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Predicting Rejection:

Early identification of individuals who may fail to reach employment

Abstract: This paper compiles possible predictors of youth joblessness from an extensive review of the literature, and tests each of them to establish whether any idiosyncratic effect is evident on a range of operationalisations of NEET outcomes. A constructed counterfactual analysis is developed which has wider application in the identification of multicollinearity within empirical research.

A thesis towards MSc. (Economics) from the University of Lancaster

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1. Introduction

Youth joblessness is a key societal concern with far reaching consequences (UKCES 2011). This section reviews those consequences, thereby motivating research into the prediction of labour market rejection. Such prediction of rejection is needed to inform both the effective targeting of and the optimal foci of intervention strategies.

Non-employment is closely linked to both deprivation and poverty. Individuals are considered to be deprived where their standard of living – including health, social, and employment status – falls below that acceptable to society, whilst poverty refers to the state wherein individuals lack the resources to escape deprivation (Townsend 1987). The duality of these concepts suggests that unemployment could causally depress an individual's wellbeing both directly and through its income effect. Unemployment is also generally believed to have substantial repercussions for health outcomes (Norström et al. 2014) and criminal involvement (Thornberry and Christenson 1984), with wider ramifications observed among the families of the unemployed (Ström 2003) and on aggregate measures of societal wellbeing (Di Tella et al. 2001).

Central to research into joblessness is the question of causality. Empirically the predictive validity of longitudinal data has been cited as evidence of joblessness causing ill-health (Burgard et al. 2007), and where theory provides testable implications their corroboration has also been interpreted as supporting causality. For instance Farrington et al. (1986) posit that criminality could be induced where wages are lost, and find corroborating evidence in that property crime is strongly associated with unemployment. However confounding factors and reverse causality affect the associations between joblessness and both health and criminality (respectively: Forcier 1998; Aaltonen et al. 2013). Altindag (2012) addresses the latter by instrumenting national unemployment rates on earthquakes, industrial accidents and exchange rate fluctuations to find significant and plausibly causal effects, although a critic could still postulate that the psychosocial effects of disasters may confound these associations.

Understanding the aetiology of joblessness could help avert the negative consequences outlined above. The present study contributes to that goal through the compilation of possible antecedents from an extensive review of the literature in Chapter 2 and through the subsequent assessment of their effects on a variety of outcome specifications in Chapter 5. Where antecedents are corroborated this does not prove causality, although the study

methodology supports the likelihood of that explanation in three ways: firstly regressors are operationalised based upon the outcomes of prior research, secondly almost all factors identified by that review are included, and thirdly the methodological philosophy of Koop (2009) is adopted. Under that philosophy all results and derivations are made available for scrutiny, and econometric models are not adjusted on the basis of their results. The former is achieved through the publication of web appendices and analytic code at https://www.researchgate.net/project/MSc-Econ-dissertation.

Central to the present study is the identification of regressors which do not predict rejection ipso facto. That amounts to an analysis of complex multicollinearity, which was supported by the development of a constructed counterfactual analysis technique. The methodologies employed are described in Chapter 4, whereafter their outcomes are discussed in Chapter 5. Chapter 6 concludes.

2. A Review of Relevant Literature

Alcock (1993) emphasises that in order to investigate a concept we must first define what is meant by it; accordingly Section 2.1 discusses the selection of potential outcomes of interest. Thereafter this chapter synthesises the findings of prior research into the antecedents of joblessness. The validity and reliability of that research will be assessed and where necessary limitations will be noted.

In addition to the microeconomic literature which attempts to predict employment outcomes there is a related body of literature which investigates wage effects, and a further body of literature which studies employment at a macroeconomic level. This chapter will primarily review the first of these, although contributions from the literatures in health, education and psychology are also discussed where appropriate.

2.1 Defining the outcome of interest

The operationalisation of joblessness is highly variable within the literature (Mortimer 1994). This section will assess possible definitions for their pertinence to the negative consequences outlined hereinbefore. One candidate definition is that of the International Labour Organisation (ILO 2013), however it does not meet the aforementioned criterion since it includes full-time students seeking supplementary work, and since it omits workless individuals who have given up on searching for a job.

An alternative definition which has often been adopted for younger people is the categorisation of Not in Education, Employment, or Training (NEET). This definition has neither of the drawbacks of ILO unemployment, however it does include individuals who are NEET for health reasons. That inclusion is desirable where the self-declared health reasons are a consequence of joblessness, but undesirable where they are exogenous to other causes of joblessness. This trade-off is acceptable since the inclusion of the latter category represents a relatively benign attenuation bias.

Implicit in the adoption of NEET outcomes is an assumption that those in education are on a successful pathway – an assumption which is supported by (Conti et al. 2010) and (Machin et al. 2011) who find that education causally improves health outcomes and criminality respectively. However those studies to not consider whether their findings extend to higher education and Teichler (2000) determines that unemployment rates are not universally lower amongst graduates in European countries. Furthermore Määttä et al. (2002) suggest that

higher education (HE) may sometimes be chosen by those who fail to gain employment. Therefore results will be checked for robustness to the exclusion of individuals who attend HE – an approach similar to that adopted by Gregg (2001).

A simplistic binary operationalisation of whether an individual has ever been NEET would be inappropriate since Dorsett and Lucchino (2012) determine that small and possibly intentional breaks in activity are not cause for concern. Furthermore Von Wachter (2010) points out that although many negative consequences of unemployment present immediately their impact is thought to increase with duration. A more appropriate outcome could be the number of months spent NEET, for which data are available throughout a period of almost four years post compulsory education. This measure has been operationalised by authors including Macmillan (2012), Gregg (2001) and Caspi et al. (1998) and has the intuitive appeal of utilising all available information. Since 82% of individuals continued in age 16-18 education in England in 2009 (DfE 2010) it will be important to test whether conclusions drawn are robust to disregarding the first two years of monthly activity data.

A further robustness check could define some benchmark quantity of time spent NEET as the outcome of interest. Such a time period should be sufficient to ensure that the individuals indicated are those which are of concern: for example ACEVO (2012) chose to define 'core NEET' as those with at least 12 months of NEET status, whilst Kokko and Pulkkinen (2000) require 24 months cumulatively within a 9 year period. The present study will operationalise a time period of 13 months since this should exclude any planned gap-year periods. That benchmark will be counted cumulatively since Burchardt et al. (2002) report that social exclusion is often characterised by a high degree of churning in and out of employment. Other studies have used a binary indicator of any NEET experience as a robustness check (Egan et al. 2015; Gregg 2001) despite its possible over-sensitivity to non-problematic pathways. This study will operationalise a final specification of three or more cumulative months NEET which would, for example, include any individual for whom the Government's Work Programme had spuriously curtailed NEET status (Dar 2016).

The foregoing discussion produces eleven candidate outcome measures which are described by Table 5.1b. Section 5.1 refines four representative specifications which are then used to analyse the effects of the antecedent factors identified in Sections 2.2 - 2.10 below.

2.2 Educational achievement

The literature consistently determine that higher attainment levels are associated with higher employability (Bradley and Nguyen 2004). This association is likely to have some element of causality, although two alternative transmission mechanisms receive variable weights in the literature. In reality educational achievement acts both as a signal of an individual's productivity endowment and a stimulant for skill development (Psacharopoulos and Patrinos 2004). The causal link from attainment to employment is nevertheless overestimated by a naïve regression since both outcomes are influenced by a range of confounding factors which will be discussed in the remainder of this chapter (Lynn et al. 1983, 1984). As such it will be appropriate for this chapter to comment on some of the literature which examines the determinants of educational attainment in addition to that seeking to predict employment outcomes.

The debate surrounding the transmission mechanism between education and employment can be illuminated by studies which include measures of intelligence at an early age in addition to educational attainment. These often find that the effects of the former become insignificant on inclusion of the latter (eg. Gregg 2001, Lynn et al. 1984), although Caspi et al. (1998) find that early age performance retains a quantitatively small yet statistically significant effect. These qualitatively different findings may be attributable to differing operationalisations of educational attainment: Caspi et al. count months-of-schooling and measure a dichotomous outcome of whether a school certificate was achieved which may capture less information than a gradation of achievement outcomes. A further limitation of their months-of-schooling count is that it was measured between the ages of 15 and 21 – the same time period as the dependent variable months of unemployment – thus ensuring a de-facto negative association.

The foregoing discussion confirms the importance of the measurement of educational achievement when studying employment outcomes. This study's failure to obtain attainment data may therefore produce significant omitted variables bias in its findings, although the discussion of section 5.2 suggests that this bias might be unexpectedly small.

2.3 Educational provision

Given the importance of educational attainment, and given that schooling affects attainment (Breen and Jonsson 2005), it seems likely that schooling will be associated with employment outcomes. This is corroborated by Bradley and Nguyen (2004) who find that school level performance better predicts employment outcomes than an individual's own forecasted results.

School performance is strongly associated with its type (DfE 2006), and when the former is omitted Gayle et al. (2002) find independent schooling to be a significant determinant of HE participation holding attainment and other background factors constant. However that result may be confounded since Lynn et al. (1984) find that the effect of grammar schooling becomes insignificant when exam performance is included.

The present study measures both school type and school quality in order to investigate these interactions. Other specific aspects of educational provision such as pre-school attendance and careers advice are also included, since the literature suggests that they may be relevant (respectively: Sparkes and Glennerster 2002; Genda and Kurosawa 2001).

