with academic achievement. *Psychology in the Schools,* 38 (6), pp.505–519.

Marcum, J.P., 1981. Explaining fertility differentials among U.S. Protestants. *Social Forces*, 60 (2), pp.532–543.

Markus, H., 1977. Self-schemata and processing information about the self. *Journal of Personality and Social Psychology,* 35 (2), pp.63–78.

Marsh, H.W., 1992. Extracurricular Activities: Beneficial Extension of the Traditional Curriculum of Subversion of Academic Goals? *Journal of Educational Psychology,* 84 (4), pp.553–562.

Martin, M.A., 2012. Family structure and the intergenerational transmission of educational advantage. *Social Science Research,* 41, pp.33–47.

Mathison, J.A., 2001. American Sport as Popular Religion: Examining a Test of Its Strength. In Joseph, L.P, *From Season to Season: Sports as American Religion*. Macon, GA: Mercer University Press. Pp.141–159.

McAdoo, H.P. and Crawford, V., 1991. The Black Church and Family Support Programs. *Prevention in Human Services,* 9 (1), pp.193-203.

McCullagh, P. and Nelder, J.A., 1989. *Generalized Linear Models*, 2nd ed. London: Chapman & Hall.

McCulloch, C.E., 2000. Generalized linear models. *Journal of the American Statistical Association,* 95 (452), pp.1320-1324.

McCulloch, C.E. and Searle, S.R., 2001. *Generalized, linear, and mixed models*. New York: Wiley.

Mclntosh, W.A. and Alston, J.P., 1982. Lenski Revisited: The Linkage Role of Religion in Primary and Secondary Groups. *American Journal of Sociology*, 87 (4), pp.852-882.

McLanahan, S., 1983. The effects of the absence of a parent on the educational attainment of offspring. Institute for research on poverty discussion paper, pp.720-783. University of Wisconsin, Madison.

McLanahan, S.S., 1985. Family Structure and the Reproduction of Poverty. *American Journal of Sociology,* 90 (4), pp.873-901.

McLanahan, S.S., 1997. Parent absence or poverty: Which matters more? In G. J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of growing up poor* (pp.35–48). New York: Russell Sage Foundation.

McLanahan, S.S., Astone, N.M., and Marks, N.F., 1988. The Role of Mother-Only Families in the Reproduction of Poverty. Centre for Demography and Ecology. Working paper No. 88-48.

McLanahan, S. and Booth, K., 1989. Mother-only families: Problems, prospects, and politics. *Journal of Marriage and Family,* 51 (3), pp.557–580.

McLanahan, S.S. and Bumpass, L., 1988. Intergenerational Consequences of Family Disruption. *American Journal of Sociology,* 94 1), pp.130-152.

McLanahan, S.S., and Sandefur, G., 1994. *Growing up with a single parent: What hurts, what helps*. Cambridge, MA: Harvard University Press.

McNeal, R.B., 1995. Extracurricular Activities and High School Dropouts. *Sociology of Education*, 68 (1), pp.62–81.

McPherson, J.M., Smith-Lovin, L. and Cook, J.M., 2001. Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*, 27, pp.415–444.

Menezes-Filho, N. and Pazello, E., 2007. Do teachers' wages matter for proficiency? Evidence from a funding reform in Brazil. *Economics of Education Review*, 26 (2007), pp.660–672.

Mensaha, F.K. and Kiernan, K.E., 2010. Gender differences in educational attainment: influences of the family environment. *British Educational Research Journal,* 36 (2), pp.239-260.

Mensaha, F.K. and Kiernan, K.E., 2011. Poverty, family resources and children's early educational attainment: The mediating role of parenting. *British Educational Research Journal,* 37 (2), pp.317-336.

Meyer, D.R. and Garasky, S., 1993. Custodial Fathers: Myths, Realities, and Child Support Policies. *Journal of Marriage and the Family,* 55 (1), pp.73–90.

