Effect of noncognitive skills on young peoples' outcomes in England

by

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Abstract

This thesis adds to the current literature on the importance of noncognitive skills, namely locus of control and effort in determining short-term and longer-term educational and labour market outcomes, of young people in England. We use a cohort study 'Next Steps' that follows millennials born in 1989 to 1990 from age 13/14 until they are 25 to examine the effect of locus of control and effort at age 14/15 in determining short-term outcomes of pathways of further education, employment or 'Not in Employment, Education or Training' (NEET) after compulsory schooling in Chapter 4, and NEET duration in Chapter 5, and longer-term outcomes of employment, earnings and well-being outcomes in adulthood in Chapter 6. We found that effort is more important compared to locus of control in determining short-term outcomes of pathways of young people at age 16/17 and age 18/19 in Chapter 4. The result is rational as our measures of noncognitive skills effort capture the self-rate ability of hard work of young people staying in further education, employment or NEET. Locus of control is more significant compared to effort in determining NEET duration at age 16/17 to age 19/20. We are only looking at young people who are NEET, and as such, it may explain why locus of control is more significant when looking at this outcome. Most importantly, locus of control and effort are both significant in deciding longer-term outcomes of educational, employment, earnings and well-being at age 25. Effort is significant in determining educational, and well-being, and locus of control is significant in determining all long-term outcomes. Thus, this thesis contributes to the literature by providing consistent evidence of significance of noncognitive skills throughout different stages of the life of young people.

Declaration

‘Declaration: I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.’

Nurjihan binti Idris

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Table of contents

Abstract ii
Declaration iii
Acknowledgments iv
Table of contents v
List of tables vii

1 Introduction 9
1.1 Main motivations 9
1.2 Research questions 12
1.3 Organization of the Thesis 16

2 Literature review 18
2.1 Introduction 18
2.2 Definition and overview of non-cognitive skills 19
2.3 The use of noncognitive skills in economic research 25
2.4 Our focus of noncognitive skills 27
2.5 Gender differences in noncognitive skills 32
2.6 Conclusions 33

3 Data 34
3.1 Introduction 34
3.2 Our cohort 34
3.2.1 The data 35
3.2.2 Noncognitive skills 38
3.2.3 Cognitive skills 40
3.2.4 Common control variables 41
3.3 Conclusions 46

4 The determinants of young people's pathways after compulsory schooling in the UK 47
4.1 Introduction 47
4.2 Literature review 48
4.3 Data and Methodology 53
4.3.1 Short-term Outcomes at age 16/17 and at age 18/19 55
4.3.2 Secondary analysis 57
4.3.3 Descriptive Statistics 60
4.4 Results and Discussions 64
4.4.1 Non-cognitive skills 65
4.4.2 Cognitive skills 65
4.4.3 Other variables 67
4.4.4 Results and discussions of secondary analysis 72
4.5 Conclusions 76

5 Young people who are Not in Education, Employment or Training (NEET) 78
5.1 Introduction 78
5.2 Literature Review 80
5.3 Method 83

5.3.1 Outcome variable 86
5.3.2 Variables of interest 87
5.3.3 Other explanatory variables 87
5.3.4 Duration analysis 87
5.3.5 Competing risk framework 88
5.4 Descriptive statistics 90
5.4.1 Duration of NEET 90
5.5 Results and Discussions 93
5.5.1 Duration analysis of young people in NEET 93
5.6 Conclusion 104

6 Role of noncognitive skills and NEET on adult outcomes 106
6.1 Introduction 106
6.2 Literature Review 109
6.2.1 Educational attainment 109
6.2.2 Employment 110
6.2.3 Wages 110
6.2.4 Well-being 111
6.3 Data and methodology 112
6.3.1 Educational Outcomes at age 25 113
6.3.2 Employment Outcomes at age 25 114
6.3.3 Wages at age 25 116
6.3.4 Well-being at age 25 117
6.3.5 Life satisfaction scores 118
6.3.6 GHQ-12 scores 119
6.4 Results and Discussions 120
6.4.1 Educational Outcomes at age 25 120
6.4.2 Employment Outcomes at age 25 123
6.4.3 Log of wages outcome at age 25 127
6.4.4 Well-being at age 25: Life satisfaction scores 132
6.4.5 Other measures of well-being: GHQ-12 scores 137
6.5 Conclusions 142

7 Conclusion 144
7.1 Summary 144
7.2 Discussions and future research questions 147
7.3 Limitations 149
7.4 Future Research 150

Bibliographies 152
Appendices 176

List of tables

Table 3.1: Number of observations in Next Steps 37
Table 3.2: Control variables details 44
Table 4.1 Activity at age 16/17 Wave 1 Year 2007 54
Table 4.2: Mean, standard deviation and t-test of dependent variables by gender 61
Table 4.3: Mean, standard deviation and t-test of independent variables by gender 63
Table 4.4: Marginal effects of multinomial probit (Age 16/17) 68
Table 4.5: Marginal effects of multinomial probit (Age 18/19) 68
Table 4.6: Average marginal effects of Sequential Probit of young people in NEET by 16/17 74
Table 4.7: Average marginal effects of Sequential Probit of young people in NEET by 18/19 75
Table 5.1: List of young people in single spells and multiple spells of NEET 92
Table 5.2: Survival or duration analysis using Cox distribution for all young people 95
Table 5.3: Survival or duration analysis using Cox distribution for boys 100
Table 5.4: Survival or duration analysis using Cox distribution for girls 101
Table 6.1: Variables of interest of young people in the Next Steps 113
Table 6.2: Mean, standard deviation and t-test by gender of employment outcomes 114
Table 6.3: Mean, standard deviation and t-test by gender of employment outcomes 116
Table 6.4: Mean, standard deviation and t-test by gender of wages 117
Table 6.5: Mean, standard deviation and t-test by gender of life satisfaction scores 119
Table 6.6: Mean, standard deviation and t-test by gender of GHQ-12 scores 119
Table 6.7: Marginal effects of having a bachelor's degree at age 25 from probit 121
Table 6.8: Marginal effects of employed at age 25 from probit 125
Table 6.9: OLS coefficients of log hourly wages at 25 years old with ordinary least squares with robust standard errors 130
Table 6.10: Marginal Effects of Life Satisfaction at 25 years old with adult, child factors and NEET interactions for all young people 135
Table 6.11: OLS Coefficients (Marginal effects) of GHQ-12 scores at age 25 with adult, child factors and NEET interactions for all young people 140

List of figures

Figure 1-1: Flowchart of the result chapters of the thesis.....17
Figure 5-1: Length of NEET for all spells.....91
Figure 0-1: Test for Proportional Hazard Assumption for external locus of control.....187
Figure 0-2: Test for Proportional Hazard Assumption for high effort and diligence 188

1 Introduction

1.1 Main motivations

This thesis explores the importance of noncognitive skills in determining pathways of young people in England. We contribute to the literature of noncognitive skills by providing evidence of the importance of noncognitive skills to short-term and longer-term of education, labour outcomes and well-being of young people. In addition, we provide to the discussion of other measures of noncognitive skills than the Big Five. We also provide evidence of possible effects of scarring for the millennials, contribute to the discussion of gender differences in the effect of noncognitive skills to young people outcomes. Lastly, we bring something new to the emerging literature of economic of happiness as we have also looked at the effect of noncognitive skills to determine other measure of outcomes, such as well-being.

Our main motivation comes from young people, and to identify important determinants for their short-term outcomes of being in further education, employment or Not in Employment, Education or Training (NEET) and longer-term outcomes of employment, earnings and well-being. Young people are the future and the idea that the decisions they make post school can have profound effects on later outcomes. The transitional period from age 16 to age 25 is an important period in the life of young people, as it includes pathways to further education, employment or NEET after compulsory schooling, and it is a demographically dense period involving multiple and inter-related social role changes, and the transition to adulthood is relevant for later outcomes such as employment (Schoon and Lyon-Amos, 2016, p. 11).

A major concern of young people after compulsory schooling is to remain in further education, or to be in employment or training. Statistics shows there were an estimated 763,000 young people or 11.1% aged 16 to 24 years in the UK who were not in education, employment or training in October to December 2019 (ONS, 2020). Young people at risk in this age group are called NEET, an acronym for the Government classification which stands for ‘Not in Education, Employment or Training’ (Gracey and Kelly, 2010). NEET

includes youth who are unemployed (youth who are not working, willing to work, actively looking for work, and are available to start work in less than four weeks), and youth who are inactive in labour market (discouraged job seekers, staying in for family care, and others).

The term NEET has been widely used by policy makers, particularly in the UK and other European countries, in the search for effective interventions to tackle the problems of joblessness, and other forms of human capital accumulation such as education, amongst young people. Being NEET is sometimes associated with the risk of social exclusion (Bynner and Parsons, 2002), which if it persists will create scarring effects (Clark et al., 2001) when these young people reach adulthood. One of the critiques using the 'NEET' label for interventions with young people according to Yates and Payne (2006) is that the label 'NEET' only classifies young people by what they are not, i.e. not in education, employment or training, neglecting the fact that this group consists of a heterogeneous mix of young people with different backgrounds, risks and issues. Thus, simply labelling these young people as NEET and targeting them as such can be misleading, as well as diverting attention away from the other real, and sometimes more important, difficulties that they actual face. Thus, they are an important group to study and analyse.

Some of the available statistics in the UK shows that age, educational qualifications, geographical variations and family backgrounds are among the factors that influence pathways of young people, where 7-9% of NEET in the UK is more likely to come from less well-off and less well-educated families, and is more likely to have multiple problems, meaning that they receive support from a variety of state agencies – and are the subject of significant public investment (Acevo, 2012). The statistics also show a small difference in gender. Aside from personal characteristics and family background, psychologist have identified personality traits as one of the contributing factors of NEET (Roberts, 2011 and Furlong, 2006). Hence, controlling for young people personal characteristics and family background, we are interested to determine the effect of noncognitive skills to young people outcomes in the UK.

Personality traits is known as noncognitive skills in economics (Thiel and Thomson, 2011), although there is a large debate in economics on whether personality traits are considered as noncognitive skills in economics. For example, Almlund et al. (2011) view personality as a kind of response function that maps personality traits to measured personality to various tasks, for example the actions or responses to situations that people take, including patterns of thoughts or feelings, and as a preference as well as a constraint. Meanwhile Borghans et al. (2008a) relates personality concepts to common parameters like time-preference, risk preference, leisure-preference, and social preferences, through constraints, for example time preference may be produced by the inability of agents to delay gratification or by the inability of agents to imagine the future. This debate of viewing personality traits as noncognitive skills will be discussed later in Chapter 2 in more detail.

There has been less focus in economics on looking at the effect of noncognitive skills to pathways of young people after compulsory schooling, with the exception of Mendolia and Walker (2015), who has looked at the relationship between personality traits in adolescence and education and labour market choices, particularly on the risk of being NEET. Furthermore, young people are constrained by resources and opportunities that are available to them, as not all young people can afford or want to continue in higher education (Schoon, 2015).

There is plenty evidence from economics and psychology that cognitive ability is a powerful predictor of economic and social outcomes (see for example Heckman, Urzua, and Stixrud, 2006). It is natural that cognition is indispensable in processing information, learning, and in decision making, and it is well-known that other traits besides problem-solving ability matter for success in life. Success is commonly defined as socioeconomic outcomes, and the most common measure is earnings.

Economists have examined non-cognitive skills in relation to a wide range of outcomes, particularly earnings (Bowles, Gintis, and Osborne, 2001). Cobb-Clark (2015) discussed that non-cognitive skills – for example, personality traits, perseverance, locus of control, self-efficacy, self-esteem, social skills, etc. – often have predictive power in wage equations through which non-cognitive skills impact human capital investments and firm decisions in general. Among the work in economics that look at earnings include Bowles and Gintis

(1976) who pioneered the analysis of the impact of personality on earnings, and Mueller and Plug (2006) who relate the Big Five personality factors (conscientiousness, extraversion, openness to experience, emotional stability, and agreeableness) to earnings. Other studies use different measure of noncognitive skills which are locus of control and self-esteem to predict successful educational and labour market outcomes, including highest completed education level, and wages (see, e.g., Heckman et al., 2006). There are also other studies that investigate effect of noncognitive skills on other outcomes, such as unemployment (O'Connor, 2020).

Other outcomes that may be influenced by noncognitive skills is human capital investment. Coleman and DeLeire (2003) discussed teenagers' "internal-external" outlook as a factor affecting their education decisions. These outlooks may be important because teenagers who believe that labour market success depends little on their human capital investments and more on luck, fate, or other "external" factors are more likely to drop out of high school or fail to attend college. On the other hand, teenagers who believe that their human capital investments or other "internal" factors will have a strong impact on their future opportunities might be more likely to complete high school or attend college. Thus, the "internal-external" outlook locus of control of teenagers may be a relevant noncognitive trait in a model of human capital investment.

1.2 Research questions

The noncognitive skills is our focus as there is a rapidly growing literature in economics is highlighting the importance of non-cognitive skills in determining economic choices and behaviours. We are interested in the effect of noncognitive skills on the short-term and longer-term outcomes of young people. Our short-term and longer-term outcomes are pathways after compulsory schooling, employment, earnings and well-being. We are interested in these outcomes as we want to compare the effect of noncognitive skills at the different stages in young people's lives.

As such, our main research questions are: Are noncognitive skills related to educational, labour market and other outcomes? We should pay attention to the importance of noncognitive skills as noncognitive skills may affect the short-term in the transitional

period in life of young people, and longer-term educational and labour market outcomes. We will answer our research question in three empirical chapters, which are:

i. What is the effect of non-cognitive skills in relation to pathways after school (full-time education, employment or NEET) at age 16/17 and age 18/19?
ii. What is the effect of non-cognitive skills in relation to duration of NEET and exit from NEET at age 16/17 to age 19/20?
iii. How do noncognitive skills and NEET experiences affect longer-term outcomes of employment, earning and well-being at age 25?

Our first research question will examine the impact of non-cognitive skills after compulsory schooling. The reason is because the end of compulsory schooling is their major transitions, and decisions made at this point will impact later outcomes. We are utilising the dataset Next Steps, where the young people could leave education after General Certificate of Secondary Education (GCSE) at age 16/17 in 2010. Our first major transition is at age 16/17, as in the UK education system, schooling in England is compulsory up to the age of 16. As they take GCSE at age 16 and afterwards, they must decide at age 16 (as to whether stay in education) and age 18 (as to whether to go to university for those who remained in education). This is no longer the case as the UK has introduced the compulsory School Leaving Age to be at age 18 in 2015. This research is still relevant for younger cohorts, but they will not be deciding whether to stay in education or not until age 18, but rather what route to pursue post-18. While most young people will go into further education, the remaining young people who did not pursue higher education and could not find a job is open to the risk of being NEET. Much of the discussion in the current literature regarding youth emphasises the significance of the youth unemployment as opposed to NEET. However, looking at only youth unemployment could be misleading if many of these young people are giving up looking for jobs altogether and becoming economically inactive. Freeman et al. (1982, pp. 6) state that "… many spells of teenage unemployment end not when a job is found, but when the young person drops out of the labour force."

Our second research question will focus specifically on NEET. Examining the likelihood of being NEET and duration is important, as it can have longer term effects, waste of youth's skills and human capital. Being a NEET may damage young people for life, as unemployed youth may suffer from scarring effects i.e. an individual will have lower

confidence and self-esteem and has to settle for lower occupation and lower wages, and is more likely to be unemployed and welfare-dependent later in life (Acevo, 2012; Ellwood, 1982; Gregg and Tominey, 2005). The effect is much larger for young people than older people and is more pronounced the longer a young person spends out of work. Additionally, youth unemployment will cause society to suffer from social issues (e.g. drug addiction problem, teen pregnancy, increasing crime rate, suicide and death rates). Furthermore, the country will incur additional cost as the monetary cost of youth unemployment can be high as economic loss in output concerns the potential waste of resources (Acevo, 2012). In 2012, youth unemployment in the UK would cost lost income to the exchequer through tax receipts forgone around £4.8 billion, which is more than the budget for education for 16 to 19 years old in England and cost the economy £10.7 billion on lost output (Acevo, 2012). Despite its popularity, the term NEET has only been applied to discussions regarding young people. Although it is understandable that young people are more exposed to the risk of being outside the labour market, in the future the experience of NEET might hinder young people from the labour market as they might face the same risks of social exclusion from unemployment. Some studies (e.g. Tse et al., 2013) argue that pathways after compulsory schooling and NEET should not be emphasised, as NEET is more relevant to short-term outcomes, because young people has higher chances to seek further education than older people. Little is known whether noncognitive skills and the scarring effects of NEET can affect longer term outcomes.

Therefore, our third research question look at longer term outcomes, because we want to examine the impact of the scarring effects of NEET, as within NEET there is "an extended state of transition, not by choice but through social circumstances" (Roberts, 2011, p. 23). The longer-term outcomes that we are looking at is at age 25, which is considered the age by which most people will have finished their formal education and have assimilated in the labour market. Roberts (2011) and Furlong (2006) discuss that for future prosperity of NEET is by no means guaranteed by having low-level employment, and progression to the lifestyle statuses that signify adulthood are financially out of reach for many young people in the immediate future.

Thus, to answer these questions, we will use the Next Steps which is a study that follows young people born in 1989/1990 from age 13/14 and follows them up to age 25. This

enables us to explore their key transitions and look at later outcomes of employment, earnings and well-being, as young people enter labour market to employment, receive wages, and self-rate their well-being. Although age 25 is still very early in career of the young people, this was the latest sweep of Next Steps available, and for most young people age 25 provides understanding on transitions out of education and into early adult life.

Our main contributions to the literature are providing evidence of the importance of noncognitive skills in influencing short-term and longer-term educational and labour market outcomes of young people. We will also explore gender differences, as there may be gender differences in the effect of noncognitive skills to determine educational and labour market outcomes of young people. We expect some gender differences as past studies have shown that men and women have different noncognitive skills, such as men are less risk averse than women in choices of lotteries, where risk averse is positively associated with neuroticism (Borghans et al., 2009). We are interested in the gender differences because one of our measure of noncognitive skills, locus of control is related to neuroticism, and there might also be gender difference in the effect of locus of control in determining educational and labour market outcomes.

Our main results show that non-cognitive skills are significant as they effect outcomes at age 16/17 and age 18/19, and age 25 for young people in Next Steps. Locus of control and effort have 1 to 3 percentage point effect to obtaining higher educational degree, 1 to 2 percentage point effect to obtaining employment and increasing wages, and 1 to 3 percentage point effect in life satisfaction and GHQ scores at age 25. Our findings are consistent with other studies for example by Heckman et al. (2006) Duckworth et al. (2007), and Mendolia and Walker (2015) as they also found that locus of control and effort are significant in determining outcomes. In respect to economic significance, investing in programmes that boost locus of control and effort would have a positive effect in increasing probability of young people getting an educational degree, obtaining employment, and increasing wages and life satisfaction, although it is not possible to quantify into money equivalences as our coefficient of locus of control and effort are based a scale from 0 to 9. However, we expect low to moderate impact as our percentage point is small and other programmes to boost locus of control and effort in the past has found low to moderate impact. For example, the Education Endowment Foundation have spent moderate cost up

to £700 per pupil per year under the programme "Aspirations interventions" and "Outdoor adventure learning" to boost locus of control and the results show low to moderate impact (Higgins et al., 2013). Another example shows that the Education Endowment Foundation have spent low cost less than £80 per pupil per year under the programme "Collaborative Learning" and "Homework Primary and Secondary" to boost effort and the results also shows low to moderate impact (Higgins et al., 2013).

1.3 Organization of the Thesis

The organization of the thesis is as follows. Chapter 2 provides a literature review on the definition of noncognitive skills, reviews past studies and focus on empirical studies. Chapter 3 discusses the data 'Next Steps' and our specific cohort used for the analyses, and the variables of interest and the basis for the control variables included in the analyses. More importantly, the bulk of the thesis is our empirical chapters of Chapter 4, 5 and 6 exploring and explaining the effect of noncognitive skills to short-term and longer-term outcomes. Figure 1-1 describes the flow chart of the Chapter 4,5 and 6. Chapter 4 focuses more on the effect of noncognitive skills on pathways after compulsory schooling. Chapter 5 builds on Chapter 4 and focus specifically on the NEET group by looking at the significance of noncognitive skills in explaining duration of NEET and exiting from NEET into further education or employment. We also found that noncognitive skills are significant in getting young people out of NEET to other pathways such as further education and employment or training. Chapter 6 builds on Chapter 4 and 5, so we are interested to see if noncognitive skills continue to impact on individual's success later, and if NEET experiences has an effect to adult outcomes in employment, earnings and well-being. Lastly, in Chapter 7 we conclude our findings, and discuss limitations and potential avenues for future research.

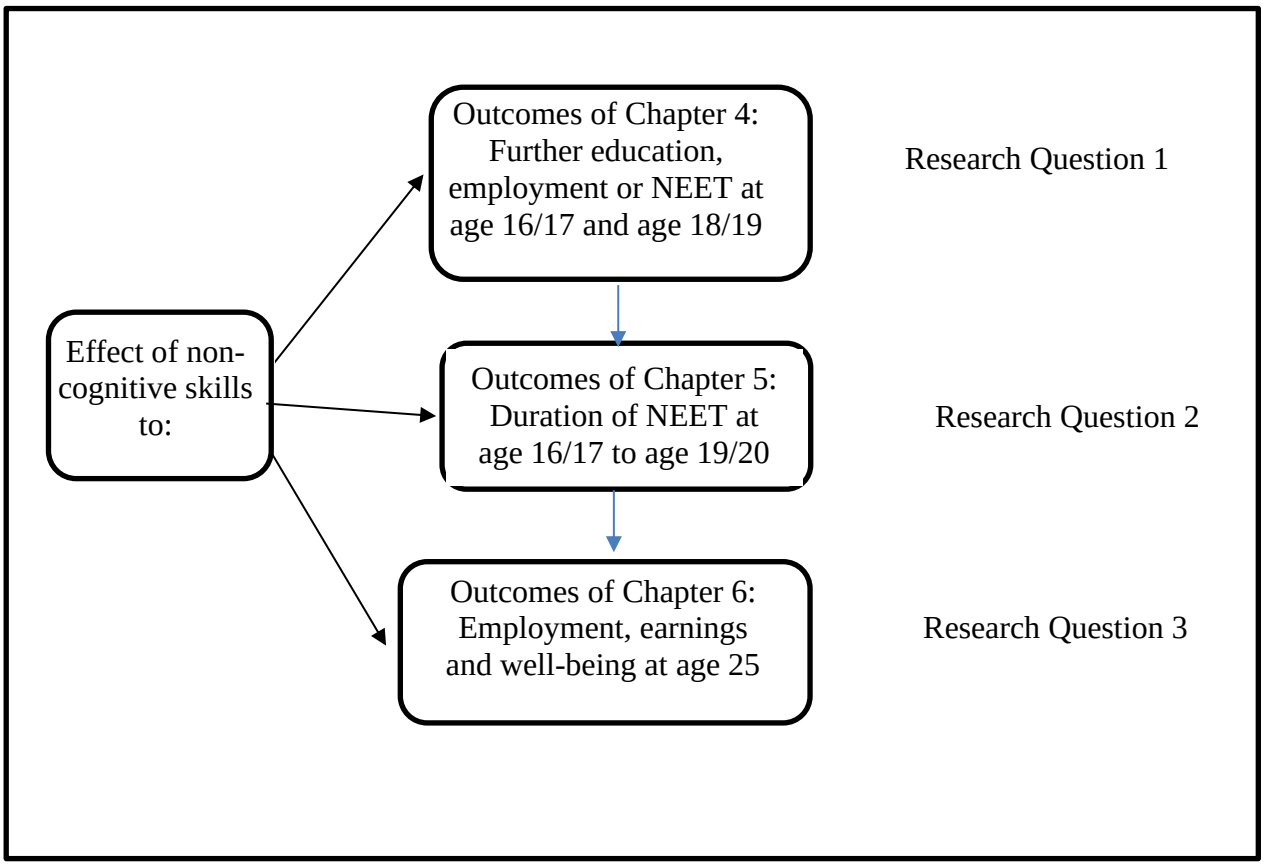

Figure 1-1: Flowchart of the result chapters of the thesis

2 Literature review

2.1 Introduction

This thesis contributes to the literature of the importance of non-cognitive skills for young people by looking at the effect of noncognitive skills to short-term and longer-term of education and labour outcomes. In Chapter 1, we have discussed short-term outcomes of pathway after compulsory schooling, NEET, and longer-term outcomes of employment, earnings, and well-being. The aim of this chapter is to review the literature on the definition and use of noncognitive skills.

Past studies have looked at the role that non-cognitive skills might play in explaining educational achievement, labour market success and other significant life outcomes. Factors such as ability, acquired skills, educational investment, and economic outcomes to determine educational or labour market success have been established starting with ground-breaking work by Becker (1964), and on human capital acquisition by Ben-Porath (1967). Economists (Becker, 1964, Heckman et al., 2006) have long recognized the importance of cognitive ability as a determinant of economic success. Since the turn of the millennium however, researchers in economics have become increasingly interested in the role of noncognitive skills in shaping economic outcomes, as there is considerable imbalance in the literature on cognitive ability compared to other traits (e.g. Cunha et al., 2010, Almlund et al., 2011). We follow recent economics literature to predict life outcomes for example Heckman et al. (2006), and to analyse educational outcomes (see Cunha and Heckman, 2008b; Cunha et al., 2010; Heckman et al., 2013). Our contribution is to add to the literature of the importance of noncognitive skills to short-term and longer-term of education and labour outcomes. We are also interested in comparing the effect of noncognitive skills with cognitive skills by looking at the outcomes at different stages in life. We are interested in the outcomes of pathways after compulsory schooling, duration of NEET, occupational attainment, earnings and well-being, as these outcomes are important in the life of young people, and how experiences in early adulthood that may influences the outcomes of young people later in life.

The rest of this chapter is structured as follows. Section 2.2 discusses the definition and overview of noncognitive skills, and Section 2.3 discusses the use of noncognitive skills in economic research. In Section 2.4 we discuss our measures of noncognitive skills used in this thesis. In the context of cognitive and noncognitive skills, we summarise the empirical evidence which predicts success in school and work. We examine how this evidence has been incorporated in determining later outcomes in life. We have also included a brief discussion on gender differences in noncognitive skills in Section 2.5. Finally, in Section 2.6 we make concluding remarks.

2.2 Definition and overview of non-cognitive skills

There is a broad definition of non-cognitive skills, basically, anything that is thought to underpin success in school, work, and other outcomes that is not considered cognitive skills can be considered as non-cognitive skills (Gutman and Schoon, 2013). Growing evidence linking these psychological differences to educational and labour market success has led some economists to consider noncognitive skills to be as important as cognitive skills in predicting economic outcomes of individuals (e.g. Heckman et al., 2006, Borghans et al., 2008). Other terms such as ‘character skills’, ‘competencies’, ‘personality traits’, ‘soft skills’ and ‘life skills’ are also widely used. The next question to ask is what constitutes non-cognitive skills? Research in psychological economics gives examples of self-control, interpersonal skills, motivation, conscientiousness, agreeableness, locus of control, and many others (Egan et al., 2017). Previous research has looked at behavioural and socio-emotional factors in explaining schooling and labour market outcomes (Heckman and Rubinstein 2001; Heckman et al. 2006; Flossmann et al., 2006).

Many authors differ when it comes to defining non-cognitive skill. Heckman (2013, pg. 4) defines non-cognitive characteristics as physical and mental health, perseverance, attentiveness, motivation, self-confidence, and other socio-emotional qualities. Consecutively, Heckman et al. (2019) elaborated that non-cognitive or socioemotional skills is a broad set of characteristics including preferences and personality. Examples include perseverance or conscientiousness (also called “grit"), self-control, trust, attentiveness, self-esteem and self-efficacy, resilience to adversity, openness to experience,

empathy, humility, tolerance of diverse opinions, and the ability to engage productively in society, which are valued in the labour market, in school, and in society at large.

Gutman and Schoon (2013) discussed non-cognitive skills as a variety of behaviours, personality characteristics, and attitudes to academic skills, aptitudes, and attainment, using the concept introduced by Bowles and Gintis (1976) to focus on factors other than those measured by cognitive test scores. Meanwhile, Farkas (2003) mentioned some of the noncognitive skills previously studied by researchers are conscientious work habits i.e. efforts (industriousness and perseverance), organization, discipline, attendance, participation and enthusiasm, and other behaviours and traits i.e. leadership, sociability (extraversion), self-confidence, social sensitivity, impulsiveness, openness to experience, emotional stability (calmness), vigour, aggressiveness, disruptiveness, high culture, loss of control, and self-esteem. Another study by Antecol and Cobb-Clark (2010) describes non-cognitive skills as having self-assessed intelligence i.e. believing how clever you are, and 'male traits' i.e. independent, assertive, not shy, not sensitive, and not emotional; self-esteem, analytical approach to problem-solving, willingness to work hard, impulsivity, and problem avoidance.

As such, we observe that there are various definitions, interpretations, and measurements of noncognitive skills across academic sub-fields in labour, education, and behavioural economics. As a result, we find that it is difficult to compare definitions of non-cognitive skills across literatures. Our definition of non-cognitive skills follows the definition of labour economics, as non-cognitive skills are a broad set of characteristics including preferences and personality or a second dimension of individual heterogeneity, next to cognitive skills (Heckman et al. 2019; Humphries and Kosse, 2017).

Our motivation of choice of effort and locus of control comes from Heckman et al. (2019), where they give example of perseverance or conscientiousness (also called "grit") as one of noncognitive skills, and from Cobb-Clark (2015), where locus of control is mentioned to be use widely to represent noncognitive skills as it plays an important role in the labour market. Empirically, we are also motivated by the data availability, which we will explain in the next chapter.

There is also a wide debate in economics of the difference of cognitive and noncognitive skills in measuring outcomes. In this section, we will discuss and contrast noncognitive skills with cognitive skills and explain the relation and importance of using both cognitive and noncognitive skills in measuring outcome.

In addition, there might also be gender differences in noncognitive skills as highlighted by Jacob (2002), where the findings indicate that noncognitive skills accounts for most differences in educational attainment in the US using the data from National Educational Longitudinal Study from 1988 to 1994.

Heckman et al. (2019) pointed out that until recently noncognitive skills have largely been ignored in evaluations of persons, schools, and interventions to improve lifetime prospects. In recent research economists and psychologists have constructed measures of these skills and provided evidence that they are stable across situations and predict meaningful life outcomes.

Before this, economists usually focused solely on the effect of cognitive skills in predicting life outcomes. The measure used for cognitive skills are usually tests scores, as it is the common definition of cognitive skills. For example, Heckman (2013, pg. 4) defines cognitive skills as IQ, achievement and other administered test of assessment. Later on, Heckman et al. (2019) mentioned that achievement test scores predict only a small fraction of the variance in later-life success, as adolescent achievement test scores explain at most 17% of the variability in later-life earnings, which IQ tests alone explain at most 7% of this variability. Other work by Borghans et al. (2011) shows that achievement tests explain a smaller proportion of lifetime success. A study by Bowles and Gintis (2002) in the United States from 1960 to 1995 also showed that while cognitive skills are important in the economy and in predicting individual economic success, the contribution of schooling to individual economic success could be explained only partly by the cognitive development fostered in schools, and argues that the noncognitive skills are gained from social experience i.e. teamwork and tolerance from school by structuring social interactions and individual rewards to replicate the environment of the workplace.

Heckman et al. (2019) and Joshi (2014, p.3) also mentioned that the word “skills" as opposed to “traits” i.e. something you are born with, suggesting that these attributes can be learned over the years and this might be why noncognitive skills are constantly described as malleable. Both cognitive and noncognitive skills can be fostered at least in childhood as they are not set in stone at birth and determined solely by genes. There are three differences between cognitive and noncognitive skills. The first difference is cognitive skills are found to be less malleable in later stages of a child's life cycle compared to noncognitive skills (Cunha et al., 2010; and Heckman et al., 2019). Almlund et al. (2011) also found that noncognitive skills are more malleable over the life cycle compared to cognitive abilities, as cognitive skills become stable around age 10[1]. Noncognitive skills do not reach stability until age 50 (Almlund et al., 2011). The second difference is that noncognitive skills can be used to foster cognitive skills. For example, Cunha et al. (2010) found fostering noncognitive skills and investments in the early years from parental environment and investment at different stages of the life cycle of children are important in the formation of adult cognitive skills. Borghans et al. (2008) discuss noncognitive skills in respect to developmental psychology literature, where psychologists Roberts et al. (2006) mentioned that most Big Five attributes except Neuroticism increase from age 10 and is stable throughout working age from age 30 to 60, and Neuroticism (represented as opposite of emotional stability) decreases from age 10 and is stable from age 30 to age 60. Thus, it is important to measure noncognitive skills at the early age before their educational and labour market outcomes.

The third difference of cognitive and noncognitive skills pointed out by Heckman et al. (2019) is that cognitive skills are more useful for people in professional jobs, while non-cognitive skills are especially critical for non-professional jobs. Heckman et al. (2019) elaborated that the importance of IQ increases with job complexity, which is the information processing requirements of the job. Cognitive skills are more important for professors, scientists, and senior managers than for semiskilled or unskilled laborers (Schmidt and Hunter, 2004). Meanwhile, non-cognitive skills or the role of personal preference or aspirations and personality traits are less well investigated on economic and

[1] A recent analysis of the Perry Preschool Program shows that by age ten, treatment group mean IQs were the same as control group mean IQ, where IQ is one of the possible measure of outcomes. Other measures include test scores e.g. reading and mathematics test scores (Cunha and Heckman, 2008).

social behaviour, although rationally noncognitive skills matter for success in life. We are interested in NEET who may typically be lower skilled, as in low-skilled labour markets, employers place higher importance on noncognitive skills such as obedience, dependability, and persistence more than cognitive ability (Bowles, Gintis, and Osborne, 2001). More information on cognitive and noncognitive skills are discuss in a large literature on measuring skills for example Cunha et al. (2010), Heckman and Kautz (2013) and Thiel and Thomson (2011).

However, it is important to include both noncognitive skills and cognitive skills in predicting adult outcomes. Heckman et al. (2019) pointed out that a growing body of empirical research shows that non-cognitive skills rival IQ in predicting educational attainment, labour market success, health, and criminality, as while both IQ and noncognitive skills predict scores on achievement tests, non-cognitive skills predict outcomes above and beyond their effects in predicting scores on achievement tests. Furthermore, Caines et al. (2017) show that the greatest growth in economic returns accrue to bundles of cognitive and non-cognitive skills and not to either separately.

From this section, we conclude that it is important to include both cognitive skills and noncognitive skills as determinants of life outcomes. The effect of cognitive skills to outcomes are established as there were many past studies that looks at this e.g. returns to education, however noncognitive skills are fairly new to economists and the effect of noncognitive skills to outcomes are still inconclusive. For example, some studies (e.g. Heckman et al. (2006) utilising National Longitudinal Survey of Youth, 1979 in the US and using locus of control and self-esteem as measures of noncognitive skills) say noncognitive skills has same effect to outcomes than cognitive skills, while other studies (e.g. Buchmueller (2019) utilising Next Steps in the UK and using locus of control, school importance and self-esteem a measures of noncognitive skills) found the effect of noncognitive skills are less than cognitive skills. As such, we will look at the effects of cognitive and noncognitive skills to life outcomes in our research. We are using educational outcomes for cognitive skills as past studies have used test scores as a measure of cognitive skills, for example Osborne-Groves (2004) and Heckman et al. (2006) use Armed Forces Qualifications Test (AFQT) score as a measure of cognitive skills.

For many outcomes, the predictive power of noncognitive skills rivals that of measures of cognitive ability. Noncognitive skills are studied in psychology as personality traits, which are defined by Roberts (2009, p.140) as "the relatively enduring patterns of thoughts, feelings, and behaviours that reflect the tendency to respond in certain ways under certain circumstances." Most psychologists accept stable personality traits as measures (Almlund et al., 2011). The personality traits are usually assessed in personality psychology by self-reported questionnaires (Heckman et al., 2019; Almlund et al., 2011). There are two problems highlighted when using self-reported questionnaires to measure personality traits which are: (i) Reference bias which means it can be misleading when comparing levels of personality skills across different groups of people (Heckman et al., 2019), and (ii) "Faking" or False response as individuals who know that their responses on a personality questionnaire will be used to make hiring decisions may deliberately exaggerate their strengths and downplay their weaknesses (Almlund et al., 2011). The Big Five personality traits are widely used by psychologists to understand the effect of noncognitive skills. Of the Big Five, conscientiousness, the tendency to be organized, responsible, and hardworking, is the most widely predictive across a variety of outcomes (see Borghans et al., 2008; Roberts et al., 2007; Almlund et al., 2011; Heckman and Kautz, 2012). Conscientiousness predicts years of schooling with the same strength as measures of intelligence (Almlund et al., 2011, Heckman and Klautz, 2013, pg 23). Palczyńska and Świst (2018) found differences in personality traits are important in explaining differences, as neuroticism has a negative relationship in life outcomes of educational attainment, labour force participation, employability, wages, job satisfaction, health, trust and life in a Polish study Programme for the International Assessment of Adult Competencies conducted in 2011-2012, with follow up in 2014-2015. Furthermore, Heckman and Kautz (2012, pg 17) mentioned that personality traits are relatively stable but are subject to change, giving an example of conscientiousness, which tends to change over the life cycle. At the early 20s, young people tend to have a lower level of conscientiousness or effort and some young people always dream about the best possible result, however when face with challenges, they tend to give up and unwilling to put the hard work into completing the challenges. This is because although Roberts et al. (2006) discussed that attributes of hard work or conscientiousness increase steadily in from age 20 to age 30 and becomes stable from age 30 to 60, some situations which cause extreme stress can alter brain structure and function and affect measured personality (Almlund et al. (2011, p.191). This is especially true for

conscientiousness, as the prefrontal cortex in the brain is correlated with conscientiousness (Almlund et al., 2011, p.66).