2.4 Geographical area

The quality of educational provision is one important characteristic of a young person's geographical area. It has also been suggested that local deprivation (Haveman and Wolfe 1995) and in particular local unemployment (Farley 1987) may be significant determinants of an individual's economic pathway. However there is debate over whether neighbourhood effects exist beyond their correlation with family background and educational provision (Breen and Jonsson 2005), with consensus only that the most disadvantaged neighbourhoods have negative employment effects ceteris paribus (Sparkes and Glennerster 2002).

Various measures are adopted by the literature to control for area effects, for example Holford (2015) includes local values for both the Index of Multiple Deprivation and unemployment, Gregg (2001) uses ward level unemployment, whilst Egan et al. (2015) control for 8 UK regions – each of these studies' measures were found to be significant in determining employment outcomes. Possible mechanisms behind these area effects include contrasting local employment opportunities (Gregg 2001) and individuals' educational investment choices (Bradley and Nguyen 2004).

2.5a Family background – housing

An additional explanation for the significance of geographical area effects is that they may be confounded by a variety of family background variables which are correlated with the former due to residential sorting (Lupton and Power 2002). Relevant family background factors include housing tenure (Hobcraft and Kiernan 2001) and the availability of books and technologies within the household (Sparkes and Glennerster 2002).

A related factor could be housing instability, which has been observed to influence attainment and earnings independent of housing deprivation (Winslow and Shaw 2007). This link seems intuitively plausible due to the implied disruption of a young person's education.

2.5b Family background – employment/education heritage

A young person's housing situation may reflect their parents' employment and educational status. Breen (1984) finds paternal occupation to be significant, however this result may be spurious since only gender and education level are controlled for in their model. Indeed Lynn et al. (1984) find that the effect of paternal occupation becomes insignificant when a range of covariates are included, although this may be attributable low statistical power in their small sample. Egan et al. (2015) regress data from two large scale longitudinal surveys with a good selection of controls and find parental occupation to be significant in both cases. Of these studies only Lynn et al. allow the effect to vary by gender, thereby exposing markedly different point estimates, whilst none take account of both paternal and maternal occupation. Gayle et al. (2002) examine that distinction in relation to progression rates into higher education, where they suggest that it is more appropriate to define parental occupation as the higher of the two maternal/paternal levels, not least since this will provide a consistent measurement for single parent families. One might also suppose that the highest parental occupation level could better describe the skill, knowledge, and aspiration levels available to the young person.

Some studies conflate parental occupation with parental employment status. Those that include both variables tend to find that the latter has a weaker and often insignificant effect (Bradley and Nguyen 2004; Gayle et al. 2002). A possible explanation for this is that the effect of maternal employment seems to be nuanced by the age of the child with adverse effects of mothers returning to work in their child's first year giving way to positive effects once children are settled into primary school (Sparkes and Glennerster 2002).

Egan et al. (2015) find significant positive effects of parental education on employment prospects, whereas Gregg and Tominey (2004) find mainly negative and occasionally significant effects of parental education on wages measured at ages 42, and 33. These ostensibly conflicting results could derive from the ages at which outcomes are measured since Egan et al. measure their outcomes by age 21 and Gregg and Tominey do find positive point estimates at age 23. That those estimates lack statistical significance may reflect the imprecision of their binary measure of parental FE participation, since the most significant categorical comparisons of Egan et al. involve isolating the effect of parents with no qualifications. The negative age 33 and 42 coefficients of Gregg and Tominey could be explained by multicollinearity under the hypothesis that parental education exerts a larger negative effect on later earnings through its implications for academic attainment than it does directly.

The foregoing discussion mandates the inclusion of a suitably specified set of variables measuring parental education, employment, and occupational status.

2.5c Family background – culture

The socio-economic characteristics of the previous section are often correlated with ethnicity (Haveman and Wolfe 1995). Those authors conclude that univariate ethnic effects are fully explained by family background characteristics, as do Kandel and Yamaguchi (1987). However such findings are not universal: for example Bertrand and Mullainathan (2004) showed unequivocally that ethnic minorities face labour market discrimination in the US, whilst Heath et al. (2008) review 10 studies concerning second generation migrants in Europe to conclude that ethnic minorities are almost universally disadvantaged in terms of both employment rates and career advancement. Nevertheless the UK provides some particular exceptions (Ibid.), and other studies have suggested that Indian heritage may be associated with improved outcomes in the UK (Bradley and Nguyen 2004; Gayle et al. 2002).

In addition to the direct effect of discrimination there are two main channels through which ethnicity might be supposed to affect employment outcomes. Firstly where there is a language or knowledge barrier for an individual it may impede their educational and employment outcomes (Egan et al. 2015; Salamonson and Andrew 2006). Secondly cultural aspects such parental involvement and attitudes may be important (Lauglo 1999; Sparkes and Glennerster 2002). This study will assess the importance of each channel.

2.5d Family background – structure

The ethnic background of a family is also correlated with its size and structure (Coleman and Dubuc 2010; Wright et al. 2013). Larger family size is often found to have detrimental implications for employment and education outcomes (Lynn et al. 1983, 1984; Gayle et al. 2002; Bradley and Nguyen 2004), however the first of these studies supports the observation of Sparkes and Glennerster (2002) that the effects may be nuanced by the siblings' relative genders and ages.

The parents' ages have also been shown to be highly significant, with Hobcraft and Kiernan (2001) determining that children born to younger mothers have markedly worsened employment outcomes. Concordantly Egan et al. (2015) find significant effects for the father's age, the number of siblings, and also the family structure in terms of marriage status and lone parenthood. The last is supported by Haveman and Wolfe (1995), Caspi et al. (1998) and Leventhal et al. (2001), although Bradley and Nguyen (2004) find lone parenthood to be largely insignificant. This inconsistency may be attributable to the suggestion that lone parenthood acts largely through a strong interaction effect with financial hardship and housing (Sparkes and Glennerster 2002).

An aspect of family structure which consistently affects educational attainment is having been in local authority care (Gilligan 2007). Gregg (2001) finds a further unique effect of care on unemployment in males, however Gregg and Machin (2000) find somewhat marginal results for women. One possible explanation is that male care leavers have a dramatically increased likelihood of being imprisoned (Ibid.); an outcome which affects very few women[1].

2.5e Family background – finances

Card and Lemieux (2000) note that single-parent households are particularly likely to experience financial hardship, which is often associated with negative employment outcomes (Haveman and Wolfe 1995). Possible channels for this include the housing and parental involvement factors discussed above and the personal psychological factors discussed below, in addition to the direct effect of lacking resources and opportunities (Bäckman and Nilsson 2011).

The literature operationalises various measures of financial difficulty, from household income (Holford 2015), through self-reported and externally observed measures of hardship

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[1] Generally <5% of the prison population are female (Allen and Dempsey 2015).

(Hobcraft and Kiernan 2001), to benefit receipt (Leventhal et al. 2001). Each of these is a proxy for actual financial hardship in childhood, although due to the likely hysteresis of household earnings a single variable measuring household income will represent a net effect offsetting childhood financial hardship against present financial hardship, where the latter has been shown to motivate higher employment rates in some circumstances (Leana and Feldman 1995). This could explain the finding of Bradley and Nguyen (2004) that log parental wage (measured post 16) is insignificant in explaining employment outcomes.

The use of benefit or free school meal receipt could also be problematic if a significant proportion of eligible households do not receive benefits, as has been suggested by Citizens Advice (2015). These problems could be confounded by collinearity where two measures of financial deprivation are included as separate multivariate regressors as in Gregg and Tominey (2004); a difficulty which Fergusson et al. (2001) overcome by deriving a scale of childhood multiple deprivation.

2.6 Part time work or care commitments

A further channel through which financial hardship could affect educational outcomes would be if a young person needed to earn money or provide care to support the household. There is limited research in this area, although both Salamonson and Andrew (2006) and Carney et al. (2005) find negative repercussions of part time work for university students' attainment. However neither study has sufficient controls for endogenous selection into part-time work to claim causality.

A robust investigation of part-time work at age 14-15 is undertaken by Holford (2015), who finds a detrimental effect on attainment for females, whereas Leventhal et al. (2001) find that part-time employment can positively affect academic outcomes for disadvantaged children of lone teenage mothers. They attribute this to a postulated positive influence on personal psychological factors such as motivation and behaviour which are discussed below.

2.7a Personal psychological – motivation etc

The interconnections between personal psychological factors are highly complex (Furnham and Rawles 1996), and so they are discussed here in three broad clusters: motivation, behaviour, and relationships. Hobcraft (2002) advocates exploring a full range of possible underlying factors, whence Table A1 documents 76 raw and derived indicators of personal psychological attributes used by this study.

The motivation cluster includes attributes such as aspiration, self-confidence, optimism, coping and attributional strategies, anxiety, distress, and religiosity. Priors for these variables are difficult to establish since those studies which focus on psychological factors often feature small samples with limited external validity (eg. Nurmi et al. 2002; Falk et al. 2006) and employ limited controls for possible confounding factors (eg. Kiessling and Henriksson 2005; Leana and Feldman 1995). Further difficulty arises from the inconsistent labelling of psychological factors (Kline 1994), however the aforementioned studies together suggest variables in the motivation cluster may be significant in determining work outcomes. The limitations of these results are emphasised by Fergusson et al. (2001), who find that anxiety and depression are highly significant only until confounding factors and reverse causality are accounted for.