Michailidis, G. and De Leeuw, J., 1998. The Gifi System of Descriptive Multivariate Analysis. *Statistical Science,* 13 (4), pp.307-336.

Miller, B.C. and Olson, T.D., 1988. Sexual attitudes and behavior of high school students relation to background and contextual factors. *Journal of Sex Research*, 24 (1988), pp.194-200.

Mortimore, P., 1993. School Effectiveness and the Management of Effective Learning and Teaching. *School Effectiveness and School Improvement,* 4 (4), pp.290-310.

Mortimore, P., et al., 1988. *School matters: the junior years*. Wells, UK:Open Books.

Mueller, D.P. and Cooper, P.W., 1986. Children of Single Parent Families: How They Fare As Young Adults. *Family Relations,* 35 (1), pp.169-176.

Muller, C., 1995. Maternal employment, parent involvement, and mathematics achievement. *Journal of Marriage and Family,* 57 (1), pp.85–100.

Muller, C., 1998. Gender differences in parental involvement and adolescents' mathematics achievement. *Sociology of Education*, 71 (4), pp.336–356.

Muller, C. and Ellison, C.G., 2001. Religious involvement, social capital, and adolescents' academic progress: Evidence from the National Education Longitudinal Study of 1988. *Sociological Focus*, 34 (2), pp.155-183.

Murnane, R.J., 1975. *The Impact of School Resources on the Learning of Inner City Children*. Cambridge, MA: Ballinger Publishing Co.

Murnane, R.J., 1981. Interpreting the evidence on school effectiveness. *Teachers College Record*, 83, pp.19-35.

Murnane, R.J., Willett, J.B. and Levy, F., 1995. The Growing Importance of Cognitive Skills in Wage Determination. *Review of Economics and Statistics*, 77 (2), pp.251–266.

Nelder, J.A. and Wedderburn, R.W.M, 1972. Generalized linear models. *Journal of the Royal Statistical Society*. 135 (3), pp.370-384.

Nelson, S., Clark, R. L., and Acs, G., 2001. Beyond the two-parent family: How teenagers fare in cohabiting couple and blended families. Urban Institute, Series B, No. B-31.

Newman, J., et al., 2002. Investigate the effect of investing in school infrastructure on students' outcome in Bolivia. *The World Bank Economic Review*, 16 (2), pp.241-274.

Nunnally, J.C., 1978. *Psychometric Theory*. 2nd ed. New York: McGraw-Hill.

Office for National Statistics, 2015. Vital Statistics: Population and Health Reference Tables (Summer 2015 update). [online] Available at: < http://www.ons.gov.uk/ons/datasets-and-tables/index.html?pageSize=50&sortBy=none&sortDirection=none&newquery=divorce&content-type=Reference+table&content-type=Dataset> [accessed 11th of September 2015].

Olsson, U., 2002. *Generalized linear models: an applied approach*. Lund: Studentlitteratur.

Opdenakker, M.C. and Van Damme, J., 2000. Effects of schools, teaching staff and classes on achievement and well-being in secondary education: Similarities and differences between school outcomes. *School effectiveness and School Improvement*, 11 (2), pp.165-196.

Pearce, L.D. and Axinn, W.G., 1998. The Impact of Family Religious Life on the Quality of Mother Child Relations. *American Sociological Review*, 63 (6), pp.810-828.

PISA, 2009. PISA 2009 Results. What Makes a School Succesful? Resources, Policies and Practices. Volume IV. Organisation for Economic Co-operation and Development.

Plucker, J.A., 1998. The relationship between school climate conditions and student aspirations. *Journal of Educational Research*, 91 (4), pp.240–246.

Portes, A., 2000. The Two Meanings of Social Capital. *Sociological Forum*, 15 (1), pp.1–12.

Portes, A. and Zhou, M., 1993. The New Second Generation: Segmented Assimilation and Its Variants. *Annals of the American Academy of Political and Social Sciences*, 530, pp.74-96.