Some studies look at the effect of noncognitive skills on educational and occupational choice, and wages. Antecol and Cobb-Clark (2010) found non-cognitive skills such as "male traits" i.e. independent, assertive, not shy, not sensitive, and not emotional, self-esteem, analytical problem solving, willingness to work hard, impulsiveness, problem avoidance, and self-assessed intelligence are related to the educational and occupational choices made by young people age 18 –28 years old in the US. Heckman (2006) provides empirical evidence on the effects of non-cognitive skills constituted by self-control and self-esteem on log hourly wages. However, non-cognitive and cognitive abilities do not solely affect wages but educational outcomes i.e. schooling, employment, work experience and choice of occupation as well. Mendolia and Walker (2014) used the data Next Steps in the UK and found the potential linkages between noncognitive skills constituted by grit and NEET. As such, we will explore the link between noncognitive skills and NEET in Section 5.2.

2.3 The use of noncognitive skills in economic research

There are many economic research that assess life-relevant skills. The dominant paradigm in economics is the human capital model developed by Becker (1964). Human capital is defined as "activities that influence future monetary and psychic income by increasing resources in people" (Becker 1994, p. 11). In that framework, human capital may be developed through family investment, schools, training on the job and other activities. Variations in levels of human capital explain variations in earnings and in a variety of other lifetime outcomes such as health, employment, and wealth, to name only a few (Heckman et al., 2019). However, the human capital model by Becker (1964) ignores any potential consumption benefits from learning. An individual might have a dislike of learning or "cognitive cost". Ehrenberg and Smith (2006) suggest that "cognitive costs" should be included in costs of acquiring human capital, which could explain why someone who has low "cognitive costs" and high ability will undertake less than expected human capital investment. Heckman et al. (2006) supported this view and hypothesized that "cognitive cost" may be determined by noncognitive skills and found both cognitive skill and

noncognitive skill explains a large array of diverse outcomes such as wages, schooling, work experience, occupational choice, and participation in a range of adolescent risky behaviours.

Our inspiration is from the empirical model of human capital from Cunha et al. (2010, pg. 886) that has a combination of cognitive and noncognitive skills. Cunha et al. (2010) analyse a model with multiple periods of childhood, and adult outcomes are produced by cognitive skills and noncognitive skills at the beginning of the adult years. This model generalizes the model of Becker and Tomes (1986), who assume only one period of childhood and consider one output associated with human capital that can be interpreted as a combination of cognitive and noncognitive skills. Becker and Tomes (1986) only discussed the inputs from families, mainly investment and wealth from families. This helps to explain cognitive skills, which are considered hereditary, however noncognitive skills for example locus of control and effort, are cultivated from young people behaviour when they grow up, mainly in school. Later, Cunha et al. (2010) introduced the concept of noncognitive skills in addition to cognitive skills in their equations of generating adult outcomes. The cognitive and noncognitive skills interact in this model through investment by parents in different stages of young people's lives. The interactions between cognitive and noncognitive skills are discussed by Cunha et al. (2010, pg. 900), where in the beginning of the model they assume there are no interactions between cognitive and noncognitive skills as one of the assumptions is all inputs are independent of each other. The model can allow interactions between cognitive and noncognitive skills by allowing endogeneity of inputs to include investment by parents in measuring outcome of young people in different stages of their lives.

We follow this model in trying to measure our outcome of human capital by estimating a combination of cognitive and noncognitive skills, and taking into account that of "cognitive cost" or dislike of learning that may be determined by noncognitive skills, although we assume one period of childhood as we only measure noncognitive once. Other assumptions of this model include to allow noncognitive skills to interact with cognitive skills in determining educational and labour market outcomes. The models will be discussed in more detail in Section 4.3.1.

In this study, we measure cognitive skills by using the Key-Stage 2 point score in English and Maths. Noncognitive skills may affect cognitive skills through their preparation in ability test scores, for example if a young person has effort, he or she may work harder and study more and get higher scores English and Maths. Economist Hanushek (1979, p.363) have also discussed how noncognitive skills affect cognitive skills as in the education production function, one of the determinants of the achievement of students or cognitive skills is innate abilities or noncognitive skills. The noncognitive skills and cognitive skills is lumped into the category of innate abilities, where innate abilities are loosely defined as "learning capacity" as suggest that IQ as a measure of cognitive skills is somewhat related to innate abilities and family background through genetics (Hanushek, 1979, p.365). However, the Becker and Tomes (1986, p.6) framework assume that human capital as homogenous and do not distinguish that individual has different skills and abilities, personality, appearance, reputation, and credentials. In this study, we assume that young people have different noncognitive skills that will determine their future educational and labour market outcomes.

2.4 Our focus of noncognitive skills

We are using two measures as noncognitive skills, which are external locus of control and effort. The non-cognitive skills of locus of control and effort are constructed following Lessof et al. (2016).

Psychologists particularly education researchers have long recognized the relationship between psychological traits and educational attainment. Duckwoth et al. (2007, p.1087) discuss the idea of the types and means of human abilities (William James, 1907, p. 322–323), although much is known about IQ as one the type of human abilities, little is known about the reason "some individuals accomplish more than others of equal intelligence". Apart from cognitive skills, a common personality trait in a high-achieving individual regardless of their career choice is grit, which is defined as perseverance and passion for long-term goals (Duckwoth et al.,2007). Another common personality trait regardless of career choice is locus of control. In the US, locus of control was found to be more highly associated to achievement than any other factor in the student's background or school (Coleman, 1971). Rotter (1966) discuss that locus of control, or "internal-external"

attitudes, is a psychological concept measuring "a generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one's own behaviour and its consequences" that can influence a variety of behavioural decisions in everyday situations.

Our motivation of choice of these two measures is due to data availability. In addition, previous literatures found importance of locus of control and effort to educational attainment and labour market success. For example, Coleman and Deleire (2003) found the significance between locus of control and human capital decisions using the National Educational Longitudinal Study in the US in 1988 to 1994. Other studies such as Cobb-Clark (2014) also discuss the potential linkages between locus of control and human capital investment. Meanwhile, the concept of effort is discussed in previous studies for example Duckworth et al. (2007) found grit or "perseverance and passion for long-term goals" relates to variance in success outcomes, including educational attainment. Mendolia and Walker (2014) used the data Next Steps in the UK and found the potential linkages between noncognitive skills constituted by grit and NEET, and Lessof et al. (2016) found association with "hard work equates success" or effort with self-reported health using the dataset Next Steps in the UK.

The other alternatives were self-esteem; however, self-esteem is embedded in our external locus of control measure. Other alternatives were to use the Big Five, however question on Big Five were not included in our data. Our measure effort closely resembles one of the Big Five conscientiousness. We will explain this in detail in Chapter 3 when we talk about the data.

Our locus of control reflects the extent to which individuals believe they can control events affecting them. According to Rotter, people vary regarding how responsible they feel for their own fate. Individuals with an internal locus of control tend to believe that people are responsible for their successes and failures. Conversely, people with a relatively external locus of control tend to attribute successes and failures to luck, chance or fate. The locus of control scale was developed by Stephen Nowicki and Marshall Duke (1974) to remedy some technical problems that were characteristic of the original Rotter (1966) scale. Like the original, it measures one's belief about whether events are controlled internally or

externally. Those with an internal (as opposed to external) locus of control believe that life events are typically caused by their own actions, thus they are more likely to "exert effort, try hard, initiate action, and persist in the face of failures and setbacks; they evince interest, optimism, sustained attention, problem solving, and an action oriented. (Cobb-Clark, 2015, p. 5, Skinner, 1996 p. 556). As a result, individuals with internal locus of control are more likely to set more challenging goals, persist in the face of adversity, experience less job stress, and be more successful generally (see Ng et al. 2006; Wang et al. 2010).

We are using a scale of locus of control, with higher values representing external locus of control and lower values internal locus of control as a measure of noncognitive skills as past studies (Cobb-Clark et al., 2014; Mendolia and Walker, 2015; and Heckman et al., 2006) have shown locus of control is significant in explaining outcomes (e.g. healthy habits, risk of being NEET, and wages). For example, Cobb-Clark et al. (2014) relates locus of control with decisions to exercise regularly, eat well, drink moderately, and avoid tobacco. Furthermore, Mendolia and Walker (2015) using the dataset Next Steps found a significant effect of external locus of control in the risk of youths being NEET. Additionally, Heckman et. al (2006) used the Rotter Locus of Control Scale as noncognitive skills and found positive impact in explaining wages through schooling decision.

Meanwhile, effort or 'equates hard work with success' reflects a belief in the value of working hard at school and generally in order to succeed. In some studies, effort is a related concept of grit. We are using effort as a measure of noncognitive skills as past studies have shown effort is a common measure of noncognitive skills and is significant in explaining outcomes. For example, Heckman and Klautz (2013, pg 23) found that effort can predict years of schooling as well as cognitive skills. Furthermore, although noncognitive skills are viewed as malleable in nature, some studies (Duckworth et al., 2007, and Gutman and Schoon, 2013, p. 20) view effort as a stable trait of personality, although "grit has yet to be measured at multiple time points in a person's life to determine whether it changes or remains constant across time".

Almlund et al. (2011) and Cobb-Clark (2014) describes internal locus of control as one's belief on whether they are responsible for their life's outcome, or if one's belief that their life's outcome is determined by factors outside their control. Cobb-Clark (1980) discuss

that this belief or perceptions of control have long had a prominent place in psychology with psychologists arguing that an individual's belief that his or her actions will lead to the desired outcome is fundamental to both motivation (Bandura 1989; Goldsmith et al. 2000) and self-control (Rosenbaum, 1980).

Locus of control are not part of the traditional Big Five typology. However, they can be related to it. Joshi (2014, p.6) relates locus of control to Neuroticism, as individuals who have external locus of control might have childhood traits of fearfulness, and frustration, and tend to display trait of anxiety and hostility later. Humphries and Kosse (2017) using German study found that factors extracted from self-reported behaviours for example locus of control can have predictive power concerning high school grade point average similar to well established classifications, such as the Big Five.

In this thesis, we are using external locus as one of the noncognitive skills to look at the effect on adult outcomes. Locus of control is a personality dimension originally described by Julian Rotter (1966). An example item from the widely-used Rotter Locus of Control Scale (Rotter, 1966) requires respondents to choose between "Many of the unhappy things in people's lives are partly due to bad luck" and "People's misfortunes result from the mistakes they make."

Heckman et al. (2006) look at how cognitive and noncognitive skills explains a variety of labour market and behavioural outcomes and highlight the importance of both cognitive and noncognitive skills in measuring social performance. Using data from National Longitudinal Survey of Youth 1979, this study uses noncognitive measures of the Rotter Locus of Control Scale i.e. the degree of control individuals feel they possess over their life, and the Rosenberg Self-Esteem Scale i.e. perceptions of self-worth. This study found that latent noncognitive skills, corrected for schooling and family background effects, raise wages through their direct positive effects on productivity as well effects through their indirect effects on schooling and work experience. This evidence is consistent with findings of "cognitive costs" (which may be determined by noncognitive traits) that explain why many adolescents who would appear to financially benefit from schooling do not pursue schooling (Carneiro and Heckman, 2003; Carneiro, Hansen, and Heckman, 2003; Cunha,

Heckman, and Navarro, 2005; Heckman, Lochner, and Todd, 2006). Some of these studies may be relevant when we examine the likelihood of going onto further education.

The most common non-cognitive skills discussed in the literature is effort. Effort is an important attribute to have as persistence or working hard towards a goal despite facing failures, challenges and plateaus, and make a person more likely to be able to achieve his or her goal (Duckworth, 2007). Duckworth (2013) argues that effort instead of ability beliefs led to higher school performance. Effort is also particularly important for young people coming from a disadvantaged background. Schoon and Lyons-Amos (2017) found that young people from a disadvantaged background are more likely to be NEET despite their academic achievement, and suggested that one of the ways to help young people from a disadvantaged background is by" agency" (likely to apply to university, goal certainty, self-efficacy, and school engagement). Duckworth et al. (2007) study the reasons some individuals accomplish more than others of equal intelligence. One of the possible reasons mentioned by this study is effort, which is defined as perseverance and passion for long-term goals. This definition of effort is similar to Heckman and Rubenstein (2001) who describe effort as self-discipline, persistence or reliability. The authors also mention the same observation as Duckworth (2007); where surprisingly people with high IQs fail to succeed in life where expected while people with low IQs who are hard-working, and persistence manage to succeed in life. However, Duckworth (2007) describes effort as non-achievement oriented. The author argues that this is because a person who has effort will continue to work hard even if there is no positive feedback, rather, a person who has effort looks at long-term objective and continues to work hard through challenges, failures and in stagnant times. Heckman et al. (2006) also suggest that noncognitive ability such as motivation and persistence plays a substantial role in predicting life outcomes. Palczyńska and Świst (2018) uses perseverance of effort as part of grit and found grit has positive effect in educational attainment and in a number of subjective outcomes: health, trust, job and life satisfaction, even after adjusting for the effects of cognitive skills and Big Five traits. In this thesis, the non-cognitive skills are observed in adolescence, which is prior to the age where the young people have their outcomes.

Effort and locus of control fit into the framework of human capital model or the education production function as we considered effort and locus of control to be part of noncognitive

skills. We distinguish individual by having different skills and abilities apart from intelligence that may have an effect to their educational and labour market outcomes later in life.

2.5 Gender differences in noncognitive skills

Past studies have discussed gender differences in noncognitive skills, as women also tend to have different labour market outcomes, less likely to participate, and there is a gender wage gap. Caliendo et al. (2015) discussed that for newly unemployed people in Germany, both men and women have higher reservation wages if they have an internal locus of control, but a more internal locus of control is linked to significantly higher search intensity only for men, not for women, as there are differences men and women typically search for different nature of the jobs (e.g., occupation, industry, hours), and women are more often to drop out from labour market, and women also often avoid competition, while men welcome it (Niederle & Vesterlund, 2007), which potentially leads to very different job search strategies. The importance of noncognitive skills and differences by gender in explaining wage gap in the labour market is also discussed in Heckman et al. (2019). Blau and Kahn (2017, p.838) surveyed the literature on the gender wage gap and found that noncognitive skills contribute to explain different outcomes achieve by gender. In their literature review, some studies have looked at the effect of non-cognitive skills in explaining the gender gap. Studies in the United States by Fortin (2008), and Reuben et al. (2015) found that non-cognitive skills contribute around 1% to 3% in gender differences to the gender gap. These authors looked at non-cognitive skills such as self-esteem, locus of control, taste for competition and self-confidence. Another US study by Mueller and Plug (2006) looked at Big Five, and found it contributes 4% to 9% of gender differences. Studies in the UK by Manning and Swaffield (2008) looked at risk, self-esteem, and locus of control and found it contributes around 1% of gender differences. Other studies found locus of control contributes around 3% of gender differences in the Netherlands (Nyhus and Pons, 2012) and found 1% in Russia (Semykina and Linz, 2007).

2.6 Conclusions

This section summarises and emphasises the major points of this review, including evidence of empirical studies on the effect of noncognitive skills in explaining life outcomes. In this chapter, we focused on the definition and past studies of noncognitive skills, cognitive skills and other control variables that might affect the outcomes of young people. Having reviewed the literature, the next chapter provides an explanation of the data that will be used for the analysis and how we constructed the variables on noncognitive skills, cognitive skills, personal characteristics, family background and other control variables.

A review of the literature reveals that non-cognitive skills predict a wide range of life outcomes, including educational achievement, labour market outcomes and health. In addition, the predictive power of non-cognitive skills rivals that of measures of cognitive ability. Heckman et al. (2019) also highlights other measures of noncognitive skills such as persistence and self-control that have been promoted recently. Grit is one of the proposed alternatives by Duckwoth et al. (2007). Our study is interested in looking at the effect of noncognitive skills to adult outcomes. We are using two measures of noncognitive skills, which are external locus of control and effort. As mentioned, previous researchers have found that locus of control is significant in explaining education and labour outcomes, but effort or grit is found to be a weak predictor of education and labour outcomes. We are interested in testing these claims and providing evidence of the effect of our measures of noncognitive skills to short-term and long-term outcomes of young people in the UK. Hence, one of our contributions is to provide to the discussion of other measures of noncognitive skills than the Big Five. In the next chapter, we will look at the data available to measure these noncognitive skills.

3 Data

3.1 Introduction

This chapter introduces the dataset which will form the basis of the current analysis on the three empirical chapters of noncognitive skills on young people's outcomes.

In order to answer our questions, we need a dataset that allows us to observe individuals' transitions from compulsory education to later outcomes. The best suited dataset to these is cohort studies because the cohort members share the same characteristics of the same birth year, thus providing the same base for everyone so that we can compare a young people to another young people from the same generation. There are a number of cohort studies in the UK, list, we choose the Next Steps because the data focus on transitions, as it is the most recent cohort study that allows us to follow individuals into adulthood.

In Section 3.2, we describe our cohort, introduce, and describe the Next Steps, and how the database will enable us to answer our research questions. We will also elaborate on how the Next Steps provide understanding of personal histories, description on sampling, data collection methods, and loss of sample members of the data. Lastly, in Section 3.3, we conclude the benefit of choosing Next Steps as our dataset.

3.2 Our cohort

Our specific cohort born in 1989/1990 faces an educational system of taking the compulsory education qualification of GCSE qualifications or O Levels at age 15/16 in 2006. They face a different compulsory school leaving age at age 16/17, than the current cohort who must be in education or training up to age 18/19. The first significant transition is at age 16/17 in 2007, as in the UK education system, individuals can, at the end of the scholastic year, stay in education or enter the labour market. Even though there was no formal requirement, students would be expected to pass at least 5 GCSEs graded A*-C, to stay in education afterwards. Those who stay on at age 16/17 enrol into further education A-levels or other qualifications such as vocational qualifications. A-Levels or other vocational qualification would last one to two years. The second educational transition

(post compulsory education) is at age 18/19 in 2009, as those who have A levels can enrol for higher education at the university level. The norm for higher education in England is three years, except in the case of certain degrees e.g. medical that requires four years or more. Our specific cohort may have entered labour market at age 23-25 in 2013-2015, at a time when labour market conditions are facing a time of low unemployment, at 7.4% of the economically active population[2].

3.2.1 The data

We will describe the data and all the variables, including the key variables that are used across chapters that we used from Next Steps[3]. Next Steps is previously known as first Longitudinal Study of Young People in England (LSYPE)[4] (Lessof et al., 2016). Respondents were selected to be representative of young people in England, and the sample members 'millennials' were born between 1st September 1989 and 31st August 1990. The original study was conducted by the Department for Education for seven waves of data collected annually when young person is age 13/14 in 2004 to age 19/20 in 2010 (Department for Education and National Centre for Social Research, 2015b). Then it was taken over by Centre for Longitudinal Studies at the University College London Institute of Education, where they did a follow up study essentially to fill the missing cohort gap as no birth cohort studies were done for those born in the 80s/90s in the UK. The wave 8 of Next Steps age 25 survey took place between August 2015 and September 2016. It was designed and managed by the Centre for Longitudinal Studies at the University College London Institute of Education where fieldwork was carried out by NatCen Social Research, and funded by the Economic and Social Research Council (Institute of Education University College London, 2017).

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[2] Source: BBC News, Available at https://www.bbc.com/news/business-25428119 (Accessed 25 May 2020) and Office for National Statistics, Labour Market Statistics, December 2013, Released: 18 December 2013, Available at: https://webarchive.nationalarchives.gov.uk/20160107082015tf_/http://www.ons.gov.uk/ons/rel/lms/labour-market-statistics/december-2013/index.html (Accessed 25 May 2020)

[3] University College London, UCL Institute of Education, Centre for Longitudinal Studies. (2014). Next Steps: Sweeps 1-8, 2004-2016. [data collection]. 15th Edition. UK Data Service. SN: 5545, http://doi.org/10.5255/UKDA-SN-5545-7

[4] The second LSYPE (LSYPE2) is conducted in 2014.

The dataset is made publicly available to registered users for download through UK data archive. The main objectives of the Next Steps are to collect data on the transitions young people make from compulsory schooling to tertiary education or training to economic roles in early adulthood. The dataset also aims to monitor and evaluate existing government policy, thus providing insights on developing future policy. Moreover, the dataset intends to focus on implementing new policies in the context of the current lives of young people.

Annual interviews obtain information from the young person, and additional information was collected from a prominent and second parent interview in the first four waves to ensure a full picture as possible as to the household the young person was growing up in. From Wave 5, when the young person is at 17/18, only the young person was interviewed.

There is some attrition from the survey as described by the number of observations in Table 3.1. A total of 15,531 cohort members were issued for fieldwork and interviews; and were completed with 7,707 cohort members in wave 8, representing a 51% response rate (Department for Education and National Centre for Social Research, 2015b). We pick the waves with our dependent variables and then merge all waves in the dataset Next Steps. Next, we use information from wave 1 and wave 2 for noncognitive skills, family background, parental socio-economic status, personal characteristics of young people and use it as our common control variable, and our cognitive skills are from wave 3. Our sample size is around 8,750 young people. The sample size is smaller than the original number of individuals in Chapter 4 as we are limited to the availability of information on main activity of young people at age 16/17 (wave 4) and age 18/19 (wave 6). In Chapter 4 and Chapter 5, we have excluded young people who have children at age 17/18 from wave 5 in 2008 to age 19/20 from wave 7 in 2010[5]. This is because there are relatively few young people who have children at this stage, and their behaviour may be different from young people who do not have children[6]. Additionally, in Chapter 4 we also exclude young people who are still taking their GCSEs from wave 5 in 2008 to wave 7 in 2010. In Chapter 5, our sample size is further reduced as not all young people experience duration of NEET from age 16/17

[5] Only 362 observations or 1.3% (187 in wave 5 in 2008, 106 in wave 6 in 2009, and 69 in wave 7 in 2010) has own children.

[6] Yates and Payne (2006) give an example where some of these young people might be consciously making the decision of not being in education, employment or training, for example young parents who prefer to concentrate on child care rather than going to education or training, and for them being NEET is not really a big issue.

to age 19/20 and limited to the information of monthly activity of young people. In Chapter 6, we are constrained to the number of young people who responded to provide information at age 25 (wave 8). There is concern about attrition bias, however we are limited to the information available in the dataset.

Table 3.1: Information collected in Next Steps

Wave	Year	Age	Individuals	Information asked
1	2004	13/14	15,770	family background; parental socio-economic status; personal characteristics; attitudes, experiences and behaviours; attainment in education; parental employment; income and family environment as well as local deprivation; school attended; and post-16 plans.
2	2005	14/15	13,539	
3	2006	15/16	12,439	
4	2007	16/17	11,801	
5	2008	17/18	10,430	household situation details of any persons living with them; and demographics, attitudes to local area, activity history and current activity, jobs and training, qualifications being studied, higher education, attitudes to work and debt, childcare and caring responsibilities, young people Not in Education Employment or Training (NEET), Apprenticeships, information, advice and guidance, risk behaviours, relationships and sexuality, and own children
6	2009	18/19	9,799	
7	2010	19/20	8,682	
8	2015	25	7,707	Household Relationships, Housing, Employment, Finance, Education and Job Training, Health and Well-being, Identity and Participation, and Self-Completion.

Source: Department for Education (2015a).

3.2.2 Noncognitive skills

The discussion on the definition and importance of noncognitive skills as our variables of interest are discussed in Chapter 2. As mentioned, we are using two measures as noncognitive skills, which are external locus of control and effort as our variables of interest in Chapter 4, 5 and 6. In wave 2, young people were asked the following eight statements[7] about success: (i) If someone is not a success in life, it is usually their own fault; (ii) Even if I do well at school, I'll have a hard time getting the right kind of job; (iii) Working hard at school now will help me get on later on in life; (iv) People like me don't have much of a chance in life; (v) I can pretty much decide what will happen in my life; (vi) Doing well at school means a lot to me; (vii) How well you get on in this world is mostly a matter of luck; and (viii) If you work hard at something you'll usually succeed. Lessof et al. (2016) use the results of exploratory and confirmatory factor analyses in which two underlying constructs were identified that were termed 'equates hard work with success' (a belief in the value of working hard at school and generally in order to succeed) and 'locus of control' (the extent to which individuals believe they can control events affecting them).

We construct external locus of control and effort following Lessof et al. (2016). We use three questions for each variable from wave 2 when young people are age 14/15 in 2005. There are 4 categories of responses, namely 4 for "Strongly agree", 3 for "Agree", 2 for "Disagree" and 1 for "Strongly disagree". Instead of 1 to 4, we code the responses to be on a scale of 0 to 3. We then sum across three questions to get a total score from 0 to 9.

The three questions of external locus of control are: (i) How well you get on in this world is mostly a matter of luck; (ii) Even if I do well at school, I'll have a hard time getting the right kind of job; and (iii) People like me don't have much of a chance in life. After the variables were constructed, we get a total score of external locus of control, where the higher score represents a young people with higher external locus of control at age 14/15, and a lower score represents a young people with lower external locus of control (or internal locus of control) at age 14/15. Our external locus of control reflects the extent to which individuals believe they cannot control events affecting them. We are using external locus

[7] Two of these statements 'If someone is not a success in life, it is usually their own fault ' and 'I can pretty much decide what will happen in my life' did not fit in the factor analysis and were dropped.

of control as a measure of noncognitive skills as past studies have shown locus of control is significant in explaining education and labour outcomes, which is justified in Chapter 2. Our measure varies from other studies as Cobb-Clark et al. (2014) captured the same concept of locus of control but uses a different set of questions[8] to represent locus of control. The Cronbach alpha for locus of control is 0.5 for 3 items of external locus of control, which is just enough to be the passable consistency for reliability and following past studies such as Lessof et al. (2016) and our factor analysis, we decided that it the best measure for locus of control. External locus of control measures the belief of an individual of outside circumstances affect their life (Gatz and Karel, 1993). Our scale of locus of control is a scale where high values mean high external locus of control and low values mean high levels of internal locus of control.

Past studies such as Mendolia and Walker (2015) uses the same three questions for external locus of control from factor analysis, and they created indices or dummy of external locus of control where young person is coded as external if they score in top third or half of the distribution of the external index. On the other hand, Lessof et al. (2016) used continuous measure of locus of control on a scale of 0 to 9 and scores were reversed so that a higher score represent higher locus of control. We use Lessof et al. (2016) continuous measure as the score represents more young people and it is a better fit to the data as continuous measure allows more variability.

Meanwhile, effort or 'equates hard work with success' reflects a belief in the value of working hard at school and generally in order to succeed. In some studies, effort also relates to grit or conscientiousness. We are using effort as a measure of noncognitive skills as past studies (e.g. Duckworth et al., 2007) have shown effort is a common measure of noncognitive skills and is significant in explaining education and labour outcomes. The three questions of effort are: (i) "If you work hard at something you'll usually succeed" (ii) "Working hard at school now will help me get on later in life"; and (iii) "Doing well at school means a lot to me". After the variables were constructed, we get a total score of

[8] The questions are: (i) I have little control over the things that happen to me; There is really no way I can solve some of the problems I have; (iii) There is little I can do to change many of the important things in my life; I often feel helpless dealing with the problems of life; (v) Sometimes I feel that I'm being pushed around in life; (vi) What happens to me in the future mostly does not depend on me; (vii) I cannot do just about anything I really set my mind to do (Cobb-Clark et al., 2014, p.7)

effort, where the higher score represents a young people with higher effort at age 14/15, and a lower score represents a young people with lower effort at age 14/15. We followed the same procedure as per construction of locus of control to get the total score for effort from 0 to 9, where 9 represents a young person with most effort, and 0 represents a young person with the least amount of effort. We checked the reliability of the 3 items of effort using Cronbach alpha, which is 0.6, indicating satisfactory representation of consistency for reliability, and, following past studies such as Lessof et al. (2016) and our factor analysis, we decided that it the best measure for effort.

3.2.3 Cognitive skills

In this section, we will look at cognitive skills. We are using the Key Stage 2 (KS2) English and Maths from National Pupil Database (NPD) in 2006 (wave 3) as a control variable for our cognitive skills. At the end of key stage 2 pupils take national curriculum tests in mathematics, English reading and English grammar, punctuation and spelling. The NPD use scaled scores to report the outcomes of these tests to ensure accurate comparisons of performance over time. We are also using GCSE qualifications at grades A*-C, and advanced level qualifications (A levels) as proxy measures of cognitive skills, as past studies have shown it is significant in explaining educational and labour market outcomes, as discussed in Chapter 2 in Section **Error! Reference source not found.**. As mentioned in our earlier discussion on our specific cohort in Section 3.2, young people are face with the UK education system, where GCSE are the main high school qualification in the UK. The five GCSE qualifications at grades A*-C are from wave 3 when young people are age 15/16. We construct the variable for GCSE as a dummy variable. We categorised 1 for whether young people achieved five GCSE A* to C or more, and 0 otherwise.

We also constructed a dummy variable if a young person has an advanced level qualification (A levels) from wave 6 when young people at age 18/19, where 1 is for young people with A levels, and 0 otherwise. Most of young people has GCE A level (61.5%) while some has GCE AS level (14.3%), BTEC National Diploma (8.8%), Applied GCE Single Award (3.7%), BTEC National Certificate (2.5%) and other A-levels equivalents, which are included in the dummy. We use A levels as a control variable for cognitive skills as A levels are subject-based qualifications that can lead to further education or

employment at age 18/19 in Chapter 4, although we do not sperate out their subjects. We use these measures as these are measures that are commonly used for later decisions. For example, schools use GCSE results to determine if an individual can do A-levels subjects, and later these A-levels subjects partly determine whether individuals can get into university, which university subjects they can do and which institutions they can go to. Employers may use GCSEs and A-level results when judging applicants, depending on the nature of the job. We did not use A levels points or number of A levels for simplification purpose as it is a control variable and not our variable of interest.

3.2.4 Common control variables

We have now described some common control variables which are used in Chapter 4, 5 and 6 for our analysis which is described in Table 3.2. We will control for personal characteristics and family background. All our control variables are included at age 14/15 (wave 2) because this is when variables of interest are measured.

We also use weights in Chapter 4 and 6 to consider oversampling of minority groups (Chapter 4) and attrition particularly in wave 8 (Chapter 6). We used probability weights of wave 4 in the regression for 16/17 years old, probability weights of wave 5 in the regression for 18/19 years old in Chapter 4, and probability weights for 25 years old in Chapter 6.

For personal characteristics, we are controlling for young person ethnicity, as past studies e.g. Schoon (2014) using the same dataset Next Steps found significant ethnic differences as ethnic minority backgrounds reporting higher levels of educational achievement orientation, than whites, and fewer months being NEET. Other reasons that may impact decisions are maybe attributed to differences in cultural norms towards higher education (Torgerson et al., 2008). However, Urzua (2008) found that although noncognitive skills are strong predictors of schooling choices and wages, noncognitive skills explain little of the racial wage gap using National Longitudinal Survey of Youth (NLSY79). We have grouped the ethnic variable into white and others (non-whites), because non-whites ethnic groups are small in percentage compared to whites. We combined other ethnic groups to be non-whites to be 31% others and 69% whites at age 14/15 (wave 2) in the dataset. We

also have a dummy variable for gender, and the reason for splitting our models by gender is because aside from differences in noncognitive skills by gender discussed in Chapter 2, young adult outcomes also are different by gender as pointed out by Isengard (2003) who found young males face a higher probability of youth unemployment than females in the UK. In Chapter 2, we have discussed that women tend to have different labour market outcomes, less likely to participate, avoid competition, and there is a gender wage gap (Caliendo et al., 2015; Niederle & Vesterlund, 2007; Blau and Kahn, 2017). We expect there may be gender differences because there may be differences in noncognitive skills of boys and girls that leads to different educational and labour market outcomes. Another reason is that girls may drop out from labour market as they have children (Niederle and Vesterlund, 2007), as fertility and "partner" decisions have more of an influence on labour decisions for women than men. In Chapter 4, we analyse the data by splitting by gender, and in Chapter 5 and 6 we use both as we use gender as a control in the analysis for all young people, and we also split the analysis by gender.

For family background, we also control for whether young people live in parents' owned house and gross household annual income when young people are at age pre-16, as Freeman (1982) in the US and Schioppa and Lupi (2002) in Italy found that youth from wealthier families have lower youth unemployment. We have also included parents' National Statistics Socio-Economic Classification as a control variable for family background, as Micklewright (1989), Rice (1999), Dickerson and Jones (2004), Schoon et al. (2001), Schoon et al. (2007) found young people from high socioeconomic status and backgrounds being more likely to stay on in full-time education and secure good jobs and reduce risk of unemployment. Another control variable for the family background is the eligibility of free school meals as Freeman (1982) found that in US youth whose family receives welfare have higher youth unemployment. We also control whether young people live with a single parent, and mother' employment as Freeman (1982) found youth with female-headed household have a higher unemployment rate. Lastly, we also control for parental education because parent education may influence other family background such as parent socio-economic class, parent income, and eligibility for free school meal. Past studies found parental education to be an important determinant of their children educational and labour market outcome, for example Adamecz-Völgyi et al. (2019) found it can be difficult for young people to enter university if neither parent has not graduated to university, and

Buchmueller and Walker (2020) also control for parent's education when looking at the effect of noncognitive skills to the log hourly wage of an individual.

Table 3.2: Control variables details

Variable	Age/wave captured	Chapter	Resulting variable
Personal Characteristics			
White	From age 14/15 in 2005 (wave 2). There are eight labels for ethnic group, which are: (i) White, (ii) Mixed, (iii) Indian, (iv) Pakistani, (v) Bangladeshi, (vi) Black Caribbean, (vii) Black African, and (viii) Other.	Chapter 4, 5 and 6	A dummy variable white (1), non-white (0)
Gender	Ask in every wave	Chapter 4, 5 and 6	A dummy variable so we can split our models by gender
Family background variables			
Parent education	From age 14/15 in 2005 (wave 2)	Chapter 4, 5 and 6	A dummy variable for whether one of the parents has bachelor's degree (1) or not (0)
Parents own house (household tenure)	From age 14/15 in 2005 (wave 2)	Chapter 4, 5 and 6	A dummy variable for whether the house they lived in is owned (1) or not (0)
Gross household income	From age 14/15 in 2005 (wave 2)	Chapter 4, 5 and 6	A categorical variable with bands Below £12,000 £12,000 to £47,999 £48,000 and above
National Statistics Socio-Economic Classification (parents)	From age 14/15 in 2005 (wave 2). We have chosen the variable of mother's and father's National Statistics Socio-Economic Classification from age 14/15 in 2005 (wave 2). The variable label are: (i) Higher Managerial and professional occupations; (ii) Lower managerial and professional occupations; (iii) Intermediate occupations; (iv) Small employers and own account workers; (v) Lower supervisory and technical occupations; (vi) Semi-routine occupations; (vii) Routine occupations; and (viii) Not currently working. We have combined the mother's and father's National Statistics Socio-Economic Classification according to whoever has the highest socio-economic classification and	Chapter 4, 5 and 6	A dummy variable for whether either parent has a managerial/professional job (1), 0 otherwise.

	categorised them into: (i) Managerial and professional occupations; (ii) Otherwise.		
Free school meal eligibility	Age 15/16 in 2006 (wave 3). The free school meal eligibility variable is available from a reduced version of National Pupil Database. A child may be able to get free school meals if one of the parents gets any of the following: (i) Income Support, (ii) income-based Jobseekers Allowance, (iii) income-related Employment and Support Allowance, (iv) support under Part VI of the Immigration and Asylum Act 1999, (v) the guaranteed element of State Pension Credit, (vi) Child Tax Credit (provided one of the parents not also entitled to Working Tax Credit and have an annual gross income of no more than £16,190), (vi) Working Tax Credit run-on - paid for 4 weeks after one of the parents stop qualifying for Working Tax Credit, and (vii) Universal Credit. Children who get any of the above benefits in their own right (i.e. they get benefits payments directly, instead of through a parent or guardian) can also get free school meals.	Chapter 4 and 5	A dummy variable for whether eligible for FSM (1) or not (0)
Live with single parent	From age 14/15 in 2005 (wave 2)	Chapter 4, 5 and 6	Dummy variable for single parent (1) versus both parents (0)
Mother work	From age 14/15 in 2005 (wave 2). The variable label available are: (i) Doing paid work for 30 or more hours a week; (ii) Doing paid work for fewer than 30 hours a week; (iii) Unemployed/ Looking for a job; (iv) On a training course or scheme; (v) In full-time education/ at school; (vi) Looking after the family/ household; (vii) Retired from work altogether; (viii) Sick/ disabled; and (ix) Other. We categorised (i), (ii), (iv) and (v) to be 1 symbolising mother is in employment, training, or education; and (iii), (vi), (vii), (viii), (ix) to be 0 otherwise.	Chapter 4, 5 and 6	A categorical variable for mother work (1); mother is not working (0)
Region	From age 16/17 in 2007 (wave 4). There are nine categories of the government office region which are: (i) North East; (ii) North West; (iii) Yorkshire and The Humber; (iv) East Midlands; (v) West Midlands; (vi) East of England; (vii) London; (viii) South East, and (ix) South West.	Chapter 4 and 5 Chapter 6	A categorical variable for 9 regions

3.3 Conclusions

Next Steps has in-depth information on personal characteristics and family background that is necessary for controlling the effect of noncognitive skills to young adults' outcomes. The response rate is good, as only about 7% of respondents drop out in each wave (Department for Education and National Centre for Social Research, 2015b) except for wave 8. Next Steps also offers researchers a chance to analyse the outcome when young people are an adult in wave 8. We will use the information of noncognitive skills, cognitive skills and common control variables to answer our research questions in Chapter 4, 5 and 6. In Chapter 4, we are interested to look at the effect of noncognitive skills to pathways after compulsory school, thus we will use our noncognitive skills, cognitive skills, common control variables from earlier waves to look at the effect on transition of young people at age 16/17, and at age 18/19. In Chapter 5, we are interested to look at the effect of noncognitive skills to the duration of NEET from age 16/17 to age 19/20, thus we will use our noncognitive skills, cognitive skills, common control variables from earlier waves to look the effect on the duration of NEET faced by young people. In Chapter 6, we are interested to look at the effect of noncognitive skills to longer-term educational and labour market outcomes, thus we will use our noncognitive skills, cognitive skills, common control variables from earlier waves to look the effect on the educational attainment, employment, earnings and well-being of young people at age 25.