One explanation for those findings is that factors such as aspiration, work ethic, psychoticism, extraversion and honesty seem to affect employment outcomes largely through educational achievements (Lynn et al. 1983, 1984; Kokko et al. 2003). However several reasonably comprehensive empirical investigations find unique effects of motivational factors on employment (Genda and Kurosawa 2001; Caspi et al. 1998; Määttä et al. 2002; Kandel and Yamaguchi 1987; Egan et al 2015). Those factors include work ethic, school attachment, passivity, religiosity and childhood psychiatric problems.

2.7b Personal psychological – behaviour etc

The results of both Fergusson et al. (2001) and Kokko et al. (2003) suggest that observable behaviours such as substance abuse, criminal activity and emotional self-control may have a larger effect on employment outcomes than the innate psychological factors discussed above. Concordantly Kandel and Yamaguchi (1987) find significant effects for substance (ab)use and truancy, postulating that these behaviours act as indicators of underlying individual predispositions, whilst Forcier (1988) and Bosworth (1994) respectively suggest that those behaviours may causally lead to negative outcomes.

The association between childhood behavioural factors and employment outcomes is corroborated by Gregg (2001), Kokko and Pulkkinen (2000), Egan et al. (2015), and Caspi et al. (1998), although the results of Gregg and Machin (2000) suggest that it may fade as an individual ages. That suggestion is consistent with the literature on personality change across the life course where conscientiousness and emotional stability are found to improve with maturation (Helson et al. 2002; Specht et al. 2011).

2.7c Personal psychological – relationships etc

Kokko and Pulkkinen (2000) find that the detrimental effects of aggressive behaviours in childhood could be substantially moderated by positive relationships with peers and with adults. Such factors are less regularly controlled for than their negative counterparts, although Fergusson et al. (2001) do include a measure of parental attachment in their study. The present study will operationalise personal psychological factors as comprehensively as the data permit.

2.8 Other personal characteristics

There are a small number of additional personal characteristics which the literature suggests may influence labour market outcomes. Firstly it has been noted above that gender can have not only substantial fixed effects, but also significant interaction effects, and so in common with many studies in this field results will be determined separately for males and females.

A second factor which has strong face validity for affecting employment outcomes would be ill health or disability (Sparkes and Glennerster 2002), however this is found to be insignificant when it is included as a control variable by Gregg (2001), Fergusson et al. (2001), Gregg and Tominey (2004) and Egan et al. (2015). One potential explanation for this finding would be if those studies had operationalised ILO unemployment which excludes those who are economically inactive, since there is a substantial pathway from unemployment to inactivity due to illness (Gregg and Wadsworth 2010). That limitation applies to none of the aforementioned studies, although two did find a significant effect of Special Educational Needs (SEN) which often includes additional health needs. The present study will distinguish between health-related and learning-related SEN.

2.9 Prior NEET status (scarring)

The argument against a scarring effect of prior joblessness is that any OLS estimate of the effect of prior joblessness on later joblessness will be confounded by all relevant heterogeneity, both observable and unobservable. Gregg (2001) instrument early unemployment experience on the local area unemployment rates then prevalent and control for persistence in local unemployment, thereby providing an instrument which is theoretically exogenous to the individual (albeit endogenous to their parents' employment and income). Controls for those factors are included, and so Gregg (2001) provides substantial evidence for a scarring effect of prior unemployment for males, with a much smaller and generally

insignificant effect for females. This conclusion is supported by Arulampalam (2001) who studies male wages longitudinally with individual level fixed effects which purport to control for unobserved individual heterogeneity; finding a significant wage scar due to unemployment incidence. The validity of this approach rests on the assumption that the expected wage trends of those of individuals who experience joblessness are parallel to those of individuals who do not experience joblessness, excepting only the influence of their jobless spells. This assumption is questionable if individuals who achieve greater pay progression are also less likely to become unemployed.

The widespread support for scarring effects is partly based upon their theoretical appeal. Proposed mechanisms include employer discrimination against those with an unemployment history (Manning 2000), the potential willingness of unemployed individuals to accept employment opportunities with sub-optimal wages or security (Arulampalam 2001), and the reciprocal effect of unemployment on self-confidence (Määttä et al. 2002). The last is supported by Specht et al. (2011) who find that the psychological impact of unemployment exceeds that of any other life event, and by Falk et al. (2006) whose lab experiments are interpreted to suggest that job search success will affect self-confidence, and that this in turn will affect job search effort. Any scarring effect could bias the findings of specifications based upon NEET duration, which provides an additional motivation for the inclusion of the binary '3 months NEET' measure as a robustness check.

2.10 Other possible factors

There are a number of other factors which the literature review has suggested may affect employment outcomes. One factor with well-proven significance is an individual's age, although within the present dataset this is essentially invariant.

A range of job-related variables such as occupation, tenure, hours per week, wage, and self-employment have been found to be significant (Green et al. 2000). However the present study seeks to predict rejection based upon pre-labour-market factors, and so only the endogenously determined components of these job-related variables are of interest, which a priori are captured by the personal and familial factors discussed above.

A final family background factor which has not yet received attention is the possibility that parental criminality and substance abuse might influence an individual in ways not observable by the factors discussed above. This possibility is controlled for by Fergusson et al. (2001), but the dataset selected below lacks information on these factors.

3. Data

The dataset utilised by the present study is the Longitudinal Study of Young People in England (LSYPE) which is also known as the 'Next Steps' study. It was selected on the basis of a survey of the existing secondary data available in the UK, a synthesis of which is available in table A2 of Appendix II. The LSYPE is well suited to this study, with wide ranging survey information collected from 16,122 participants and their families in seven waves between the ages of 13 and 19. These data include many of the psychological attributes discussed in section 2.7, although the accurate characterisation of those factors will be hampered by the absence of established psychological assessment scales.

General survey data limitations also affect the LSYPE. These include possibly endogenous participation and drop-out rates, and possibly endogenous missing responses. Piesse and Kalton (2009) recommend the use of weights and imputation to mitigate these respective limitations in the LSYPE; these approaches are discussed in Section 4.3. That section also discusses variance estimation under the non-random sampling of participants which arises through the LSYPE survey design.

An additional limitation pertinent to all surveys is recall bias, which Arulampalam et al. (2001) suggest may lead to the under-reporting of short unemployment spells. This problem would be compounded where respondents choose not to submit fully comprehensive responses due to the opportunity or psychological costs of doing so. Further compounding of those inaccuracies arises since a period of inactivity of less than two weeks would be entirely unacknowledged by monthly main activity data (Gregg 2001). These limitations are mitigated by the selection of suitably broad outcome measures.

4. Methodology

The aim of this study is to investigate the antecedents of youth joblessness. Chapter 2 identified possible risk factors, and Chapter 3 identified an appropriate data source with which to study the impact of those risk factors. This chapter describes the methodological approaches adopted to operationalise and analyse the effects of those risk factors within that data source. Section 4.1 describes the distillation of unobservable latent factors from multiple indicator variables. Those processes refine the 194 regressors which were initially identified to 85 derived measures. The correspondence between those raw and derived variables is fully documented in Table A1 of Appendix II.

In addition to the investigation of those variables which influence NEET outcomes, a key focus for this study was the identification of those variables which have no effect. Multivariate regression is often effective in investigating unique effects but can produce both type 1 and type 2 errors. The risk of a type 2 error is reduced by careful analysis of multicollinearity and clustering, which is undertaken in Section 4.2. The risk of a type 1 error can be reduced by comparing multivariate with univariate effect sizes, however this is not always sufficient in situations where regressors have complex interactions. Therefore Section 4.4 motivates and derives a constructed counterfactual analysis technique which provides additional information in such situations.

The empirical specifications used in Chapter 5 were logistic models for binary NEET outcomes (in common with Gayle et al. (2002); Määttä et al. (2002)) and tobit models for the number of months NEET (in common with Gregg (2001); Caspi et al. (1998)). The tobit model is appropriate since the possible number of months NEET is censored below at 0, and above at either 45 or 20 dependent upon the specification (Maddala 1983). There were also a few auxiliary situations such as in the imputation of missing data where the dependant variable was ordinal; here ordered logistic models were fitted as per Holford (2015).

Due to software limitations censored outcomes with imputed regressors were modelled using an OLS specification; in these circumstances Stewart (2009) suggests that the heteroskedasticity-robust standard errors calculated should yield appropriate p values. The bias of the point estimates will be towards zero – in the asymptotic case by a factor equal to the proportion of non-censored results. Correcting by this factor generally provides a good approximation to an unbiased estimate (Greene 1981), therefore that adjustment is applied within Table 5.2e. All analyses were carried out using Stata 14.1 or Matlab R2014a.

4.1 Constructing latent factors

This section describes in detail the methods used to derive the latent 'school quality' factor. Similar processes were used to construct seven other latent factors from clusters of proposed indicator variables, as is fully documented in Appendix III.

> Key comparisons between cases are commentated by indented paragraphs.

Potential indicator variables were first identified for each latent factor; these were then examined to establish whether the distillation of a single latent factor would be empirically justified. The initial examination was a screening of the correlations between the candidate variables to evaluate whether their realisation matched theoretical priors. Polychoric correlations were calculated since the data are predominantly ordinal or binary (Kokko and Pulkkinen 2000). Augmented scree plots were then produced based upon the parallel analysis of Dinno (2009) to assess the variables' collective dimensionality.

Figure 4.1a gives the correlations for the exemplar case. The signs therein are as expected since W1squietYP and W1snodisYP code the most positive responses as high scores whilst the other variables are coded inversely. The strongest correlations are observed between variables which could be expected to be particularly closely related, for example prevalent misbehaviour is associated with disrupted learning, whilst teacher control, marking, and homework enforcement are also closely interrelated. The general level of correlation is adequate though not particularly strong.