Powell, B. and Steelman, L.C., 1993. The Educational Benefits of Being Spaced Out: Sibship Density and Educational Progress." *American Sociological Review*, 58 (3), pp.367–381.

Pugh, G., Mangan, J. and Gray, J., 2008. *Resources and Attainment at Key Stage 4: Estimates from a Dynamic Methodology*. London: Department for Children, Schools and Families.

Putnam, R.D., 2002. Community-Based Social Capital and Educational Performance. In Diane Ravitch and John P. Viteritti, *Making Good Citizens: Education and Civil Society*. New Haven: Yale University Press.

Rainwater, L., 1979. Mothers' contributions to the family money economy in Europe and the United States. *Journal of Family History*, summer, pp.198-211.

Regnerus, M.D., 2000. Shaping school success: Religious socialization and educational outcomes in metropolitan public schools. *Journal for the Scientific Study of Religion*, 39 (3), pp.363-370.

Regnerus, M.D., 2008. Making the grade: The influence of religion upon the academic performance of youth in disadvantaged communities. Report by the Institute for Studies of Religion, Baylor University. Retrieved 15th of September, 2015. Available online at < http://www.baylorisr.org/wp-content/uploads/ISR-Making-Grade_071.pdf >.

Regnerus, M.D. and Elder, G.H., 2003. Staying on track in school: Religious influences in high- and low-risk settings. *Journal for the Scientific Study of Religion*, 42 (4), pp.633-649.

Reynolds, D., 1982. The Search for Effective Schools. *School Organisation*, 2(3), pp.215-237.

Reynolds, D. and Creemers, B., 1990. School Effectiveness and School Improvement: A Mission Statement. *School Effectiveness and School Improvement*, 1 (1), pp.1-3.

Rivkin, S.G., Hanushek, E.A., and Kain, J.F., 2005. Teachers, schools, and academic achievement. *Econometrica*, 73(2), pp.417–458.

Rockoff, J.E., 2004. The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data. *American Economic Review*, 94 (2), pp.247-252.

Rodriguez, H. And Arnold, C., 1998. *Children and divorce: A snapshot*. Center for Law and Social Policy, Inc.

Roof, W.C., 1979. Socioeconomic Differentials Among White Socioreligious Groups in the United States. *Social Forces*, 59 (3), pp.831–836.

Roof, W.C., 1981. Unresolved Issues in the Study of Religion and the National Elite: Response to Greeley. *Social Forces*, 59 (3), pp.831–836.

Rosenzweig, C.J., 2000. A meta-analysis of parenting and school success: The role of parents in promoting students' academic performance. Paper presented at the Annual Meeting of the American Educational Research Association.

Rutter, M., et al., 1979. *Fifteen thousand hours: Secondary schools and their effects on children*. Somerset, UK: Open Books.

Sammons, P., et al., 1995. Continuity of School Effects: A longitudinal analysis of primary and secondary school effects on GCSE performance. *School Effectiveness & School Improvement*, 6 (4), pp. 285-307.

Sammons, P., Hillman, J. and Mortimore, P., 1995. *Key characteristics of effective schools: A review of school effectiveness research*. London: OFSTED.

Sandefur, G.D., McLanahan, S.S . and Wojtkiewicz, R.A., 1989. Race and Ethnicity, Family Structure and High School Graduation. Centre for Demography and Ecology. Working paper No.89-27.

Sandefur, G.D., Meier, A.M., and Campbell, M.E., 2006. Family resources, social capital, and college attendance. *Social Science Research*, 35, pp.525–553.

Sander, W., 1992. The Effects of Ethnicity and Religion on Educational Attainment. *Economics of Education Review*, 11 (2), pp.119-135.

Sanders, M.G., 1998. The effects of school, family, and community support on the academic achievement of African-American adolescents. *Urban Education*, 33 (3), pp.385-410.

Scheerens, J. and Creemers, B.P.M., 1996. School effectiveness in the Netherlands; the modest influence of a research programme. *School Effectiveness and School Improvement*, 7 (2), pp.181–195.