4 The determinants of young people's pathways after compulsory schooling in the UK

4.1 Introduction

The objective of this chapter is to investigate how non-cognitive skills impact pathways after compulsory education for young people in the UK. For our cohort, young people at age 16 and over face the choice to further their education or not, and then if they decide not to go onto further education, they decide whether to enter the labour market or not. Our research question for this chapter is: how do non-cognitive skills impact pathways after compulsory education for young people?

Our pathways or outcomes are further education, employment or NEET at age 16/17, and at age 18/19. Pathways after compulsory schooling is important as it is a demographically dense period involving multiple and inter-related social role changes, and the transition to adulthood is relevant for later outcomes (Schoon and Lyon-Amos, 2016). If young people indeed have higher values of non-cognitive skills (low external locus of control and high effort at age 14/15) that are very different from the other young people with lower values noncognitive skills (high external locus of control and low effort at age 14/15), we expect young people with higher values of noncognitive skills to be associated with higher chance of pathways either in further education or employment or government training. We expect noncognitive skills to have an effect to pathways as Heckman et al. (2006) found cognitive and noncognitive skills are equally important in schooling decisions and labour market outcomes. We contribute to the literature by looking at the impact of non-cognitive skills to the short-term outcomes of pathways of young people in the UK, apart from the youth's socio-economic background and qualifications. It is important to look separately by gender as there are some gender differences in noncognitive skills highlighted by Coleman and DeLeire (2003, p.717), as noncognitive skills may be different by gender.

In theory, it is important to look at pathways after compulsory schooling as a set of choices to maximise utility (Becker et al., 2012). Using a sequential model of education, Heckman

et. al, (2018) found cognitive and personality skills affect schooling choices, labour market outcomes, and adult health. Past studies that uses our cohort Next Steps in England such as Mendolia and Walker (2014) found that young individuals with external locus of control and low self-esteem at age 15 are less likely to have good test scores at age 16/17 and to pursue further studies at 17/18, while Mendolia and Walker (2015) found that young individuals with low effort and diligence, low self-esteem, and external locus of control are estimated to be more likely to drop out of education and employment at age 18 to 20. In other countries, Brunello and Schlotter (2011) in their literature review of Europe and US from older cohorts found that there is consensus that noncognitive skills (locus of control, self-esteem, Big-5, work habits and etc) have important effects both on school attainment and on labour market outcomes. Our research question has not been fully answered as our main interest is to determine the roles of different noncognitive skills in different pathways after compulsory schooling.

This chapter is organized as follows. Section 4.2 presents a literature review. Next, Section 4.3 describes the data and methodology, while Section 4.4 presents and discusses the results. Finally, Section 4.5 presents the overall conclusions. The appendices provide the construction of the control variables.

4.2 Literature review

In this chapter we summarise the results of a large body of research from economics, mainly from labour economics and education in economics, and some from psychological and sociological economics examining childhood skills determinants of young adult outcomes.

In this section, we discuss the general literature on outcomes after compulsory schooling, and the determinants that have been explored in past studies. Past studies have looked at the role that non-cognitive skills might play in explaining educational achievement, labour market success and other significant life outcomes. Some studies have looked at youth unemployment and other studies have looked at NEET specifically in looking at factors that explain this phenomenon. Past studies have looked at other variables that explain youth unemployment such as personal characteristics of the young person, socio-economic background, qualifications, and other variables (see Freeman, 1982; Meyer and Wise, 1982;

Micklewright, 1989; Rice, 1999; Schioppa and Lupi, 2002, Dickerson and Jones, 2004; and Antecol and Cobb-Clark, 2010). Meanwhile, others have looked at NEET specifically (see Schoon et al., 2001; Isengard, 2003; Schoon et al., 2007; Chowdry et al., 2009; Britton, 2011; Duckworth, 2012; and Schoon, 2014). Some of past studies referred cognitive skills as key stage scores, and non-cognitive skills as educational aspirations. Older studies such as Freeman (1982) and Meyer and Wise (1982) in the US only include male youth in their observation.

Cobb-Clark (2015) have discussed how non-cognitive skills, especially locus of control is associated with labour market outcomes such as human capital investments, firm hiring decisions, and optimal incentive contracts. In this chapter, we are looking at the effect of noncognitive skills on human capital investment, and our research is related to Coleman and DeLeire (2003), who have looked at human capital investment and found locus of control in teenage years influences high school completion, college attendance, income and occupation expectation at age 30.

The empirical literature that employs the dataset Next Steps use non-cognitive skills such as educational aspirations and engagement. Schoon (2014) found that high educational achievement orientation, as well as high previous academic attainment, can reduce the risk of being long-term NEET. The variables used for high educational achievement orientation are young person wants to stay on in post-compulsory schooling, intention to apply for university and likelihood of getting into university if they apply to reduce the risk of being long-term NEET. Meanwhile, Duckworth and Schoon (2012) used Next Steps and British Cohort Study 1970 (BCS70) to look at young people's employment statuses at age 18; and found prior achievement, educational aspirations and engagement i.e. school motivation and not truanting, are potential factors to avoid becoming NEET. The variables used are the young person wants to stay on in post-compulsory schooling, the parent wants young person to stay on post -16, school motivation i.e. I am happy at school, schoolwork is worth doing, I work as hard as I can at school, the work I do in lessons is interesting to me, I get good marks for my work, young person has part time job, and young person does not truant. Using the dataset Next Steps, Chowdry et al. (2009) found that evidence on the importance of the attitudes and behaviours of young people and their parents is based on observing strong correlations between those attitudes and teenage outcomes. For example, there may

be something unobserved causing young people from poorer families to have both lower aspirations and worse outcomes. In this case, a policy intervention that merely addressed the symptom of lower aspirations, rather than the underlying cause, might have a reduced or possibly no impact on outcomes. Some studies using the dataset Next Steps have found relationships or correlations between non-cognitive skills and choice after school. Mendolia and Walker (2015) found young people with low effort and diligence, low self-esteem, and external locus of control are estimated to be more likely to drop out of education and employment at age 18-20. In this chapter, we want to add a few small contributions to the literature and to check that our results are consistent with the literature. Our study is different from previous studies that are using Next Steps as we are using different dependant variables. Most previous studies look at NEET as the outcome, but we focus on the transitions after compulsory schooling to further education, labour market and also NEET.

In addition, a study by Bowles and Gintis (2002) also showed that while cognitive skills are important in the economy and in predicting individual economic success, the contribution of schooling to individual economic success could be explained only partly by the cognitive development fostered in schools. This study argues that the non-cognitive skills are gained from social experience i.e. teamwork and tolerance from school by structuring social interactions and individual rewards to replicate the environment of the workplace. Duckworth et al. (2013) argues that effort instead of ability beliefs led to higher school performance. Another study by Chowdry et al. (2010) discussed that young people who came from poor families who engage in risky activities at age 14 are associated negatively with educational attainment at age 16.

Personal characteristics that are typically explored include gender, age ethnicity and nationality. Schioppa and Lupi (2002) using data from Bank of Italy 1995 survey on Italian household incomes found a higher probability of unemployment for younger female in Italy, however Isengard (2003) using national data from National Labour Force Surveys from Germany and UK found young males face a higher probability of youth unemployment than females in the UK. Meanwhile, these two studies found consistent findings on age, which are older youth face a higher probability of unemployment. Regarding ethnicity, Freeman (1982) using the Current Population Survey data and

Isengard (2003) found that white young people have a lower likelihood of youth unemployment and blacks have higher and longer youth unemployment. Schoon (2014) using Next Steps in England found significant ethnic differences, with males and females from ethnic minority backgrounds reporting higher levels of educational achievement orientation, than whites, and fewer months being NEET. Meanwhile, Isengard (2003) and Antecol and Cobb-Clark (2010) found no significant effect of citizenship on youth unemployment.

The socio-economic background consists of parents' income, whether family receives a benefit, parent's employment, parental social class, parental education, and family structure. Freeman (1982) in US and Schioppa and Lupi (2002) in Italy found that youth from wealthier families have lower youth unemployment. On the other hand, Freeman (1982) found that in US youth whose family receives welfare have higher youth unemployment. Meanwhile, Freeman (1982) found that in the US, youth with unemployed parents have higher youth unemployment. Regarding parental social class and education, Micklewright (1989), Rice (1999), Dickerson and Jones (2004), Schoon et al. (2001), Schoon et al. (2007) found young people from high socioeconomic status and backgrounds being more likely to stay on in full-time education and secure good jobs and reduce risk of substantial unemployment and teenage motherhood. Looking at family structure, Freeman (1982) found youth with female-headed household have higher unemployment rate; while Schioppa and Lupi (2002) found youth, who is the head of household decrease unemployment rate.

The cognitive abilities include highest educational qualification, academic performances and key-stage scores. Schioppa and Lupi (2002) found in Italy opposite effect as having degree face greater probability of unemployment compared to having a diploma or A-level; however, Isengard (2003) found in UK and Germany that youth with higher educational qualification face a lower probability of youth unemployment. In the US, Meyer and Wise (1982) found that high test scores and class rank in the high school lower the probability of youth unemployment. Using the same dataset Next Steps, Schoon (2014) found that those who did well in Key Stage 2 (KS2) examination experienced fewer months being NEET, while Britton et al. (2011) found that young person with low KS2 scores (lower than one standard deviation below mean) and with five or more of the key characteristics (English

is not the first language, never had private tuition, live in social housing, receive child benefits, parents long term unemployed, the house have no computer with internet, no car, black Caribbean/African, wants to leave school after Year 11, don't know about post Year 11 plans, smoke cigarettes, had a paid job during term time, has played truant in last 12 months, has ever been excluded, the parent has ever been in contact with social services about young person's behaviour) to be selected for intervention to prevent young people from becoming a NEET statistic at age 13/14. Other variables which are included in past studies are regions, young person's work experiences, unemployed first year out of school, and vocational training. Schioppa and Lupi (2002) found the probability of unemployment is lower in the richer region where households have higher family wealth in Italy. Meanwhile, Meyer and Wise (1982) found that part-time work experiences in high school lead to a lower probability of unemployment in the US. Regarding being an unemployed first year out of school, Freeman (1982) found in the US that there is a higher probability of youth unemployment for male youth who is unemployed first year out of school. About vocational training, Meyer and Wise (1982) in the US and Isengard (2003) in the UK found no significant effect of vocational training to youth unemployment; while Cedefop (2013) found vocational training lowers the chance of youth unemployment at the medium and tertiary education level in the Europe.

From the literature review outside of UK, we found that the effect of noncognitive skills such as locus of control have an effect to labour market outcomes, and effort have an effect to school performances. In US, the key findings from Coleman and DeLeire (2003) highlights how locus of control in teenagers affect human capital investments on high school completion and college attendance. Meanwhile, the concept of effort from Duckworth et al. (2013) is tested on 77 children age 11 years old in the US, where the key findings are students who convert positive thoughts and images about their future into effective action improves academic success. We are interested to compare these studies to our cohort of young people aged 13 to 14 years old. To date, there is a gap in the literature as there are few past studies that analyse the effects of noncognitive skills to educational and labour market outcomes, especially in the UK. We aim to contribute to the literature by looking at the effect of non-cognitive skills in teenage years to pathways of young people in further education, labour market or NEET after compulsory schooling, apart from the youth's socio-economic background and qualifications.

4.3 Data and Methodology

This chapter looks at the pathways to youth outcomes by utilising the variable activity in the dataset Next Steps, as discussed in Chapter 3, which is categorised into youth that are in further education, employment or government training, and NEET. We are looking at age 16/17 from wave 4 and age 18/19 from wave 5 as two main transition points of further education, employment or NEET, and our samples include the information from earlier waves (wave 1 and wave 2) to control for personal characteristics and family background at age 14/15. We also bring in information from wave 3 to control for cognitive skills. For the methodology, we consider three different pathways (further study, employment or NEET) at age 16/17 and at age 18/19. The sample sizes for activity (further education, employment, or NEET) at age 16/17 is 10,453 young people, and at age 18/19, there are fewer young people compared to at age 16/17. at 8,909 young people, due to attrition in the data. This sample does exclude young people with children because of their immediate need to take care of their children.

Table 4.1 describes the main activity of young people at age 16. We obtained the main activity from a variable called Young People's Main Activity (first and second options). There are three categories for our dependent variable, which are further education, employment and NEET. We classify a young person at age 16/17 in further education if he or she is doing: (i) full-time education and (iii) spending part of the week at a college, part of it with an employed job. There are 9,148 of young people in education, which is 79% of young people at age 16/17, where 98% who are in education are in full-time education. Next, we classify a young person at age 16/17 in employment if he or she is: (ii) In full-time paid work (30 or more hours a week), (iv) On a training course or Apprenticeship and (vii) Something else: In part-time job. There are 1,621 of young people in employment or 14%, where 47% young people who are in full-time paid work and 35% young people in training course or apprenticeship. Finally, our last category is NEET. We classify a young person at age 16/17 is NEET if he or she is doing: (v) Something else: Unemployed/looking for work, (vi) Something else: Looking after home or family full-time, and (iv) Something else: Other. There are 817 of young people in NEET or 7%, where 70% young people who are unemployed. Those who are excluded from the analysis are: (v) Something else: Refused.

Table 4.1 Activity at age 16/17 Wave 1 Year 2007

Young people's Main Activity first and second options (W4MainActYP and W4MainAct2YP)		No. of young people	% overall
(i)	Full-time Education	8,971	77%
(ii)	In full-time paid work (30 or more hours a week)	765	7%
(iii)	Spending part of the week at a college, part of it with an employed job	177	1%
(iv)	On a training course or Apprenticeship	576	5%
(v)	Something else: Unemployed/looking for work	571	5%
(vi)	Something else: Looking after home or family full-time	60	1%
(vii)	Something else: In part-time job	280	2%
(viii)	Something else: Other	183	2%
(ix)	Something else: Refused	3	0%
	Total	11,586	100%

Table 4.1a describes the main activity of young people at age 18. We obtained the main activity from a variable called "Admin: Derived main current activity". We classify a young person to be in further education at age 18/19 if he or she is: (i) Doing a course at a university, (ii) In education and (x) Spending part of the week with an employer and part of the week at college. There are 5,147 of young people in further education, which 53% of young people at age 18/19, where 64% young people are doing a course at a university. Next, we classify a young person to be in employment at age 18/19 if he or she is: (iii) In paid work, (iv) On a training course or scheme, and (v) Doing an Apprenticeship. There are 3,290 of young people in employment or 34%, where 84% young people are in full-time paid work. Finally, our last category is NEET. We classify a young person at age 18/19 is NEET if he or she is: (vii) Looking after the family and home, and (viii) Unemployed and looking for work. There are 876 of young people in NEET or 9%, where 86% young people who are NEET are unemployed. Those who are excluded from the analysis are: (xi) Doing voluntary work; (vi) Waiting for a course or job to start; (x) Waiting for exam results or result of job application.

Table 4.1a: Activity at age 18/19 Wave 3 Year 2009

Young people's Derived main current activity (W6TCurrentAct)		No. of young people	% overall
(i)	Doing a course at a university	3,306	34%
(ii)	In education	1,767	18%
(iii)	In paid work	2,751	28%
(iv)	On a training course or scheme	77	1%
(v)	Doing an Apprenticeship	462	5%
(vi)	Waiting for a course or job to start	317	3%
(vii)	Looking after the family and home	121	1%
(viii)	Unemployed and looking for work	755	8%
(ix)	Waiting for exam results or result of job application	19	0%
(x)	Spending part of the week with an employer and part of the week at college	74	1%
(xi)	Doing voluntary work	41	1%
	Total	9,690	100%

4.3.1 Short-term Outcomes at age 16/17 and at age 18/19

First, we are looking at 3 different pathways as short-term outcomes at age 16/17 and at age 18/19, and we estimate the empirical counterpart of equation (4.1) *(6.2)*:
Short-term outcomes of boys and girls:

$$P_i = \beta_1 + \beta_2 NONCOGN_i + \beta_3 X_i + u_i \quad (4.1)$$

where P_i is pathways or short-term outcomes (further education, employment or NEET) reported by individual i at time t, $NONCOGN_i$ is non-cognitive skills, X_i is a vector of individual and other characteristics affecting outcomes, and u_i is the error term. X= contemporaneous characteristics at age 14/15: tenure (whether live in parents' owned house), gross household annual family income, benefit (eligibility for free school meals), living with natural parents, parents' socio-economic classification, government office region, childhood characteristics: race (white or non-white), parents' highest educational qualification, and cognitive skills i.e. number of subjects A-C* GCSEs at age 15/16. Our choices of control variables are described in detail in Chapter 3. In addition, the control variable of government office region is to consider the regional differences, as some region, for example, London is more economical advance than the others as Schioppa and Lupi

(2002) found the probability of unemployment is lower in a richer region where households have higher family wealth in Italy. When estimating pathways at age 18/19, we included if a young person has A-levels as an additional control for cognitive skills.

Our dependent variable is the annual main activity (further education, employed or training, or NEET) of the young person aged 16/17 in 2007 (wave 4) and age 18/19 in 2009 (wave 6), as mentioned. We have also excluded the young people who are still taking their GCSEs, and young people who have own children at age 16/17 and at age 18/19. The details of this variable and the descriptive statistics are in the appendices. We estimate equation (4.1) using two multinomial probit equations at age 16/17 and age 18/19, and then the marginal effects estimated.

These equations are estimated by multinomial probit because there is no apparent ordering or ranking between the economic outcome of being in further education, being employed or in training, or being NEET. For a multinomial probit (MNP) the probability of choosing each option Pathways from a set of choices 1,2,3 (1=Further education,2=employment or government training, and 3=NEET at age 16/17 and age 18/19) is:

$$\Pr(Pathways = 1,2,3\ |X) = \Phi(X_i^{'}\beta)$$
$$P(Path_i = 1,2,3|X) = P(Noncogn + X_i^{''} + u_i > 0|x) \quad (4.2)$$

$Where\ \phi$ is the cumulative distribution function of the standard normal distribution, X' is a vector of explanatory/control variables and β is a vector of parameters to be estimated. Meanwhile, subscript i is for an individual. The characteristics of X' includes variables that are common determinants of choices for pathways according to the literature.

Empirically, the multinomial probit is similar to a multinomial logit model except the multinomial probit assume the error term is normally distributed and does not rely on the assumption of independence of irrelevant alternatives (IIA), although the multinomial probit is computationally more intensive. The IIA is likely to be violated, as if an additional choice was added this would not keep the relative probabilities between our categories the same. For example, if a brand-new training programme was developed, we would expect

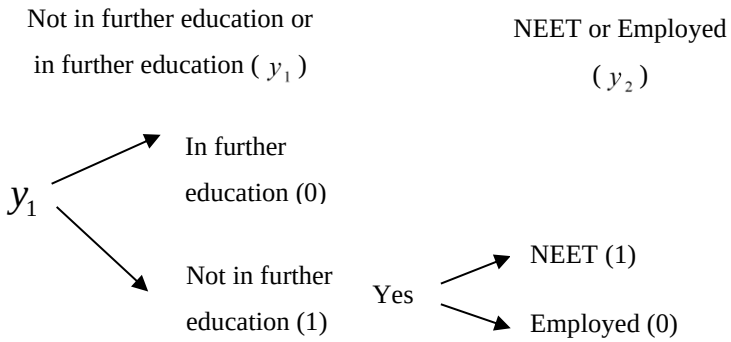
more people in the labour market than who are in education to switch to this choice. Thus, the multinomial probit model is better, as it does not assume IIA.

In the secondary analysis we are interested in examining the probability of being NEET in more detail, as it would make a nice comparison with our results in Chapter 5 when we discuss the effect of noncognitive skills to the duration of NEET. Hence, we use sequential probit as this is more about adjusting for selection since those who stay in education and those who opt out of education may have different characteristics.

4.3.2 Secondary analysis

4.3.2.1 Two-step probit

In secondary analysis, we are interested in examining the probability of being NEET in more detail, as being NEET is a cost to the economy and major problem in society. Hence, we use two-step probit to do this, because it enables us to control for selection of dropping out of education, as young people who drop out of education may share the same characteristics that is different from young people in further education. This might bias our results if we compare the effect of noncognitive skills between young people in further education and young people who drops out of further education. We illustrate a two-step model using two decision of youth pathways choice. An individual makes the decision y_1 to be not in further education (y_1=1) or be in further education (y_1=0) and if they choose to be not in further education, they have two outcomes of not in further education (decision y_2) to be NEET (y_2=1) or employed (y_2=0). These decisions can be represented as a decision tree:



Decisions y_1 and y_2 can be modelled by two separate models with y_1 including the whole sample and y_2 only those who chose y_1=1. Results in the first stage can be interpreted in the normal way for a binary model, with results in the second stage conditional on y_1=1.

Therefore, the probabilities in the second stage are as follows:

Pr (y_{i2} = 1) = Pr(y_{i1} = 1).Pr(y_{i2}=1 | y_{i1} = 1)
Pr (y_{i2} = 0) = Pr(y_{i1} = 1).Pr(y_{i2}=0 | y_{i1} = 1)

The predicted probabilities can be estimated either by a probit or logit model, as long as the decisions in each stage are independent. However, in this case, the decisions in each stage are not independent; hence a selection model such as the two-step probit model will be used. In the first stage, we are looking at the probability of youth not going to further education versus going to further education, as this then determines the next stage. We are assuming an identifier of ability beliefs in English, Maths and Science at age 13/14 matters for the decision of going to further education or not, as Chowdry et al. (2009) using the same dataset Next Steps found ability beliefs have a positive correlation with educational outcome. We explored the first stage with and without the identifiers, and ability beliefs are significance in explaining if the young people are in further education or not, and the pseudo r-squared 19.9% compared to 18.6% if we do not include the ability beliefs. We also tried putting ability beliefs to explain if the young people are NEET or in labour market, and ability beliefs are not significant.

The equations that we are estimating are:

<u>First stage</u>

$$\Pr(y_{1it}) = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \beta_3 x_{3it} + e_{1it}$$

$y_{1it} = 1\ (Not\ in\ Education), 0\ (Education)$

(4.3)

Where x_{it1} are young people's characteristics: tenure (whether live in owned house), gross household annual income, benefit (eligibility for free school meals), living with both parents or otherwise, mother's employment, parent's national statistics socio-economic classification, government office region, race (white or non-white), and cognitive skills i.e. number of subjects A-C* achieved from General Certificate of Secondary Education (GCSEs); x_{it2} are external locus of control and effort at age 14/15, and x_{it3} are ability beliefs in subjects in school at age 13/14 (e.g. English, Maths, and Science). In the second stage, for those who are not in further education, we look at the decision of employment or NEET. We are assuming that ability beliefs in English, Maths and Science at age 13/14 do not influence this decision of employment or NEET. Thus, the selected variables are not included as they are not related to explain the difference between these two groups. Unfortunately, not much literature can be found on the effect of self-belief academic abilities to labour market outcomes. Past studies have looked at academic abilities on labour market outcomes utilised test scores (Semeijn et al., 2006) and working experience (Semeijn et al., 2006 and Holford, 2020) to see the effect on wages. In our opinion, the academic beliefs are not a perfect instrument, but it does reflect young people interest to stay in education or not, but not determine the decision of young people who are not in education whether they are NEET or in the labour market. We have also included the academic beliefs in a probit of the second stage and the result confirms that they are not related to the probability of being NEET.

Second stage

$$\Pr(y_{2it}) = \gamma + \delta_1 x_{1it} + \delta_2 x_{2it} + e_{2it}$$
$$y_{2it} = 1\ (NEET), 0\ (Employment)$$

(4.4)

Where x_{it1} are young people's characteristics, which is the same as in previous equation. At age 18/19, we added if young people have A-levels for cognitive skills. Meanwhile, x_{2it} are external locus of control and effort at age 14/15, and t is the year 2007 (age 16/17) and 2009 (age 18/19).

There are two marginal effects reported, which are selection probability and marginal probability. The selection probability reports marginal effects of not in further education

versus in further education. Meanwhile, the marginal probability reports the marginal effects of being in NEET versus being in employment.

4.3.3 Descriptive Statistics

Table 4.2 below presents the mean, standard deviation and t-test of difference of the economic activity of male and female in LSYPE at age 16/17 and age 18/19. Further details on the dependent variables can be found in Appendix 1. Most of young people are in further education (74.9% of male and 83.1% of girls), while a few of youth are in employment or training (15.2% of boys and 8.6% of girls), and only around 10% are in NEET (9.9% of boys and 8.2% of girls). As there are some gender differences observed in our outcomes, labour force participation for men and women (e.g. Azmat & Petrongolo, 2014; Fortin, 2005) and also because there are differences in noncognitive skills by gender, we run separate models by gender. For the current LSYPE cohort, Crawford et al. (2011) found girls are more likely to stay on in full-time education than boys, and especially more often to progress on to higher education by age 18-19, and boys are more likely to be NEET at age 18-19 than girls.

The proportion of young people who goes into further education reduce substantially at age 18/19, there are double the proportion of young people in employment but the proportion for NEET remains the same. There are 55% of young people in further education, 36% in employment, and 9% in NEET. About half of young people are in further education (51.6% of male and 58.0% of girls), while around 30% of youth are in employment or training (38.4% of boys and 33.6% of girls), and only around 10% are in NEET (9.9% of boys and 8.4% of girls).

Table 4.2: Mean, standard deviation and t-test of dependent variables by gender

Variables	Variable label	Mean		T-test
		Male	Female	Difference (male – female)
Activity at age 16/17	Further education	0.749 (0.006) N=3,958	0.831 (0.005) N=4,298	-0.082*** (0.008)
	Employment or government training	0.152 (0.005) N=804	0.086 (0.004) N=446	0.066*** (0.006)
	NEET	0.099 (0.004) N=522	0.082 (0.004) N=425	0.016*** (0.006)
	Total	N=5,284	N=5,169	
Activity at age 18/19	Further education	0.516 (0.007) N=2,274	0.580 (0.007) N=2,612	-0.063*** (0.010)
	Employment or government training	0.384 (0.007) N=1,692	0.336 (0.007) N=1,515	0.048*** (0.013)
	NEET	0.099 (0.004) N=438	0.084 (0.004) N=378	0.015** (0.006)
	Total	N=4,404	N=4,505	

Notes: (1) Robust standard errors are reported for differences in the means across genders. (2) Significant t-test at *** p<0.01, ** p<0.05, * p<0.1. Figures in parenthesis are standard errors.

Table 4.3 presents the mean, standard deviation and t-test by gender of the independent variables in the Next Steps. Further details on the independent variables can be found in Appendix 2. From the descriptive statistics, we observe some gender differences as more girls go into further education compared to boys. Noncognitive skills are important as there are implications of these gender difference e.g. if girls perform better, they may be expected to be more likely to go onto further education. We observe noncognitive skills are different by gender, as boys have higher external locus of control, and girls have higher effort. This information may help we analyse our result as the differences in noncognitive skills by gender may explain the reason of having more girls are in further education, and more boys in employment and NEET. There is also gender difference in cognitive skills, as there are a higher proportion of girls that have "5 or more GCSEs at A*-C" at age 16/17, and A-levels at age 18/19. The gender difference is also observed in ability beliefs, as girls have higher ability beliefs in English, while boys are more confidence in Maths and Science.

Meanwhile, there are little gender difference observed in other childhood characteristics as there are roughly the same proportion of boys and girls who live with natural parents, lived in parents owned house, white, eligible for free school meal, parents' national socio-economic classifications, and if mother is working at schooling age.

Table 4.3: Mean, standard deviation and t-test of independent variables by gender

Variables	Variable label	Mean		Min	Max	T-test
		Male	Female			Difference (male – female)
Non-cognitive skills (0 "Strongly disagree" 1 "Disagree" 2 "Agree" 3 "Strongly agree") A sum across 3 questions. The sum is a scale of 0-9 with the individual questions coded on a scale of 0-3						
External locus of control		3.126 (1.608)	3.095 (1.598)	0	9	0.031** [0.013]
Effort		7.192 (1.387)	7.299 (1.377)	0	9	-0.107*** [0.010]
Cognitive skills						
KS2 English	Key stage 2 scores English	36.016 (16.09)	40.80 (15.26)	1	77	-4.784*** [0.118]
KS2 Maths	Key stage 2 scores Maths	49.904 (23.05)	47.23 (22.09)	1	88	2.668*** [0.170]
GCSE5	General Certificate of Secondary Education when young people aged 15/16 (1 "5 or more GCSEs at A*-C" 0: "Otherwise")	0.590 (0.492)	0.683 (0.465)	0	1	-0.093*** [0.003]
A-levels	A-level at age 18/19 (1 "A-levels" 0: "Otherwise")	0.383 (0.486)	0.433 (0.495)	0	1	-0.050*** [0.005]
Ability beliefs (1 "Not good at all" 2 "Not very good" 3 "Fairly good" 4 "Very good")						
English	Young person: How good or bad at this subject: English	2.987 (0.661)	3.127 (0.641)	1	4	-0.140*** [0.005]
Maths	Young person: How good or bad at this subject: Maths	3.135 (0.630)	2.985 (0.664)	1	4	0.150*** [0.004]
Science	Young person: How good or bad at this subject: Science	3.155 (0.683	2.959 (0.721)	1	4	0.005*** [0.003]
Parent's degree	If either parent has a bachelor's degree	0.342 (0.474)	0.336 (0.472)	0	1	0.006* [0.003]
Own house (household tenure)	Whether live in owned house (1 "Yes" 0 "No")	0.739 (0.439)	0.730 (0.440)	0	1	0.009*** [0.003]
Gross household income	Gross household income from wave 2, category 2 "£12,000 to £47,999" (base category)					
	1 "Below £12,000"	0.327 (0.469)		0	1	
	3 "£48,000 and above"	0.108 (0.310)		0	1	0.026*** [0.006]
White	Race (1 "White" 0 "Otherwise")	0.706 (0.455)	0.684 (0.465)	0	1	0.022*** [0.003]
Free school meal eligibility	Eligible for free school meal (1 "Yes" 0 "No")	0.152 (0.359)	0.164 (0.371)	0	1	-0.012*** [0.003]
National Statistics Socio-Economic Classification (parents)	From age 14/15 in 2005 (wave 2). A dummy variable for whether either parent has a managerial/professional job (1), 0 otherwise.	0.451 (0.498)	0.442 (0.497)	0	1	0.009*** [0.004]
Live with single parent	(1 "Yes" 0 "Live with natural parents")	0.319 (0.466)	0.328 (0.470)	0	1	-0.009*** [0.003]

Mother work	If mother is employed when young people aged 14/15 (1 "Yes" 0 "No")	0.685 (0.464)	0.678 (0.467)	0	1	0.008** [0.003]

*Other variable is government office region

Notes: (1) Figures in parenthesis are standard deviation. (2) Significant t-test at *** p<0.01, ** p<0.05, * p<0.1. (3) Figures in square bracket are robust standard errors reported for differences in the means across genders.

4.4 Results and Discussions

This section discusses the two models that we estimated. First, we look at whether the outcomes for pathway after compulsory education to go to further education, employment or NEET as decision that is made simultaneously by young people. We used multinomial probit to analyse these decisions. Marginal effects are displayed in Table 4.4 and Table 4.5. The further education variable in Table 4.5 is young people at age 18/19 who are doing a full-time or part-time course at a university or college as discussed in Section 4.3.

The regression results indicate the following across genders: cognitive skills, noncognitive skills and parents' socio-economic classification in managerial or professional occupations are consistently significant factors that influence the probability of pathways at age 16/17 and age 18/19. Most relevant for this thesis, the noncognitive skills variables are highly significant in predicting the probability of being in any of the pathways. The probability of being in further education at age 16/17 tends to rise as noncognitive skills i.e. effort at age 14/15 increases and conversely, the probability of being in employment or government training and NEET tends to decrease as noncognitive skills increase. This is consistent with abundance of literature on pathways and noncognitive skills (Heckman et al., 2006, Duckworth et al., 2007, Mendolia and Walker, 2015).

As expected, there is a pattern that arises when looking at the marginal effects, which is the marginal effects of being in further education is always the opposite signs with the marginal effect of being in employment or government training and NEET. This could imply that there is a great distinction of characteristics of young people who goes into further education and young people who do not go into further education at age 16/17. Thus, this result then lends itself to us doing the two stage probit.

4.4.1 Non-cognitive skills

In Table 4.4 and 4.5, we found noncognitive skills are significant in determining educational and labour market outcomes after compulsory schooling. In comparison, we found that effort consistently explain all outcomes compared to external locus of control at age 16/17 and at age 18/19. Effort significantly increases the probability of young people to be in further education and decrease the probability of employment or training and being NEET at age 16/17 and age 18/19. For example, an increase in one percentage point of the index of effort increases the chance of boys being in further education by 1.6 percentage points, and girls by 1.4 percentage points at age 16/17. We also observe higher marginal effects for effort and pathways to further education and employment. For instance, an increase in one percentage point of the index of effort increases the chance of boys being in further education by 2.3 percentage points, and girls by 2.1 percentage points at age 18/19. Meanwhile, the effect of external locus of control is less significant in determining pathways. External locus of control significantly increases the probability of employment or training and being NEET at age post-16. For example, external locus of control increases the chance of girls being in NEET by 0.8 percentage points at age 16/17. We are also interested to see if there is a difference in gender, however, we found that there is little difference in noncognitive skills by gender in looking at probabilities of pathways. There might be differences in the endowments of the traits by gender, as Jacob (2002) founds that greater noncognitive skills among girls account for most difference in gender gap in higher education.

4.4.2 Cognitive skills

The key-stage 2 variables included are key-stage 2 English and Maths, where we found that key-stage 2 Maths are more significant than key-stage 2 English in determining all pathways of further education, employment, or NEET. However, the size of marginal effects is quite small, with the largest effect of key-stage 2 Maths is increasing the probability for boys to be in further education at age 16/17 by 0.4 percentage point. Some of the key-stage 2 variables are less significant when we add A-level/GCSE, such as the key stage 2 English in determining all pathways for boys. When we add A-level/GCSE, the marginal effects are significant in explaining all pathways of young people, and the size of

marginal effects are much larger than noncognitive skills. This is as expected as most past studies found that cognitive skills have larger effects on further education, for example Jacob (2002) founds cognitive ability is a strong determinant of college attendance.

From the multinomial probit result at both age 16/17 and 18/19, GCSE are important determinant of outcomes. The marginal effect of GCSE is the largest in pathways of being in further education, implying most important for young people to be in further education. For example, it increases the chance of boys being in further education by 27 percentage points, and girls by 17 percentage points. The marginal effect of GCSE is smaller in pathways of being in employment or training and NEET than in further education, implying less importance for young people to be in employment and training and NEET compared to further education. For example, it decreases the chance of boys being in employment or training by 14 percentage points, and NEET by 13 percentage points.

We also observe gender differences as cognitive skills have higher effect to pathways for boys especially pathways to further education and employment, compared to girls. Some of the other studies who looked on the differences of cognitive skills are attributing this difference to social and cultural factors (e.g. Bennet et al., 2005).

At age 18/19, we include if young people have A-levels as another measure of cognitive skills. The results are similar. Column 1 in Table 4.5 shows that boys and girls who have A-levels are significantly more likely to be in further education at age 18/19, compared to young people who have no A-levels. For example, it increases the chance of boys being in further education by 36 percentage points, and girls by 29 percentage points. Meanwhile, Column 2 and Column 3 shows that boys and girls who have A-levels are significantly less likely to be in employment and training, and less likely to be in NEET at age 18/19, compared to young people who have no A-levels at age 18/19. The results also show that the effect of having more than 5 A*-C in GCSEs is still significant even after we include having A-levels as an additional measure of cognitive skills for pathways of NEET.

There are changes in noncognitive skills when we add A-level/GCSE results. The marginal effects for effort are lower for boys to enter further education, and the marginal effects of

effort for boys are also reduced to enter employment or NEET when we add more cognitive skills. However, there are no changes in the marginal effects of external locus of control.

4.4.3 Other variables

We found family background matters for pathways of further education, employment and NEET at age 16/17 and at age 18/19. In particular, young people with parents with managerial or professional occupations capture the pathways of more likely to go into further education, and less likely to be in employment or training, and less likely to be in NEET at age 16/17 and 18/19. Other control variables at age 14/15 that are significant in explaining pathways of young people at age 16/17 and age 18/19 are whether young people who live in parents owned house compared to living in a rented house, and family household income. The results also show that young people with white background have the tendency to take more risks in their pathways as they are less likely to go to further education, and more likely to be in employment or training and more likely to be in NEET at age 16/17 and 18/19. A past study Finucane et al. (2000) explains that this might be due to attributed cultural biases, where the authors found a gender difference in risk-taking in whites but not the other ethnic group.