> In the construction of four other factors at least one variable was dropped on the basis of the observed correlations and the augmented scree plots.

Figure 4.1a – Polychoric correlations of potential school quality indicator variables

	W1squietYP	W1snodisYP	W1kidskolMP	W1yys5YP	W1yys14YP	W1yys19YP	
W1snodisYP	0.53						disturb
W1kidskolMP	-0.22	-0.19					repute_MP
W1yys5YP	-0.26	-0.21	0.42				repute_YP
W1yys14YP	-0.26	-0.16	0.26	0.33			Hwork
W1yys19YP	-0.34	-0.23	0.23	0.34	0.47		control
W1yys21YP	-0.23	-0.16	0.21	0.31	0.42	0.45	marking
	naughty	disturb	repute_MP	repute_YP	Hwork	control	

W1squietYP	frequency of (others') misbehaviour in classes
W1snodisYP	frequency of being unable to work due to the behaviour of others

W1kidskolMP	quality of child's school (parental opinion)
W1yys5YP	the extent to which people think the school is good (YP opinion)
W1yys14YP	the extent to which teachers make sure that homework is completed
W1yys19YP	the extent to which teachers can keep order in class
W1yys21YP	How often pupils' work is marked

Figure 4.1b plots the eigenvalues associated with sequentially generated principle components of the above correlation matrix. Each eigenvalue equates to the proportion of the indicators' combined variance which is explained by its associated component multiplied by the number of indicators (Kline 1994). Thus Figure 4.1b demonstrates that a component could explain 39.6% of the total variance, whilst a second component would explain 16.0% of the total variance.

> All eight cases feature a predominant first eigenvalue which supports the theoretical cohesion of the proposed indicators, however a ninth factor was not formed due to the outcomes of these analyses – see Appendix III-e.

The scree test formalises such eigenvalue comparisons. It determines the true number of latent factors to be k, where the $k + 1^{th}$ node marks the distinct slope change at the start of the 'scree' (Cattel 1978). In this case the 1st scree starts at node 2, however there is also a distinct second scree which starts at node 4. The standard interpretation would be that just one clear latent factor exists, although there is some suggestion that the second and third factors may also warrant consideration.

> All other cases exhibit a singular scree.

Figure 4.1b – Augmented scree plot for school quality indicator variables

An alternative test for the true number of factors is provided by the dashed line which represents the counterfactual eigenvalues of a completely uncorrelated situation with seven variables and 15,770 observations. These are generated as the 95th percentiles of a Monte-carlo experiment iterated 500 times as recommended by Ledesma and Valero-Mora (2007). A factor is considered salient where its eigenvalue exceeds its counterfactual prediction (Glorfeld 1995); thus here 2 factors are implicated.

> The 'parental interest' factor is the only other case with any indication of a second latent factor. There as here factor loadings were examined to interpret that that indication; in the other six cases factor loadings were screened as a robustness check to ensure that each of the variables contributed significantly to the proposed factor.

The factor loadings for three factors were generated using maximum likelihood (ML) factor analysis based upon the polychoric correlations of Figure 4.1a. Embretson and Reise (2000) caution that factor analysis assumes (continuous) normally distributed indicator variables, however Babakus et al. (1987) report that ML factor analysis copes well with ordinal data and up to moderate skewness, particularly where polychoric correlations are used. The validity of this approach is ensured by the comparison of results produced by Maximum Likelihood (ML) and iterated principle factor analyses with nominal and graded item response theoretic (IRT) approaches. In seven cases all correlations exceeded $r = 0.91$.

> In one case (Appendix III-b) these correlations were weaker due to the skewed distribution of parental income and the imposed normality of IRT. Here two candidate 'financial position' scores were taken forward for analysis in Section 4.2, where it was determined that the IRT score provided a more pertinent measure of poverty. This is reasonable since the tail of the positively skewed income distribution is not relevant to the incidence of financial deprivation. In all other cases factor scores were predicted by graded item response theory since that is the most theoretically appropriate model as is discussed below.

Figure 4.1c shows the unrotated factor loadings for three potential school quality factors. Whilst a strong first factor is guaranteed by the methodology we see therein that the first factor explains a greater proportion of every variable than any other factor – this strongly supports the existence of a general factor.

Figure 4.1c – Unrotated maximum likelihood factor loadings for school quality

Variable	Factor1	Factor2	Factor3	Uniqueness
W1squietYP	-0.63	0.45	0.28	0.33
W1snodisYP	-0.48	0.33	0.28	0.58
W1kidskolMP	0.65	0.53	-0.17	0.26
W1yys5YP	0.56	0.13	0.10	0.66
W1yys14YP	0.54	-0.05	0.38	0.56
W1yys19YP	0.59	-0.17	0.37	0.49
W1yys21YP	0.49	-0.08	0.40	0.59

In order to explain why the second and third factors lie distinctly above the baseline trend in eigenvalues the rotated factor loadings were analysed. An oblique oblimin rotation was used as recommended by Kline (1994), since an orthogonal rotation would not allow the factors to expose interrelated latent constructs. Figure 4.1d successfully characterises a simple structure with all loadings either smaller than 0.10 in magnitude or greater than 0.30, and most non-negligible values considerably larger than that. 0.10 and 0.30 are proposed as threshold values for significant factor loadings by Cattel (1978) and Kline (1994) respectively. Since the proportion of an indicator's variance which can be explained by an (orthogonal) factor's loading is the square of that loading a threshold of 0.10 would explain 1% of the indicator's variance, whilst a loading of 0.30 would explain 9% of that variance.

Figure 4.1d exposes Factor 1 as a measure of teacher effectiveness (which is related to W1yys5YP – the young person's perception of school repute), with Factor 2 a measure of classroom behaviour, and Factor 3 predominantly driven by parental opinion of school quality (which again is unsurprisingly related to W1yys5YP). The emergence of these primary factors is both interesting and intuitive; furthermore it identifies that the construction of a single latent factor would produce a hybridisation of these primary factors. That outcome is optimal for the current context, and was advocated under similar circumstances by Bäckman and Nilsson (2011).

Table 4.1d – Oblimin rotated factor loadings for three school quality factors

Variable	Factor1	Factor2	Factor3	Uniqueness
W1squietYP	-0.03	0.81	0.01	0.33
W1snodisYP	0.05	0.66	-0.03	0.58
W1kidskolMP	-0.01	0.00	0.86	0.26
W1yys5YP	0.32	-0.06	0.33	0.66
W1yys14YP	0.66	0.03	0.05	0.56
W1yys19YP	0.68	-0.08	-0.04	0.49
W1yys21YP	0.66	0.04	-0.01	0.59

The careful validation that a single factor representation is appropriate was essential since the item response models used assume that items are locally independent conditional upon a univariate latent factor. In practice this means that the item response model will assume all item covariance to be attributable to a single latent factor, thus its predicted latent trait scores θ represent the most efficient projection of all possible primary factors onto that unidimensional scale.

An important robustness check is the examination of the item characteristic response curves (ICC) generated by a nominal item response model. That model estimates three parameter vectors: a latent trait score for each individual $[\theta_j]$, a location measure for each category of each item on that θ scale $[b_{ik}]$, and a discrimination factor for each category of each item $[a_{ik}]$. Given the modest assumption that the latent trait is normally distributed the probability of an individual j with trait score θ_j having outcome Y_{ij} of category k on item i is taken to be:

$$\Pr(Y_{ij} = k \mid \theta_j) = \frac{\exp\{a_{ik}(\theta_j - b_{ik})\}}{\sum_{h=1}^{K} \exp\{a_{ih}(\theta_j - b_{ih})\}} \qquad , \theta_j \sim N(0,1)$$

Where item i has K categories. The item characteristic curves for item i plot the probability distribution of the θ_j for the individuals in each category k of that item. Those graphs can be analysed for two key attributes: firstly the centres of mass of each category of each potential indicator variable should progress monotonically according to their expected ordinality, and secondly the spread and slope of each curve should discriminate meaningfully between individuals with differing θ scores. An example of a particularly desirable ICC plot is available in the W1yys19YP plot of Figure 14.1e, where any given response category will indicate a reasonably narrow θ interval to which the individual concerned is likely to belong.

The categories in each of the ICC plots for school quality are located as expected, however the discriminatory power of some categories is quite low. Categories (2) and (3) in W1squietYP are an example of this – not only do their members have relatively diffuse probability distributions over θ, but there is also little distinction between them. The latter observation is unsurprising since the associated questionnaire responses are closely comparable: (2) represents misbehaviour in "about half of classes" whilst (3) indicates misbehaviour in "more than half but less than most classes". These two categories could be merged to improve inter-category discrimination, however since their distributions are offset in the direction expected such an action would lead to a slight loss of information in this case. All of the school quality variables were therefore retained without recoding, although the first three plots were marginal in this regard.

Across all cases 11 variables were recoded and 30 others retained without change.

Figure 4.1e – Characteristic curves of potential school quality indicator variables

Category Characteristic Curves - W1yys21YP

4.2 Initial multicollinearity assessments

Multicollinearity is a significant concern since 85 explanatory variables have thus far been operationalised. To mitigate this variables were screened using their polychoric correlations and R^2 values when regressed upon the other explanatory variables[2]. This was undertaken in two halves for pragmatic reasons, thus Figures 4.2b and 4.2c assess the attitudinal and behavioural measures listed in Table 4.2a. Both of these figures shade in light blue values smaller than 0.3 and in dark blue values smaller than 0.2 in order to facilitate the identification of the larger values[3]. The potentially concerning variables thereby identified are discussed below.