Seginer, R. and Vermulst, A.D., 2002. Family environment, educational aspirations, and academic achievement in two cultural settings. *Journal of Cross-Cultural Psychology*, 33 (6), pp.540–558

Sewell, W.H., Haller, A.O., and Portes, A., 1969. The educational and early occupational attainment process. *American Sociological Review*, 34 (1), pp.82–89.

Sewell, W.H. and Shah, V.P., 1968. Social Class, Parental Encouragement and Educational Aspirations. *American Journal of Sociology*, 73 (5), pp.559-572.

Shaw, L.B., 1982. High School Completion for Young Women: Effects of Low Income and Living With A Single Parent. *Journal of Family Issues*, 3 (2), pp.147-163.

Sherkat, D.E. and Darnell, A., 1999. The effects of parents' fundamentalism on children's educational attainment: Examining differences by gender and children's fundamentalism. *Journal for the Scientific Study of Religion*, 38 (1), pp.23–35.

Sherkat, D.E. and Wilson, J., 1995. Preferences, Constraints, and Choices in Religious Markets: An Examination of Religious Switching and Apostasy. *Social Forces*, 73 (3), pp.993-1026.

Shortz, J. and Worthington, J.E., 1994. Young adults' recall of religiosity, attributions, and coping in parental divorce. *Journal for the Scientific Study of Religion*, 33 (2), pp.172-179.

Skevik, A., 2003. Children of the Welfare State: Individuals with Entitlements or Hidden in the Family? *Journal of Social Policy*, 32 (3), pp.423–440.

Slater, H., Davies, N. and Burgess, S., 2009. Do teachers matter? Measuring the variation in teacher effectiveness in England. Bristol: Centre for Market and Public Organisation. Working paper No.09/212.

Smith, C., 2003. Theorizing religious effects among American adolescents. *Journal for the Scientific Study of Religion*, 41 (1), pp.17-30.

Smith, J.R., Brooks-Gunn, J. and Klebanov, P.K., 1997. Consequences of Living in Poverty for Young Children's Cognitive and Verbal Ability and Early School Achievement. In: Duncan, G. and Brooks-Gunn, J. *Consequences of Growing up Poor*. Russell Sage Foundation, New York, pp.132–189.

Smith, T.L., 1980. *Revivalism and social reform: American Protestantism on the Eve of the Civil War*. Baltimore: Johns Hopkins University Press.

Stalling, J., 1975. Implementation and child effects of teaching practices in follow through classrooms. *Monographs of the Society for Research in Child Development*, 40 (7/8), pp.1-133.

Stark, R. and Bainbridge, W.S., 1980. Networks of Faith: Interpersonal Bonds and Recruitment to Cults and Sects. *American Journal of Sociology*, 85 (6), pp.1376-1395.

StataCorp, 2013. *Stata survey data reference manual release 13*. Texas: Stata Press.

Steelman, L.C. and Powell, B., 1989. Acquiring Capital for College: The Constraints of Family Configuration." *American Sociological Review*, 54 (5), pp.844–855.

Steinberg, L., 1987. Single Parents, Stepparents, and the Susceptibility of Adolescents to Antisocial Peer Pressure. *Child Development*, 58 (1), pp.269-275.

Steinberg, L., Elmen, J.D. and Mounts, N.S., 1989. Authoritative parenting, psychosocial maturity, and academic success among adolescents. *Child Development*, 60 (6), pp.1424–1436.

Stevenson, D.L., Schiller, K.S. and Schneider, B., 1994. Sequences of Opportunities for Learning. *Sociology of Education*, 67 (3), pp.184-198.

Stone, S., 2006. Correlates of change in student reported parent involvement in schooling: A new look at the National Educational Longitudinal Study of 1988. *American Journal of Orthopsychiatry*, 76 (4), pp.518–530.

Sugarman, S., 1993. Reforming Welfare through Social Security. *University of Michigan Journal of Law Reform*, 26, pp.849–851.