Table 4.4: Panel A: Marginal effects of multinomial probit (Age 16/17)

	Age 16/17					
	Further Education (1)		Employment or Training (2)		NEET (3)	
	Boys	Girls	Boys	Girls	Boys	Girls
Non-cognitive skills at age 14/15						
External locus of control	-0.002 [0.006]	-0.013** [0.006]	-0.005 [0.006]	0.005 [0.005]	0.001 [0.005]	0.008* [0.004]
Effort at age 14/15	0.030*** [0.007]	0.025*** [0.006]	-0.017*** [0.006]	-0.006 [0.005]	-0.012** [0.004]	-0.018*** [0.004]
Cognitive skills						
Key-stage 2 English	0.002** [0.001]	0.002*** [0.002]	-0.002*** [0.001]	-0.001 [0.001]	-0.001 [0.001]	-0.001* [0.001]
Key-stage 2 Maths	0.004*** [0.001]	0.002*** [0.001]	-0.002*** [0.001]	-0.001*** [0.001]	-0.001*** [0.001]	-0.001** [0.001]
Other variables						
Parent's socio-economic classification (ref: Other classifications)						
Managerial and professional	0.049*** [0.021]	0.058*** [0.020]	-0.018 [0.019]	-0.029** [0.015]	-0.025* [0.016]	-0.045*** [0.015]
Parent's education (ref: Other education levels)						
Bachelor's degree	0.105*** [0.023]	0.067*** [0.020]	-0.060*** [0.020]	-0.054** [0.014]	-0.045*** [0.016]	-0.013 [0.016]
White (ref: others)	-0.179*** [0.017]	-0.116*** [0.018]	0.162*** [0.014]	0.058*** [0.014]	0.040*** [0.013]	0.058*** [0.013]
Live in parents' owned house (ref: rented)	0.038 [0.026]	0.066*** [0.025]	-0.013 [0.023]	-0.018 [0.018]	-0.013 [0.015]	-0.021 [0.014]
Gross household income (ref: middle income £12,000 to £47,999 per year)						
Low income below £12,000	0.020 [0.023]	0.028 [0.025]	-0.029 [0.025]	-0.040** [0.020]	0.009 [0.020]	0.012 [0.016]
High income £48,000 and above	0.065** [0.026]	0.065*** [0.024]	-0.065*** [0.023]	-0.047** [0.019]	0.004 [0.021]	-0.018 [0.015]
Live with single parent age 14/15 (ref: both parents)	-0.029 [0.018]	-0.010 [0.015]	0.022 [0.016]	0.009 [0.012]	0.006 [0.016]	0.001 [0.012]
Mother work (ref: mother not working)	-0.004 [0.021]	-0.006 [0.018]	0.008 [0.018]	0.010 [0.014]	-0.029 [0.019]	-0.003 [0.014]
Free school meal (ref: no)	-0.011 [0.024]	-0.017 [0.024]	-0.004 [0.025]	0.019 [0.020]	0.015 [0.027]	-0.002 [0.016]
Wald chi[2]	Boys = 401.0***, Girls = 356.0***					
Observations[9]	Boys = 2,566, Girls = 2,447					

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

(1) Other control variables captured at age 14/15 include government office region (ref: London).

(2) We use the main probability weight for wave 4 (w4weight_main) for age 16/17

[9] Young people who have children are excluded from this analysis.

Panel B: Added GCSE as a control variable

	Age 16/17					
	Further Education (1)		Employment or Training (2)		NEET (3)	
	Boys	Girls	Boys	Girls	Boys	Girls
Non-cognitive skills at age 14/15						
External locus of control	0.008 [0.006]	-0.013** [0.006]	-0.008 [0.006]	0.003 [0.005]	0.001 [0.005]	0.008* [0.004]
Effort at age 14/15	0.022*** [0.007]	0.025*** [0.006]	-0.014*** [0.006]	-0.003 [0.005]	-0.009* [0.004]	-0.018*** [0.004]
Cognitive skills						
Key-stage 2 English	0.002 [0.001]	0.002*** [0.002]	-0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]	-0.001* [0.001]
Key-stage 2 Maths	0.002*** [0.001]	0.001*** [0.001]	-0.001*** [0.001]	-0.001* [0.001]	-0.001 [0.001]	-0.001** [0.001]
5 or more GCSES at age 15/16	0.271*** [0.029]	0.166*** [0.027]	-0.143*** [0.025]	-0.102*** [0.022]	-0.128*** [0.021]	-0.001** [0.001]

Note: All the other variables are the same as Panel A

Table 4.5: Panel A: Marginal effects of multinomial probit (Age 18/19)

	Age 18/19					
	Further Education (1)		Employment or Training (2)		NEET (3)	
	Boys	Girls	Boys	Girls	Boys	Girls
Non-cognitive skills at age 14/15						
External locus of control at age 14/15	0.011 [0.008]	0.008 [0.008]	-0.020** [0.008]	-0.018** [0.008]	0.009 [0.006]	0.009* [0.005]
Effort at age 14/15	0.033*** [0.008]	0.032*** [0.008]	-0.032*** [0.009]	-0.022*** [0.008]	-0.001 [0.006]	-0.010* [0.006]
Cognitive skills						
Key-stage 2 English	0.003*** [0.001]	0.003*** [0.001]	-0.002 [0.001]	-0.002** [0.003]	-0.001* [0.002]	-0.001 [0.001]
Key-stage 2 Maths	0.003*** [0.001]	0.003*** [0.001]	-0.002** [0.001]	-0.001* [0.001]	-0.001* [0.001]	-0.001** [0.001]
Other variables						
Parents socio economic classification: (ref: Other classifications)						
Managerial and professional	0.058** [0.027]	0.054* [0.029]	-0.017 [0.026]	-0.052** [0.026]	-0.059*** [0.019]	-0.002 [0.017]
Parent's education (ref: Other education levels)						
Bachelor's degree	0.118*** [0.027]	0.088*** [0.028]	-0.126*** [0.028]	-0.077*** [0.028]	0.008 [0.021]	-0.011 [0.018]
White (ref: others)	-0.206*** [0.032]	-0.235*** [0.031]	0.205*** [0.033]	0.173*** [0.030]	0.001 [0.023]	0.030** [0.016]
Lived in parents' owned house (ref: rented)	0.105*** [0.031]	-0.011 [0.032]	-0.033 [0.032]	-0.070** [0.034]	-0.029 [0.021]	-0.049** [0.023]
Gross household income (ref: middle income £12,000 to £47,999 per year)						
Low income below £12,000	0.063* [0.035]	0.051 [0.034]	-0.079** [0.035]	-0.079** [0.035]	0.022 [0.024]	0.028 [0.023]
High income £48,000 and above	0.078*** [0.030]	0.087*** [0.030]	-0.061* [0.032]	-0.061* [0.032]	0.004 [0.024]	-0.038** [0.019]
Live with single parent age 14/15 (ref: both parents)	0.003 [0.024]	-0.039 [0.026]	-0.013 [0.026]	0.022 [0.027]	0.010 [0.018]	0.017 [0.017]
Mother work (ref: mother not working)	0.012 [0.027]	0.015 [0.030]	-0.001 [0.031]	0.008 [0.031]	-0.011 [0.021]	-0.023 [0.021]
Free school meal (ref: no)	0.031 [0.042]	0.042 [0.043]	-0.015 [0.044]	-0.050 [0.044]	-0.015 [0.025]	0.007 [0.025]
Wald chi^2	Boys =613.6***, Girls = 458.1***					
Observations[10]	Boys = 2,137, Girls = 2,113					

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

(1) Other control variables captured at age 14/15 include government office region (ref: London).

(2) We use the main probability weight for wave 6 (w6finwt_cross) for age 18/19

[10] Young people who have children are excluded from this analysis.

Panel B: Added GCSE and A-level as a control variable

	Age 18/19					
	Further Education (1)		Employment or Training (2)		NEET (3)	
	Boys	Girls	Boys	Girls	Boys	Girls
Non-cognitive skills at age 14/15						
External locus of control at age 14/15	0.018** [0.008]	0.012 [0.008]	-0.024*** [0.008]	-0.020** [0.008]	0.006 [0.005]	0.008* [0.005]
Effort at age 14/15	0.020*** [0.007]	0.019** [0.008]	-0.021** [0.009]	-0.015* [0.008]	-0.001 [0.006]	-0.004 [0.006]
Cognitive skills						
Key-stage 2 English	0.001 [0.001]	0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]	0.001 [0.001]
Key-stage 2 Maths	0.003 [0.001]	0.001** [0.001]	-0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]
5 or more GCSES at age 15/16	0.040 [0.029]	0.023 [0.033]	0.013 [0.032]	0.034 [0.034]	-0.052** [0.019]	-0.058*** [0.022]
A-level	0.359*** [0.028]	0.290*** [0.028]	-0.307*** [0.028]	-0.200*** [0.028]	-0.052*** [0.021]	-0.090*** [0.017]

Note: All the other variables are the same as Panel A

4.4.4 Results and discussions of secondary analysis

Our secondary analysis of two-step probit is important as from this analysis, we can further assess the effect of noncognitive skills to young people who are at risk, which are young people who drop out from further education, and then subsequently enter NEET. Table 4.6 and Table 4.7 show the marginal effects of two-step probit of young people in NEET at age 16/17 and age 18/19. The sequential probit is showing the probability of two groups, which are: (i) not in further education at age 16/17 and 18/19; and (ii) NEET at age 16/17 and 18/19.

Our first stage results show consistent result compared to our multinomial probit result as effort and external locus of control is statistically significant in explaining probability of dropping from further education. The effect of effort to pathways at age 18/19 is stronger in our multinomial probit results, as the effect of effort is statistically significant for boys to drop out from further education at age 18/19. External locus of control shows consistent result with our multinomial probit as it is not statistically significant to explain pathways of dropping out of further education. Our first stage results also show that consistent results as cognitive skills are statistically significant in reducing the probability of dropping out from further education.

The selection variable of ability belief in English, Maths and Science are significant in explaining pathways after compulsory schooling. The results show that the selection belief matters for boys, as at age 16/17 and age 18/19 boys with ability belief in English and Maths at age 14/15 are significantly less likely to drop out from further education at age 16/17 and age 18/19. The ability beliefs matter for education but not for labour market outcomes because young people who believe that they are good in English and Maths at age 14/15 may be more inclined to get higher grades in their GCSE and have more interest in pursuing further education at age 16/17 and higher education at age 18/19 instead of going into the labour market at age 16/17 and at age 18/19. Ability beliefs in Science and Maths help girls to stay in further education at age 16/17 and at age 18/19, however ability beliefs in English are insignificant to educational outcome for girls. A possible reason for this might be because most girls perform better at language than boys.

In Table 4.7, the implications given young people did not have to stay in education or training post-16 as young people in our cohort are under different regime are, they might have left

education at age 16/17, instead of at age 18/19. Our results are still relevant to today's cohort for young people at age 18/19, except that under the new compulsory leaving age, those who would have left education at age 16/17 would leave education at age 18/19. We found that lack of noncognitive skills have impact on pathways especially for young people who are less likely to remain in education.

Our interest is in the second stage as young people in our sample size is young people who drop out from further education. In the second stage we compare young people who are NEET with young people who are employed. The second stage results may give further insight as it is more logical to compare young people who are excluded from further education, as previously, in multinomial probit, we compare young people who are NEET with young people who are in further education, and in employment. We found consistent results that noncognitive skills are still significant in explaining NEET, and the effect of effort is stronger than locus of control. Effort shows consistent results with our multinomial probit as it is statistically significant to explain NEET at age 16/17, but not at age 18/19. This might be because at age 18/19, those who are NEET at age 18/19 were probably NEET at age 16/17, and the discouragement of young people are facing after compulsory schooling might hamper their willingness to work hard when they were in school at age 14/15. These differences implied that we should control for the effect of NEET, and in Chapter 6, we controlled the effect of NEET in our analysis to provide a stronger result to our analysis.

Table 4.6: Average marginal effects of Sequential Probit of young people in NEET by 16/17

Variables	Not in further education (1)		NEET (2)	
	Selection Probability		Marginal Probability	
	Boys	Girls	Boys	Girls
Non-cognitive skills				
External locus of control at age 14/15	-0.001	0.008	-0.001	0.008*
	[0.006]	[0.005]	[0.007]	[0.004]
Effort at age 14/15	-0.015***	-0.019***	-0.008	-0.017***
	[0.007]	[0.006]	[0.007]	[0.004]
Cognitive skills				
Key stage 2 English	-0.002***	-0.001*	0.001	0.001*
	[0.001]	[0.001]	[0.001]	[0.001]
Key stage 2 Maths	-0.002***	-0.002***	-0.002*	-0.001**
	[0.001]	[0.001]	[0.001]	[0.001]
More than 5 A*-C GCSEs at age 15/16 (included in a second step separate model)	-0.254***	-0.194***	-0.131***	-0.091***
	[0.023]	[0.023]	[0.022]	[0.177]
Ability beliefs at age 14/15 (1.				
English	-0.051***	-0.013		
	[0.014]	[0.010]		
Math	-0.065***	0.001		
	[0.014]	[0.011]		
Science	-0.027**	-0.020**		
	[0.014]	[0.009]		
Parent's socio-economic classification: Managerial and professional (ref: Other classifications)	-0.041**	-0.069***	-0.034	-0.046
	[0.021]	[0.019]	[0.022]	[0.075]
White (ref: others)	0.172***	0.131***	-0.032	-0.004
	[0.022]	[0.014]	[0.068]	[0.149]
Live in parents' owned house (ref: rented)	-0.019	0.003	-0.013	-0.024
	[0.025]	[0.019]	[0.018]	[0.065]
Gross household income (ref: middle income £12,000 to £47,999 per year)				
Low income below £12,000	-0.031	-0.031*	0.025	0.092
	[0.027]	[0.018]	[0.024]	[0.105]
High income £48,000 and above	-0.056**	-0.062***	-0.005	0.042
	[0.025]	[0.016]	[0.022]	[0.142]
Live with single parent (base category: with both parents)	0.023	0.012	-0.001	0.007
	[0.021]	[0.014]	[0.023]	[0.053]
Mother work (ref: mother not working)	-0.030	0.001	-0.039	-0.014
	[0.025]	[0.022]	[0.032]	[0.063]
Eligible for free school meal (ref: not eligible)	0.007	0.006	0.017	0.002
	[0.025]	[0.023]	[0.037]	[0.076]
Observations	Boys= 2,536; Not in further education=1,897, NEET=639 Girls=2,516; Not in further education=2,114, NEET=402			
Wald chi2	Boys= 75.9***, Girls=29.7**			

Notes:

(1) Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1; (2) Other control variables captured at age 14/15 include government office region (ref: London).

(2) We use the main probability weight for wave 4 (w4weight_main) for age 16/17

Table 4.7: Average marginal effects of Sequential Probit of young people in NEET by 18/19

Variables	Not in further education (1) Selection Probability		NEET (2) Marginal Probability	
	Boys	Girls	Boys	Girls
Non-cognitive skills				
External locus of control at age 14/15	-0.011*	-0.006	-0.013	0.008
	[0.007]	[0.007]	[0.006]	[0.007]
Effort at age 14/15	-0.016**	-0.015**	0.008	-0.006
	[0.007]	[0.007]	[0.007]	[0.006]
Cognitive skills				
Key stage 2 English	-0.001	-0.001	-0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]
Key stage 2 Maths	-0.001	-0.001	-0.001	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]
More than 5 A*-C GCSEs at age 15/16	-0.017	-0.062*	-0.072*	-0.055**
	[0.027]	[0.032	[0.043]	[0.024]
A-level at age 18/19	-0.339***	-0.265***	0.026	-0.054***
	[0.027]	[0.026]	[0.139]	[0.018]
Ability beliefs at age 14/15				
English	-0.041***	-0.026		
	[0.016]	[0.017]		
Math	-0.061***	-0.058***		
	[0.017]	[0.017]		
Science	-0.013	-0.021		
	[0.016]	[0.016]		
Parents socio-econ classification: Managerial and professional (ref: Other classifications)	-0.066***	-0.059**	-0.061*	-0.003
	[0.023]	[0.026]	[0.030]	[0.021]
White (ref: others)	0.139***	0.181***	-0.082	0.029*
	[0.026]	[0.031]	[0.107]	[0.021]
Owned house (ref: rented)	-0.092***	-0.009	-0.022	-0.050*
	[0.022]	[0.033]	[0.035]	[0.029]
Gross household income (ref: middle income £12,000 to £47,999 per year)				
Low income below £12,000	-0.044*	-0.054	0.049	0.040
	[0.023]	[0.034]	[0.049]	[0.034]
High income £48,000 and above	-0.054**	-0.071**	0.010	0.040
	[0.019]	[0.029]	[0.050]	[0.034]
Live with single parent (base category: with both parents)	0.011	0.052**	0.018	0.017
	[0.017]	[0.026]	[0.033]	[0.021]
Mother work (ref: mother not working)	-0.016	-0.022	-0.014	-0.030
	[0.020]	[0.030]	[0.034]	[0.026]
Eligible for free school meal (ref: not eligible)	-0.020	-0.028	-0.012	0.020
	[0.030]	[0.044]	[0.043]	[0.034]
Observations	Boys= 2,116, Girls = 2,093			
Wald chi2	Boys= 86.3***, Girls = 145.9***			

Notes:

(1) Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1; Other control variables captured at age 14/15 include government office region (ref: London).

(2) We use the main probability weight for wave 6 (w6finwt_cross) for age 18/19

4.5 Conclusions

The main aim of this chapter was to investigate how cognitive and noncognitive skills affect the probability of outcomes of young people at age 16/17 and 18/19. We have used two measures for noncognitive skills at age 14/15, which are external locus of control and effort. The results generally follow those found in the literature, for example, we found young people with external locus of control are less likely to be in employment and to not be in further education, which is relatable to the past study by Mendolia and Walker (2015), although we use different dependant variable. Our results support past studies as we found that the effect of effort and external locus of control are significant to explain pathways to further education, employment and NEET at age 16/17 and age 18/19. For example, Duckworth et al. (2007) found perseverance and passion for long-term goals to account 4% of the variance in outcomes such as educational attainment and grade point average., while Heckman et al. (2006) found that locus of control affects schooling decisions, wages, occupational choices, and health risky behaviours using data from the US NLSY1979. These non-cognitive skills effect pathways in the way that they do as young people with more internal locus of control believe they can control events affecting them, and thus may be more in charge of their own actions and allocate their time towards getting in further education, and avoiding NEET. Young people with effort "young people who strongly equate hard work with success and believe in the value of working hard at school in order to succeed" (Lessof et al., 2016, p.10) may work harder to get into further education and less likely to be NEET.

We also compared noncognitive skills and cognitive skills. It is hard to make a direct comparison between cognitive and noncognitive skills as noncognitive and cognitive skills are measured on different scales. For interpretation of our noncognitive skills, we could look at the effect of having the lowest (noncognitive skills=1) and highest (noncognitive skills=9) amount of that trait. To get a rough idea, we multiply the extreme values by their marginal effect. For example, from our multinomial probit result, the effect of having effort increases the chance of boys being in further education at age 16/17 by 14.4[11] percentage points, compared to the effect of having cognitive skills at 30 percentage points. Meanwhile, at age 18/19 the effect of having effort increases the chance of boys being in further education by 20.7 percentage points,

[11] Marginal effect of 0.016 x 9

compared to the effect of having cognitive skills at 36 percentage points. Thus, the results show that noncognitive skills are less important to explain the decision for going to further education than cognitive skills, as the size of the effect is smaller compared to cognitive skills. However, we found that the effect of noncognitive skills is greater than cognitive skills when comparing the effect to pathways of NEET for girls, as the effect of having effort decreases the chance of girls being in NEET by 12.6 percentage points, compared to the effect of having cognitive skills at 9 percentage points. Our results are in line with Heckman et al. (2006), who found that noncognitive skills strongly influence schooling decisions, and as important, if not more important than cognitive skills.

As the pathways or decisions to go into further education, employment or being NEET are made simultaneously, we have analysed the decision made by youth using multinomial probit. In the sequential probit, we first look at the different choices of not being in further education and staying in further education, and then we look specifically at NEET allowing for selection into employment versus NEET. Both multinomial probit regression and two-stage probit show significance of noncognitive skills in explaining pathways but does not allow us to examine the variations in pathways from age 16/17 and at age 18/19, as some young people have long-term versus short-term NEET, and the fact that outcomes are measured at a single point in time. We will look at this issue in the next chapter by looking at duration of NEET and how they can get out of NEET. From our second stage results in the two-stage probit, we found that effort gives consistent results when we only look at young people who are excluded from further education, while the effect of locus of control loses its statistical significance when we look at NEET. Some of the implications of our findings in this chapter is that the results give early indication of gender differences in the effect of noncognitive skills to early pathways at age 16/17 and age 18/19, and the gender differences would probably persist in later pathways. We also found that it is important to control the effect of NEET as it would reduce the significance effect of noncognitive skills to educational and labour market outcome, which we will control in Chapter 6.

5 Young people who are Not in Education, Employment or Training (NEET)

5.1 Introduction

In the previous chapter we found significance of noncognitive skills to pathways of NEET, where effort and external locus of control influences the outcome of young people to drop out of further education, and the outcome of NEET. This chapter builds on our existing results by exploring the effect of noncognitive skills in explaining variations of the duration of NEET in the UK. We use the same two measures of noncognitive skills as we did in the previous chapter, which are external locus of control and effort. Our outcome the duration of NEET is a short-term outcome, as there may be lots of transitions in and out of NEET status for those who are ever NEET at age 16 to age 18 (Sullivan and Urwin, 2011). We have looked at NEET whilst most have looked at unemployment. This is because Furlong (2006) discuss concern with youth unemployment has been replaced with a focus on those in NEET, as NEET can be used as a concept for representing problematic transitions in the UK. NEET may capture those who are essentially unemployed who are not captured by the unemployment definition, which is individual who does not have a job, has looked for a job in the last 2 weeks and is able to start within the next 4 weeks. In addition, we are also driven by the data Next Steps as it is not possible to separate unemployment and inactivity as the information is combined as "NEET" in the monthly activity. Hence, it is not possible to test on unemployment, nevertheless it is not a major concern as our descriptive statistics that categorised NEET by waves in Section 4.3.1 shows most (86%) of young people in NEET are unemployed, and we expect results to be similar if we were able to focus on just those who are unemployed.

Our research question is: how do noncognitive skills effect the duration of NEET? The importance of looking at the duration of NEET is because being NEET may damage young people for life, as unemployed and inactive youth may suffer from scarring effects i.e. an individual will have lower confidence and may settle for lower occupation and lower wages, and is more likely to be unemployed and welfare-dependent later in life (Acevo, 2012; Ellwood, 1982; Gregg and Tominey, 2005), which we look at in Chapter 6. Additionally, youth unemployment and inactivity are often associated with social issues (e.g. drug addiction

problem, teen pregnancy, increasing crime rate, suicide and death rates), monetary cost, and potential waste of resources (Acevo, 2012). The characteristics of NEET is strongly linked to parents' social class, however, the likelihood of being NEET is predicted by prior academic attainment, bullying at school, exclusion and absenteeism, low attainment, special education needs, parental education, and low level or lack of parental support (Gracey and Kelly (2010); Maguire (2013)).

This chapter is different from Mendolia and Walker (2015) and Lyons-Amos and Schoon (2017) as we focus on transitions from compulsory schooling to further education, labour market and the probability of being NEET and uses pre-determined noncognitive skills from wave 2. We contribute to the literature by looking at the impact of non-cognitive skills to the duration of NEET. Our hypothesis is based on the reasons to leave unemployment which is the 'heterogeneity effect' or 'frailty' as described by Jenkins (2005, pp.86). Bosworth (1996) described that the longer someone has been without work the harder it becomes to find a job i.e. the probability of finding employment declines with duration of unemployment. This is because: (i) the 'heterogeneity effect' arises from the fact that individuals who enter unemployment vary in their skills, abilities, aptitude, etc., and those with the 'most desirable' qualities will leave unemployment first, (ii) the 'duration dependence effect', where the length of unemployment may itself affect re-employment probability. Pure duration dependence effects, however, become intertwined with unobserved heterogeneity. This is partly caused by demand-side factors, for example, duration of unemployment is used as a screening device by employers; partly on the supply side, as individuals' search activity falls with the duration of the search, and partly by a mixture of both, for example, skills deteriorate when they are not used Bosworth (1996).

Our hypothesis is young people in NEET who have higher values on the scale of noncognitive skills will affect the duration of NEET compared to young people who have lower values of noncognitive skills. For example, we want to see if those with a more internal locus of control are more likely to exit NEET or those with higher "effort". The observations underpin our hypothesis is that non-cognitive skills are part of the unobserved heterogeneity or omitted variables and controlling for these may reduce unobserved heterogeneity. The remaining NEETs that have low values of non-cognitive skills will have longer NEET duration. Noncognitive skills are important in this sense as without considering noncognitive skills as

unobserved heterogeneity, the estimates that we get is inefficient as there are omitted variables. For example, if we use only cognitive skills to look at duration of NEET, we will overestimate the effect of cognitive skills on duration of NEET, as the effect of noncognitive skills are unobserved.

Our analysis proceeds in two stages. The first stage presents the duration of NEET analysis where we observe when the young people exit NEET. The second part of the analysis uses a competing risk framework to look at the non-cognitive skills by considering the exit options, which is the exit to further education and compare it with other exits from duration in NEET. The chapter is organized as follows. Section 5.2 presents the literature review on the duration of NEET. Section 5.3 describes the methodology on the survival or duration analysis to look at the duration of NEET. Section 5.4 presents the descriptive statistics on the young people in the Next Steps and their pathways after compulsory schooling. Section 5.5 develops and tests a model of duration in NEET using survival or duration analysis and look at the difference in short-term or long-term duration, and the difference between boys and girls. Section 5.6 concludes and discuss policy implications. The appendices provide the full result tables and robustness checks.

5.2 Literature Review

Duration of NEET is the basis for this chapter, however, as there is an abundance of literature on unemployment and very few literatures on the duration of NEET, we will be looking at the literature of unemployment instead.

Past studies (Lancaster, 1979; Lynch, 1985; Machin and Manning, 1999; Kroft 2013) have looked at duration of unemployment, as unemployed people who have soft skills or non-cognitive skills leave unemployment first, and for the young people who are still unemployed, these skills deteriorate when not in use. The longer young people stay in unemployment, the more this skill will deteriorate, and this leads to ‘duration dependence effect’ in the job search model. Stigler (1961) and McCall (1960) have originally discussed on job search model, and some literature has looked at the search cost of unemployment (Smith et al.,1999). Search cost discussed in the literature mainly covers only financial cost and time (Stigler, 1961), however, search cost also consists of mental cost as being unemployed can cause mental strain as

discussed by Hemmerstrom and Janlert (1997). We highlight some pieces of evidence that inform our research design. Hemmerstrom and Janlert (1997) found a difference in gender when looking at job search cost as respondents who are unemployed girls suffer from loss of self-confidence, loss of openness, lack of sleep, worrying excessively, and increase in stress, while unemployed boys seem to drink alcohol more and have suicidal thoughts. All of these search cost can cause deterioration of non-cognitive skills as it leads to loss of locus of control. As non-cognitive skills deteriorate when young people are in NEET, we will look at non-cognitive skills of young people before they are in NEET, and see if there is any difference in gender. Lindquist and Westman (2010) using Sweedish data from young male enlistment found that men with high noncognitive ability experience shorter spells, while cognitive ability has no statistically significant effect on the duration of unemployment, where the duration of unemployment is set as one year if annual earnings in 2005 that preceeded unemployment is above unemployment benefit for men who received unemployment support in 2006. Another study in German by Ulsa and Pohlmeier (2011) found that noncognitive skills that the personality traits Conscientiousness and Neuroticism have a strong impact on the probability of employment, but no impact on the duration of unemployment.

The definitions of duration of unemployment differs in past studies, for example Machin and Manning (1999) look at long-term unemployment in European countries and have two definitions of long-term unemployment to be a duration of unemployment of (i) more than 6 months and (ii) more than 12 months. We then provide evidence that non-cognitive skills are significant in looking at the duration of NEET, using the conditional duration distributions that uses single spell data, as discussed by Heckman and Singer (1984, pg 67). The conditional duration distribution is similar with competing risk framework, where we have multi-state outcome, and the outcomes compete with each other because only one of the outcome had to happen first as described by Cleves et al. (2010, pg. 365). The application of competing risk model can be observed in Arranz et al. (2010), where he has used the competing risk model to look at labour market transitions on Spanish longitudinal data 1992-2004. The authors were looking at transitions from newly unemployed to exiting unemployment where four different outcomes is permanent job, temporary job, self-employment or inactivity. The motivation for the authors to look at competing risk framework is because there are a lot of options to exit unemployment, and there are different determinants for each exit. The authors argue that

exiting unemployment does not necessarily equal to find a job, an unemployed person may be exiting into self-employment or out of the labour force.

The social consequences of unemployment depend very much on the duration of unemployment spells. While most spells are less than 9 months, most of the days lost are the result of a relatively small number of long spells, and long-term unemployment remains an important problem in many countries (Acevo, 2012, p.57)[12]. The duration of unemployment is usually estimated using longitudinal data, which are usually in the form of cohort data set although there are not many cohort datasets available. Example of cohort dataset is a sample of individuals who enter unemployment during a month or reach the minimum school-leaving age during a year. These individuals are then followed up at successive points in time to collect information about their work histories, including their unemployment and employment experiences. As some individuals move out of unemployment during the period cover by the survey, cohort data can provide the information about the complete duration of unemployment and we can calculate hazard rate i.e. the probability of leaving unemployment for individuals in different duration categories, conditional on non-cognitive skills and other variables such as age, qualifications, family commitments, etc.

In this literature review, we also look at some empirical studies that discuss the unemployment duration. Some of the studies discussed do not use the same variables of interest as our study but use the same methodology which is duration analysis. For example, Carling et al. (1996) examine transitions out of unemployment using data on unemployed individuals in Sweden by looking at the expiration of unemployment insurance benefits. The maximum period of unemployment in the dataset is 60 months, and this study also found that young people exit unemployment at a higher rate compared to older people. This means that younger people may have more noncognitive skills to exit unemployment compared to older people. There is also some gender difference observed where women exit at a higher rate compared to male. Meanwhile, Kettunen (1997) studies the relationship between the level of education and the probability of reemployment, using the Weibull models of unemployment duration to look at

[12] If a young person is NEET for 6 months and claims Job Seeker Allowance for 3 months, the young person will be referred to a welfare-to-work system called the Work Programme.

Finnish microeconomic data on unemployed workers. The author confirms the search theoretical models which predict that on the lowest levels, additional education increases the probability of re-employment, but on the highest levels, the relationship turns negative. It is shown that unemployed persons who have about the lowest level of education at 13-14 years of education have the highest re-employment probability. They observe that the unemployment rate decreases as the level of education increases, however those who are unemployed at higher levels of education are mostly in long-term unemployment.

Some of the studies have used the same dataset as what we are using for analysis, which is the Next Steps, but has not used the duration analysis. The studies below have warned caution when interpreting their results as causal evidence as all the studies mentioned are not experimental studies. Mendolia and Walker (2015) uses data on the yearly observations of activity and used treatment effects and probit and found that individuals that display low effort and external locus of control are estimated to be more likely to be NEET. The authors also found that the size of the relationship is higher than the parental background of education, employment or whether they are living with both or a single parent. Meanwhile, Schoon and Lyons-Amos (2017) have also used the monthly activity data from the Next Steps and used stepwise Ordinary Least Squares and cluster analysis, and found one in 10 young people have long-term experience of NEET because of deprivation of socioeconomic conditions and resources. Our study provides similar evidence except that we found non-cognitive skills can help young people to get out of the long-term experience of NEET.

5.3 Method

Survival analysis or duration analysis is used to model transitions between states or length of time in states. Duration analysis is the best approach for our purpose as we are interested to look at the continuous importance of noncognitive skills to transitions from NEET to further education or employment, or duration of NEET. This is the most suitable approach as past studies suggest faster exit for unemployed people who have higher values of non-cognitive (Lancaster, 1979; Lynch, 1985; Machin and Manning, 1999; Kroft 2013). In the field of economics, survival or duration analysis is commonly used to study the period of unemployment (Bosworth, 1996). Hence, this chapter will utilize the duration analysis or

survival analysis to study duration of NEET duration, where we are interested in transitions between states. There are two possible outcomes of this analysis, first is the length of time in states, i.e. duration of NEET. Second is the probability of leaving NEET. In our case, an individual who exit NEET enters another state which is either education or employed. We will be using these outcomes to see the possible causes of an individual exiting NEET state and if noncognitive skills are important in increasing the probability of leaving NEET.

Jenkins (2005, p. 81) discussed unobserved individual effects or unobserved heterogeneity as the differences between individuals that were assumed not to be captured using observed explanatory variables, or the X vector. The author elaborated on the importance of unobserved heterogeneity, such as the problem of omitted variable and measurement errors. In this study, we are focusing on the problem of omitted variables, for example 'ability' as it is usually intrinsically unobservable in the available data. In our case, we try to measure 'ability' by non-cognitive skills and cognitive skills, as Cunha et al. (2010, p.887) measure adult outcome as a function of cognitive and noncognitive skills. By reducing the unobserved heterogeneity in the model estimation, the author explained that: (1) the estimated results will overestimate the degree of negative duration dependence, in our case, the NEET duration; (2) the proportionate response of the hazard rate to a change in a regressor or the independent variable is no longer constant but declines with time; and (3) the true proportionate response of the hazard to a change in a regressor is under-estimated.

Jenkins (2005, pp.86) elaborated that the hazard rate from a model which exclude unobserved heterogeneity or characteristics increases less fast or falls faster than the true hazard model. Controlling for observable differences, people with unobservable heterogeneity associated with higher exit rates, thus leaving the state more quickly than the others. Hence, those who remain in the state are people with little or no unobserved heterogeneity and are associated with lower hazard rates, and the estimates of the hazard rate is underestimated compared to the true one. In this study, we are interested to see do people with non-cognitive skills have higher exit rates and leave NEET more quickly than the others.

There are four key concepts for survival analysis described by Jenkins (2016) which are states, events, risk period and duration or time. States are described as categories of the outcome variables of interest. Each unit occupies exactly one state at any moment in time. In this study,

we observe an individual or a young person occupying NEET as a state. The other states are being in further education or being in employment. Meanwhile, an event is described as a transition from one state of origin to another or destination state. In our analysis, an event is from NEET to not NEET. A risk period is described as a time spent in two states. At any given time, not all individuals will be in the origin state. In our case, at a given time where we start observing the young people, which is in September 2006, not all young people are NEET. The last concept in survival which is time since onset of risk which is time spent to find a job or to further study since becoming NEET. Unfortunately, as mentioned we are only able to look at NEET as the monthly activities information collected from Next Steps is only available with the combination of unemployment and inactivity (NEET).

Our dependent variable or study time is in the form of time to event data, which we observe young people from the time start of NEET till the time that young people get out of NEET. The time to event data can be described as when we have a set of finite and discrete states and we observe individuals in one state, and we observe transitions between states. We are interested to observe the time until a transition takes place. Hence, we observe the survival in NEET. The dependent variable can be described as the time since onset of risks. Thus, the duration of NEET is the time or the months of the young people in NEET spend to get out of NEET by finding a job or pursuing further study. However, it is tricky to observe the event or "failure time" that a young person gets out of NEET, because after being out of NEET for some time, he or she may be in NEET again. As such, in the dataset, we can observe some of the individuals have multiple spells of NEET, as some individuals go in and out of NEET.

In this analysis the duration of NEET at any point of time between September 2006 and May 2010 at age 16/17 to age 19/20. Within these 45 months, some young people will have single or multiple spells of NEET. In May 2010, some may not have exited NEET and hence censored observations. The observations are "censored" if the young person has never left NEET because we can only look at if the young person has exit NEET or "failure", or still in NEET or "success" in the time frame given. We will observe characteristics at the time they are first NEET and examine the duration based on these characteristics.

5.3.1 Outcome variable

The outcome variable is a continuous variable, which are discrete but measured at high frequency measuring the total months of NEET. We have look at a few different outcomes in this chapter. In the Next Steps, there are some young people who experienced short spells of NEET and long spells of NEET. First, we include all observations of all spells of NEET. Second, we look at short duration of NEET which are observations of NEET for 6 months and less, as Longhi and Taylor (2010, pg.470) has also look at unemployment or inactivity spells lasting 3 to 12 months. It is appropriate for our situation to look at less than 6 months of NEET as short-term because in the data Next Steps about half (44%) of young people in single spells of NEET have less than 6 months of NEET. The purpose for this is because if someone is waiting for a job or NEET between education and starting work, they are not included in the longer spells. Lastly, we look at long duration of NEET or 'core NEET' which is NEET for more than 6 months discussed in Machin and Manning (1998) and Britton et al. (2011), as 6 months of unemployment is the measures of the incidence of long-term unemployment most commonly used.

We then merge the outcome variable with yearly observations of the independent variables from earlier waves so that we have panel data in monthly format. [13] The independent variables are as described below. Some of the respondents have missing data on activity. We excluded respondent with missing data on activity data and other control variables.

Our sample sizes of young people with more than 6 months of NEET in single spell is 1,858 young people. The research question that we are asking is: Are non-cognitive skills important for young people to exit NEET?