Figure 4.2c highlights the perfect multicollinearity between W1yys22YP, W1yys23YP, and 'inward confidence'. Since the polychoric correlations suggested that 'inward confidence' contains more unique information than the other two it was retained. The correlation matrix further suggested that W1yys22YP and W1yys23YP have highly comparable external associations, and so the variable 'academic confidence' was derived to replace those two variables with their sum.

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[2] Unadjusted R^2 values are preferred here since they give the true proportion of the variance which can be derived from the other variables, regardless of whether that derivation is spurious (due to chance within this particular dataset).
[3] This is a conservative shading since Studenmund (2006) suggests 0.8 as a possible threshold for multicollinearity detection in correlation coefficients, whilst acknowledging the significant limitation that correlations can only detect collinearity between two variables and not multicollinearity between more than two. The regression R^2 values of Figure 4.2c are not subject to this limitation and Studenmund also suggests 0.8 as a guideline value for these, whilst Kennedy (2003) suggests using 0.9 as a threshold. Note also that the R^2 value corresponds to a tolerance of $(1-R^2)$ and a variance inflation factor of $(1-R^2)^{-1}$.

The correlation matrix suggests that the set of yys variables are strongly interrelated; a conclusion which is largely reinforced by their R^2 values. For this reason cluster analyses were undertaken on these variables, as documented in Section 4.2.1. This resulted in the following amalgamation of variables:

- The sum of yys1 and yys6 became 'positive about school'
- The sum of yys11 and yys18 became 'positive about classes'
- The sum of yys12 and 'academic confidence' became 'positive about ability'
- The sum of yys2, yys4, yys8, yys9, and yys10 became 'dislike schooling'

Figure 4.2b shows a predictably strong association (0.57) between W1sportYP and 'played sport', however the R^2 values for each are only 0.22. This suggests that those who play sport most regularly (W1sportYP) are not necessarily those who do so outside of school (played sport); a suggestion which is substantiated by the two-way table of these variables in Figure 4.2d. For this reason both variables were retained.

Figure 4.2d – Two way table of W1sportYP and 'played sport'

	played_sport		
W1sportYP	Not mentioned	Mentioned	Total
Most days	755	4,504	5,259
More than once a week	1,598	3,029	4,627
Once a week	1,173	1,252	2,425
Less than once a week	491	392	883
Hardly ever	789	320	1,109
Never	911	200	1,111
Total	5,717	9,697	15,414

The remaining area of significant collinearity involves the variables suspended, behaviour, W1expelMP, substance_abuse, police, W1truant1YP and W1paloutYP. Cluster analyses analogous to those in Section 4.2.1 delineated three clusters of closely associated variables, however theoretical and external disparities were identified within these clusters. Therefore the original variables were retained except that a new behaviour factor was derived to incorporate truancy. Appendix III-m documents these analyses fully and in so doing finds preliminary evidence that increased religiosity may reduce substance abuse.

Table 4.2a – Descriptions of the 44 attitudinal and behavioural variables

Variable	Description	+ indicates
religiosity	How important is religion to your way of life?	more important
W1quahelpYP	How important is helping others in selecting a job?	less important
W1quawageYP	How important is a high salary in selecting a job?	less important
W1quaworkYP	How important is being your own boss in selecting a job?	less important
W1quavarYP	How important is interesting work in selecting a job?	less important
W1quapromYP	How important are advancement opportunities in selecting a job?	less important
W1quahourYP	How important are regular hours in selecting a job?	less important
W1yys1YP	I am happy at school,	strongly disagree
W1yys2YP	School is a waste of time for me,	strongly disagree
W1yys3YP	School work is worth doing,	strongly disagree
W1yys4YP	Most of the time I don't want to go to school,	strongly disagree
W1yys6YP	On the whole I like being at school,	strongly disagree
W1yys7YP	I work as hard as I can in school,	strongly disagree
W1yys8YP	I often count the minutes until a lesson ends,	strongly disagree
W1yys9YP	I am bored in lessons,	strongly disagree
W1yys10YP	The work in lessons is a waste of time,	strongly disagree
W1yys11YP	The work in lessons in interesting,	strongly disagree
W1yys12YP	I get good marks for my work,	strongly disagree
W1yys22YP	How good do you think you are at school work?	weaker
W1yys23YP	How good do school teachers think you are?	weaker
inward_confidence	The difference between W1yys22YP and W1yys23YP	More inward
work_ethic	Quantity of out-of-lesson studying	more
job_aspiration	Import of employment / career (factor)	less important
W1yys18YP	I like my teachers	strongly disagree
W1sportYP	Frequency of doing sport	less often
played_instrument	Whether played an instrument in the last 4 weeks,	yes
community_work	Whether done community work in the last 4 weeks,	yes
youth_group	Whether attended a youth group in the last 4 weeks,	yes
played_sport	Whether played sport in the last 4 weeks,	yes
entertainment	Whether cinema/concert/sports match in the last 4 weeks,	yes
gone_out	Whether party/pub/dance/nightclub in the last 4 weeks,	yes
hung_out	Whether hung out on the street in the last 4 weeks,	yes
behaviour	Antisocial behaviours / behavioural support (factor)	more antisocial
suspended	How often suspended from school	more often
W1expelMP	Whether ever expelled from school	no
substance_abuse	Level of substance abuse (factor)	more
police	Frequency of police contact	more
W1abs3meMP	Whether YP has ever been continuously absent for 3+ months.	no
W1abs1myMP	Whether YP has been continuously absent for 1+month in the last 12 months.	no

W1truant1YP	Severity of longest truancy in the last 12 months.	less severe
parental_relationships	Quality of relationship with parents (factor)	better relationship
W1palhomeYP	How many times have you had friends round to your house in the last 7 days?	more often
W1paloutYP	How many times have you gone out with friends in the last 7 days?	more often
bullied	Reports of being bullied in the last 12 months	more reported
Academic_confidence	Combined score for how good you and your teachers think you are at school work (later dropped) (derivation motivated in Section 4.2)	Weaker
positive_about_school	(sum of) I am happy at school; On the whole I like being at school	More positive
positive_about_classes	(sum of) The work in lessons in interesting; I like my teachers	More positive
positive_about_ability	(the sum of) I get good marks for my work; How good do you think you are at school work? How good do school teachers think you are?	More positive
dislike_schooling	(the sum of) School is a waste of time for me; Most of the time I don't want to go to school; I often count the minutes until a lesson ends; I am bored in lessons; The work in lessons is a waste of time	Less negative
behaviour2	Factor comprising antisocial behaviours, poor behaviour in school, receipt of behaviour support, and truancy.	more antisocial

Figure 4.2b – Polychoric correlations between the 44 proposed attitudinal and behavioural measures