Summers, A.A. and Wolfe, B.L., 1977. Do schools make a difference? *American Economic Review*, 67 (4), pp.639–652.

Tarazi, N., 1995. *The child in Islam: A Muslim parent's handbook*. Indianna: American Trust Publications.

Taylor, L.C., Clayton, J.D., and Rowley, S.J., 2004. Academic socialization: Understanding parental influences on children's school-related development in early years. *Review of General Psychology*, 8 (3), pp.163–178.

Taylor, R., et al., 2000. Mental health services in faith communities: The role of clergy in black churches. *Social Work*, 45 (l), pp.73-87.

Teachman, J.D., 2008. The living arrangements of children and their educational well-being. *Journal of Family Issues*, 29 (6), pp.734–761.

Teachman, J.D., and Paasch, K., 1998. The family and educational aspirations. *Journal of Marriage and Family*, 60 (3), pp.704–714.

Teachman, J.D., Paasch, K. and Carver, K., 1997. Social Capital and the Generation of Human Capital. *Social Forces*, 75 (4), pp.1343–1359.

Teddlie, C., 1994. The integration of classroom and school process data in school effectiveness research. In Reynolds, D., Creemers, B.P.M., Nesselrodt, P.S., Schaffer, E.C., Stringfield, S. and Teddlie, C. (Eds.), Advances in school effectiveness research and practice (pp. 111 – 132). Oxford: Pergamon.

Teddlie, C. and Reynolds, D., 2000. *The International Handbook of School Effectiveness Research.* London: RoutledgeFalmer.

The Office for Standards in Education, Children's Services and Skills, 2011. *The framework for school inspection*. Available at: <http://www.ofsted.gov.uk/resources/framework-for-school-inspection> [accessed 08 September 2014].

Thomson, E., Hanson, T.L., and McLanahan, S.S., 1994. Family structure and child well-being: Economic resources versus parental behaviors. *Social Forces*, 73 (1), pp.221–242.

Thomson, E., McLanahan, S.S. and Curtin, R.B., 1992. Family structure, gender, and parental socialization. *Journal of Marriage and the Family*, 54 (2), pp.368–378.

Thornton, A., 2001. *The well-being of children and families: Research and data needs*. Ann Arbor: University of Michigan Press.

Tocqueville, A.de., 1969. *Democracy in America*. Garden City, NY: Doubleday.

Tomes, N., 1983. Religion and the Rate of Return on Human Capital: Evidence from Canada. *Canadian Journal of Economics*, 16 (1), pp.122–138.

Tomes, N., 1985. Religion and the Earnings Function. *American Economic Review*, 75 (2), pp.245–250.

Trusty, J., 1998. Family influences on educational expectations of late adolescents. *Journal of Educational Research*, 91 (5), pp.260–270.

Tymms, P., 1992. The relative effectiveness of post-16 institutions in England (including Assisted Places Scheme Schools). *British Educational Research Journal*, 18 (2), pp.175-192.

Useem, E.L., 1992. Getting on the Fast Track in Mathematics: School Organizational Influences on Math Track Assignment. *American Journal of Education*, 100 (3), pp.325-353.

Van der Heijden, P.G.M., De Falguerolles, A. and De leeuw, J., 1989. A combined approach to contingency table analysis using correspondence analysis and log-linear analysis. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*. 38 (2): pp. 249-292.

Vandenbroucke, J. P., 2004. The history of counfounding. Soz Praventiv Med, 47 (4), pp.216-224.

Ver Ploeg, M., 2002. Children from disrupted families as adults: Family structure, college attendance, and college completion. *Economics of Education Review*, 21 (2), pp.171–184.

Waite, L.J. and Lehrer, E.L., 2003. The benefits from marriage and religion in the United States: A comparative analysis. *Population and Development Review*, 29 (2), pp.255–275.

Walberg, H.J., 1984. Improving the productivity of American schools. *Educational Leadership*, 41(8),pp.19-27.