The equation that we estimate for duration of NEET for all young people:

$$DNEET_i = \beta_0 + \beta_1 NONCOGN_i + \beta_2 COGN_i + X_i'\gamma + u_i \quad (5.1)$$

[13] The way we have arranged the dataset is according to Cox (2007) where we have spells in panel data and we mark the start of each spell in Stata with indicator variables and tagging spells with integer codes with the by: prefix.

where $DNEET_i$ is the duration of a young person in NEET at age 16/17 to 19/20 reported by individual i at time t, $NONCOGN_i$ is non-cognitive skills, X_i' is a vector of individual and other characteristics affecting adult outcomes, and u_{it} is the error term. We are using the duration analysis to answer our research question.

5.3.2 Variables of interest

The variables of interest are noncognitive skills in adolescence of young people, namely external locus of control and effort, which are described in Chapter 3. The questions used for the variables of interest are similar to Chapter 4, which are from wave 2 when young people are age 14/15.

5.3.3 Other explanatory variables

Most of the independent variables or covariates are measured in wave 2 when the young people are age 13/14 or 14/15. The covariates are only measured once thus it does not vary over time. All the variables we control for are pre-determined variables as discussed in Chapter 3 measured at age 13 to age 15 and not influenced by noncognitive skills when the young people already entered NEET at age 16/17 to 19/20. We control for personal characteristics at age 14/15 such as lived in owned house, gross household income, white, eligible for free school meals, parents managerial or professional occupations, live with single parents, mother work and government region living areas. Lastly, we also control for the young people's cognitive skills of getting 5 GCSE passes (A* to C), as young people at age 16/17 with this result gets higher chances to go to further education after compulsory schooling.

5.3.4 Duration analysis

Cleves et al. (2010) discussed duration analysis as the equations below as follows. Let T denote the duration or length of time, spell, the individual remains in the initial state i.e. NEET. F(t) is the probability of leaving NEET while t is time. The cumulative distribution function of F(t) is:

$$F(t) = P(T \leq t) = \int_0^t f(t)\, dt \tag{5.2}$$

In our study, the probability function (P(T)) is looking at whether an individual is successful to get out of the state of NEET before or on May 2010 (t). Equation (**5.2**) is the probability of exiting before or at time t. The survival function, S(t) measures the probability of surviving past time t i.e. the time since entry to the state at t=0.

$$S(t) = 1 - F(t) = P(T > t) \tag{5.3}$$

We are observing the characteristics at the time prior to age 16/17 i.e. control variables when they were in school as mentioned in Section 5.3.3.

The shape of the distribution or hazard specification often matters when duration analysis is estimated. In this study, we have estimated the Cox model as the Cox model has a more relaxed assumption on the shape of distribution, although we did estimate the Weibull model in the preliminary analysis. The result does not vary much between Weibull and Cox model, and the sensitivity analysis to test for validity of Cox model is presented in Appendix 12. In the duration analysis, we will discuss the hazard rate. Cleves et al. (2010) have also described the Cox proportional hazards regression model (Cox, 1972) hazard rate for the *j*th subject of the data to be:

$$h(t|x_j) = h_0(t)\exp(x_j\beta_x) \tag{5.4}$$

Where $h(t|x_j)$ is the hazard, β_x are the regression coefficient estimated from the dataset, and $h_0(t)$ is the baseline hazard, where all covariates equal to zero.

5.3.5 Competing risk framework

In competing risk framework, we have multiple options or exit. In this case, young people who are NEET can exit NEET by going to further education, employment, or government training/apprenticeship. Thus, instead of looking at one hazard function, we are looking at the subhazards function for failure. Cleves et al. (2010) has described the subhazards function for failure cause *i* at time t as:

$$\bar{h}_i(t) = \lim_{\Delta t \to 0} \frac{P\{t \leq T < t + \Delta t, failure\ from\ cause\ i \mid T > t\ or\ (T \leq t\ and\ not\ cause\ i)\}}{\Delta t} \quad (5.5)$$

In the second part of the analysis, we have two causes of exit from NEET, young people going to further education (cause 1) and employment or government training (cause 2); the risks of these events are represented by $h_1(t)$ and $h_2(t)$, respectively. The standard methodology of survival analysis estimates $h_1(t)$ by treating events from cause 2 as censorings. However, Cleves (2010, pg 382) described equation (**5.5**) as the subhazard for cause i, which is the instantaneous probability of failure from cause i at time t given either (i) no failure before t; or (ii) failure from another cause before t. This means that this hazard generates failure events of cause i but does not remove subjects from the sample when competing events occur.

This subhazards function is similar to the conditional hazard defined by Heckman and Springer (1984, pg. 67). Cleves et al. (2010) further explains that the interpretation of the subhazard function is directly related to the cumulative incidence functions for a particular cause *i*. To estimate the subhzards function, we are using a model from Fine and Gray (1999) which is:

$$\bar{h}(t|x) = \bar{h}_{i,0}(t)\exp(x\beta) \quad (5.6)$$

Where x is a covariate vector and $\bar{h}_{i,0}(t)$ is the baseline subhazard function. The estimation of this model can be done where β the exponentiated coefficients or the subhazard ratios is produced. A positive coefficient means that the effect of increasing that covariate is to increase subhazard, while a negative coefficient will decrease the subhazard (Cleves et al., 2010). In the second part of our analysis, we will estimate the competing risk model to further explain the result by looking at different choices of young people to exit NEET to further education, employment or training.

We have estimated duration analysis using two models, which are: (i) the standard Cox model and (ii) the competing risk framework Cox model. The first part of our analysis is the standard Cox model, where there is only one "failure", which is to exit NEET. Discussion on duration

analysis is often centred on the exponential of the coefficient, which is the hazard ratio. This hazard ratio is simply the exponentiated individual coefficients, and the interpretation of the ratio of the hazard is a 1-unit change in the independent variable (Cleves et al., 2010, pg 131). The second part of our analysis presents the competing risks framework using the Cox model, because we want to see is there any difference of exiting NEET into multiple exit options, which are: (i) further education, (ii) employment or (iii) government apprenticeship/training. Further education in these models is young people who are in full-time education, while employment is young people who are working full-time, and government apprenticeship/training is young people in government apprenticeship or in vocational training. However, we can only look at 2 competing events at a time, as this is the assumption of the competing risk framework as described by Cleves et al. (2010, pg 365). We will look at the subhazard rate of non-cognitive skills for young people to exit NEET to further education as the first exit and compare the event of finding employment with the event of exiting into government training/apprenticeship is treated as censored. We will then again use the event of being in further education as the first exit, and this time we will compare the event of exiting into government training/apprenticeship and treat the event of finding employment as censored. This is because at age 16/17 until age 19/20, majority of young people are in further education than employment or government training/apprenticeship. At this age, young people usually have insecure jobs (Furlong, 2006, pg 567), and any form of government training/apprenticeship is usually for short-term duration of up to 1 year, as opposed to further education as it is longer-term.

5.4 Descriptive statistics

5.4.1 Duration of NEET

Figure 5-1 describe the distribution the frequency of observations in NEET and the duration of NEET in months. As mentioned, almost half (44%) spells of NEET are from 1 to 6 months, and 46% of NEET are from more than 6 months to 2 years of NEET. We can also observe from this figure that there are very few young people in NEET (134 young people) for more than 2 years.

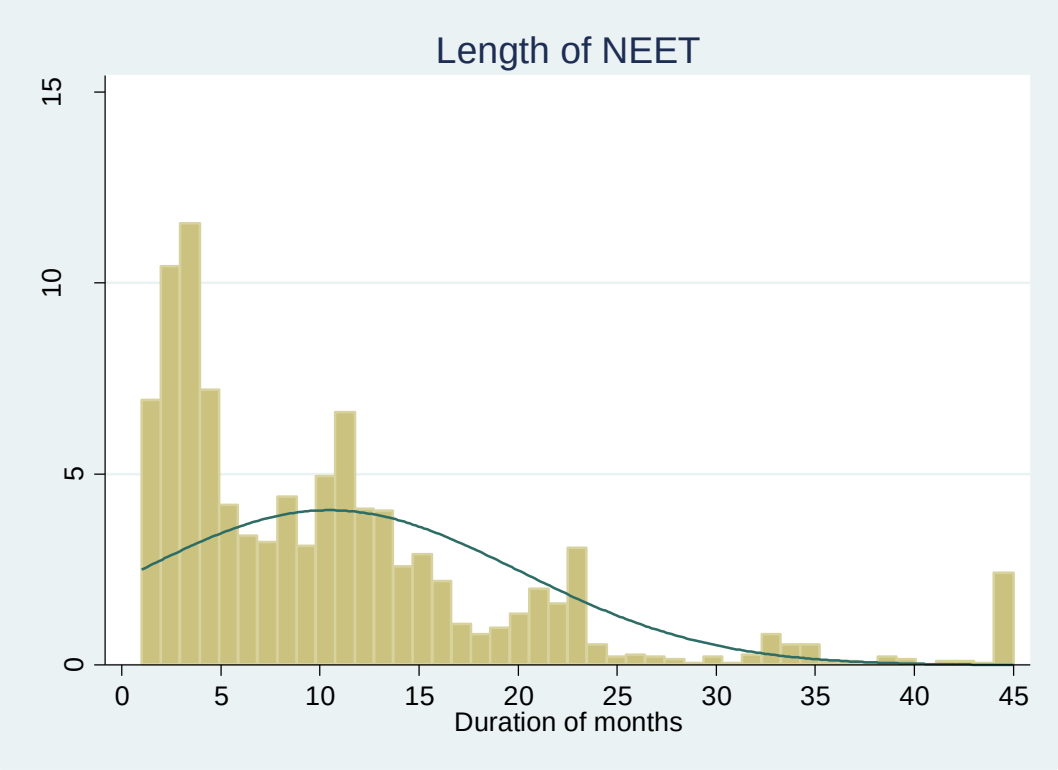


Figure 5-1: Length of NEET for all spells

Table 5.1 shows that there are 30% of young people who are in single and multiple spells of NEET (2,487 young people who are NEET divide by 8,266 young people that has monthly observations). We decided to look at young people who have only one spell of NEET, rather than using the first or longest spell for those with multiple spells. The consequences of dropping multiple spells altogether and not using their first spell is not serious, as we have only 45 months observation period, and majority of young people in NEET (74.7%[14]) have single spell of NEET. Our data for 45-month observation period in England is similar with Carcillo et al (2015) who looked at longitudinal data for young people aged 16 to 20 years old in European countries also found that most NEETs only have a single spell during the 48-month observation period. We also think that it is fairer to compare a young person who has a single spell of NEET with another young person who has a single spell of NEET, as opposed to comparing one young person who have a single spell of NEET with another young person who have multiple spells of NEET. In addition, multiple spells might be viewed as short-term as Akerlof and Main (1980) found that the average length of single spells of unemployment is longer than the

[14] 1,858 young people who have single spells of NEET divide by 2,487 young people with one to five spells in NEET.

average of multiple spells. In our data, the average length of single spell is 10.5 months, while the average length of multiple spells is 7.1 months. Our sample sizes are 1,858 young people with single spell of NEET, where 934 are boys and 904 are girls.

Next, we look at the distribution of young people who have single spell of more than 6 months of NEET. There are 11.4%[15] of all young people with activity data have a spell of more than 6 months of NEET, which is similar if we compare our result with NEET in Europe as Carcillo et al. (2015) found there are only 12% of all youth have a spell that lasts longer than 6 months. Our study is also similar with Carcillo et al. (2015) as the calculations in both studies have short observation period and the ending of most spell are not observed. In our data, at the end of 45-month observation period, there are 612 young people with single spell of NEET who have not exited NEET.

Table 5.1: List of young people in single spells and multiple spells of NEET

No. of spells	All	6 months and less	More than 6 months
1	1,858	813	1,045
Multiple spells	629	343	286
Total no. of young people in NEET	2,487	1,156	1,331

[15] 1,540 young people who have more than 6 months in NEET divide by 13,539 youth in the dataset.

5.5 Results and Discussions

5.5.1 Duration analysis of young people in NEET

The discussion has two sections[16]. In the first section, we will discuss about all young people. In the second section, we compare boys and girls. This is because we want to look if there is a difference in non-cognitive skills that matters more to boys or to girls, as there may be gender differences in noncognitive skills, as girls also tend to have different labour market outcomes and less likely to participate in the labour market discussed in our literature on gender differences in Section 2.6.4.

5.5.1.1 All young people in NEET duration

Table 5.2 shows the hazard and subhazard ratios from the duration analysis of all young people exiting NEET at age 16/17 to 19/20. The detailed results can be found in Appendix 3, Appendix 4, and Appendix 5 where we list the full control variables included in the estimation. The analysis is based on 853 young people in NEET at age 16/17 to age 19/20 for 45 months from September 2006 to May 2010. There are 596 young people manage to be out of NEET at May 2010, where 253 young people exit to further education, 305 young people exit to employment, and 38 young people exit to government training.

The results show that noncognitive skills which are external locus of control and effort are statistically significant in explaining duration of NEET. External locus of control shows to be more significant in explaining duration of NEET compared to effort. Our results are consistent with the previous chapter as in Chapter 4, where we know that those with lower noncognitive skills are more likely to be NEET from our earlier analysis. Column 1 shows that compared to young people who do not have external locus of control at age 14/15, young people with external locus of control at age 14/15 have significantly lower chances of getting out of NEET in all spells. The result is significant for young people in longer term NEET at more than 6 months. Column 2 and column 3 shows that compared to young people who do not have

[16] Young people who have children are excluded from the analysis as they are unlikely to exit NEET. Only 10 boys who has children and living with them. For girls, there are 97 girls in all spells of NEET who have children and living with them, however, after considering all the responses to other covariates we ended up with 47 observations, which is insufficient to present a good analysis.

external locus of control at age 14/15, young people with external locus of control at age 14/15 have significantly lower chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells. Meanwhile, Column 2 and column 3 shows that compared to young people who do not have effort at age 14/15, young people who have effort at age 14/15 have significantly higher chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells. These results are expected as young people with external locus of control are less likely to exit NEET by 8.6 percentage points, and young people with effort are more likely to exit NEET into further education at 12.4%. The results are consistent with past literature as Mendolia and Walker (2015, p.13) found external locus of control explain 4.7 percentage points, and effort explain 8.5% to number of years in NEET (information from yearly activity) in their ordinary least squares regression using the same dataset Next Steps, however, we use information from monthly activity for our outcome and different measurement for external locus of control and effort.

Column 1 also shows that compared to young people who have less than 5 GCSEs A*-C at age 15/16, young people with more than 5 GCSEs A*-C at age 15/16 have significantly higher chances of getting out of NEET in all spells. The result is significant for young people in longer term NEET at more than 6 months. Column 2 and column 3 shows that compared to young people who have less than 5 GCSEs A*-C at age 15/16, young people with more than 5 GCSEs A*-C at age 15/16 have significantly higher chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells, in less than or more than 6 months of NEET. Column 2 and column 3 also shows that the size of the subhazard ratios increase when we specify the exit to further education, indicating more importance of cognitive skills to exit in further education. This result is consistent with results in Chapter 4, as cognitive skills are more important compared to noncognitive skills in explaining further education.

Column 2 and 3 also shows that compared to young people who do not have parents with managerial or professional occupations at age 14/15, young people with parents with managerial or professional background is significantly more likely to get out of more than 6 months of NEET to further education compared to exiting NEET to employment or government.

Table 5.2: Panel A: Survival or duration analysis using Cox distribution for all young people

All young people in NEET at age 16/17 to 19/20	Hazard ratio from standard Cox model (1)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to employment (2)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to government training/apprenticeship (3)		
	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months
External locus of control at age 14/15	0.939 **	0.972	0.939	0.922*	0.917	0.959	0.933*	0.946	0.963
	[0.027]	[0.039]	[0.041]	[0.040]	[0.055]	[0.075]	[0.039]	[0.055]	[0.075]
Effort at age 14/15	0.994	0.985	0.973	1.147***	1.119*	1.137*	1.133**	1.092	1.134
	[0.031]	[0.039]	[0.048]	[0.056]	[0.065]	[0.088]	[0.057]	[0.060]	[0.092]
Key stage 2 scores English at age 14/15	1.006	1.002	1.011	1.013	1.006	1.015	1.104*	1.006	1.018
	[0.005]	[0.006]	[0.008]	[0.008]	[0.010]	[0.012]	[0.008]	[0.009]	[0.009]
Key stage 2 scores Maths at age 14/15	1.006*	0.999	1.003	1.016***	1.013**	1.016*	1.016***	1.009	1.014
	[0.003]	[0.004]	[0.005]	[0.005]	[0.006]	[0.008]	[0.005]	[0.006]	[0.009]
Parents have bachelor's degree at age 14/1/5	0.931**	1.215	1.848	0.809	0.864	0.931	0.797	0.862	0.959
	[0.128]	[0.245]	[0.171]	[0.168]	[0.228]	[0.315]	[0.164]	[0.225]	[0.320]
Parents managerial or prof. occupations at age 14/15	1.370	1.090	1.223	1.341*	1.296	1.454	1.376**	1.265	1.489
	[0.122]	[0.155]	[0.213]	[0.218]	[0.267]	[0.433]	[0.224]	[0.256]	[0.440]
Chi square	72.5***	11.7	38.7***	153.3***	74.4***	95.8***	149.6***	65.6***	102.1***
No. of observations	823	382	441	823	382	441	853	382	441
No. of young people who got out of NEET	578	331	247						
To further education				244	149	95			
To employment				296	161	135			
To government training							38	21	17

Note: *** denotes 1% level of significance, ** denotes 5% level of significance, and *** denotes 1% level of significance. All figures in parentheses is standard errors. The full table can be found in the **Appendix 3**, **Appendix 4**, and **Appendix 5**. The other covariates are live in owned house, income levels, white, parents' highest educational qualification, live with both parents, mother work, and government regions.

Panel B: Survival or duration analysis using Cox distribution for all young people with additional control variable GCSEs

All young people in NEET at age 16/17 to 19/20	Hazard ratio from standard Cox model (1)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to employment (2)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to government training/apprenticeship (3)		
	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months
External locus of control at age 14/15	0.941 **	0.980	0.942	0.922*	0.928	0.959	0.934	0.950	0.965
	[0.027]	[0.039]	[0.041]	[0.040]	[0.055]	[0.075]	[0.039]	[0.057]	[0.075]
Effort at age 14/15	0.989	0.981	0.975	1.124**	1.074	1.141*	1.122**	1.058	1.140
	[0.031]	[0.039]	[0.048]	[0.055]	[0.060]	[0.089]	[0.057]	[0.057]	[0.095]
More than 5 A* to C in GCSEs	1.252*	1.143	1.178	1.816***	1.958***	1.416	1.812***	1.775**	1.459
	[0.148]	[0.179]	[0.221]	[0.334]	[0.464]	[0.455]	[0.347]	[0.426]	[0.498]
Key stage 2 scores English at age 14/15	1.004	1.002	1.009	1.007	1.000	1.012	1.009	1.001	1.015
	[0.005]	[0.006]	[0.008]	[0.008]	[0.010]	[0.012]	[0.008]	[0.009]	[0.013]
Key stage 2 scores Maths at age 14/15	1.004	0.998	1.001	1.011**	1.006	1.013	1.010**	1.004	1.011
	[0.003]	[0.004]	[0.005]	[0.005]	[0.006]	[0.009]	[0.005]	[0.006]	[0.009]
Parents have bachelor's degree at age 14/1/5	1.025	1.016	1.135	1.508***	1.711***	1.283	1.456**	1.605**	1.270
	[0.115]	[0.149]	[0.205]	[0.237]	[0.313]	[0.291]	[0.235]	[0.294]	[0.349]
Parents managerial or prof. occupations at age 14/15	1.113	1.103	1.154	1.095	1.001	1.272	1.124	0.976	1.330
	[0.128]	[0.165]	[0.215]	[0.195]	[0.218]	[0.417]	[0.203]	[0.211]	[0.432]
Chi square	75.5***	11.5	38.5***	166.5***	78.0***	114.5***	160.4***	67.5***	106.7***
No. of observations	823	382	441	823	382	441	853	382	441
No. of young people who got out of NEET	578	331	247						
To further education				244	149	95			
To employment				296	161	135			
To government training							38	21	17

5.5.1.2 Boys and girls in NEET duration

Table 5.3 shows the hazard and subhazard ratios from the duration analysis of boys exiting NEET at age post-16. The detailed results can be found in Appendix 6, Appendix 7, and Appendix 8 where we list the full control variables included in the estimation. The analysis is based on 450 boys in NEET at age 16/17 to age 19/20 for 45 months from September 2006 to May 2010. There are 324 boys manage to be out of NEET in May 2010, where 140 boys exit to further education, 159 boys exit to employment, and 25 boys exit to government training.

Table **5.4** shows the hazard and subhazard ratios from the duration analysis of girls exiting NEET at age post-16. The detailed results can be found in Appendix 9, Appendix 10, and Appendix 11 where we list the full control variables included in the estimation. The analysis is based on 403 girls in NEET at age 16/17 to age 19/20 for 45 months from September 2006 to May 2010. There are 272 girls manage to be out of NEET in May 2010, where 113 girls exit to further education, 146 girls exit to employment, and 13 girls exit to government training.

We found that only external locus of control is significant in explaining duration of NEET for boys in Table 5.3. Column 1 shows that compared to boys who do not have external locus of control at age 14/15, boys with external locus of control at age 14/15 have significantly lower chances of getting out of NEET in all spells. The result is significant for boys in longer term NEET at more than 6 months. Column 2 and column 3 show that compared to boys who do not have external locus of control at age 14/15, boys with external locus of control at age 14/15 have significantly lower chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells. The result is also significant for boys in longer term NEET at more than 6 months. Our results are in line with Lindqvist and Vestman (2011) who found men aged 32-41 who have longer unemployment lack noncognitive rather than cognitive ability[17]. Although our age group is much younger at 16/17 to age 19/20, we found that the results hold for younger individuals.

[17] Lindqvist and Vestman (2011) found men age 32-41 with high noncognitive skills, experience shorter spells as 1 standard deviation increase in noncognitive skill decreases expected unemployment duration by 10 days using Swedish enlistment data. In their study, the measurement of noncognitive skills is different than our study, as they use a personal interview conducted by a psychologist for noncognitive skills, and data on total unemployment benefits and earnings in previous years to construct the duration of unemployment.

For girls, the result for noncognitive skills are significant, as both external locus of control and effort is significant in explaining duration of NEET, but only if the exit is further education. Our results are in line with Chapter 4, where effort is more significant in explaining pathway to further education. Column 2 and column 3 in Table 5.4 show that compared to girls who do not have external locus of control at age 14/15, girls with external locus of control at age 14/15 have significantly lower chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells. Meanwhile, Column 2 and column 3 show that compared to girls who do not have effort at age 14/15, girls who have effort at age 14/15 have significantly higher chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells.

Our results of the significant of external locus of control and duration of NEET can be linked to Caliendo et al. (2015) who found for the average unemployed worker with an internal locus of control, unemployment durations are around 0.5 months shorter compared to the same individual with an external locus of control using individuals age 16-54 years old from Germany. The study also found that although those with an internal locus of control may search more intensively, but they also set higher reservation wages.

Column 1 in Table 5.3 also shows that compared to boys who have less than 5 GCSEs A*-C at age 15/16, boys with more than 5 GCSEs A*-C at age 15/16 have significantly higher chances of getting out of NEET in all spells. Column 2 and column 3 show that compared to boys who have less than 5 GCSEs A*-C at age 15/16, boys with more than 5 GCSEs A*-C at age 15/16 have significantly higher chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells, in less than or more than 6 months of NEET. We observe the same results for boys as Column 2 and column 3 also show that the size of the subhazard ratios increase when we specify the exit to further education, indicating more importance of cognitive skills to exit in further education. Our results are different from Lindqvist and Vestman (2011), who found that cognitive ability has no statistically significant effect on the duration of unemployment or the hazard rate of leaving unemployment for men. However, their measurement of cognitive skills is also different than ours, as they use standardized index ranging from 1-9, consists of four different parts (synonyms; inductions; metal folding; and technical comprehension) as a measure of cognitive skills.

Column 1 in Table 5.4 also shows that compared to girls who have less than 5 GCSEs A*-C at age 15/16, girls with more than 5 GCSEs A*-C at age 15/16 have significantly higher chances of getting out of NEET in all spells, and more than 6 months of NEET. Column 2 and column 3 shows that compared to girls who have less than 5 GCSEs A*-C at age 15/16, girls with more than 5 GCSEs A*-C at age 15/16 have significantly higher chances of getting out of NEET to further education compared to exiting NEET to employment or government training in all spells, in less than or more than 6 months of NEET. The results for girls are similar as Column 2 and column 3 also show that the size of the subhazard ratios increase when we specify the exit to further education, indicating more importance of cognitive skills to exit in further education.

Column 1, 2 and 3 in Table 5.4 also shows that compared to girls who do not have parents with managerial or professional occupations at age 14/15, girls who have parents with managerial or professional background is significantly more likely to get out of more than 6 months of NEET to further education compared to exiting NEET to employment or government. The implications of gender difference are important because boys and girls have difference in noncognitive skills as on average girls have higher effort and boys have more external locus of control, and this leads to different effect on the duration of NEET. Our results imply that we treat boys and girls differently by different interventions and policies, as effort and eternal locus of control is statistically significant for girls in NEET to exit to further education, but only external locus of control is statistically significant for boys to exit NEET.

Table 5.3: Panel A: Survival or duration analysis using Cox distribution for boys

Boys in NEET at age 16/17 to 19/20	Hazard ratio from standard Cox model (1)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to employment (2)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to government training/apprenticeship (3)		
	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months
External locus of control at age 14/15	0.885* [0.059]	0.935 [0.093]	0.866** [0.056]	0.908 [0.058]	0.965 [0.091]	0.870 [0.117]	0.896* [0.055]	0.974 [0.084]	0.851 [0.108]
Effort at age 14/15	1.093 [0.079]	1.087 [0.091]	0.973 [0.073]	1.151* [0.085]	1.147* [0.092]	1.140 [0.128]	1.104 [0.082]	1.107 [0.081]	1.138 [0.129]
Key stage 2 scores English at age 14/15	1.018* [0.010]	1.017 [0.014]	0.997 [0.010]	1.022* [0.102]	1.018 [0.013]	1.017 [0.016]	1.017 [0.007]	1.014 [0.013]	1.012 [0.016]
Key stage 2 scores Maths at age 14/15	1.014** [0.007]	1.000 [0.009]	1.008 [0.007]	1.014* [0.008]	1.005 [0.009]	1.022* [0.012]	1.015** [0.007]	1.004 [0.008]	1.023* [0.132]
Parents have bachelor's degree at age 14/1/5	1.238 [0.432]	1.101 [0.524]	1.305 [0.384]	1.103 [0.351]	1.097 [0.437]	1.023 [0.612]	1.162 [0.364]	0.946 [0.345]	1.108 [0.653]
Parents managerial or prof. occupations at age 14/15	1.118 [0.275]	1.375 [0.420]	0.982 [0.255]	1.065 [0.241]	1.174 [0.335]	0.718 [0.309]	1.095 [0.255]	1.298 [0.359]	0.671 [0.288]
Chi square	102.8***	34.8**	25.0	127.8***	56.9***	96.6***	128.2***	55.0***	94.7***
No. of observations	436	210	226	436	210	226	436	210	226
No. of young people who got out of NEET	136	84	131						
To further education				136	84	52			
To employment				155	88	70			
To government training							25	13	12

Note: *** denotes 1% level of significance, ** denotes 5% level of significance, and *** denotes 1% level of significance. All figures in parentheses is standard errors. The full table can be found in the **Appendix 6**, **Appendix 7**, and **Appendix 8**. The other covariates are live in owned house, income levels, white, parents' highest educational qualification, live with both parents, mother work, and government regions.

Panel B: Survival or duration analysis using Cox distribution for boys with added control variables GCSEs

Boys in NEET at age 16/17 to 19/20	Hazard ratio from standard Cox model (1)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to employment (2)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to government training/apprenticeship (3)		
	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months
External locus of control at age 14/15	0.901*	0.948	0.865**	0.915	0.987	0.871	0.897*	0.992	0.848
	[0.038]	[0.058]	[0.056]	[0.058]	[0.097]	[0.118]	[0.056]	[0.093]	[0.109]
Effort at age 14/15	0.971	0.975	0.976	1.136*	1.099	1.147	1.108	1.074	1.149
	[0.043]	[0.053]	[0.074]	[0.085]	[0.084]	[0.135]	[0.082]	[0.078]	[0.136]
More than 5 GCSEs at age 16/17	1.142	1.466*	0.790	1.986***	2.285***	1.313	1.866***	2.060**	1.303
	[0.184]	[0.316]	[0.205]	[0.449]	[0.659]	[0.497]	[0.439]	[0.653]	[0.522]
Key stage 2 scores English at age 14/15	1.001	1.000	0.999	1.016	1.014	1.014	1.012	1.010	1.009
	[0.006]	[0.008]	[0.011]	[0.011]	[0.012]	[0.016]	[0.011]	[0.013]	[0.017]
Key stage 2 scores Maths at age 14/15	1.006	0.992	1.010	1.008	0.995	1.021*	1.011	0.995	1.022*
	[0.004]	[0.006]	[0.007]	[0.007]	[0.009]	[0.012]	[0.007]	[0.009]	[0.013]
Parents have bachelor's degree at age 14/1/5	0.994	0.959	1.036	1.441*	1.577*	1.254	1.388	1.443	1.273
	[0.159]	[0.195]	[0.293]	[0.299]	[0.374]	[0.462]	[0.309]	[0.359]	[0.477]
Parents managerial or prof. occupations at age 14/15	1.210	1.415*	0.976	0.938	0.993	0.647	0.950	1.044	0.614
	[0.196]	[0.290]	[0.283]	[0.232]	[0.299]	[0.332]	[0.247]	[0.306]	[0.318]
Chi square	49.5***	19.6	25.0	124.9***	56.3***	99.5***	122.0***	52.3***	93.9***
No. of observations	436	210	226	436	210	226	436	210	226
No. of young people who got out of NEET	136	84	131						
To further education				136	84	52			
To employment				155	88	70			
To government training							25	13	12

Table 5.4: Panel A: Survival or duration analysis using Cox distribution for girls

Girls in NEET at age 16/17 to 19/20	Hazard ratio from standard Cox model (1)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to employment (2)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to government training/apprenticeship (3)		
	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months
External locus of control at age 14/15	0.957	0.998	0.972	0.888*	0.836*	0.989	0.915	0.870	1.008
	[0.040]	[0.066]	[0.064]	[0.058]	[0.079]	[0.119]	[0.059]	[0.085]	[0.120]
Effort at age 14/15	0.995	0.994	0.913	1.153**	1.123	1.092	1.151**	1.117	1.062
	[0.045]	[0.061]	[0.062]	[0.080]	[0.110]	[0.114]	[0.081]	[0.105]	[0.122]
Key stage 2 scores English at age 14/15	1.011	0.997	1.028**	1.005	0.982	1.013	1.011	0.990	1.026
	[0.007]	[0.010]	[0.012]	[0.013]	[0.015]	[0.024]	[0.013]	[0.014]	[0.024]
Key stage 2 scores Maths at age 14/15	1.003	1.003	0.997	1.016**	1.027***	1.010	1.014*	1.021**	1.008
	[0.004]	[0.007]	[0.007]	[0.008]	[0.010]	[0.013]	[0.007]	[0.010]	[0.013]
Parents have bachelor's degree at age 14/1/5	0.642**	1.302	0.493**	0.526**	0.747	0.726	0.545**	1.017	0.742
	[0.131]	[0.369]	[0.154]	[0.156]	[0.305]	[0.320]	[0.160]	[0.417]	[0.343]
Parents managerial or prof. occupations at age 14/15	1.076	0.827	1.571*	1.658**	1.452	3.226**	1.540*	1.165	3.478***
	[0.173]	[0.193]	[0.401]	[0.424]	[0.440]	[1.576]	[0.394]	[0.358]	[1.633]
Chi square	35.7**	11.7	34.2**	73.8***	45.1***	57.3***	71.5***	33.5**	53.0***
No. of observations	387	172	215	387	172	215	387	172	215
No. of young people who got out of NEET	262	146	116						
To further education				108	65	43			
To employment				141	73	68			
To government training							13	8	5

Note: *** denotes 1% level of significance, ** denotes 5% level of significance, and *** denotes 1% level of significance. All figures in parentheses is standard errors. The full table can be found in the **Appendix 9**, **Appendix 10**, and **Appendix 11**. The other covariates are live in owned house, income levels, white, parents' highest educational qualification, live with both parents, mother work, and government regions.

Panel B: Survival or duration analysis using Cox distribution for girls with added control variables GCSEs

Girls in NEET at age 16/17 to 19/20	Hazard ratio from standard Cox model (1)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to employment (2)			Subhazard ratios from Competing risk Cox model – exit into further education compete with exit to government training/apprenticeship (3)		
	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months	All spells	6 months and less	More than 6 months
External locus of control at age 14/15	0.964	0.998	0.985	0.905	0.834*	0.996	0.926	0.875	1.013
	[0.040]	[0.067]	[0.064]	[0.059]	[0.084]	[0.123]	[0.059]	[0.089]	[0.126]
Effort at age 14/15	0.987	0.997	0.911	1.135*	1.078	1.078	1.137*	1.083	1.058
	[0.045]	[0.063]	[0.063]	[0.079]	[0.110]	[0.112]	[0.081]	[0.107]	[0.119]
More than 5 A*-C in GCSEs	1.421**	0.832	1.584	1.822*	1.621	1.458	1.921**	1.372	1.393
	[0.252]	[0.208]	[0.456]	[0.550]	[0.790]	[0.804]	[0.589]	[0.619]	[0.826]
Key stage 2 scores English at age 14/15	1.006	1.002	1.021*	0.999	0.974*	1.010	1.005	0.984	1.022
	[0.007]	[0.010]	[0.012]	[0.013]	[0.016]	[0.025]	[0.013]	[0.015]	[0.025]
Key stage 2 scores Maths at age 14/15	1.001	1.005	0.994	1.013*	1.027**	1.009	1.010	1.022**	1.007
	[0.005]	[0.007]	[0.007]	[0.008]	[0.011]	[0.014]	[0.008]	[0.011]	[0.015]
Parents have bachelor's degree at age 14/1/5	1.091	1.114	1.213	1.591*	2.205**	1.580	1.657**	2.070**	1.532
	[0.177]	[0.271]	[0.295]	[0.404]	[0.707]	[0.701]	[0.406]	[0.654]	[0.634]
Parents managerial or prof. occupations at age 14/15	1.008	0.839	1.370	1.251	0.977	2.466*	1.139	0.851	2.713**
	[0.171]	[0.203]	[0.366]	[0.364]	[0.322]	[1.265]	[0.325]	[0.290]	[1.343]
Chi square	35.5**	11.4	34.4**	71.2***	52.3***	50.8***	71.4***	47.0**	47.0***
No. of observations	387	172	215	387	172	215	387	172	215
No. of young people who got out of NEET	262	146	116						
To further education				108	65	43			
To employment				141	73	68			
To government training							13	8	5

5.6 Conclusion

This chapter is motivated to look at how non-cognitive skills can help young people to get out of NEET. Given that noncognitive skills are measured in adolescence, years before the cohort members first entered the labour market, our methodology eliminates potential econometric issues of endogeneity between young people who are experiencing NEET and noncognitive skills. We use external locus of control and effort as a measure of noncognitive skills at age pre-16 and we look at the effects to exit all spells of NEET, short-term NEET, which is less than 6 months, or longer-term NEET, which is more than 6 months. Our results show differences between the short term and longer-term measures of NEET. For example, boys in longer-term NEET with higher values for external locus of control are statistically significant to reduce their chance to exit NEET, however, the results are not statistically significant for short-term NEET. We care about these as it is important to identify determinants to help young people to exit longer term NEET, as experience of longer-term NEET may have negative effect to our longer-term educational and labour market outcomes that we will discuss in Chapter 6. We estimate two types of models, where in the first model we compare if young people exit NEET or not, and in the second model we compare exit of NEET to further education compete with exit to employment or government training.

External locus of control and effort are significant to help young people to exit NEET. As such, it is important to consider noncognitive skills in interventions to improve the life of young people, as noncognitive skills are malleable particularly in childhood (Joshi (2014). In the second model, if the exit is specified to be in further education, the non-cognitive skills which are effort show a significant result for girls. In this case, high diligence and effort might be viewed as similar to conscientiousness as they have similar ability to predict years of schooling as discussed by Heckman and Klautz (2013, pg 23). Cognitive skills are significant to help young people to get out of NEET. This may be attributed to the characteristics of cognitive skills, as cognitive skills are not malleable in nature after age 8 to 10 years old (Cunha et al. (2006), Cunha and Heckman (2007), and Heckman (2007, 2008)).

The gender differences are highlighted by cognitive skills, where boys have higher hazard or subhazards ratios to exit NEET if they have more than 5 GCSEs A* to C at age 16/17, compared to girls. There are also gender differences in non-cognitive skills, where girls are impacted by both external locus of control and effort, but boys are more likely to be impacted by external locus of control rather than effort. Potential explanations for boys to relate more to external locus of control is discussed in Bertrand and Pan (2013) who found boys have riskier behaviours and have poorer outcomes in broken families but they found no effect for girls. Another study by Chetty et al. (2016) also found that boys are impacted more if they have disadvantage in childhood, for example, coming from a poor family or broken family compared to girls. However, we do not control for risky behaviours and broken, but we did include a control if young person is living with single parent.