	religios	quahelp	quawage	quawork	quavar	quaprom	quahour	yys1	yys2	yys3	yys4	yys6	yys7	yys8	yys9	yys10	yys11	yys12	yys22	yys23	inward conf	work ethic	job asp	yys18	sport	played instrum	commun work	youth group	played sport	entert ainment	gone out	hung out	behaviour	suspend	expel	subst abuse	police	abs3	abs1	truant	parental relations	palhome	palout	bullied
W1quahelpYP	-0.18
W1quawageYP	-0.06	0.00
W1quaworkYP	-0.15	0.06	0.34
W1quavarYP	0.03	0.07	0.15	0.22
W1quapromYP	-0.13	0.11	0.37	0.36	0.30
W1quahourYP	-0.05	0.13	0.20	0.17	0.11	0.25
W1yys1YP	-0.20	0.14	-0.02	0.01	0.04	0.10	0.08
W1yys2YP	0.12	-0.11	0.06	0.07	-0.05	-0.07	-0.03	-0.34
W1yys3YP	-0.12	0.14	0.00	0.00	0.04	0.13	0.07	0.35	-0.45
W1yys4YP	0.15	-0.10	0.08	0.06	-0.01	-0.05	-0.03	-0.47	0.50	-0.30
W1yys6YP	-0.21	0.17	-0.03	0.00	0.04	0.10	0.07	0.69	-0.44	0.45	-0.56
W1yys7YP	-0.23	0.19	-0.06	0.02	-0.01	0.08	0.08	0.33	-0.30	0.38	-0.34	0.39
W1yys8YP	0.13	-0.05	0.08	0.05	0.02	-0.02	0.01	-0.26	0.30	-0.23	0.42	-0.31	-0.25
W1yys9YP	0.21	-0.14	0.09	0.02	0.00	-0.07	-0.02	-0.41	0.43	-0.33	0.54	-0.48	-0.41	0.55
W1yys10YP	0.16	-0.13	0.06	0.03	0.00	-0.07	-0.03	-0.33	0.54	-0.44	0.43	-0.41	-0.36	0.35	0.53
W1yys11YP	-0.23	0.18	-0.04	0.06	0.04	0.12	0.07	0.44	-0.34	0.41	-0.40	0.52	0.49	-0.33	-0.52	-0.42
W1yys12YP	-0.14	0.07	-0.01	-0.01	0.05	0.08	0.05	0.32	-0.29	0.32	-0.28	0.37	0.48	-0.19	-0.29	-0.28	0.42
W1yys22YP	-0.17	0.05	-0.01	-0.00	0.07	0.10	0.01	0.31	-0.29	0.28	-0.29	0.34	0.41	-0.19	-0.32	-0.27	0.35	0.62
W1yys23YP	-0.17	0.06	-0.02	-0.01	0.06	0.09	0.02	0.31	-0.27	0.27	-0.28	0.33	0.41	-0.19	-0.31	-0.26	0.35	0.59	0.76
inward_confidence	0.00	-0.02	0.01	0.01	0.00	0.01	0.00	0.00	-0.02	0.01	0.00	0.01	-0.02	0.00	0.00	0.01	0.01	0.01	0.46	-0.49
work_ethic	0.23	-0.10	0.08	0.07	-0.04	-0.02	-0.02	-0.21	0.25	-0.19	0.23	-0.24	-0.29	0.16	0.26	0.25	-0.23	-0.25	-0.28	-0.28	0.02
job_aspiration	-0.04	0.14	0.18	0.10	0.17	0.26	0.14	0.11	-0.14	0.17	-0.08	0.12	0.09	-0.02	-0.09	-0.07	0.08	0.08	0.08	0.08	0.00	-0.06
W1yys18YP	-0.15	0.14	-0.09	-0.03	-0.02	0.03	0.03	0.43	-0.28	0.29	-0.37	0.47	0.38	-0.31	-0.47	-0.35	0.48	0.32	0.33	0.33	-0.01	-0.21	0.05
W1sportYP	0.00	-0.05	0.04	0.09	0.07	0.09	0.03	0.09	-0.10	0.06	-0.08	0.09	-0.03	-0.06	-0.09	-0.08	0.08	0.07	0.11	0.09	0.02	-0.05	0.07	0.08
played_instrument	-0.05	0.01	0.14	0.12	-0.08	0.07	0.05	-0.05	0.16	-0.08	0.10	-0.10	-0.02	0.07	0.08	0.07	-0.06	-0.14	-0.17	-0.17	0.00	0.15	-0.02	-0.09	-0.11
community_work	0.06	-0.13	0.09	0.05	-0.01	0.03	0.05	-0.02	0.09	-0.05	0.10	-0.09	-0.07	0.05	0.10	0.06	-0.10	-0.12	-0.07	-0.09	0.04	0.08	0.02	-0.10	-0.02	0.18
youth_group	0.03	-0.05	0.03	-0.01	-0.04	-0.01	-0.02	-0.02	0.04	-0.05	0.03	-0.02	0.03	0.01	0.02	0.01	-0.04	-0.04	-0.01	-0.01	0.00	0.00	-0.01	-0.03	-0.12	0.16	0.36
played_sport	-0.09	0.08	-0.01	-0.04	-0.07	-0.06	-0.01	-0.05	0.09	-0.05	0.05	-0.05	0.07	0.06	0.07	0.04	-0.03	-0.06	-0.11	-0.08	-0.05	0.04	-0.06	-0.07	-0.57	0.25	0.13	0.22
entertainment	-0.06	0.00	0.02	0.03	-0.08	-0.03	-0.01	-0.06	0.12	-0.06	0.06	-0.08	0.02	0.01	0.03	0.00	-0.06	-0.08	0.00	0.00	0.10	-0.06	0.10	-0.05	0.19	0.08	0.13	0.18	0.31
gone_out	-0.22	-0.01	-0.01	0.00	-0.04	0.02	0.00	0.06	-0.01	0.03	-0.06	0.06	0.14	-0.08	-0.10	-0.07	0.10	0.04	0.06	0.06	0.00	-0.05	-0.05	0.08	-0.10	0.11	0.04	0.15	0.21	0.14
hung_out	-0.31	0.06	-0.05	0.01	-0.02	0.00	-0.03	0.13	-0.11	0.11	-0.17	0.17	0.27	-0.17	-0.24	-0.14	0.21	0.17	0.19	0.19	-0.01	-0.18	-0.04	0.20	-0.09	0.00	-0.02	0.01	0.16	0.32	0.35
behaviour	-0.16	0.10	-0.12	-0.10	0.00	-0.03	0.01	0.23	-0.24	0.19	-0.28	0.24	0.41	-0.23	-0.32	-0.25	0.25	0.26	0.26	0.27	-0.03	-0.31	0.02	0.28	-0.08	-0.09	-0.06	0.08	0.09	0.01	0.20	0.35
suspended	-0.13	0.07	-0.16	-0.14	0.04	-0.04	-0.01	0.27	-0.25	0.16	-0.22	0.22	0.28	-0.14	-0.27	-0.19	0.26	0.22	0.22	0.22	0.16	-0.37	0.03	0.20	-0.06	-0.15	-0.04	0.07	0.03	-0.12	0.08	0.18	0.46
W1expelMP	0.13	-0.02	0.03	0.15	-0.05	-0.06	-0.01	-0.20	0.26	-0.21	0.26	-0.23	-0.13	0.16	0.22	0.22	-0.12	-0.10	-0.17	-0.19	0.00	0.29	-0.07	-0.14	-0.07	0.14	-0.08	0.03	-0.01	0.17	-0.06	-0.11	-0.38	-0.66
substance_abuse	-0.35	0.08	-0.03	0.04	-0.03	0.04	0.03	0.21	-0.15	0.14	-0.21	0.22	0.33	-0.19	-0.26	-0.20	0.24	0.17	0.18	0.18	-0.01	-0.21	-0.01	0.23	0.02	-0.03	0.06	0.02	0.06	0.29	0.37	0.45	0.26	-0.20	0.33
police	-0.26	0.09	-0.12	-0.07	0.04	0.03	0.01	0.23	-0.25	0.16	-0.23	0.23	0.26	-0.11	-0.25	-0.21	0.18	0.21	0.23	0.23	0.00	-0.36	0.03	0.18	-0.02	-0.16	0.00	0.06	0.04	-0.16	0.10	0.26	0.46	0.58	-0.20	0.33
W1abs3meMP	0.01	0.05	0.02	0.04	-0.08	-0.05	-0.05	-0.16	0.19	-0.16	0.19	-0.18	-0.04	0.08	0.13	0.15	-0.06	-0.13	-0.15	-0.13	-0.02	0.15	-0.04	-0.08	-0.09	0.08	-0.06	0.04	0.09	0.17	0.01	0.06	-0.16	-0.25	0.55	-0.09	-0.30
W1abs1myMP	0.07	0.02	0.01	0.03	-0.05	-0.05	0.02	-0.09	0.14	-0.06	0.11	-0.12	-0.06	0.05	0.12	0.11	-0.04	-0.12	-0.10	-0.11	0.00	0.16	-0.06	-0.06	0.09	0.14	-0.04	0.01	0.08	0.10	0.01	0.05	-0.18	-0.31	0.44	-0.07	-0.30	0.45
W1truant1YP	0.12	-0.04	0.12	0.09	-0.02	0.00	-0.02	-0.26	0.31	-0.21	0.32	-0.29	-0.33	0.25	0.33	0.31	-0.24	-0.23	-0.24	-0.25	0.02	0.33	-0.04	-0.28	-0.07	0.06	0.05	-0.15	-0.25	-0.50	-0.45	0.33	-0.39	-0.45	0.28	0.25
parental_relationships	0.18	-0.14	0.03	-0.04	-0.03	-0.07	-0.05	-0.24	0.22	-0.23	0.24	-0.26	-0.33	0.17	0.27	0.23	-0.29	-0.25	-0.23	-0.25	0.00	0.19	-0.08	-0.27	-0.05	0.05	0.08	0.01	0.01	0.03	-0.08	-0.21	-0.30	-0.20	0.12	-0.27	-0.24	0.07	0.06	0.29
W1palhomeYP	-0.18	0.00	-0.05	-0.04	-0.03	-0.02	0.00	0.08	-0.09	0.05	-0.10	0.10	0.13	-0.08	-0.12	-0.09	0.10	0.12	0.13	0.12	0.01	-0.16	-0.02	0.10	-0.07	-0.06	-0.01	0.09	0.05	0.10	0.21	0.35	0.20	0.15	-0.05	0.20	0.19	0.02	-0.07	-0.17	-0.06
W1paloutYP	-0.29	0.04	-0.07	-0.05	-0.03	-0.02	-0.01	0.12	-0.12	0.08	-0.13	0.14	0.23	-0.11	-0.16	-0.13	0.15	0.14	0.18	0.17	0.00	-0.24	-0.03	0.14	-0.17	-0.06	-0.04	0.16	0.17	0.12	0.27	0.50	0.31	0.25	-0.17	0.31	0.33	0.05	-0.08	-0.23	-0.16	0.60
bullied	-0.15	-0.04	0.04	0.03	0.03	0.05	0.03	0.23	-0.09	0.04	-0.13	0.17	0.06	-0.14	-0.15	-0.08	0.07	0.05	0.10	0.10	-0.01	-0.12	0.02	0.10	0.08	0.07	0.10	0.06	-0.04	-0.02	0.09	0.10	0.18	0.24	-0.14	0.19	0.17	-0.11	-0.09	-0.21	-0.07	0.04	0.05