Wallerstein, J. and Kelly, J., 1979. *Surviving the Breakup: How Children and Parents Cope with Divorce*. New York: Basic Books.

Wallerstein, J. And Lewis, J., 2005. The Long-Term Impact of Divorce on Children: A First Report From a 25-Year Study. *Family Court Review*, 36 (3), pp.368-383.

Weber, G., 1971. Inner City Children Can Be Taught to Read: Four Successful Schools. Washington, DC: Council for Basic Education, occasional papers Number 18.

Warner, R.S., 1997. Religion, Boundaries, and Bridges. *Sociology of Religion*, 58 (3), pp.217-238.

Weis, L., 1988. *Class, race and gender in American education*. Albany: State University of New York Press.

West, E.M., Sweeting, P. and Richards, M. 2000. Teenage family life, life chances, life styles and health: A comparison of two contemporary cohorts. *International Journal of Law, Policy and the Family*, 14 (1) pp.1–30.

Westoff, C.F. and Jones, E.F., 1979. The end of 'Catholic' fertility. *Demography*, 16 (2), pp.209-217.

White, M., 1994. Stepfamilies over the Life Course. In: Booth, A. and Dunn, J. *Stepfamilies: Who Benefits? Who Does Not?* Lawrence Erlbawn Associates, Hillsdale.

Wilcox, W.B., 1998. Conservative Protestant Childrearing: Authoritarian or Authoritative? *American Sociological Review*, 63 (6), pp.796-809.

Wilkins, J.D. and Raudenbush, S.W., 1989. A longitudinal hierarchical linear model for estimating school effects and their stability. *Journal of Educational Measurement*, 26(3), pp.209-232.

Winkler, D.R., 1975. Educational achievement and school peer group composition. *Journal of Human Resources*, 10 (2), pp.189–205.

Woessmann, L., 2003. Schooling resources, educational institutions, and student performance: The international evidence. *Oxford Bulletin of Economics and Statistics*, 65 (2), pp.117-170.

Wojtkiewicz, R.A., 1993. Simplicity and Complexity in the Effects of Parental Structure on High School Graduation. *Demography*, 30 (4), pp.701–717.

Wolfe, B., et al., 1996. The 'Window Problem' in Studies of Children's Attainments: A Methodological Exploration." *Journal of the American Statistical Association*, 91 (435), pp.970–982.

http://www.hmc.org.uk/about-hmc/projects/the-british-education-system/

Wright, L. S., Frost, C.J. and Wisecarver, S.J., 1993. Church attendance, meaningfulness of religion, and depressive symptomatology among adolescents. *Journal of Youth and Adolescence*, 22 (5), pp.559-68.

Wu, L.L. and Martinson, B.C., 1993. Family Structure and the Risk of a Premarital Birth." *American Sociological Review*, 58 (2), pp.210–232.

Wuthnow, R., 1995. *Learning to care: Elementary Kindness in an Age of Indifference*. New York: Oxford University Press.

Wuthnow, R., 1999. Mobilizing Civic Engagement: The Changing Impact of Religious Involvement. In Skocpol, T. and Fiorina, M.P. *Civic Engagement in American Democracy*. Washington, DC: Brookings Institution Press. Pp.331–363.

Yamauchi, F., 2008. Early Childhood Nutrition, Schooling, and Sibling Inequality in a Dynamic Context: Evidence from South Africa. *Economic Development and Cultural Change*, 56 (2008), pp.657-682.

Yazici, A.C., et al., 2010. An application of nonlinear canonical correlation analysis on medical data. *Turkish Journal of Medical Sciences*, 40 (3), pp.503-510.

Young, F.W., 1981. Quantitative analysis of qualitative data. *Psychometrika*, 46 (4), pp.347-388.

Zheng, W., Schimmele, C.M. and Hou, F., 2015. Family Structure, Academic Characteristics, and Postsecondary Education. *Family Relations*, 64 (2), pp.205-220.