Our findings in this chapter will guide our outcomes in the next chapter, Plum (2016) found that increase duration of unemployment brings greater risk of becoming unemployed and poor later in life. We have thus far only looked at short-term outcomes of age 16/17 to age 19/20, and we will look at longer-term outcomes in the next chapter, such as employment, wages, and well-being, and whether the effect of non-cognitive skills is still significant. It is important to look at longer-term outcomes as most past studies (e.g. Furlong, 2006) focus on the age group of 18 to 24 years old of young people go into labour market transitions. In Chapter 6, we will look at outcomes of young people when they are at age 25, and how non-cognitive skills and NEET experience are related to their outcomes.

6 Role of noncognitive skills and NEET on adult outcomes

6.1 Introduction

In two of the previous chapters, we are looking at the effect of noncognitive skills on short-term outcomes. In this chapter, our motivation is to develop a deeper understanding on the role of non-cognitive skills on later outcomes such as wellbeing, earnings, and employment outcomes at age 25. We are looking at these outcomes because we found earlier in Chapter 4 and Chapter 5 that noncognitive skills are statistically significant in explaining pathways of young people at age 16, age 18, and exiting NEET status at age 16/17 to age 19/20. We are interested to see if the effect of non-cognitive skills continues to be significant in explaining outcomes of young people at adulthood at age 25. Furthermore, noncognitive skills especially locus of control is one of the promising factors of labour market outcomes and there are few studies that focus on locus of control specifically (Cobb-Clark, 2015). Previous studies also found that noncognitive skills are important in measuring the effect of longer-term outcomes such as employment (Cobb-Clark and Tan, 2009), earnings (Flossman and Piatek, 2007; Buchmueller, 2019; and Lindqvist and Vestman, 2011) and well-being (Verme, 2009; Buddelmeyer and Powdthavee (2016)). We are looking at age 25 as it is the latest sweep of data available for this cohort and is an early labour market outcome, as majority of individuals have finished their formal human capital accumulation (education) and have assimilated themselves in the labour market.

In Chapter 5, we looked at young people in NEET at age 16/17 to age 19/20 and how non-cognitive skills affect their abilities to get out of NEET. In this chapter, we are interested in if there are any longer-term impacts of being NEET. And then later we will look at interactions of being NEET with non-cognitive skills. The scarring effects from NEET have important negative consequences especially on the well-being of young people (Carcillo et al., 2015). Our motivation from this chapter comes from scarring effects on employment, earnings and well-being, as McQuaid et al. (2014) found experience of NEET for young people aged between 18 and 24 has caused scarring effects on pay and unemployment, but not on wellbeing, five and ten years later in life, using panel data of BHPS. Our study is different as we will also look at both the effect of noncognitive skills and scarring effects of NEET on employment, earnings and well-being.

Our main research question in this chapter is: What is the effect of noncognitive skills and NEET to longer-term outcomes of employment, earnings and well-being? We have chosen these outcomes as they are important to reflect life events in young people, and they are also interlinked with each other as it is a natural step for young people to get a bachelor's degree, employment and earnings. These long-term outcomes are the centre of attention of economists, as Darity and Goldsmith (1996) discuss a major concern for labour economists has been to understand how wages and employment respond to variations in predetermined factors of human capital. Meanwhile, well-being measures has been gaining popularity in the last decade, as Clark (2006) mentions "great deal of attention has been paid to two specific relationships: that between well-being and income, and that between well-being and labour market status".

Our first research question is: What is the effect of noncognitive skills on longer-term outcomes of educational attainment, employment, earnings and well-being? In Chapter 4, we have looked at the effect of noncognitive skills to short-term outcomes, and we want to continue to look at the effect of noncognitive skills to longer-term outcomes. Our research question is important as in Chapter 4, we have looked at the effect of noncognitive skills to short-term outcomes, and we want to continue to look at the effect of noncognitive skills to longer-term outcomes. Past studies for example Carneiro et al. (2011) found non-cognitive skill is important for longer-term outcomes, whether or not an individual stays on at school beyond the age of 16, whether they have obtained a degree by age 42, employment status at age 42, work experience between ages 23 and 42, and wages at age 42 from data in the UK for individuals born in 1958. Other past studies found noncognitive skills have a statistically significant, but rather modest, role in explaining the gender wage gap (Fortin, 2008; Mueller and Plug, 2006). Recently, there is some interest on the effect of noncognitive skills on life satisfaction (Palczyńska and Świst, 2018). Our study is slightly different as we will estimate the effects of noncognitive skills on educational outcomes, labour market outcomes and well-being at early adulthood at age 25. Our contribution is to add to the literature of the effects of noncognitive skills on educational outcomes, labour market outcomes and well-being for young people born in 1989/1990, as previous generations have found statistically significant effects on labour market outcomes and well-being.

Our second research question is: What is the effect of more than 6 months of NEET at age 16/17 to age 19/20 on longer-term outcomes of employment outcomes, earnings outcome and well-being? There are limited studies on scarring effects of NEET, however some literatures on unemployment for instance Winkelmann and Winkelmann (1998) found that unemployment has large negative monetary and non-monetary effect on life satisfaction even after individual specific fixed effects are controlled for. The authors also found that the non-monetary effect is much larger than the effect that stems from the associated loss of income. The reason for this adverse effect is pointed out by Darity and Goldsmith (1996, p. 122), who explain that unemployment may change tastes for work and search strategies, as well as lowering productivity "in several interrelated ways: as a consequence of lower self-esteem; as a consequence of feeling that life is not under one's control; and as a loss of what might be called by products of participating in a work environment". Other literature on wage scarring effects of unemployment by Gregg and Tominey (2005) found a wage penalty from youth unemployment of 13-21% at age 42 using National Child Development Survey. Other studies on scarring effects on life satisfaction by Clark et al. (2001) found life satisfaction is lower for those with higher levels of past unemployment using German panel data. Our research question is interesting as there are 10% in our sample sizes that have experienced NEET, and we want to see if there is scarring effects on longer-term outcome, as past studies found scarring effects on employment, earnings and well-being. For example, McQuaid et al. (2014) found scarring effects to unemployment and future pay from BHPS, and Clark et al. (2001) found scarring effects on well-being using life satisfaction scores from German panel data. Our study is slightly different as we will estimate the scarring effects of employment instead of unemployment, and we include additional measure of GHQ-scores to measure well-being. Our contribution is to provide evidence of possible effects of scarring for the millennials, as previous generations have found scarring effect on labour market outcomes and well-being.

We have also included the interaction effects for noncognitive skills and NEET on longer-term outcomes of wages and well-being as McQuaid et al. (2014) found that there is little evidence of scarring on life satisfaction but suggest for future research that scarring effects may be reduced by non-cognitive skills, such as not losing self-confidence, as losing self-confidence was negatively associated with pay and scarring. This study is relevant as self-

confidence and locus of control is somewhat interlinked as Lessof et al. (2016, p.55) found low confidence in young people's ability to control their own future.

This chapter is organized into the following sections. Section 6.2 discusses the literature review, Section 6.3 deliberates the data, Section 6.3 presents the results and discussion and Section 6.5 offers the conclusion.

6.2 Literature Review

6.2.1 Educational attainment

We expect noncognitive skills to be significant as past studies for example Heckman et al. (2006, p. 421) found noncognitive skills strongly influence schooling decisions, which is measured by the net benefit associated with each schooling level[18]. In the UK, for most young people the lowest educational attainment is GCSE and the highest is a bachelor's degree. In our study, we measure educational outcomes by binary variable for having a bachelor's degree by age 25. Example of past studies that use Next Steps is Mendolia and Walker (2014b), who found individuals in the Next Steps with external locus of control or with low levels of self-esteem are less likely to pursue further studies at 17–18, especially in Mathematics or Science.

Cobb-Clark (2015, p.7) discuss on how locus of control may influence educational outcomes, which is through human capital investments, as "the effect of locus of control on labour market outcomes, in particular wages, may operate indirectly through the decisions individuals make to acquire productive skills" (Heckman et al. 2006; Piatek and Pinger, 2010).

Other measurement of educational attainment is expected wage, for example Coleman and DeLeire (2003) found locus of control affects educational outcomes by influencing adolescents' beliefs about the returns to education, measured by expected wage outcomes.

[18] There are 5 levels in the US where the lowest is high school dropouts and the highest is 4-year degree

6.2.2 Employment

We are using the probability of being employed as one labour market outcome, which is the same as Heckman (2006). Heckman et al. (2006, p.422) uses binary variable for employment outcome and found employment is affected by latent noncognitive skills, which is measured by locus of control and self-esteem, using a cohort of young person's aged 14 to 21 from National Longitudinal Survey of Youth 1979. From this study, we expect noncognitive skills to be statistically significant to explain the probability of being in employment, as we are also using a cohort of young person aged 13/14 to age 25.

Past literature for example Cobb-Clark (2015, p.8) discuss on how locus of control may influence employment, which is through hiring decisions, for example potential employers use personality tests in interviews to screen applicants' suitability for positions in their organizations. Other past studies sometimes use job search model or unemployment as labour market. For example, Caliendo et al. (2015) found individuals with internal locus of control search more intensively for job, and Lindqvist and Vestman (2011) found men with low noncognitive skills are more likely to be unemployed.

6.2.3 Wages

Wages are commonly used to measure longer-term outcomes, as it is economically meaningful (Cobb-Clark and Schurer, 2013). For instance, Flossman and Piatek (2007) also uses locus of control as a measure of noncognitive skills, and found differences in locus of control accounts for a wage difference of 24-25%[19] using German Socioeconomic Panel, controlling for different aspects like education or professional experience. This study is relevant to our study as we are also using index of locus of control to determine log of wages, and we can compare our findings with this study. Another study by Cobb-Clark and Tan (2009) found that noncognitive skills i.e. locus of control give a slight wage advantage to women using individuals age 25 to 65 in the Household Income and Labour Dynamics in Australia (HILDA) Survey, where the disparity in men's and women's characteristics

[19] The wage equation is in the log form, and locus of control index ranges from 0 to 18, where a one-point increase of the index leads to a 1.39% increase of the wage for males and a 1.33% increase for females.

accounts for 3.8% of the gap in relative wages. This study is relevant to our first question as we are also looking at the effect of locus of control in explaining wages.

Buchmueller (2019) uses the same dataset of Next Steps and found only internal locus of control, measured with a minimum score of 4 and a maximum score of 16, has a statistically significant positive impact on income as opposed to traits of work ethics, conscientiousness and self-esteem. Buchmueller (2019) also found that cognitive skills which is measured as having obtained a degree has a much bigger effect on income compared to noncognitive skills, as the effect of other noncognitive skills conscientiousness and self-esteem are not statistically significant in determining wages. Another study that focuses on the impact of non-cognitive skills on wage is by Heckman et al. (2006), where they found the effects of noncognitive skills measured by the standardized sum of scores on the Rotter Locus of Control and Rosenberg Self-Esteem scales on log hourly wages. This is related to our use of locus of control as a measure of noncognitive skills. Other studies that use different measure of cognitive skills have also look at wages, for example Lindqvist and Vestman (2011) uses the ability to function in armed combat as a measure of noncognitive skills, and found men who have low wages also have low noncognitive skills.

6.2.4 Well-being

Next, we look at past studies that uses well-being for longer-term outcomes. Using life satisfaction as a measure of well-being, Verme (2009) discuss the relationship of locus of control and happiness using World and European Values Surveys. The author found 'freedom of choice and the locus of control' as a measure of noncognitive skills predict life satisfaction better than any other known factor such as health, employment, income, marriage or religion, across countries and within countries, using measures of freedom of choice combined with the locus of control to measure noncognitive skills. This is because the only variable that is consistently significant with a positive sign with life satisfaction is 'freedom and control' across all ten countries (USA, Canada, Germany, Spain, South Africa, Mexico, Russia, China, India and Nigeria).

We anticipate that the effects of locus of control is statistically significant to well-being, however, there may be interaction effect of unemployment on well-being that causes locus

of control to be insignificant in explaining well-being. This is because Buddelmeyer and Powdthavee (2016) found that individuals in Australia with strong internal locus of control are psychologically insured against own and others' serious illness or injury, close family member detained in jail, becoming a victim of property crime and death of a close friend, but not against the majority of other life events, such as fired or made redundant, as they are generally more satisfied with life and have better mental health than those with external locus of control. Buddelmeyer and Powdthavee (2016) also found gender differences as internal locus of control acts as psychological insurance against being fired from a job or made redundant for women with respect to life satisfaction, but not for men.

We also expect external locus of control to be statistically significant in explaining well-being, as O'Connor (2020) found improvements in an individual's noncognitive skills, such as reduced neuroticism, are associated with increase in life satisfaction in a fixed-effects regression with socio-economic controls. We use external locus of control as a measure for neuroticism.

On the other hand, we are also interested on the effect of NEET on long-term outcomes. McQuaid et al. (2014) found using the same cohort of BHPS in the UK, being unemployed when young at age 18 have scarring on later pay and unemployment at age 24 but found no significant evidence of scarring on later life satisfaction at age 28-34. However, there is evidence that unemployment has long term effects on life satisfaction, and it is the one event that individuals do not seem to revert to baseline satisfaction levels, captured by life satisfaction scores and GHQ-12 (Clark and Georgellis, 2012). Clark and Georgellis (2012) found that unemployment does not adapt to the baseline of well-being as well as other life changing events such as marriage, divorce, birth of child and widowhood, based on the general population from eighteen waves of the BHPS covering the period 1991–2008 aged from 16 to 60. However, our study is slightly different as we are interested in the well-being of a younger age group.

6.3 Data and methodology

As discussed in Chapter 3, the dataset that we are using for this chapter is the Next Steps from wave 8 when the young people aged 25 in 2015 with some characteristics merged

from earlier waves. This is because one of the strengths of cohort data is, we can include more control variables from earlier waves to address the concern of selection of unobservables, for example there may be unobserved factors that partly determine both wage and education at age 25. Our sample comprises those who responded in wave 8 and we merge information available in earlier waves, and our sample sizes is 7,707 individuals. As we look at different outcomes, our sample sizes vary. For example, when we look at employment outcomes, our sample is limited to young people who are employed. We are interested to look at the effects of noncognitive skills and the effect of NEET, as described in Table 6.1.

Table 6.1: Variables of interest of young people in the Next Steps

Variables	Variables descriptions	Wave	Age
Variables of interest			
External locus of control	Scores of external locus of control (0 to 9) at age 14/15	2	14
Effort	Scores of effort (0 to 9) at age 14/15	2	14
NEET at age 16/17 to age 19/20	Whether experience more than 6 months of NEET at age 16/17 to age 19/20	4 to 6	16/17 to 19/20

The dependent variables are adult outcomes which are educational attainment, employment, earnings and wellbeing from wave 8 when young people are at age 25. Educational attainment is from the academic qualifications gained variable, employment outcomes are constructed from current activity, earnings outcome from current pay/salary main job, and wellbeing from life satisfaction scores and GHQ-12 scores. In all our analysis, we split by gender as there are gender differences as women tend to have different labour market outcomes, less likely to participate, and there is a gender wage gap which we discussed in Chapter 2.

6.3.1 Educational Outcomes at age 25

First, we are looking at educational outcomes at age 25, as we are interested to see the effect of noncognitive skills to educational attainment of having a higher education degree. This is a binary variable that captures educational attainment of academic qualifications gained

of University Higher Degree or First-degree level qualification. We estimate equation *(6.1)* for educational outcomes of boys and girls:

$$DO_i = \beta_1 + \beta_2 NONCOGN_i + X_i'\gamma + u_i \quad \textbf{(6.1)}$$

where DO_i is educational outcomes reported by individual i at time t, $NONCOGN_i$ is non-cognitive skills, X_i' is a vector of individual and other characteristics affecting adult outcomes, and u_{it} is the error term. We estimate equation *(6.1)* using probit. The purpose of this analysis is to link it to earlier results on the link between non-cognitive skills and staying on in education.

Our sample sizes for educational outcomes are 7,707 young people. Table 6.2 describes the count, mean and standard deviation of educational outcomes. At age 25, about one third have a bachelor's degree, and there are no statistically significant gender differences.

Table 6.2: Mean, standard deviation and t-test by gender of employment outcomes

Variables	Variable label	Boys	%	Girls	%
Education at age 25	Have a bachelor's degree	1,312	34.1	1,377	35.4
	Does not have bachelor's degree	2,532	65.9	2,486	64.3
	Total	3,844	100.0	3,863	100.0
	Mean	0.34		0.36	
	Std. Dev.	0.47		0.48	
	Difference between boys and girls	-0.015 (0.011)			

6.3.2 Employment Outcomes at age 25

One of our research questions is to look at the effect of non-cognitive skills to employment outcomes; and if experience of NEET has an effect of employment outcomes. We use employment outcomes at age 25 and we estimate the empirical counterpart of equation *(6.2)*. This is a binary variable that captures employment versus non-employed and employment is defined as full time and part-time paid employee, full time and part-time self-employed, and on government scheme for employment training or apprenticeship.

There are differences to measures used in Chapter 4 as at age 25, we included information on full-time and part-time self-employed work as the information is available, where we did not include in Chapter 4 as the information on self-employed is not available. As in Chapter 4, we exclude individuals in volunteer work, education, unemployed and inactive.

Employment outcomes of boys and girls:

$$EO_i = \beta_4 + \beta_5 NEET_i + \beta_6 NONCOGN_i + X_i'\gamma + u_i \quad \textbf{(6.2)}$$

where EO_i is employment outcomes reported by individual i at time t, $NEET_{it}$ is past unemployment and inactivity, $NONCOGN_i$ is non-cognitive skills, X_i' is a vector of individual and other characteristics affecting adult outcomes, and u_{it} is the error term. We estimate equation *(6.2)* using probit. We estimate the above equations in two specifications: the first specification is without adult control variables, and the second specification includes adult control variables. Our background to control for other variables that affects long-term outcomes came from Clark et al. (2014), and Layard et al. (2014). We are controlling for log income, educational achievement, employment, personal characteristics, family background and gender discussed in Chapter 3. We are also controlling for education level as Schmelzer (2011) found that having an education degree protect people in the UK from scarring effects as people with higher levels of educational attainment do not have the same scarring effects using BHPS data. Our adult control variables are married or have a civil partner at age 25, cohabiting at age 25, number of children at age 25, and education at age 25.

Our sample sizes are 6,104 young people, as we are looking at young people who have information on current activity. Table 6.3 describes the count, mean and standard deviation of employment outcomes. At age 25, most of young people (94.6% of boys and 87.1% of girls) are in employment or training, a few of young people (5.4% of boys and 12.9% of girls) are unemployed and inactive, and people who are in further education at age 25 are excluded.

Table 6.3: Mean, standard deviation and t-test by gender of employment outcomes

Variables	Variable label	Boys	%	Girls	%
Employment at age 25	Employment or government training	2,975	94.6	2,578	87.1
	Unemployed and inactive	169	5.4	382	12.9
	Total	3,144	100.0	2,960	100.0
	Mean	0.95		0.87	
	Std. Dev.	0.22		0.33	
	Difference between boys and girls	-0.075*** (0.007)			

6.3.3 Wages at age 25

Next, we are looking at wages outcomes at age 25. Wage data is self-reported in Next Steps and it is also censored, as individuals only report a wage conditional on working. Our wages are from the derived variable weekly take home pay divide by usual hours per week that works in main job at age 25. We estimate equation *(6.3)*:

Wages outcomes of boys and girls:

$$Log(Wage_i) = \beta_4 + \beta_5 NEET_i + \beta_6 NONCOGN_i + \beta_7 (NEET_i \, x \, NONCOGN_i) + X_i'\gamma + u_i \quad \textbf{(6.3)}$$

where WO_i is log hourly wages at age 25 reported by individual i at time t, $NEET_{it}$ is past unemployment and inactivity, $NONCOGN_i$ is non-cognitive skills, X_i' is a vector of individual and other characteristics affecting adult outcomes, and u_{it} is the error term. We estimate equation *(6.3)* using OLS. The individual characteristics that we include are ethnicity and region, following Buchmueller (2019) who included individual characteristics such as gender, ethnicity, and region when looking at effects of noncognitive skills to wage at age 25 using Next Steps data.

In this section, we are only looking at young people with employment. Our dependent variable, log hourly wages is calculated by dividing the derived variable weekly take home pay with usual hours per week that works in main job. There are 5,215 young people out of 6,104 young people in the labour market (employed, unemployed and inactive) who earn

hourly wages ranging from 0 to £96.15, with mean of £8.80 and standard deviation of £4.50[20]. There are 3,216 young people with wages above the mean and 1,996 of young people with wages below the mean. Table 6.4 describes the descriptive statistics by gender, where boys have higher average wages at £9.08/hour, compared to girls at £8.54/hour. As there is difference of wages by gender, we analyse our wage models by gender. For analysis purpose, we then convert wages to log form for linear estimation and easier interpretation. In OLS approach, we specify a classical wage equation including the noncognitive skills. This standard approach provides a lot of interesting insights about the impact of noncognitive skills on wages. We also look at whether experience of NEET plays a role to earnings outcome using hourly wages.

Table 6.4: Mean, standard deviation and t-test by gender of wages

Wages	Boys	Girls
Observations	2,553	2,662
Mean	9.08	8.54
Std. Dev.	4.62	4.38
Difference between boys and girls	0.542*** (0.125)	

6.3.4 Well-being at age 25

To measure well-being, we use life satisfaction scores and GHQ-12 as a measure for well-being of young people at age 25. When we look at well-being, we are controlling for economic activity of young people and their wages:

Well-being of all young people:

$$W_i = \beta_0 + \beta_1 NEET_i + \beta_2 NONCOGN_i + \beta_3 (NEET_i \, x \, NONCOGN_i) + \beta_4 ACT_i + + X_i' \gamma + u_i \quad \textbf{(6.4)}$$

where W_i is well-being reported by individual i at time t, $NEET_{it}$ is if an individual has experience past unemployment and inactivity for more than 6 months at age 16/17 to age 19/20, $NONCOGN_i$ is non-cognitive skills, ACT_i is activity, X_i' is a vector of individual

[20] We remove 9 outliers above £99 and only take observations from £0 to £99 following Labour Force Study (Labour Force Survey, 2015).

and other characteristics affecting adult outcomes, and u_{it} is the error term. We intend to pick up the cushioning effect on noncognitive skills from experiencing NEET from the interaction term. We use two measures as W_i, life satisfaction, which are life satisfaction scores and GHQ scores. Life satisfaction is measured as an ordinal categorical variable on a scale one (very dissatisfied) to five (very satisfied), we first estimate equation *(6.4)* using probit. The second wellbeing measure is the GHQ-12 measure of mental wellbeing (see Goldberg 1988), based on responses to the GHQ. This consists of twelve questions (administered via a self-completion questionnaire) covering feelings of strain, depression, inability to cope, anxiety-based insomnia and lack of confidence, among others. Responses are made on a four-point scale of frequency of a feeling in relation to a person's usual state: 'Not at all', 'No more than usual', 'Rather more than usual' and 'Much more than usual'. The GHQ is widely used in medical, psychological and sociological research, and is considered to be a robust indicator of the individual's psychological state. The GHQ has previously been used in economics to examine the psychological impact of unemployment (Clark and Oswald 1994; Clark 2003).

6.3.5 Life satisfaction scores

In this section, we are looking at well-being of young people, and the two measures that we use are life satisfaction scores and GHQ scores. Our first dependent variable is life satisfaction scores. We calculate this variable by grouping young people who previously score 4 and 5 in Likert-5 life satisfaction scores as 1 and 0 for the rest to differentiate satisfaction, as the binary variable is easier to interpret from young people who are satisfied with their life versus young people who are not satisfied with their life. The response rate for this variable is very high at a total of 7,427 young people or 96.0%, as we include young people both in the labour market and outside of labour market. Overall, 73.2% are fairly satisfied or very satisfied with their life, while 26.8% are very dissatisfied, fairly dissatisfied, or neither satisfied nor dissatisfied with their life. Table 6.5 shows the descriptive statistics of the life satisfaction scores by gender, where girls are slightly more satisfied in their life compared to boys. We separate by gender because past studies (e.g. Buddelmeyer and Powdthavee, 2016) found gender differences in internal locus of control as internal locus of control is significant to buffer from unemployment for women, but not for men.

Table 6.5: Mean, standard deviation and t-test by gender of life satisfaction scores

Life satisfaction at age 25	Boys	%	Girls	%
Neither, fairly or very unsatisfied	1,098	29.8	891	23.8
Fairly or very satisfied	2,583	70.2	2,855	76.2
Total	3,681	100.0	3,746	100.0
Mean	0.70		0.76	
Std. Dev.	0.46		0.42	
Difference between boys and girls	-0.060*** (0.010)			

6.3.6 GHQ-12 scores

Our second dependent variable is GHQ-12 scores, where we revere code so that higher scores represents higher well-being, and lower scores represents lower well-being. GHQ is different from life satisfaction, as GHQ is more of a measure of mental well-being, covering feelings of strain, depression, inability to cope, anxiety-based insomnia and lack of confidence, whilst life satisfaction is more of an evaluation of how things have gone in their life thus far. There are 7,363 observations, where the mean score is 9.7 out of 12, representing a high well-being for most young people in Next Steps at age 25. We have less observations as the number of young people who answered the GHQ-12 questions are not as many of those who answered the life satisfaction question. Table 6.6 describes the descriptive statistics by gender, where boys have slightly higher GHQ-12 scores at 9.87, compared to girls at 9.53.

Table 6.6: Mean, standard deviation and t-test by gender of GHQ-12 scores

GHQ-12 scores	Boys	Girls
Observations	3,651	3,712
Mean	9.87	9.53
Std. Dev.	3.03	3.20
Difference between boys and girls	0.342*** (0.073)	

6.4 Results and Discussions

6.4.1 Educational Outcomes at age 25

In this section, we introduce whether they have a degree or not as an additional outcome variable following Buchmueller (2019) so we can see if our non-cognitive skills have an impact on longer educational outcomes.

Table 6.7 discusses the results of the marginal effects of having a bachelor's degree at age 25 from probit analysis. In Chapter 4, our noncognitive skills which are locus of control and effort has a return of 1-2% of staying in further education at age 16/17 and at age 18/19. However, our result in Chapter 4 for external locus of control is weakly significant at age 16/17 and at age 18/19. We found stronger result for obtaining a bachelor's degree at age 25, as our external locus of control is statistically significant at 99% with 1-3 percentage points to obtaining a degree at age 25, after controlling for personal characteristics and family background. We also found our second measure of noncognitive skill which is effort is significant for girls to obtain a degree at age 25, which is consistent with our early findings in Chapter 4 of pathways of staying in further education at age 16/17 and at age 18/19. Our results are comparable to Duckworth et al. (2007) who found the effect of perseverance and passion for long-term goals, grit accounted for an average of 4% of the variance in success outcomes, including educational attainment. For cognitive skills, there is no strong effect of results of key stage 2 English and Maths in relation to getting a bachelor's degree at age 25, although when we add GCSEs, there is a much stronger effect to getting a bachelor's degree at age 25.

Table 6.7: Panel A: Marginal effects of having a bachelor's degree at age 25 from probit

Dependent variable: Have a bachelor's degree at age 25	Model 1 without adult control variables (1)		
	All	Boys	Girls
Non-cognitive skills at age 14/15			
External locus of control at age 14/15	-0.027*** [0.006]	-0.044*** [0.010]	-0.016*** [0.008]
Effort at age 14/15	0.009 [0.007]	-0.002 [0.011]	0.017* [0.010]
Control variables at age 25			
Married at age 25	-0.026 [0.051]	0.097 [0.060]	-0.090** [0.041]
Cohabiting at age 25	0.040* [0.023]	0.038 [0.037]	0.034 [0.030]
No. of children at age 25	-0.189*** [0.021]	-0.269*** [0.050]	-0.169*** [0.023]
White	-0.100** [0.025]	-0.056 [0.031]	-0.136*** [0.033]
Key stage 2 English	-0.002* [0.001]	-0.001 [0.002]	-0.003** [0.002]
Key stage 2 Mathematics	0.001 [0.001]	-0.001 [0.001]	0.001* [0.001]
Family background at age 13/14 to age 19/20			
Either parents have bachelor's degree	-0.003 [0.021]	0.003 [0.031]	0.010 [0.027]
Lived in parents' owned house at age 14/15 (ref: rented)	0.059** [0.027]	0.114*** [0.39]	0.012 [0.037]
Parents gross household income at age 14/15 (ref: middle income £12,000 to £47,999 per year)			
Low income below £12,000	-0.041 [0.030]	0.029 [0.045]	-0.107*** [0.039]
High income £48,000 and above	0.091*** [0.027]	0.104*** [0.039]	0.073** [0.036]
Parents socio-economic classification at age 14/15			
Managerial and professional: (ref: Other)	0.064*** [0.023]	0.072** [0.034]	0.060** [0.030]
Live with single parent age 14/15 (ref: both parents)	-0.012 [0.026]	-0.005 [0.041]	-0.017 [0.034]
Mother work (ref: mother not working)	0.018 [0.026]	0.016 [0.039]	0.041 [0.034]
Female	0.063*** [0.019]		
Pseudo R^2	0.11	0.11	0.11
Observations	2,341	1,027	1,314

Notes: All variables are in standardised with mean of 0 and standard deviation of 1. Standard errors are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.. Other control variables include eight government regions at age 25 (ref: London).

Panel B: Marginal effects of having a bachelor's degree at age 25 from probit with added control variables GCSEs

Dependent variable: Have a bachelor's degree at age 25	Model 1 without adult control variables (1)		
	All	Boys	Girls
Non-cognitive skills at age 14/15			
External locus of control at age 14/15	-0.017*** [0.006]	-0.032*** [0.010]	-0.008 [0.008]
Effort at age 14/15	0.009 [0.007]	-0.002 [0.011]	0.018* [0.010]
Control variables at age 25			
Married at age 25	-0.006 [0.051]	0.121** [0.060]	-0.075* [0.041]
Cohabiting at age 25	0.029 [0.023]	0.020 [0.037]	0.028 [0.030]
No. of children at age 25	-0.154*** [0.021]	-0.221*** [0.050]	-0.123*** [0.023]
White	-0.093** [0.025]	-0.063* [0.031]	-0.123*** [0.033]
Key stage 2 English	-0.001 [0.001]	-0.001 [0.002]	-0.003** [0.002]
Key stage 2 Mathematics	0.001 [0.001]	-0.001 [0.001]	0.001 [0.001]
More than 5 A*-C in GCSEs	0.223*** [0.037]	0.284*** [0.060]	0.172*** [0.030]
Family background at age 13/14 to age 19/20			
Either parents have bachelor's degree	-0.001 [0.021]	0.003 [0.031]	0.009 [0.027]
Lived in parents' owned house at age 14/15 (ref: rented)	0.059** [0.027]	0.078** [0.38]	0.012 [0.037]
Parents gross household income at age 14/15 (ref: middle income £12,000 to £47,999 per year)			
Low income below £12,000	-0.041 [0.030]	0.029 [0.045]	-0.107*** [0.039]
High income £48,000 and above	0.068*** [0.027]	0.082*** [0.039]	0.092** [0.036]
Parents socio-economic classification at age 14/15			
Managerial and professional: (ref: Other)	0.041*** [0.023]	0.037 [0.034]	0.060** [0.030]
Live with single parent age 14/15 (ref: both parents)	-0.012 [0.026]	-0.005 [0.041]	-0.017 [0.034]
Mother work (ref: mother not working)	0.018 [0.026]	0.016 [0.039]	0.056* [0.033]
Female	0.043*** [0.019]		
Pseudo R^2	0.11	0.11	0.11
Observations	2,341	1,027	1,314

6.4.2 Employment Outcomes at age 25

Table 6.8 discusses the results of employment outcomes of the young people in the Next Steps at age 25. First, we exclude the adult variables to see the effects of noncognitive skills without considering recent events in life of young people, since this could be a potential channel through which these skills work. Column 1 shows not much difference of marginal effects of noncognitive skills to employment. However, the experience of NEET for girls are much larger without control variables at age 25, which suggests that those who are NEET during youth are more likely to have children or to be married. Our statistics show that 41% of girls who are NEET for more than 6 months at age 16/17 to age 19/20 have children, compared to 22% girls who have not experience NEET, and there are 20% of girls who are NEET for more than 6 months at age 16/17 are married, compared to 14% girls who have not experience NEET. This finding suggests gender difference that marriage and having children lessen the effect of NEET to employment by half for girls, however, there are no effect for boys.

Column 2 in Table 6.8 shows that young people with higher degree of external locus of control at age 14/15 are significantly less likely to be in employment and training at age 25 at 1-2%, compared to young people with a lower degree of external locus of control. The result is consistent with our results in Chapter 4 where external locus of control is significant in explaining employment at age 18/19 at 1-3%. The effect is stronger as our external locus of control is statistically significant at 99% at age 25 compared to weakly significant at younger age of age 16/17. If we compare the marginal effect of being in employment or training at age 16/17 and age 18/19, the magnitude of marginal effect external locus of control of at age 25 is similar to the effect of external locus of control at age 16/17 for girls, but lower for boys.

The impact of noncognitive skills particularly external locus of control is strongly significant and is going to mean a small change in the probability of being employed at age 25. This is because although we found that external locus of control is significant in determining NEET in Chapter 5, it is still significant in explaining employment although we include NEET experience at early age. Next, we found that effort is not consistent in explaining employment. In Chapter 4, we found that effort is significant for boys to be less

likely to be in employment at age 16/17 and age 18/19 as most young people are in further education. At age 25, we found that the effect for effort is positive but insignificant for young people to be in employment.

Furthermore, we found that the other early experiences like NEET at age 16/17 to age 19/20 show significant results in explaining long-term outcome of employment at age 25. The size of effect of experiencing NEET when young to employment is higher at 4-5% percentage points, compared to noncognitive skills. Our results are comparable with McQuaid et al. (2014) who use the same cohort in BHPS found that being unemployed when young have scarring on future unemployment at 3-6%. Our results confirm the existence of a scarring effect in terms of a lesser likelihood of future employment.

Control variables that are significant in explaining employment at more than 95% level of significance are marriage, cohabiting and higher education degree, which are consistent with past literature discussed in Chapter 2. We note a gender difference where girls who are married and have children are less likely to be employed. Meanwhile, young people with education degree are 2-5% more likely to be employed compared to young people without an education degree at age 25. For cognitive skills, there is no significance effect of results of key stage 2 English and Maths in relation to being employed at age 25, although when we add GCSEs, there is a significant positive effect to being employed at age 25 for all young people, especially girls.

Table 6.8: Panel A: Marginal effects of employed at age 25 from probit

Dependent variable: Employed at age 25	Model 1 without adult control variables (1)			Model 2 with adult control variables (2)		
	All	Boys	Girls	All	Boys	Girls
Non-cognitive skills at age 14/15						
External locus of control at age 14/15	-0.032*** [0.003]	-0.048*** [0.010]	-0.013** [0.005]	-0.027*** [0.006]	-0.044*** [0.004]	-0.016* [0.005]
Effort at age 14/15	0.013* [0.004]	0.001 [0.005]	0.008** [0.006]	0.009 [0.003]	0.001 [0.003]	0.017* [0.005]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.076*** [0.019]	-0.088*** [0.033]	-0.096*** [0.030]	-0.046*** [0.016]	-0.085*** [0.032]	-0.039* [0.023]
Key stage 2 English	0.001 [0.001]	0.001 [0.002]	0.001 [0.001]	0.001 [0.001]	0.001 [0.002]	-0.001 [0.001]
Key stage 2 Mathematics	-0.001 [0.001]	-0.001 [0.002]	-0.001 [0.001]	0.001 [0.006]	-0.001 [0.002]	0.001 [0.001]
Control variables at age 25						
Married or civil partner at age 25				-0.058*** [0.021]	-0.016 [0.037]	-0.081*** [0.031]
Cohabiting at age 25				0.030*** [0.012]	0.020 [0.021]	0.032* [0.017]
Number of children at age 25				-0.049*** [0.005]	0.005 [0.015]	-0.080*** [0.008]
Personal characteristics						
White	-0.026** [0.024]	0.016 [0.014]	-0.040** [0.019]	-0.020* [0.012]	-0.030 [0.018]	-0.015 [0.019]
Female	-0.073*** [0.016]			-0.055*** [0.009]		
Family background at age 13/14 to age 19/20						
Lived in parents' owned house at age 14/15 (ref: rented)	0.017 [0.013]	0.019 [0.015]	0.026 [0.022]	0.009 [0.012]	0.020 [0.015]	0.014 [0.016]
Parents gross household income at age 14/15 (ref: middle income £12,000 to £47,999 per year)						
Low income below £12,000	-0.037** [0.018]	-0.019 [0.016]	-0.052* [0.029]	-0.032* [0.025]	-0.017 [0.017]	-0.034 [0.025]
High income £48,000 and above	0.035*** [0.010]	Not estimable	0.044** [0.018]	0.030*** [0.011]	Not estimable	0.033* [0.019]
Parents socio-economic classification at age 14/15						
Managerial and professional: (ref: Other)	0.010 [0.012]	0.004 [0.013]	0.020 [0.019]	0.001 [0.011]	0.006 [0.013]	-0.001 [0.015]
Live with single parent age 14/15 (ref: both parents)	-0.008 [0.013]	0.005 [0.014]	-0.019 [0.021]	-0.005 [0.011]	0.008 [0.013]	-0.024 [0.017]
Mother work (ref: mother not working)	0.022 [0.014]	0.020 [0.016]	0.031 [0.023]	0.023** [0.016]	0.017 [0.016]	0.034** [0.018]
Pseudo R^2	0.21	0.18	0.23	0.38	0.21	0.47
Observations	2,342	1,027	1,315	2,342	1,027	1,315

Notes: All variables are in standardised with mean of 0 and standard deviation of 1. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.. Other control variables include eight government regions at age 25 (ref: London).