Figure 4.2c – R2 Values for each of the 44 proposed attitudinal and behavioural measures when regressed on the other 43

variable	religiosity	W1quahelpYP	W1quawageYP	W1quaworkYP	W1quavarYP	W1quapromYP	W1quahourYP	W1yys1YP	W1yys2YP	W1yys3YP	W1yys4YP	W1yys6YP	W1yys7YP	W1yys8YP	W1yys9YP	W1yys10YP	W1yys11YP	W1yys12YP	W1yys22YP	W1yys23YP	inward_confidence	work_ethic
r2	0.16	0.07	0.12	0.14	0.06	0.17	0.06	0.40	0.26	0.17	0.39	0.48	0.35	0.26	0.45	0.29	0.34	0.34	1.00	1.00	1.00	0.20
Adjusted r2	0.16	0.07	0.12	0.14	0.06	0.16	0.06	0.39	0.25	0.17	0.38	0.47	0.35	0.26	0.44	0.29	0.34	0.34	1.00	1.00	1.00	0.20

variable	job_aspiration	W1yys18YP	W1sportYP	played_instrument	community_work	youth_group	played_sport	entertainment	gone_out	hung_out	behaviour	suspended	W1expelMP	substance_abuse	police	W1abs3meMP	W1abs1myMP	W1truant1YP	parental_relationships	W1palhomeYP	W1paloutYP	bullied
r2	0.09	0.30	0.22	0.07	0.03	0.06	0.22	0.07	0.12	0.21	0.42	0.19	0.04	0.33	0.15	0.02	0.04	0.21	0.19	0.28	0.38	0.09
Adjusted r2	0.08	0.30	0.21	0.07	0.03	0.05	0.21	0.07	0.12	0.20	0.42	0.19	0.04	0.33	0.15	0.02	0.03	0.21	0.19	0.27	0.38	0.09

Table 4.2e Descriptions of the 40 family background variables

Variable	Description	+ indicates
gender	gender (as first reported)	female
W1chea1HS	whether YP has any long-standing illness, disability, or infirmity; and whether it affects school work	worse health
birthweight	low-normal-high birth weights	higher birth weight
ontime	whether premature or late birth	further from term
SEN	whether YP has any learning related SEN.	more current
IndSchool	whether the school attended at age 13 was independent.	yes
school_quality	factor comprising perceptions, classroom behaviour, teacher quality	lower quality
W1nurschHS	whether either pre-school or nursery was attended.	no
careers_advice	maximum usefulness of careers advice from school	more useful
extra_tuition	How much extra tuition has been received	more
gor	Government Office Regions: 1 North East 2 North West 3 Yorkshire and The Humber 4 East Midlands 5 West Midlands 6 East of England 7 London 8 South East 9 South West	dummies
urban_rural_indicator	Area type (urban - rural - sparse)	increasingly sparse
IDACIRSCORE	Income Deprivation Affecting Children Index	
IMDRSCORE	Index of Multiple Deprivation	
W1hous12HH	housing tenure	decreasingly independent
W1inyrmov	The number of school moves experienced excluding those during the summer holidays	more moves
W1vehnoHH	the number of vehicles the household has	more vehicles

mobile_phone	level of mobile phone access (none - basic phone - phone with internet)	increasing phone access
W1readsYP	frequency of reading for pleasure	decreasing frequency
computing_access	level of computing access (none - basic - computer with internet)	increasing IT access
parental_education	grouped highest qualification level of main and second parents,	decreasingly qualified
parental_occupation	Standard Occupational Classifications	decreasingly respected
MRetwrk	the age of the child when the mother returned to work (full-time)	older
Mretwrk_sq	the square of the above	older^2
parental_employment	current employment status and duration	longer
W1ethgrpYP	7 ethnic groups: 1 White 2 Mixed 3 Indian 4 Pakistani 5 Bangladeshi 6 Black Caribbean 7 Black African 8 Other	dummies
language	level of personal and household familiarity with english	less fluent
W1sampborHS	whether YP born in the UK?	no
parental_aspiration	factor measuring the extent to which education is valued	less valued
parental_interest	factor comprising engagement with the YP's school and education	more involved
W1evercarMP0a	whether YP has ever been in care?	yes
mbirthag	mother's age at birth.	older
W1agedad	father's current age.	older
W1famtyp	current familial context.	increasingly broken
separation	whether/when parents separated	intact for longer
W1NoldsibHS	number of older siblings	more

W1NyoungsibHS	number of younger siblings	more
financial_position_ml	factor comprising relative income, how well the household is managing, benefit reciept	increasing difficulties
financial_position_irt_grm	factor comprising relative income, how well the household is managing, benefit reciept	increasing difficulties
jobtime	amount of time YP spends working	more
care	level of burden of YP's caring responsibilities	more burdensome

The family background variables listed in Table 4.2e were assessed for multicollinearity in a similar way. It is unsurprising that Figure 4.2f shows relatively high R^2 values for the regional and ethnic dummy variables, as these will be largely collinear within themselves. It is also unsurprising that the two formulations of the financial position factor are largely explained by each other: with a t statistic of over 50. Given this degree of collinearity the skewed ml factor was dropped in favour of the grm predictions, since the stronger external associations of the latter suggest empirically that it may be a more meaningful measure in this context, and since Section 4.1 noted its greater theoretic relevance.

Another expected result is the high R^2 values of the indices of deprivation, which are driven by their mutual correlation of 0.92. An inspection of Figure 4.2g suggests that the two indices generally have comparable external associations, although the IMD is perhaps more sensitive to the geographical region. This is theoretically sound as the IMD comprises 7 domains of deprivation relating to the lower super output area[4], whilst the IDACI is the proportion of young people affected by a subset of the IMD's income deprivation domain. Since the present study has alternative measures of individual income deprivation the IMD was retained as a more complete reflection of neighbourhood deprivation.

The large R^2 values for MRetwrk and MRetwrk_sq are driven by the presence of each other – the former has an R^2 value of 0.16 when the latter is excluded. Nevertheless both variables were retained since Section 2.5b suggested that the effects of the mother returning to work may be initially adverse but later positive.

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[4] Approximately 650 households (DCLG 2015)

The remaining collinear variables reflect intuitive relationships. For example the language variable is largely explained by whether an individual was born oversees (t statistic of 14) and their ethnicity (t statistics of up to 15), whilst parental occupation is largely explained by parental education (t statistic of 21). Similarly mbirthag and W1agedad are interrelated with a t statistic of 43, and both of these are significant in explaining NyoungsibHS and NoldsibHS, which also explain each other with a t statistic of 19. Despite their multicollinearity these variables represent theoretically distinct attributes, hence they were retained pending constructed counterfactual results from Section 5.1.

Figure 4.2f – R^2 Values for each of the 41 proposed contextual measures when regressed on the other 40 such measures

variable	gender	W1chea1HS	birthweight	ontime	SEN	gor1	gor2	gor3	gor4	gor5	gor6	gor8	gor9	IndSchool
r2	0.07	0.09	0.26	0.25	0.14	0.43	0.60	0.51	0.49	0.53	0.52	0.61	0.52	0.17
Adjusted r2	0.06	0.09	0.26	0.24	0.13	0.42	0.59	0.51	0.49	0.53	0.52	0.61	0.52	0.16

variable	school_quality	W1nurschHS	careers_advice	extra_tuition	urban_rural_indicator	IDACIRSCORE	IMDRSCORE	W1hous12HH	W1inyrmov	W1vehnoHH	mobile_phone	W1readsYP	computing_access	parental_education
r2	0.15	0.03	0.11	0.12	0.15	0.88	0.89	0.33	0.06	0.26	0.12	0.11	0.23	0.35
Adjusted r2	0.14	0.02	0.10	0.11	0.14	0.88	0.89	0.33	0.06	0.25	0.11	0.10	0.22	0.35

variable	parental_occupation	MRetwrk	parental_employment	ethgrp2	ethgrp3	ethgrp4	ethgrp5	ethgrp6	ethgrp7	ethgrp8	language	W1sampborHS	parental_aspiration	parental_interest
r2	0.37	0.95	0.32	0.05	0.32	0.22	0.30	0.10	0.23	0.10	0.41	0.17	0.09	0.18
Adjusted r2	0.36	0.95	0.32	0.05	0.32	0.21	0.29	0.09	0.22	0.09	0.40	0.16	0.08	0.18

variable	W1evercarMP0a	mbirthag	W1agedad	W1famtyp	separation	W1NoldsibHS	W1NyoungsibHS	financial_position_ml	financial_position_irt_grm	jobtime	care	MRetwrk_sq		
r2	0.02	0.52	0.48	0.19	0.24	0.29	0.33	0.46	0.59	0.06	0.04	0.95		
Adjusted r2	0.01	0.52	0.48	0.19	0.23	0.28	0.32	0.45	0.59	0.05	0.04	0.95		

Note: gor7 (London) and ethgrp1 (white) were omitted as the most populous categories.

Figure 4.2g – Polychoric correlations between the 41 proposed contextual measures

Lower-triangular polychoric correlation matrix. Column order (diagonal labels, left block): (1) gender, (2) chea1, (3) birth weight, (4) ontime, (5) SEN, (6) Ind School, (7) school quality, (8) nursch, (9) careers advice, (10) extra tuition, (11) gor1, (12) gor2, (13) gor3, (14) gor4, (15) gor5, (16) gor6, (17) gor7, (18) gor8, (19) gor9, (20) urban rural, (21) IDACI SCORE, (22) IMD SCORE, (23) hous12, (24) inyrmov, (25) vehno, (26) mobile phone, (27) reads, (28) comput. access, (29) parental education, (30) parental occupation, (31) MRetwrk, (32) Mretwrk sq, (33) parental employm, (34) ethgrp1, (35) ethgrp2, (36) ethgrp3, (37) ethgrp4, (38) ethgrp5, (39) ethgrp6, (40) ethgrp7, (41) ethgrp8, (42) language, (43) sampbor, (44) parental aspiration.