Panel B: Marginal effects of employed at age 25 with added control variables GCSEs

Dependent variable: Employed at age 25	Model 1 without adult control variables (1)			Model 2 with adult control variables (2)		
	All	Boys	Girls	All	Boys	Girls
Non-cognitive skills at age 14/15						
External locus of control at age 14/15	-0.007** [0.003]	-0.008 [0.006]	-0.009 [0.005]	-0.007** [0.003]	-0.009 [0.007]	-0.008* [0.005]
Effort at age 14/15	0.003 [0.004]	0.001 [0.008]	0.006 [0.006]	0.003 [0.003]	0.004 [0.008]	0.004 [0.005]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.057*** [0.015]	-0.102** [0.041]	-0.070*** [0.027]	-0.038** [0.015]	-0.099** [0.021]	-0.031 [0.022]
Key stage 2 English	-0.001 [0.001]	0.001 [0.002]	-0.002 [0.002]	0.001 [0.001]	0.001 [0.002]	-0.002 [0.002]
Key stage 2 Mathematics	0.001 [0.001]	-0.001 [0.002]	0.001 [0.001]	0.001 [0.001]	-0.001 [0.002]	0.001 [0.001]
More than 5 A*-C in GCSEs	0.049*** [0.010]	0.003 [0.036]	0.079*** [0.016]	0.037*** [0.011]	0.012 [0.010]	0.049*** [0.010]
Control variables at age 25						
Married or civil partner at age 25				-0.053*** [0.020]	-0.021 [0.028]	-0.074** [0.023]
Cohabiting at age 25				0.029** [0.012]	0.027 [0.029]	0.032* [0.017]
Number of children at age 25				-0.044*** [0.005]	0.017 [0.021]	-0.074*** [0.008]
Personal characteristics						
White	-0.014 [0.012]	-0.017 [0.026]	-0.024 [0.020]	-0.014 [0.012]	-0.042* [0.026]	-0.008 [0.019]
Female	-0.077*** [0.009]			-0.060*** [0.009]		
Education degree at age 25 (ref.: No education degree)						
Degree and higher education				0.032*** [0.011]	Not estimable	0.031* [0.018]
Family background at age 13/14 to age 19/20						
Lived in parents' owned house at age 14/15 (ref: rented)	0.013 [0.013]	0.003 [0.023]	0.022 [0.021]	0.007 [0.012]	0.020 [0.015]	0.006 [0.018]
Parents gross household income at age 14/15 (ref: middle income £12,000 to £47,999 per year)						
Low income below £12,000	-0.027 [0.017]	-0.003 [0.023	-0.037 [0.027]	-0.026 [0.016]	-0.053* [0.032]	-0.027 [0.024]
High income £48,000 and above	0.032*** [0.011]	Not estimable	0.040* [0.021]	0.029** [0.012]	Not estimable	0.033 [0.021]
Parents socio-economic classification at age 14/15						
Managerial and professional: (ref: Other)	0.016 [0.011]	0.013 [0.026]	0.006 [0.019]	0.003 [0.011]	0.008 [0.026]	-0.007 [0.017]
Live with single parent age 14/15 (ref: both parents)	-0.009 [0.012]	0.016 [0.024]	-0.020 [0.021]	-0.006 [0.012]	0.031 [0.023]	-0.015 [0.018]
Mother work (ref: mother not working)	0.018 [0.013]	0.039 [0.028]	0.025 [0.022]	0.014 [0.013]	0.053* [0.029]	0.011 [0.019]
Pseudo R^2	0.25	0.17	0.21	0.34	0.22	0.35
Observations	2,342	1,027	1,315	2,342	1,027	1,315

6.4.3 Log of wages outcome at age 25

In this section, we are looking at wages as to continue looking at long-term outcomes that are meaningful. Table 6.9 shows the result for OLS of log wages at 25 years old. First, in Column 1 we exclude the adult variables to see the effects of noncognitive skills without considering recent events in life of young people. Column 3 shows not much difference of marginal effects of noncognitive skills to wages. However, the experience of NEET is slightly larger without control variables at age 25, which suggests that those who have NEET experiences are more likely maybe to cohabiting, or are in full-time work.

In Column 2 in Table 6.9, we have done the analysis without the interaction effects of noncognitive skills and NEET. The result shows that for non-cognitive skills, young people with a greater degree of external locus of control at age 14/15 are significantly less likely to earn higher wages compared to young people with more internal locus of control at age 14/15. The estimate of the parameter is equal to 0.010 for boys and 0.015 for women. The wage equation being in the log form, this means that a one-point increase of the index leads to a 0.9% increase of the wage for boys and a 1.8% increase for females. Since the index ranges from 0 to 9, the maximum wage difference due to the one extreme of a non-cognitive skills to the other is thus equal to 8% in the first and 16% in the latter case. Our results are comparable with Flossman and Piatek (2007), where they found the maximum difference for wage due to differences in noncognitive skills is 25% for men and 24% for women at age 30 using 1999 wave of German Socioeconomic Panel.

Our findings are consistent with evidence from Buchmueller (2019) using the same dataset Next Steps found that only locus of control has a statistically significant positive impact on outcome. The difference is that Buchmueller (2019) used probability of having an education degree as an outcome, while we found that locus of control has led to 2-3% higher wages. Another difference between our study and Buchmueller (2019) is that we use different measurement for locus of control[21]. We also found our second measure of

[21] We use 3 questions on external locus of control as explained in Chapter 3, and Buchmueller (2019, p. 8) uses 4 questions as a measure for locus of control, where the only same question with our study is "How well you get on this world is a matter of luck" at age 14/15.

noncognitive skill which is effort to be weakly significant to higher wages at age 25, however Buchmueller (2019) found her measurement of noncognitive skills which are conscientiousness and self-esteem to be not significant in explaining educational outcome. Another potential comparable study by Caliendo et al. (2015) that individuals who believe that their future outcomes are determined by external factors have lower expected wages in participation of job search decisions. We found effort at age 14/15 is weakly significant in explaining wage at age 25, if we did not include the interaction term and if we did not control adult factors. We also observe no significant gender differences, as boys and girls show similar results.

Meanwhile, other early experiences like NEET at age 16/17 to age 19/20 show significant results in explaining wages at age 25. Column 1 shows that young people who experience NEET more than 6 months at age 16/17 to age 19/20 are significantly less likely to earn higher wages compared to young people who did not experience NEET more than 6 months at age 16/17 to age 19/20. The results confirm the existence of a scarring effect in terms of reduced pay, as our wage penalty is at 6-9%. Our results are comparable with past studies from the UK. McQuaid et al. (2014) using a cohort in BHPS age 18 to age 24 in 1998 found that being unemployed when young have scarring on later pay (age 28 to age 34 in 2008) at 0.6-0.8%. Another past study Gregg and Tominey (2005) using National Child Development Survey found 10-20% wage penalty when they look at effect of youth unemployment to wages at age 23, controlling for education, region and family variables. We also found that there is a gender difference to log of wages as girls are more likely to be affected by NEET experience, might be because girls who are NEET are more likely to get married and have children in life earlier instead of going to further education, and later seek job with lower wages to support their family. However, it is difficult to compare with previous study as a lot of literature only looked at wages of men, for example Gregg and Tominey (2005) who looked at youth unemployment at age 16 to 23. Our result for wage penalty for boys are lower at 3.5% if a young person has NEET experience for more than 6 months, compared to Gregg and Tominey (2005, p. 495) who found wage penalty of 10.5% for youth unemployment 5-6 months, 10.0% for 7-12 months, and 23.3% for more than 13 months.

In Column 3 in Table 6.9, we included the interaction effects of noncognitive skills with NEET experience at age 16/17 to age 19/20 as moderating effects. This is because we are interested to see whether noncognitive skills lessen or boost effect of NEET experience on wages. We found that the interaction effect of having a higher degree of external locus of control and NEET experience for girls is significant, and there is no significant effect of NEET experience to log of wages when we included the interaction effect. This is possibly because the combination of having external locus of control at age 14/15 and NEET experience more than 6 months at age post-16 decreases young people's motivation in their pathways to go for higher education, or employment and later this situation has negative effect on their income at age 25.

Control variables that are statistically significant in explaining higher wages at more than 95% level of significance are male, cohabiting, and having higher education degree. Our results are similar with McQuaid et al. (2014) who use the 1998 cohort in BHPS found the significant determinants of higher pay were: being male, being married or cohabiting and having a degree. For cognitive skills, there is no significance effect of results of key stage 2 English and Maths in relation to log of wages at age 25, although when we add GCSEs, there is a significant positive effect to log of wages at age 25 for all young people, especially boys.

Table 6.9: Panel A: OLS coefficients of log hourly wages at 25 years old with ordinary least squares with robust standard errors

Dependent variable: Log of wages at age 25	(1)			(2)			(3)		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
External locus of control at age 14/15	-0.024***	-0.021*	-0.024**	-0.014*	-0.011	-0.016	-0.012	-0.016	-0.009
	[0.008]	[0.012]	[0.012]	[0.008]	[0.011]	[0.011]	[0.009]	[0.012]	[0.012]
Effort at age 14/15	0.019**	0.018	0.017	0.022**	0.016	0.023*	0.020*	0.014	0.021
	[0.008]	[0.015]	[0.013]	[0.009]	[0.014]	[0.013]	[0.011]	[0.016]	[0.015]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.086**	-0.069	-0.113**	-0.067*	-0.036	-0.090*	-0.165	-0.287	-0.131
	[0.038]	[0.052]	[0.052]	[0.037]	[0.041]	[0.049]	[0.202]	[0.284]	[0.260]
Key stage 2 English	-0.001	0.001	-0.001	-0.001	0.001	-0.001	0.001	0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Key stage 2 Maths	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
More than 5 A*-C in GCSEs				0.071**	0.146***	0.007	0.070**	0.146***	0.001
				[0.030]	[0.051]	[0.037]	[0.030]	[0.051]	[0.037]
Interaction effects									
Experience NEET more than 6 months at age 16/17 to age 19/20 x External locus of control at age 14/15							-0.008	0.039	-0.055*
							[0.018]	[0.028]	[0.031]
Experience NEET more than 6 months at age 16/17 to age 19/20 x Effort at age 14/15							0.011	0.018	0.029
							[0.019]	[0.035]	[0.030]
Control variables at age 25									
Married or civil partner at age 25				-0.005	0.008	-0.001	-0.006	0.013	0.001
				[0.036]	[0.051]	[0.050]	[0.036]	[0.052]	[0.050]
Cohabiting at age 25				0.078***	0.108**	0.049	0.078***	0.104**	0.047
				[0.025]	[0.044]	[0.025]	[0.025]	[0.044]	[0.031]
Number of children at age 25				-0.021	-0.039	-0.003	-0.020	-0.041	0.008
				[0.020]	[0.025]	[0.031]	[0.020]	[0.025]	[0.028]
Education degree at age 25 (ref.: No education degree)									
Degree and higher education				0.120***	0.184***	0.072*	0.118***	0.185***	0.066*
				[0.032]	[0.053]	[0.038]	[0.032]	[0.053]	[0.038]

Full-time paid employee[22] or self-employed at age 25 (ref: part-time)				0.149*** [0.042]	0.015 [0.090]	0.219*** [0.045]	0.187*** [0.032]	0.012 [0.091]	0.221*** [0.045]
Personal characteristics									
White	-0.125*** [0.031]	-0.067 [0.052]	-0.171*** [0.044]	-0.100*** [0.032]	-0.096* [0.049]	-0.111*** [0.042]	-0.100*** [0.032]	-0.097** [0.049]	-0.108*** [0.042]
Female	-0.123*** [0.025]			-0.118*** [0.025]			-0.118*** [0.025]		
Family background at age 13/14 to age 19/20									
Lived in parents' owned house at age 14/15 (ref: rented)	0.057 [0.039]	0.026 [0.051]	0.085 [0.057]	0.063* [0.038]	0.020 [0.049]	0.095* [0.056]	0.061** [0.038]	0.023 [0.049]	0.087 [0.057]
Parents gross household income at age 14/15 (ref: middle income £12,000 to £47,999 per year)									
Low income below £12,000	-0.031 [0.040]	-0.052 [0.056]	-0.011 [0.044]	-0.021 [0.038]	-0.062 [0.053]	0.012 [0.055]	-0.021 [0.038]	-0.062 [0.053]	0.010 [0.055]
High income £48,000 and above	0.140*** [0.032]	0.151*** [0.056]	0.126*** [0.038]	0.113*** [0.031]	0.105** [0.052]	0.113* [0.056]	0.113*** [0.031]	0.105** [0.052]	0.114*** [0.037]
Parents socio-economic classification at age 14/15									
Managerial and professional: (ref: Other)	0.019 [0.029]	-0.035 [0.044]	0.060 [0.039]	0.006 [0.028]	-0.038 [0.044]	0.032 [0.037]	0.007 [0.028]	-0.039 [0.044]	0.033 [0.037]
Live with single parent age 14/15 (ref: both parents)	-0.003 [0.039]	0.048 [0.052]	-0.039 [0.058]	-0.003 [0.038]	0.045 [0.050]	-0.036 [0.057]	-0.003 [0.038]	0.046 [0.050]	-0.038 [0.056]
Mother work (ref: mother not working)	0.026 [0.031]	0.044 [0.047]	0.020 [0.041]	0.013 [0.031]	0.028 [0.045]	0.014 [0.041]	0.015 [0.031]	0.028 [0.045]	0.019 [0.042]
R^2	0.07	0.05	0.08	0.11	0.10	0.13	0.11	0.10	0.13
Observations	1,692	743	949	1,692	743	949	1,692	743	949

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other control variable is government region office at age 25 (ref: London).

(1) Model 1 without adult control variables
(2) Model 2 with no interactions of noncognitive skills and NEET
(3) Model 3 with interactions of noncognitive skills and NEET

[22] Full-time paid employee works more than 30 hours per week

Panel B: OLS coefficients of log hourly wages at 25 years old with ordinary least squares with robust standard errors with added control variables GCSE

Dependent variable: Log of wages at age 25	Model 1 without adult control variables (1)		
	All	Boys	Girls
External locus of control at age 14/15	-0.019** [0.009]	-0.016 [0.012]	-0.018 [0.012]
Effort at age 14/15	0.019** [0.009]	0.018 [0.015]	0.017 [0.013]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.072* [0.037]	-0.069 [0.052]	-0.100* [0.052]
Key stage 2 English	0.001 [0.001]	0.001 [0.001]	-0.001 [0.001]
Key stage 2 Maths	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
More than 5 A*-C in GCSEs	0.141*** [0.033]	0.131** [0.033]	-0.149** [0.036]
Personal characteristics			
White	-0.117*** [0.031]	-0.067 [0.052]	-0.157*** [0.043]
Female	-0.137*** [0.026]		
Family background at age 13/14 to age 19/20			
Lived in parents' owned house at age 14/15 (ref: rented)	0.057 [0.039]	0.026 [0.051]	0.085 [0.057]
Low income below £12,000	-0.031 [0.040]	-0.052 [0.056]	-0.011 [0.044]
High income £48,000 and above	0.123*** [0.032]	0.130** [0.058]	0.112*** [0.037]
Parents socio-economic classification at age 14/15			
Managerial and professional: (ref: Other)	0.019 [0.029]	-0.035 [0.044]	0.060 [0.039]
Live with single parent age 14/15 (ref: both parents)	-0.003 [0.039]	0.048 [0.052]	-0.039 [0.058]
Mother work (ref: mother not working)	0.026 [0.031]	0.044 [0.047]	0.020 [0.041]
R^2	0.08	0.06	0.10
Observations	1,692	743	949

6.4.4 Well-being at age 25: Life satisfaction scores

Table 6.10 shows the results for probit of life satisfaction at age 25. Column 1 shows our analysis without considering life events at age 25. We found that the effect of external locus of control, effort and NEET are more significant in explaining life satisfaction, as Clark et al. (2008) discussed that strongest life satisfaction effect is often at the time of the life and labour market event.

In Column 1 in Table 6.10, we have done the analysis without the interaction effects of noncognitive skills and NEET. The result shows that for non-cognitive skills, young people with a greater degree of external locus of control at age 14/15 are significantly less likely to be fairly satisfied or very satisfied in their life at age 25 compared to those with a lower degree of external locus of control at age 14/15. This result is in line with Verme (2009) as they found 'Internals' are found to appreciate freedom of choice more than 'externals' and to be happier. There is a gender difference as only boys show significant result, which can contribute to the discussion of gender difference in young people's well-being as Bergman and Scott (2001) found girls generally report greater unhappiness and more frequent past worries.

In addition, young people with higher degree of effort at age 14/15 is significantly more likely in to be fairly satisfied or very satisfied at age 25 compared to young people with lower degree of effort at age 14/15. There is no direct comparison to past studies to the best of our knowledge on effect of effort on life satisfaction. A possible reference by Duckworth et al. (2007) found that perseverance and passion for long-term goals or grit accounted for an average of 4% of the variance in success outcomes, including educational attainment. Another possible reference is Boyce et al. (2010), who found that conscientiousness is related positive to well-being, in the event of unemployment, the positive relationship typically seen between conscientiousness and well-being is reversed.

Meanwhile, other early experiences like NEET at age 16/17 to age 19/20 show significant results in explaining life satisfaction scores at age 25. Column 2 in Table 6.10 shows that boys who experience NEET more than 6 months at age 16/17 to age 19/20 are significantly less likely to be fairly satisfied or very satisfied in their life at age 25 compared to young people who did not experience NEET more than 6 months at age 16/17 to age 19/20. There is a gender difference observed as only the result for boys are significant. The impact of unemployment on life satisfaction is worse for men is explained by Clark et al. (2008) who found men are somewhat more affected by labour market events of unemployment and layoffs than women using German panel data, most probably because most men are sole provider for their family. However, evidence in the UK by McQuaid et al. (2014) using the same cohort in BHPS found no significant evidence of scarring on later life satisfaction. In Column 3 in Table 6.10, we have included the interaction effects of noncognitive skills

with NEET experience at age 16/17 to age 19/20 as moderating effects, however we found that the interaction effects are not significant.

Control variables that are significant in explaining life satisfaction scores at more than 95% level of significance are personal relationship, economic activity and higher education degree. Young people with marriage or cohabiting relationship at age 25 are more likely to be fairly satisfied or very satisfied in their life at age 25 compared to young people without cohabiting relationship at age 25. However, life events such as marriage may be a temporary as Clark et al. (2008) found complete adaptation to baseline life satisfaction level using German panel data. We also found unfavourable economic activity such as unemployment and inactivity are significant in explaining life satisfaction scores. This result might have longer-term effect on life satisfaction as it is the one event that individuals do not seem to revert to baseline satisfaction levels (Clark et al. (2008); Clark and Georgellis, 2012). For cognitive skills, there is no significance effect of results of key stage 2 English and Maths in relation to life satisfaction at age 25, although when we add GCSEs, there is a significant effect to life satisfaction at age 25.

Table 6.10: Panel A: Marginal Effects of Life Satisfaction at 25 years old with adult, child factors and NEET interactions for all young people

Life Satisfaction = 1 (satisfied), 0 (the rest)	Model 1 without adult control variables (1)			Model 2 with no interactions of noncognitive skills and NEET (2)			Model 3 with interactions of noncognitive skills and NEET (3)		
Variables	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
External locus of control at age 14/15	-0.010* [0.006]	-0.024** [0.009]	-0.001 [0.008]	0.008 [0.006]	-0.007 [0.009]	0.006 [0.007]	-0.001 [0.006]	-0.007 [0.009]	0.006 [0.008]
Effort at age 14/15	0.011* [0.007]	-0.001 [0.011]	0.017* [0.008]	0.010 [0.006]	0.001 [0.010]	0.015* [0.008]	0.010 [0.006]	0.001 [0.010]	0.015* [0.008]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.110*** [0.028]	-0.167*** [0.044]	-0.067* [0.035]	-0.073*** [0.027]	-0.095** [0.042]	-0.051 [0.026]	-0.069** [0.027]	-0.096** [0.043]	-0.037 [0.035]
Key stage 2 scores English	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
Key stage 2 scores Maths	0.001 [0.001]	0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]	0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]	0.001 [0.001]	-0.001 [0.001]
More than 5 A*-C in GCSEs				0.048** [0.020]	0.075** [0.033]	0.028 [0.026]	0.048** [0.020]	0.075** [0.033]	0.029 [0.026]
<u>Interaction effects (raw coefficients)</u>									
Experience NEET more than 6 months at age 16/17 to age 19/20 x External locus of control at age 14/15							0.001 [0.053]	0.006 [0.088]	-0.050 [0.070]
Experience NEET more than 6 months at age 16/17 to age 19/20 x Effort at age 14/15							0.047 [0.057]	-0.006 [0.091]	0.093 [0.079]
<u>Control variables</u>									
Married or civil partner at age 25				0.103*** [0.028]	0.084* [0.051]	0.104*** [0.033]	0.101*** [0.028]	0.084* [0.051]	0.104*** [0.033]
Cohabiting at age 25				0.132*** [0.020]	0.135*** [0.034]	0.133*** [0.025]	0.132*** [0.020]	0.135*** [0.034]	0.130*** [0.025]
Number of children at age 25				0.016 [0.015]	-0.015 [0.027]	0.019 [0.018]	0.017 [0.015]	-0.015 [0.027]	0.020 [0.018]
Unemployed at age 25				-0.297*** [0.047]	-0.329*** [0.063]	-0.252*** [0.074]	-0.297*** [0.047]	-0.329*** [0.063]	-0.251*** [0.074]
In education at age 25				-0.036 [0.040]	-0.025 [0.065]	-0.046 [0.051]	-0.034 [0.040]	-0.025 [0.065]	-0.044 [0.051]

Sick, looking after home or other at age 25				-0.180*** [0.046]	-0.388*** [0.106]	-0.177*** [0.054]	-0.194*** [0.046]	-0.388*** [0.106]	-0.173*** [0.054]
White	0.108*** [0.023]	0.131*** [0.036]	0.090*** [0.029]	0.048* [0.027]	0.065 [0.040]	0.064* [0.038]	0.047* [0.027]	0.065 [0.040]	0.064* [0.038]
Female	0.076*** [0.018]			0.051*** [0.018]			0.061*** [0.027]		
Log weekly income at age 25				0.113** [0.057]	0.120 [0.087]	0.004 [0.082]	0.063 [0.059]	0.120 [0.087]	0.004 [0.082]
Education degree at age 25 (ref.: No education degree)									
Degree and higher education				0.009 [0.019]	0.006 [0.030]	0.006 [0.024]	0.007 [0.019]	0.120 [0.087]	0.004 [0.082]
Family background at age 13/14 to age 19/20									
Lived in parents' owned house at age 14/15 (ref: rented)	0.026 [0.024]	0.025 [0.039]	0.034 [0.031]	0.006 [0.023]	-0.005 [0.037]	0.023 [0.030]	0.009 [0.023]	-0.005 [0.037]	0.023 [0.030]
Low income below £12,000	0.006 [0.028]	-0.016 [0.045]	0.024 [0.035]	0.015 [0.026]	-0.012 [0.042]	0.032 [0.033]	0.012 [0.026]	-0.012 [0.042]	0.032 [0.033]
High income £48,000 and above	0.055** [0.024]	0.059 [0.036]	0.051* [0.031]	0.041* [0.023]	0.035 [0.036]	0.045 [0.031]	0.043* [0.023]	0.035 [0.036]	0.045 [0.031]
Parents socio-economic classification at age 14/15									
Managerial and professional: (ref: Other)	-0.003 [0.021]	-0.037 [0.033]	0.019 [0.026]	-0.017 [0.021]	-0.055* [0.032]	0.023 [0.027]	-0.013 [0.021]	-0.055* [0.032]	0.023 [0.027]
Live with single parent age 14/15 (ref: both parents)	-0.048* [0.025]	-0.033 [0.033]	-0.057* [0.031]	-0.022 [0.024]	-0.013 [0.033]	-0.047 [0.032]	-0.022 [0.024]	-0.013 [0.033]	-0.047 [0.032]
Mother work (ref: mother not working)	-0.014 [0.023]	0.001 [0.037]	-0.027 [0.029]	-0.027 [0.023]	-0.010 [0.037]	-0.034 [0.029]	-0.022 [0.023]	-0.010 [0.037]	-0.032 [0.029]
R^2	0.04	0.05	0.03	0.10	0.12	0.09	0.10	0.12	0.09
Observations	2,310	1,014	1,296	2,310	1,014	1,296	2,310	1,014	1,296

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Panel B: Marginal Effects of Life Satisfaction at 25 years old with child factors with added control variable GCSEs

Life Satisfaction = 1 (satisfied), 0 (the rest)	Model 1 without adult control variables (1)		
Variables	All	Boys	Girls
External locus of control at age 14/15	-0.008 [0.006]	-0.021** [0.009]	-0.001 [0.008]
Effort at age 14/15	0.010 [0.007]	-0.001 [0.011]	0.017* [0.008]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.105*** [0.028]	-0.156*** [0.044]	-0.065* [0.035]
Key stage 2 scores English	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
Key stage 2 scores Maths	0.001 [0.001]	0.001 [0.001]	-0.001 [0.001]
5 or more A*-C in GCSEs	0.051*** [0.020]	0.131*** [0.036]	0.094*** [0.029]
White	0.112*** [0.023]	0.133*** [0.036]	0.094*** [0.029]
Female	0.072*** [0.018]		
Family background at age 13/14 to age 19/20			
Lived in parents' owned house at age 14/15 (ref: rented)	0.021 [0.024]	0.015 [0.039]	0.032 [0.031]
Low income below £12,000	0.009 [0.027]	-0.014 [0.044]	0.026 [0.034]
High income £48,000 and above	0.050** [0.024]	0.050 [0.037]	0.048 [0.032]
Parents socio-economic classification at age 14/15			
Managerial and professional: (ref: Other)	-0.009 [0.021]	-0.045 [0.033]	0.015 [0.027]
Live with single parent age 14/15 (ref: both parents)	-0.048* [0.025]	-0.034 [0.039]	-0.056* [0.031]
Mother work (ref: mother not working)	-0.011 [0.023]	0.007 [0.037]	-0.025 [0.029]
R^2	0.04	0.05	0.03
Observations	2,310	1,014	1,296

6.4.5 Other measures of well-being: GHQ-12 scores

Table 6.11 show the results for marginal effects of GHQ scores at age 25. In Column 1, when we remove adult control variables, the result shows that noncognitive skills at age 14/15 are not significant to explain well-being at age 25. In Column 3, when we remove adult control variables, the result shows that effect of NEET to GHQ scores increases and significant for boys and girls, implying some of life events at age 25 has a greater effect on GHQ scores. Life events such as unemployment might have a recurring effect, as McQuaid et al. (2014) confirm the existence of a scarring effect to a greater likelihood of future unemployment.

In Column 1, 2 and 3 of Table 6.11 the result shows that although we do not find a significant result for non-cognitive skills at age 14/15 and GHQ-12 at age 25, girls with external locus of control at age 14/15 are less likely to report higher levels of well-being at age 25. Our results contribute to the discussion of the relationship between noncognitive skills and GHQ-12, as Lessof et al. (2016) who also used GHQ-12 found correlation between lower locus of control and higher levels of psychological distress, particularly among girls and those with long-standing illness and disability that affects schooling.

We also found gender difference as discussed in the life satisfaction section. The biggest difference when using GHQ scores as a measure of well-being is that we found that effort is not significant to explain well-being, even when we remove life events at age 25. This might be due to effort is correlated with one of the variables used to calculate GHQ-12 scores. We check the correlation of effort with one of the variables used to calculate GHQ-12 scores which is "Concentrate on what doing" and the correlation is 7%.

GHQ also has previously been used in economics to examine the psychological impact of unemployment (Clark and Oswald, 1994; Clark, 2003). Our results show other early experiences like NEET at age 16/17 to age 19/20 show significant results in explaining GHQ-12 scores at age 25. Column 2 in Table 6.11 shows that boys who experience NEET more than 6 months at age 16/17 to age 19/20 are significantly less likely to be at a higher well-being at age 25 compared to young people who did not experience NEET more than 6 months at age 16/17 to age 19/20. There is a gender difference observed as only the result for boys are significant. We found 4-8% experience of NEET explaining GHQ scores, which is similar to 3-9% experience of NEET explaining life satisfaction. Our results are in line with previous literature as the Clark and Georgellis (2002) found negative well-being effect from unemployment using both life satisfaction and GHQ.

The results for control variables are similar with life satisfaction scores. Control variables that are significant in explaining GHQ-12 scores at more than 95% level of significance are personal relationship, economic activity and higher education degree. We note some difference, for example the effect of cohabiting is significant for girls, probably because of the reason discussed Azmat and Petrongolo (2014) who found women may be more

sensitive to social cues. For cognitive skills, there is no significance effect of results of key stage 2 English and Maths in relation to GHQ at age 25, although when we add GCSEs, there is a significant effect to GHQ at age 25.

In this section, we use GHQ-12 to measure well-being. It may affect our results as GHQ may pick up different aspects of well-being compared to satisfaction. GHQ is more of a short-term measure whilst life satisfaction is more of a longer-term measure in some ways. In addition, past studies such as Lessof et al. (2016) found that disadvantaged young people from lower socio-economic family and with no education degree reported lower average levels of psychological distress than those from more advantaged backgrounds. Although we control for all these variables, it is harder to measure the effect of noncognitive skills to well-being.

Table 6.11: Panel A: OLS Coefficients (Marginal effects) of GHQ-12 scores at age 25 with adult, child factors and NEET interactions for all young people

GHQ-12 scores, reversed (higher values represent higher well-being)	Model 1 without adult control variables (1)			Model 2 with no interactions of noncognitive skills and NEET (2)			Model 3 with interactions of noncognitive skills and NEET (3)		
Variables	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
External locus of control at age 14/15	-0.033	-0.034	-0.031	0.005	0.047	-0.024	0.005	0.047	-0.024
	[0.046]	[0.069]	[0.062]	[0.046]	[0.069]	[0.061]	[0.046]	[0.069]	[0.061]
Effort at age 14/15	-0.003	0.006	0.004	0.002	0.031	0.015	0.002	0.031	0.015
	[0.053]	[0.078]	[0.073]	[0.053]	[0.076]	[0.072]	[0.053]	[0.076]	[0.072]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.421**	-0.890***	-0.072	-0.230	-0.539*	0.030	-0.230	-0.539*	0.030
	[0.201]	[0.314]	[0.260]	[0.204]	[0.310]	[0.265]	[0.204]	[0.310]	[0.265]
Key stage 2 scores English	0.003	0.001	0.005	0.001	0.001	0.001	0.001	0.001	0.001
	[0.006]	[0.009]	[0.008]	[0.006]	[0.009]	[0.008]	[0.006]	[0.009]	[0.008]
Key stage 2 scores Maths	0.001	0.004	-0.001	0.001	0.002	-0.001	0.001	0.002	-0.001
	[0.004]	[0.006]	[0.006]	[0.004]	[0.006]	[0.006]	[0.004]	[0.006]	[0.006]
More than 5 A*-C in GCSEs				-0.351**	-0.097	-0.509**	-0.351**	-0.097	-0.509**
				[0.159]	[0.245]	[0.210]	[0.159]	[0.245]	[0.210]
Interaction effects									
Experience NEET more than 6 months at age 16/17 to age 19/20 x External locus of control at age 14/15							-0.026	-0.001	0.089
							[0.140]	[0.236]	[0.171]
Experience NEET more than 6 months at age 16/17 to age 19/20 x Effort at age 14/15							0.009	-0.198	0.164
							[0.146]	[0.234]	[0.182]
Control variables									
Married or civil partner at age 25				0.360*	0.273	0.361	0.360*	0.273	0.361
				[0.216]	[0.350]	[0.273]	[0.216]	[0.350]	[0.273]
Cohabiting at age 25				0.435***	0.170	0.645***	0.435***	0.170	0.645***
				[0.154]	[0.234]	[0.201]	[0.154]	[0.234]	[0.201]
Number of children at age 25				-0.063	-0.203	0.065	-0.063	-0.203	0.065
				[0.128]	[0.176]	[0.172]	[0.128]	[0.176]	[0.172]
Unemployed at age 25				-2.403***	-2.896***	-1.816***	-2.403***	-2.896***	-1.816***
				[0.384]	[0.527]	[0.552]	[0.384]	[0.527]	[0.552]
In education at age 25				-0.388	-0.574	-0.318***	-0.388	-0.574	-0.318***
				[0.319]	[0.494]	[0.419]	[0.319]	[0.494]	[0.419]

Sick, looking after home or other at age 25				-1.856*** [0.393]	-3.450*** [0.986]	-1.635*** [0.439]	-1.856*** [0.393]	-3.450*** [0.986]	-1.635*** [0.439]
White	0.001 [0.164]	0.062 [0.244]	-0.026 [0.219]	-0.070 [0.205]	-0.146 [0.298]	-0.122 [0.283]	-0.070 [0.205]	-0.146 [0.298]	-0.122 [0.283]
Female	-0.305 [0.131]			-0.213 [0.134]			-0.213 [0.134]		
Log weekly income at age 25				-0.484 [0.450]	0.009 [0.613]	-1.198* [0.658]	-0.484 [0.450]	0.009 [0.613]	-1.198* [0.658]
Education degree at age 25 (ref.: No education degree)									
Degree and higher education				-0.089 [0.171]	-0.151 [0.219]	-0.076 [0.194]	0.360* [0.216]	0.273 [0.350]	0.361 [0.273]
Family background at age 13/14 to age 19/20									
Lived in parents' owned house at age 14/15 (ref: rented)	0.176 [0.197]	0.012 [0.295]	0.291 [0.264]	0.093 [0.194]	0.100 [0.295]	0.256 [0.261]	0.093 [0.194]	0.100 [0.295]	0.256 [0.261]
Low income below £12,000	0.014 [0.213]	-0.152 [0.310]	0.149 [0.291]	0.003 [0.207]	-0.133 [0.310]	0.118 [0.284]	0.003 [0.207]	-0.133 [0.310]	0.118 [0.284]
High income £48,000 and above	0.238 [0.165]	0.160 [0.239]	0.298 [0.227]	0.245 [0.166]	0.081 [0.247]	0.365 [0.227]	0.245 [0.166]	0.081 [0.247]	0.365 [0.227]
Parents socio-economic classification at age 14/15									
Managerial and professional: (ref: Other)	-0.081 [0.156]	-0.389* [0.228]	0.130 [0.213]	-0.039 [0.156]	-0.370 [0.230]	0.251 [0.213]	-0.039 [0.156]	-0.370 [0.230]	0.251 [0.213]
Live with single parent age 14/15 (ref: both parents)	-0.486** [0.196]	-0.473 [0.306]	-0.474* [0.257]	-0.487** [0.197]	-0.434 [0.306]	-0.560** [0.261]	-0.487** [0.197]	-0.434 [0.306]	-0.560** [0.261]
Mother work (ref: mother not working)	0.106 [0.184]	0.238 [0.268]	0.010 [0.251]	0.068 [0.191]	0.132 [0.268]	0.037 [0.260]	0.068 [0.191]	0.132 [0.268]	0.037 [0.260]
R^2	0.01	0.01	0.01	0.06	0.10	0.05	0.06	0.10	0.05
Observations	2,296	1,822	1,288	2,296	1,822	1,288	2,296	1,822	1,288

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Panel B: OLS Coefficients (Marginal effects) of GHQ-12 scores at age 25 with child factors with added control variable GCSE

GHQ-12 scores, reversed (higher values represent higher well-being)	Model 1 without adult control variables (1)		
Variables	All	Boys	Girls
External locus of control at age 14/15	-0.046 [0.046]	-0.039 [0.069]	-0.052 [0.062]
Effort at age 14/15	0.005 [0.053]	0.006 [0.078]	0.005 [0.073]
Experience NEET more than 6 months at age 16/17 to age 19/20	-0.452** [0.202]	-0.905*** [0.314]	-0.106 [0.260]
Key stage 2 scores English	0.002 [0.006]	0.001 [0.009]	0.005 [0.008]
Key stage 2 scores Maths	0.001 [0.004]	0.004 [0.006]	-0.001 [0.006]
More than 5 A*-C in GCSEs	-0.341** [0.153]	-0.145 [0.233]	-0.484** [0.202]
White	-0.021 [0.164]	0.058 [0.244]	-0.086 [0.219]
Female	-0.279** [0.131]		
Family background at age 13/14 to age 19/20			
Lived in parents' owned house at age 14/15 (ref: rented)	0.190 [0.196]	0.028 [0.295]	0.324 [0.264]
Low income below £12,000	-0.003 [0.212]	-0.156 [0.310]	0.118 [0.291]
High income £48,000 and above	0.279* [0.166]	0.179 [0.244]	0.365 [0.227]
Parents socio-economic classification at age 14/15			
Managerial and professional: (ref: Other)	-0.038 [0.156]	-0.373 [0.223]	0.194 [0.213]
Live with single parent age 14/15 (ref: both parents)	-0.472** [0.196]	-0.470 [0.306]	-0.476* [0.257]
Mother work (ref: mother not working)	0.088 [0.184]	0.226 [0.268]	-0.016 [0.251]
R^2	0.01	0.02	0.02
Observations	2,296	1,822	1,288

6.5 Conclusions

The purpose of this chapter is to look at the effect of noncognitive skills and NEET experience to later outcomes in employment, earnings and well-being. In Chapter 4, we found that the effect of noncognitive skills particularly effort is statistically significant in the pathways of young people at age 16/17 and age 18/19. Meanwhile, in Chapter 5, we also found that noncognitive skills especially external locus of control matters for duration of NEET. In this chapter, our research question is to look at the effect of noncognitive skills at age 14/15 to long-term outcomes. We found that noncognitive skills particularly external locus of control is significant in explaining long-term outcomes at age 25. Our findings are

in line with previous study that noncognitive skills has effect on longer-term outcomes of employment, earnings and long-term well-being (Cobb-Clark and Tan (2009), Flossman and Piatek (2007), Buchmueller (2019), Lindqvist and Vestman (2011), (Verme (2009), Buddelmeyer and Powdthavee (2016)). We also found that noncognitive skills has no significant effect to short-term wellbeing at age 25. Our key results in this chapter reveal that noncognitive skills are significant in determining educational outcomes (1-4%), and labour market outcomes (1-3%), wages (1-2%), and life satisfaction (1-2%). As these outcomes are also related with each other, for example young people with an education degree is more likely to find employment and higher wages and leads to higher life satisfaction, we can see that the effect of noncognitive skills is crucial in determining young people outcomes, especially since noncognitive skills effect the first stage of outcome in getting an education degree.

We also found that experience of NEET at age 16/17 to age 19/20 has significant but small effect in explaining pathways at age 25. The results appear to support Kahneman et al., (2004) who argue that many circumstances have small effects on wellbeing. The size of coefficients on recent unemployment and relationships are larger than effects of NEET, which is in line with findings of Burchard (2004) that adverse effects on life satisfaction are likely to be greater with recent life events, rather than longer term changes in circumstances. The small effect of NEET to well-being may be related with the findings of Clark and Oswald (1994), who suggested that youth unemployment is common among young people and it is perceive as an experience to transition to enter the labour market. The author suggested the adverse damage of unemployment are more visible to mental well-being for those aged 30–49, as unemployment rate is higher at that age.

7 Conclusion

7.1 Summary

This thesis aimed to analyse the effect of non-cognitive skills on the pathways of youth outcomes, the duration of NEET, and on longer-term outcomes of young people in England. From the three empirical analyses reported in this study, we found that non-cognitive skills do influence the pathways of youth outcomes, the duration of NEET, and on the long-term outcomes of young people in England.

We start with an overview of the main results, with reference to the research questions outlined in chapter 1, before moving onto a discussion of and the policy implications of our findings. Our over-arching question is: What is the effect of noncognitive skills to young peoples' outcomes in England? We break it into three research chapters of Chapter 4, 5 and 6. In Chapter 4, our sub-question is as below:

i. What is the effect of non-cognitive skills in relation to pathways after school (further education, employment or NEET) at age 16/17 and age 18/19?

The first set of research questions addressed the effect of non-cognitive skills to the probability of outcomes of young people at age post-16, and if there is any gender difference. The two measures of non-cognitive skills at age 14/15 (locus of control and effort) were found statistically significant in determining the outcomes (further education, employment, or NEET) of young people at age post-16. We considered two outcomes after compulsory education at age 16/17, and then at age 18/19.

Our first analysis shows that the largest effect of non-cognitive skills to outcomes of young people is contributed by effort which was in line with previous studies (e.g. Duckworth et al., 2007). The effect of effort is statistically significant to determine all three outcomes at age 16/17 and at age 18/19. We found that the effect of effort is the largest to determine further education compared to employment or training and NEET compared to locus of control, and the effect of effort is larger at age 18/19 compared to the effect at age 16/17. There is no large gender difference observed in further education, but there are some gender

differences observed in the likelihood of young people in employment and NEET. Boys benefit more from noncognitive skills in reducing chance of employment, and girls benefit more from noncognitive skills in lowering chance of NEET. There is a slight gender difference as boys benefit more from effort compared to girls in increasing chance of going to further education and lowering probability of being in employment or training. From our first analysis, we also found weaker effect of locus of control compared to effort, as it is statistically significant in determining NEET at age 16/17, but not at age 18/19.

Our secondary analysis offers more insight on young people at risk of dropping out of further education, and later at risk of being NEET. Our results reveal that locus of control is statistically significant to determine outcome of NEET at age 16/17 and at age 18/19 when we allow for selection out of further education. The effect of effort is statistically significant in determining pathways of young people who drops out of further education and NEET at age 16/17 but is weaker when we look at people who drop out from further education at age 18/19. We observe that boys benefit more from both non-cognitive skills to determine the likelihood to drop out from further education, and to be NEET at age 18/19, while the results for girls is statistically insignificant. The greatest risk for young people is to be NEET. From our secondary analysis, we only look at NEET at two points of time in their life, which is at age 16/17 and at age 18/19. As such, we are wondering whether young people are continuously in NEET and what is the effect of noncognitive skills if young people are in that situation? This leads to our second research question, which are:

ii. What is the effect of non-cognitive skills in relation to duration and exit in NEET at age 16/17 to age 19/20?

Our results provide evidence that locus of control and effort are significant to help young people to exit NEET. Locus of control is more important in determining duration of NEET, as it is statistically significant for young people to exit NEET either to further education or employment or training, while effort is statistically significant for young people to exit NEET either to further education.

As such, it is important to consider noncognitive skills in interventions to improve the life of young people, as noncognitive skills are malleable particularly in childhood (Joshi, 2014). In the second model, if the exit is specified to be in further education, the non-cognitive skills which are effort show a significant result for girls. In this case, high diligence and effort might be viewed as similar to conscientiousness as they have similar ability to predict years of schooling as discussed by Heckman and Klautz (2013, pg 23). It is important to focus on non-cognitive skills as non-cognitive skills are more malleable than cognitive skills. This leads to our third research question, where we examined the influence of noncognitive skills and NEET on longer-term outcomes.

iii. How noncognitive skills and NEET experiences effect long-term outcomes of employment, earning and well-being at age 25?

We found that non-cognitive skills particularly external locus of control is significant in explaining longer-term outcomes at age 25. Our findings are in line with previous study that look at adult and youth population that noncognitive skills has effect on longer-term outcomes of employment, earnings and well-being (Cobb-Clark and Tan, 2009, Flossman and Piatek, 2007, Buchmueller, 2019, Lindqvist and Vestman, 2011, Verme, 2009, Buddelmeyer and Powdthavee, 2016). We also found that experience of NEET at age 16/17 to age 19/20 has significant but small effect in explaining pathways at age 25. The results appear to support Kahneman et al., (2004) who argue that many circumstances have small effects on wellbeing. The size of coefficients on recent unemployment and relationships are larger than effects of NEET, which is in line with findings of Burchard (2004) that adverse effects on life satisfaction are likely to be greater with recent life events, rather than longer term changes in circumstances. The small effect of NEET to well-being may be related with the findings of Clark and Oswald (1994), who suggested that youth unemployment is common among young people and it is perceive as an experience to transition to enter the labour market.

One of our contributions is that there are some gender differences in the effect of noncognitive skills to young people outcomes. We bring something new to the emerging literature of economic of happiness as we have also looked at the effect of noncognitive skills to determine other measure of outcomes, such as well-being. We assume

noncognitive skills are just as important as cognitive skills in determining young people outcomes. We find empirical evidence that we allow noncognitive skills to determine outcomes of young people in different stages in life, from pathways after compulsory schooling, to duration of NEET, and longer outcomes such as educational attainment, employment, earnings and well-being. Our main empirical contributions include further insight from locus of control and effort that affect pathways of young people and NEET and determine longer-term outcomes in the labour market; and a new approach to assessing noncognitive skills by looking at other measures than the Big Five.

7.2 Discussions and future research questions

Our study provides a conclusive evidence of the statistical significance of noncognitive skills at age 14/15 in determining short-term and longer-term outcomes. We minimize heterogeneity in our results as our sample sizes are from the same age of cohort study 'Next Steps' that follows millennials born in 1989 to 1990. We found that our measure of noncognitive skills which is external locus of control are significant to explain outcomes in different stage of life. We thus contribute to the discussion of the stability of the effect of noncognitive skills as although the size of the effect changes, it is still statistically significant. We also contribute to the discussion of linking different measures of noncognitive skills, as our measure effort is link with a more establish classification of Big Five conscientiousness, and our measure of external locus of control is linked with the Big Five of neuroticism, as Palczyńska and Świst (2018) found conscientiousness is positively related to educational attainment, labour market participation, employability, wages, job satisfaction, health, trust and life satisfaction while Neuroticism has a negative relationship using a Polish study.

In 2006 at age 15/16, more than 4 in 5 of the respondents in Next Steps planned to stay in full-time education after the age of 16 (User guide, Wave 8, Appendix a, Pg. 27). However, in 2011, 1.16 million 16-24 year olds are not in education, employment or training and some young people remain out of learning or work for long periods in the UK (HM Government, 2011). The Next Steps respondents are included in this statistic as this policy paper 'Building Engagement, Building Futures' takes some of its findings from the Next Steps data, where our statistics show 9% of young people are NEET. The UK government

is also concerned that disadvantaged and vulnerable young people are at greater risk of long-term disengagement (HM Government, 2011). In this thesis, we found consistent evidence of the importance of noncognitive skills in determining pathways of young people at age 16/17 and age 18/19, NEET at age 16/17 to age 19/20, and long-term outcomes of employment, earnings and well-being at age 25. Focusing on NEET, our results show that noncognitive skills is an important determinant to get out of NEET to further education or employment at age 1617 to age 19/20. This thesis can bring new light in bringing in a new approach to encourage this group to realize their potential and to break the inter-generational cycle of disengagement. Our results also confirmed that experiences of NEET negatively affect 4-5% percentage point of young peoples' well-being through life satisfaction scores.

As such, we have provided evidence of noncognitive skills for young people at risk of dropping out of further education, and at later risk of being NEET. Noncognitive skills are important as a young person are in control of their noncognitive skills, for example a person can choose to believe in their own control instead of blaming it on luck. Although there are other factors such as personal characteristics, and family background that determine the outcomes of young people, all these factors are outside of control of young people. Non cognitive skills are also malleable up to late adulthood, compared to cognitive skills which are only malleable in childhood, and not malleable after adolescence. Our findings of the significance of noncognitive skills especially locus of control in determining short-term and long-term educational labour outcomes are important because young person can change their noncognitive skills and affect their future outcomes, even if they lack advantage in personal characteristics, family background and cognitive skills.

Our policy implications include to increase locus of control and effort for young people in school, as locus of control is important in driving educational and labour market outcomes, and effort is important in short-term outcomes or pathways after compulsory schooling. For example, the interventions to raise grit by Education Endowment Foundations discussed the measure used by Duckworth and Quinn (2009), where they recommend using

short grit scale based on 4 items[23] from 'consistency of interest' and 4 items[24] from 'perseverance of effort' rather than the original grit scale that uses 12 items to predict educational attainment and academic success. Another example is by Gutman and Schoon (2013, p.44), where they proposed to increase noncognitive skills by introducing service-learning provision to increase self-efficacy, motivation and social skills through: "i) having a curriculum-based approach where the intervention has clear goals that align with the curriculum and containing corresponding activities to match those goals; ii) involving reflection where young people can assess their experiences (e.g., using journals, having discussions in class or in small groups, writing essays about the service experience, presenting to the class what was learned, or reflecting individually with the teacher or site supervisor); iii) giving students or young people a voice and involving them in the planning, decision-making, implementation, or evaluation process of the programme; and iv) ensuring community involvement where the community has a part in the programme besides providing a place for students to serve".

7.3 Limitations

Our results for age 16/17 might not be applicable to newer cohort. For the cohort that we are looking at, young people had to make these choices at age 16 but this is not necessarily true of more recent cohorts who must remain in education and training until they are aged 18.

We found that the results are not causal but rather correlations as there are endogeneity issues as there might be omitted variables that lead to the endogeneity, such as expectations of financial means after compulsory schooling. For example, the external locus of control looks at questions such as "Even if I do well at school, I will have a hard time" and "People like me do not have much of a chance". However, young people from low socio-economic background probably interpret these questions differently from young people from high

[23] The 4 items from 'consistency of interest' are: 1. I often set a goal but later choose to pursue a different one; 2. I have been obsessed with a certain idea or project for a short time but later lost interest; 3. I have difficulty maintaining my focus on projects that take more than a few months to complete; and 4. New ideas and projects sometimes distract me from previous ones.

[24] The 4 items from 'perseverance of effort' are: 1. I finish whatever I begin.; 2. Setbacks don't discourage me.; 3. I am diligent.; 4. I am a hard worker.

socio-economic background. Young people from low socio-economic background might feel that although they are doing well in school, they will still have a hard time securing a place at the university as they will face a lack of financial means later in life, as opposed to young people from high socio-economic background who have their funds available for them provided by their family. Although there are control variables for the socio-economic background, these effects might persist when looking at the external locus of control. In addition, there also might be some other factors that impact locus of control. A study by Elkis and Schurer (2018) utilizing British cohort data suggest that for female and socioeconomically disadvantaged children, fathers' interest in their child's education at age 10 predicts internal locus of control in middle age.

One caveat of the analyses in this thesis is that it is not possible to see if there is variation in non-cognitive skills as we are taking observation only at age 14/15. Thus, we cannot observe and test for malleability of noncognitive skills. There are some limitations in using the Next Steps dataset, as we can only capture the non-cognitive skills earliest at age 14/15. However, because non-cognitive skills are more malleable than cognitive skills it is important to focus on non-cognitive skills at later years of adolescence.

There are some omitted variables in our specifications. For example, we did not include good conduct and family psychosocial in determining adult life satisfaction as Clark et al. (2014), and Layard et al. (2014) controls for these variables to explain adult life satisfaction at age 34 using British Cohort Study 1970. In addition, all of our results are correlations rather than causal as there are a lot of variables are outside of control.

7.4 Future Research

There is considerable scope for future research to expand on thesis. An obvious first step would be to test whether these findings replicate when using alternative measures of noncognitive skills, to reduce measurement error and produce more accurate estimates. It would be interesting to see if we can replicate our findings using another set of data in the UK. For example, Lessof et al. (2016) highlighted the difference and similarities of the second cohort of LSYPE (LSYPE2), known as 'Our Future' from millennials born in 1999/2000, where the data collection is from age 13/14 to age 19/20 starting from 2013 to

2020. It would be easy to replicate our study at least for Chapter 4 and 5 and to compare the findings between the two cohort as this dataset collect the same exact information on our measure external locus of control and effort. Lessof et al. (2016) compares noncognitive skills between these two cohorts, as young people in Next Steps have higher locus of control, and lower effort, but young people in Our Future have lower locus of control, and higher effort. It would be interesting to see how these differences in noncognitive skills would affect the short-term and long-term outcomes of young people. Another alternative dataset is Millennium Cohort Study who were born in 2000 to provide robust evidence to our findings by looking at the effects of noncognitive skills to their outcomes and comparing the findings to our findings of young people in Next Steps.

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Appendices

Appendix 1: Dependent variables details

Variable used	Original variable	Original variable label and question
Variable name: Activity Definition: Current labour market status Wave: Wave 4 – 7 (2007-2010), Age 16-19 Variable label 3 Employed and training 2 Education 1 NEET_unemployed and inactive Note: Excluded variable: Variable name ifheyp0e – YP: Type of qualification YP likely to be doing : GCSEs academicyp0c – YP: Whether YP studying for : GCSEs gcsenoyp - YP: Number of GCSEs YP studied for since September	Variable name : Mainactyp Definition: YP: Current main activity of YP (first options) Wave: Wave 4 (2007), Age 16	Variable label 1 Going to a school or college full time 2 In full-time paid work (30 or more hours a week) 3 Spending part of the week at a college, part of it with an employed job 4 On a training course or Apprenticeship 5 Something else Question I'd like you to look at this card and tell me which of the answers on it best describes what you are doing now. If you are currently on holiday from a school or college which you will be returning to in September, please answer number 1 from the card. IF NECESSARY: If you are on holiday or off sick at the moment, please tell me what you usually do. (5545wave_four_documentation.pdf)
	Variable name: tcurrentact Definition: Admin: Derived main current activity Wave: Wave 6 (2009), Age 18	

Appendix 2: Control variables details

Variable	Age/wave captured	Pre/post school	Fixed/variable	How constructed
Gender	Age 13/14 to age 19/20	In every wave pre-school and post school	Time invariant	As is
Ownhouse (household tenure)	Age 13/14 to age 17/18	In every wave pre-school and 2 waves post school	Time variant	Take average of every wave pre-school, then take maximum observation
Gross household income	Age 13/14 to age 14/15	In first 2 waves pre-school	Time variant, pre-16	Take average of every wave pre-school, then take maximum observation
White	Age 13/14 Age 14/15 Age 16/17	In first 2 waves pre-school and first wave post-school	Time invariant	Take maximum observation
Free school meal eligibility	Age 15/16	In last wave pre-school	Time invariant	Take maximum observation
Number of GCSEs achieved (A* to G)	Age 15/16	In last wave pre-school	Time invariant	Take maximum observation
Live with single or stepparent	Age 14/15 Age 15/16 Age 16/17	In last 2 waves pre-school and first wave post-school	Time variant	Take maximum observation
National Statistics Socio-Economic Classification (parents)	Age 13/14 Age 14/15	In first two wave pre-school	Time variant	Take maximum observation
Government office region	Age 14/15 Age 15/16	In last two waves pre-school	Time variant	Take maximum observation
Mother work	Age 14/15 Age 15/16	In last two waves pre-school	Time variant	Take maximum observation

Appendix 3: Hazard ratio of the other independent variables on NEET duration post-16 for all young people from Cox model

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.914***	0.984	0.920**
	[0.025]	[0.038]	[0.038]
High effort and diligence	0.982	0.988	0.967
	[0.030]	[0.039]	[0.047]
More than 5 A* to C in GCSEs	1.517***	1.144	1.503***
	[0.148]	[0.142]	[0.231]
Boys	1.116**	1.096	1.034
	[0.094]	[0.122]	[0.135]
Live in owned house	1.052	0.920	0.989
	[0.122]	[0.160]	[0.176]
Gross household income below £12,000	0.968	0.909	1.088
	[0.123]	[0.160]	[0.206]
Gross household income above £48,000	0.829	1.056	0.961
	[0.107]	[0.182]	[0.192]
White	0.954	1.108	0.798
	[0.115]	[0.173]	[0.151]
Eligible for free school meals at age 14/15	1.177	1.081	0.885
	[0.179]	[0.143]	[0.206]
Parents managerial or professional occupations at age 14/15	1.153	1.051	1.252
	[0.120]	[0.143]	[0.210]
Live with single parents at age 14/15	0.992	1.027	1.002
	[0.097]	[0.139]	[0.153]
Mother work at age 14/15	1.107	1.070	0.970
	[0.127]	[0.177]	[0.167]
Chi square	76.5***	10.4	38.7***
No. of observations in NEET	853	394	459
No. of young people who got out of NEET by May 2010 (failures)	596	342	254

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 4: Subhazard ratios of the other independent variables on NEET duration post-16 for all young people from Competing risk Cox model – exit into employment compete with exit to further education

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.894**	0.938	0.927
	[0.037]	[0.052]	[0.066]
High effort and diligence	1.124**	1.099*	1.132
	[0.054]	[0.063]	[0.086]
More than 5 A* to C in GCSEs	2.813***	2.421***	2.557***
	[0.472]	[0.521]	[0.713]
Boys	1.318**	1.175	1.264
	[0.169]	[0.175]	[0.271]
Live in owned house	1.196	1.236	1.119
	[0.212]	[0.256]	[0.328]
Gross household income below £12,000	1.268	1.267	1.189
	[0.246]	[0.284]	[0.401]
Gross household income above £48,000	1.264	1.514**	1.475
	[0.212]	[0.296]	[0.425]
White	0.613***	0.715*	0.436***
	[0.110]	[0.130]	[0.135]
Eligible for free school meals at age 14/15	0.916	0.807	0.865
	[0.217]	[0.221]	[0.355]
Parents managerial or professional occupations at age 14/15	1.358**	1.172	1.737**
	[0.211]	[0.228]	[0.484]
Live with single parents at age 14/15	0.849	0.875	0.927
	[0.127]	[0.164]	[0.229]
Mother work at age 14/15	1.005	0.931	0.971
	[0.161]	[0.186]	[0.250]
Chi square	142.8***	74.5***	95.8***
No. of observations in NEET	853	394	459
No. of young people who got out of NEET to employment by May 2010 (competing)	305	166	139
No. of young people who got out of NEET to further education by May 2010 (failure)	253	155	98

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 5: Subhazard ratios of the other independent variables on NEET duration post-16 for all young people from Competing risk Cox model – exit into government training/apprenticeship compete with exit to further education

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.895***	0.965	0.930
	[0.036]	[0.052]	[0.068]
High effort and diligence	1.110**	1.072	1.126
	[0.055]	[0.058]	[0.091]
More than 5 A* to C in GCSEs	2.903***	2.273***	2.278***
	[0.501]	[0.485]	[0.795]
Boys	1.322**	1.227	1.162
	[0.168]	[0.178]	[0.242]
Live in owned house	1.154	1.105	1.078
	[0.207]	[0.223]	[0.297]
Gross household income below £12,000	1.216	1.117	1.109
	[0.231]	[0.239]	[0.367]
Gross household income above £48,000	1.107	1.516**	1.298
	[0.186]	[0.288]	[0.387]
White	0.627***	0.711**	0.414***
	[0.113]	[0.120]	[0.133]
Eligible for free school meals at age 14/15	1.020	0.884	0.804
	[0.249]	[0.240]	[0.325]
Parents managerial or professional occupations at age 14/15	1.372**	1.107	1.736**
	[0.214]	[0.211]	[0.481]
Live with single parents at age 14/15	0.818	0.912	0.965
	[0.129]	[0.169]	[0.232]
Mother work at age 14/15	1.114	1.009	0.956
	[0.174]	[0.191]	[0.244]
Chi square	139.8***	67.6***	96.2***
No. of observations in NEET	853	394	459
No. of young people who got out of NEET to government training by May 2010 (competing)	38	21	17
No. of young people who got out of NEET to further education by May 2010 (failure)	253	155	98

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 6: Hazard ratio of the other independent variables on NEET duration post-16 for boys from Cox model

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.872***	0.960	0.836***
	[0.035]	[0.054]	[0.052]
High effort and diligence	0.967	1.002	0.971
	[0.042]	[0.052]	[0.070]
More than 5 A* to C in GCSEs	1.406***	1.203	1.045
	[0.187]	[0.205]	[0.224]
Live in owned house	1.201	0.788	1.595*
	[0.199]	[0.172]	[0.431]
Gross household income below £12,000	1.204	1.070	1.369
	[0.224]	[0.257]	[0.403]
Gross household income above £48,000	0.851	1.167	1.207
	[0.147]	[0.268]	[0.349]
White	0.982	0.903	0.891
	[0.162]	[0.195]	[0.235]
Eligible for free school meals at age 14/15	1.010	0.984	0.984
	[0.221]	[0.267]	[0.345]
Parents managerial or professional occupations at age 14/15	1.258	1.286	1.075
	[0.183]	[0.236]	[0.271]
Live with single parents at age 14/15	0.862	0.795	1.048
	[0.122]	[0.153]	[0.239]
Mother work at age 14/15	1.091	1.175	0.943
	[0.169]	[0.254]	[0.224]
Chi square	51.0***	15.9	24.2
No. of observations in NEET	450	215	235
No. of young people who got out of NEET by May 2010 (failures)	324	190	134

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 7: Subhazard ratios of the other independent variables on NEET duration post-16 for boys from Competing risk Cox model – exit into employment compete with exit to further education

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.864***	0.990	0.797*
	[0.052]	[0.088]	[0.094]
High effort and diligence	1.102	1.096	1.107
	[0.079]	[0.082]	[0.121]
More than 5 A* to C in GCSEs	3.088***	2.643***	2.655***
	[0.689]	[0.741]	[0.997]
Live in owned house	1.280	1.180	1.714
	[0.312]	[0.330]	[0.767]
Gross household income below £12,000	1.392	1.546	1.162
	[0.403]	[0.494]	[0.639]
Gross household income above £48,000	1.243	1.649*	1.467
	[0.273]	[0.440]	[0.591]
White	0.572**	0.665	0.336**
	[0.130]	[0.165]	[0.157]
Eligible for free school meals at age 14/15	0.582	0.770	0.348
	[0.212]	[0.323]	[0.251]
Parents managerial or professional occupations at age 14/15	1.247	1.137	1.098
	[0.270]	[0.310]	[0.461]
Live with single parents at age 14/15	0.662*	0.613*	0.797
	[0.140]	[0.164]	[0.279]
Mother work at age 14/15	0.977	1.242	0.779
	[0.188]	[0.321]	[0.248]
Chi square	103.0***	51.5***	84.6***
No. of observations in NEET	450	215	235
No. of young people who got out of NEET to employment by May 2010 (competing)	159	89	70
No. of young people who got out of NEET to further education by May 2010 (failure)	140	88	52

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 8: Subhazard ratios of the other independent variables on NEET duration post-16 for boys from Competing risk Cox model – exit into government training/apprenticeship compete with exit to further education

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.850***	1.001	0.773**
	[0.051]	[0.081]	[0.093]
High effort and diligence	1.076	1.071	1.094
	[0.077]	[0.074]	[0.126]
More than 5 A* to C in GCSEs	3.090***	2.349***	2.602**
	[0.702]	[0.648]	[1.030]
Live in owned house	1.417	1.160	1.771
	[0.355]	[0.315]	[0.736]
Gross household income below £12,000	1.390	1.296	1.093
	[0.399]	[0.401]	[0.593]
Gross household income above £48,000	1.037	1.566*	1.501
	[0.227]	[0.416]	[0.627]
White	0.553***	0.578**	0.328**
	[0.126]	[0.129]	[0.154]
Eligible for free school meals at age 14/15	0.653	0.911	0.310*
	[0.245]	[0.375]	[0.226]
Parents managerial or professional occupations at age 14/15	1.274	1.128	1.075
	[0.278]	[0.293]	[0.446]
Live with single parents at age 14/15	0.674*	0.600*	0.955
	[0.139]	[0.158]	[0.319]
Mother work at age 14/15	1.090	1.380	0.725
	[0.210]	[0.337]	[0.229]
Chi square	101.7***	49.4***	87.4***
No. of observations in NEET	450	215	235
No. of young people who got out of NEET to government training by May 2010 (competing)	25	13	12
No. of young people who got out of NEET to further education by May 2010 (failure)	140	88	52

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 9: Hazard ratio of the other independent variables on NEET duration post-16 for girls from Cox model

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.942	1.005	0.978
	[0.037]	[0.060]	[0.057]
High effort and diligence	0.980	0.997	0.901
	[0.044]	[0.061]	[0.062]
More than 5 A* to C in GCSEs	1.622***	1.034	1.933***
	[0.241]	[0.200]	[0.447]
Live in owned house	0.953	1.054	0.642*
	[0.162]	[0.240]	[0.165]
Gross household income below £12,000	0.802	0.698	0.726
	[0.152]	[0.197]	[0.208]
Gross household income above £48,000	0.737	0.946	0.718
	[0.146]	[0.282]	[0.211]
White	0.907	1.424	0.720
	[0.167]	[0.346]	[0.217]
Eligible for free school meals at age 14/15	1.337	1.357	0.761
	[0.297]	[0.408]	[0.260]
Parents managerial or professional occupations at age 14/15	1.066	0.815	1.576*
	[0.165]	[0.182]	[0.382]
Live with single parents at age 14/15	1.096	1.419	0.932
	[0.157]	[0.313]	[0.210]
Mother work at age 14/15	1.122	0.853	0.720
	[0.208]	[0.245]	[0.210]
Chi square	36.4***	10.8	34.2**
No. of observations in NEET	403	179	224
No. of young people who got out of NEET by May 2010 (failures)	272	152	120

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 10: Subhazard ratios of the other independent variables on NEET duration post-16 for girls from Competing risk Cox model – exit into employment compete with exit to further education

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.887**	0.907	0.984
	[0.053]	[0.079]	[0.098]
High effort and diligence	1.143*	1.133	1.067
	[0.080]	[0.110]	[0.115]
More than 5 A* to C in GCSEs	2.571***	2.365***	2.180*
	[0.669]	[0.395]	[0.917]
Live in owned house	1.035	1.236	0.798
	[0.266]	[0.395]	[0.366]
Gross household income below £12,000	1.443	1.328	1.185
	[0.411]	[0.484]	[0.561]
Gross household income above £48,000	1.254	1.129	1.573
	[0.349]	[0.454]	[0.680]
White	0.698	0.765	0.374*
	[0.217]	[0.239]	[0.188]
Eligible for free school meals at age 14/15	1.266	0.955	1.094
	[0.414]	[0.342]	[0.637]
Parents managerial or professional occupations at age 14/15	1.455	1.287	3.139***
	[0.339]	[0.376]	[1.240]
Live with single parents at age 14/15	1.138	1.095	1.471
	[0.251]	[0.345]	[0.570]
Mother work at age 14/15	1.130	0.840	0.962
	[0.325]	[0.312]	[0.487]
Chi square	71.9***	38.8***	50.7***
No. of observations in NEET	403	179	224
No. of young people who got out of NEET to employment by May 2010 (competing)	146	77	69
No. of young people who got out of NEET to further education by May 2010 (failure)	113	67	46

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 11: Subhazard ratios of the other independent variables on NEET duration post-16 for girls from Competing risk Cox model – exit into government training/apprenticeship compete with exit to further education

Variable label	(1)	(2)	(3)
High external locus of control at age 14/15	0.891*	0.933	0.987
	[0.052]	[0.079]	[0.099]
High effort and diligence	1.132*	1.124	1.031
	[0.082]	[0.106]	[0.124]
More than 5 A* to C in GCSEs	2.760***	2.146**	2.487**
	[0.745]	[0.769]	[1.035]
Live in owned house	0.937	1.028	0.719
	[0.241]	[0.314]	[0.325]
Gross household income below £12,000	1.334	1.214	1.078
	[0.376]	[0.431]	[0.522]
Gross household income above £48,000	1.151	1.171	1.221
	[0.312]	[0.469]	[0.557]
White	0.771	0.968	0.356*
	[0.244]	[0.276]	[0.206]
Eligible for free school meals at age 14/15	1.433	1.173	0.983
	[0.493]	[0.407]	[0.579]
Parents managerial or professional occupations at age 14/15	1.340	1.060	3.198***
	[0.318]	[0.318]	[1.286]
Live with single parents at age 14/15	1.155	1.152	1.391
	[0.253]	[0.362]	[0.517]
Mother work at age 14/15	1.292	0.898	0.962
	[0.375]	[0.322]	[0.527]
Chi square	69.7***	36.4***	49.7***
No. of observations in NEET	403	179	224
No. of young people who got out of NEET to government training by May 2010 (competing)	13	8	5
No. of young people who got out of NEET to further education by May 2010 (failure)	113	67	46

Note: The dependent variable is different for each regression column. For column (1) the dependent variable includes all NEET duration from one to 45 months. For column (2) the dependent variable is NEET for 6 months and less. For column (3) the dependent variable is NEET for more than 6 months. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Other variable is government regions.

Appendix 12: Details of proportional hazards test for diagnostic check

A robustness test to check the diagnostic of the model is done by a test based on Schoenfeld residuals (Cleeves, 2010, pp. 206). The author proposed a way to check the specification for the proportional-hazards assumption by using analysis of residuals as a basis. Basically, residuals are retrieved from the Cox regression, and a smooth function of time is fit to them, and then we will test whether there is a relationship. This test is based on the generalization of Grambsch and Therneau (1994), which showed that most of test for proportional hazards are tests on nonzero slope in a generalized linear regression of the scaled residuals function on time originally from Schoenfeld (1982).

Figure 0-1 and Figure 0-2 are the test of proportional hazard assumption for external locus of control and effort. The null hypothesis of the test is that for the curve to have a zero slope. From the figures and the proportional hazards test[25], none of the variables of interest have zero slope. Thus, we find no evidence that my specification violates the proportional-hazards assumption.

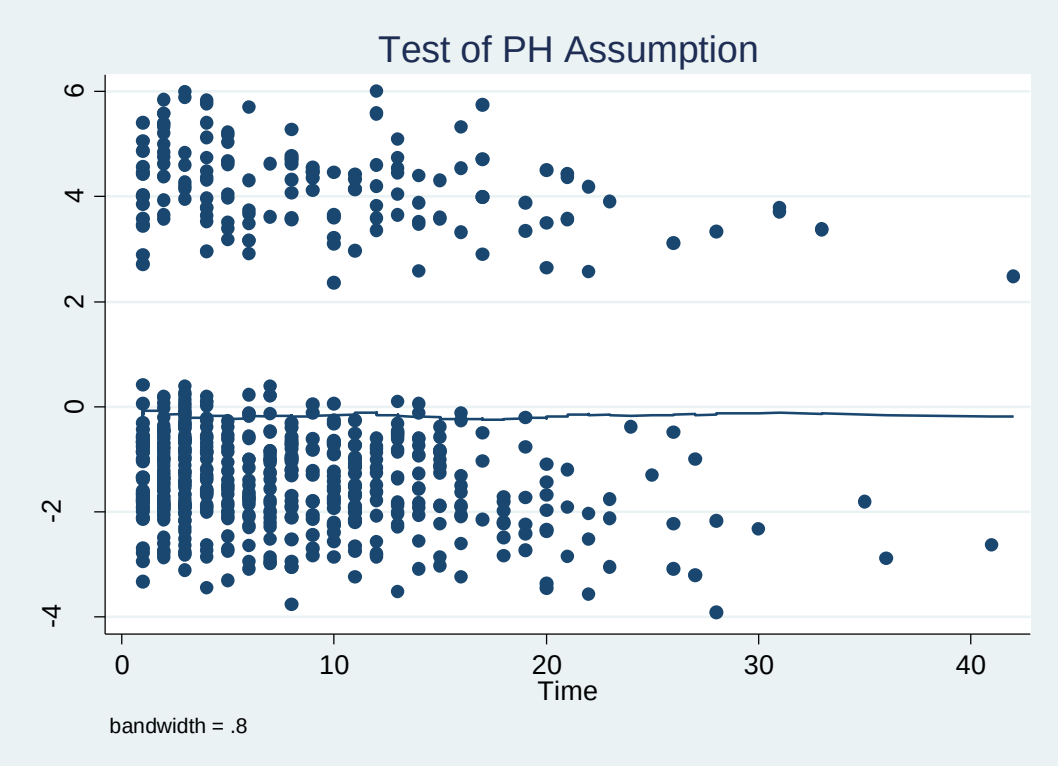

Figure 0-1: Test for Proportional Hazard Assumption for external locus of control

[25] The test of proportional-hazards assumption is not significant at 12.07 with 21 degrees of freedom.

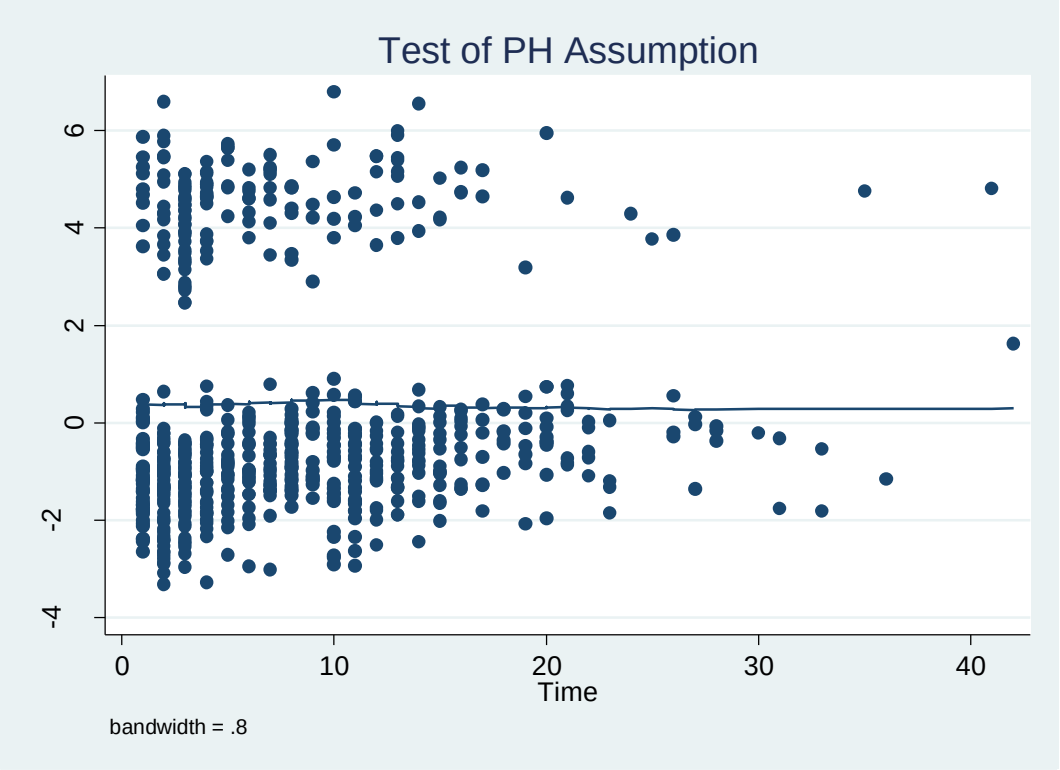

Figure 0-2: Test for Proportional Hazard Assumption for high effort and diligence