Row (diagonal)	Correlations (columns 1 … k, left to right)
W1chea1HS (chea1)	-0.12
birthweight	-0.14, -0.04
ontime	-0.01, 0.12, -0.63
SEN	-0.19, 0.41, -0.01, 0.10
IndSchool	-0.01, -0.02, 0.05, 0.01, 0.00
school_quality	0.07, 0.08, 0.02, 0.01, 0.11, -0.43
W1nurschHS (nursch)	0.00, 0.00, -0.03, 0.01, 0.00, -0.13, 0.02
careers_advice	0.01, -0.10, 0.05, -0.04, -0.13, 0.02, -0.25, -0.04
extra_tuition	-0.03, -0.01, -0.03, -0.02, 0.04, 0.15, -0.02, -0.05, -0.21
gor1	0.02, 0.05, 0.04, 0.01, -0.01, -0.20, -0.02, -0.12, -0.05, -0.21
gor2	-0.03, 0.00, 0.03, 0.05, -0.03, 0.22, -0.08, 0.03, -0.03, -0.12, -0.94
gor3	0.00, 0.00, -0.03, 0.01, -0.04, -0.19, -0.06, 0.04, 0.04, -0.13, -0.94, -0.96
gor4	-0.05, 0.04, -0.01, 0.04, 0.00, 0.02, 0.07, -0.01, -0.04, -0.04, -0.96
gor5	-0.03, -0.03, -0.02, 0.04, -0.03, -0.01, -0.01, 0.01, 0.02, -0.04, -0.96, -0.95, -0.94
gor6	0.00, 0.01, 0.04, -0.03, -0.02, -0.04, 0.06, 0.05, 0.00, -0.06, -0.97
gor7	0.07, -0.12, -0.06, -0.05, -0.14, -0.04, -0.04, 0.11, 0.03, 0.33, -0.96
gor8	0.02, 0.07, 0.05, -0.04, 0.18, 0.21, 0.06, -0.09, -0.02, -0.02, -0.96, -0.94, -0.96
gor9	-0.03, 0.03, -0.02, 0.03, 0.08, -0.13, 0.03, -0.01, -0.02, -0.13, -0.94, -0.96
urban_rural_indicator	0.00, 0.00, 0.07, -0.01, 0.05, 0.15, -0.08, -0.05, 0.00, -0.09, -0.08, -0.11, -0.05, 0.19, -0.10, 0.20, -0.97, 0.12, 0.36
IDACIRSCORE	0.03, -0.01, -0.10, 0.01, -0.01, -0.45, 0.08, 0.16, -0.01, -0.08, 0.09, 0.12, 0.06, -0.12, 0.05, -0.25, 0.33, -0.40, -0.23, -0.60
IMDRSCORE	0.02, -0.01, -0.10, 0.02, -0.03, -0.44, 0.07, 0.16, -0.01, -0.11, 0.16, 0.24, 0.20, -0.09, 0.14, -0.36, 0.17, -0.55, -0.24, -0.57, 0.92
W1hous12HH	0.00, 0.07, -0.04, 0.03, 0.11, -0.28, 0.10, 0.14, -0.03, -0.13, 0.03, -0.07, -0.09, -0.04, -0.09, -0.02, 0.24, -0.04, 0.00, -0.14, 0.36, 0.29
W1inyrmov	0.00, 0.09, 0.00, 0.03, 0.09, 0.07, 0.03, 0.03, -0.04, 0.03, -0.04, -0.06, -0.02, 0.01, -0.09, 0.07, -0.03, 0.06, 0.10, 0.05, 0.02, 0.00, 0.14
W1vehnoHH	-0.01, -0.01, 0.07, -0.02, 0.01, 0.30, -0.04, -0.11, 0.02, -0.06, -0.06, -0.06, -0.11, 0.06, -0.03, 0.11, 0.18, 0.10, 0.31, -0.40, -0.39, -0.28, -0.06, -0.06
mobile_phone	-0.07, 0.00, 0.09, 0.00, -0.02, 0.08, 0.06, -0.15, 0.03, -0.06, 0.00, 0.00, 0.03, 0.00, -0.03, 0.03, -0.19, 0.11, 0.16, -0.21, -0.22, -0.04, -0.05, 0.02
W1readsYP	-0.22, 0.05, 0.01, 0.03, 0.20, -0.17, 0.13, 0.03, -0.15, -0.06, 0.08, -0.02, 0.06, 0.04, 0.03, -0.02, -0.12, 0.01, 0.02, -0.04, 0.06, 0.06, 0.07, 0.00, -0.05, 0.02
computing_access	-0.01, -0.05, 0.10, -0.02, -0.13, 0.38, -0.12, -0.20, 0.07, 0.23, 0.00, -0.07, -0.14, 0.04, -0.07, 0.14, -0.05, 0.16, 0.06, 0.21, -0.39, -0.40, -0.35, -0.07, 0.40, 0.20, -0.10
parental_education	0.00, 0.00, -0.07, -0.02, 0.08, -0.46, 0.10, 0.19, -0.04, -0.17, 0.05, 0.04, 0.10, 0.00, 0.06, -0.15, -0.09, -0.20, 0.39, 0.40, 0.26, -0.02, -0.25, -0.16, 0.15, -0.49
parental_occupation	0.00, 0.03, -0.06, 0.01, 0.08, -0.39, 0.11, 0.12, -0.04, -0.17, 0.07, 0.01, 0.10, 0.03, 0.05, -0.07, 0.03, -0.15, -0.04, -0.18, 0.38, 0.39, 0.28, 0.02, -0.33, -0.12, 0.11, -0.45, 0.52
MRetwrk	0.01, 0.00, -0.08, -0.02, 0.02, -0.12, 0.03, 0.21, -0.03, -0.05, -0.01, 0.03, 0.05, -0.10, 0.01, -0.05, 0.19, -0.11, -0.12, -0.17, 0.35, 0.35, 0.22, 0.02, -0.19, -0.28, 0.05, -0.37, 0.41, 0.30
MRetwrk_sq	0.01, 0.00, -0.08, -0.02, 0.02, -0.12, 0.03, 0.21, -0.03, -0.05, -0.01, 0.03, 0.05, -0.10, 0.01, -0.05, 0.19, -0.11, -0.12, -0.17, 0.35, 0.35, 0.22, 0.02, -0.19, -0.28, 0.05, -0.37, 0.41, 0.30, -0.67
parental_employment	-0.03, -0.06, 0.08, -0.02, -0.06, 0.22, -0.08, -0.26, 0.04, 0.13, 0.00, 0.01, -0.03, 0.09, 0.00, 0.09, -0.26, 0.14, 0.12, 0.27, -0.45, -0.43, -0.42, -0.12, 0.42, 0.25, -0.06, 0.49, -0.48, -0.46, -0.67, -0.67
ethgrp1	-0.04, 0.19, 0.18, 0.08, 0.25, 0.37, 0.07, -0.20, -0.09, -0.37, 0.32, 0.15, -0.01, 0.12, -0.13, 0.20, -0.66, 0.34, 0.45, 0.62, -0.43, -0.41, -0.06, -0.02, 0.28, 0.36, 0.21, -0.19, -0.14, -0.36, -0.36, 0.38
ethgrp2	0.04, 0.01, -0.03, -0.04, 0.03, -0.12, 0.08, -0.02, -0.05, 0.04, -0.18, -0.10, -0.01, -0.03, 0.07, 0.02, 0.16, -0.09, -0.05, -0.25, 0.10, 0.08, 0.13, 0.08, -0.11, 0.04, 0.01, -0.05, -0.04, -0.02, -0.01, -0.01, -0.11
ethgrp3	-0.02, -0.15, -0.19, 0.00, -0.24, -0.26, -0.12, 0.03, 0.09, 0.35, -0.29, -0.14, -0.09, 0.17, 0.21, -0.20, 0.26, -0.22, -0.40, -0.48, 0.01, 0.04, -0.29, -0.10, -0.04, -0.17, -0.03, 0.10, 0.02, 0.05, 0.03, 0.03, 0.08, -0.99
ethgrp4	0.01, -0.12, -0.13, -0.08, -0.20, -0.29, -0.10, 0.08, 0.10, 0.14, -0.16, 0.12, 0.34, -0.30, 0.12, -0.11, -0.02, -0.21, -0.40, -0.52, 0.27, 0.35, -0.22, -0.10, -0.21, -0.39, 0.00, -0.21, 0.29, 0.18, 0.61, 0.61, -0.29, -0.99, -0.91
ethgrp5	0.07, -0.22, -0.14, -0.18, -0.18, -0.91, 0.09, 0.24, 0.03, 0.08, -0.05, -0.05, -0.12, -0.10, -0.22, -0.05, -0.08, -0.31, -0.52, -0.55, 0.45, 0.42, 0.16, -0.08, -0.31, -0.52, -0.01, -0.30, 0.52, 0.26, 0.70, 0.70, -0.48, -0.99, -0.92, -0.90
ethgrp6	0.02, 0.02, -0.07, 0.04, -0.02, -0.40, 0.10, -0.01, 0.02, 0.04, -0.28, -0.21, -0.11, 0.13, -0.18, 0.52, -0.36, -0.37, 0.31, 0.24, -0.02, -0.01, -0.23, -0.07, -0.08, -0.15, -0.04, 0.07, -0.17, -0.17, -0.09, -0.99, -0.91, -0.90, -0.90
ethgrp7	0.03, -0.23, 0.00, -0.06, -0.22, -0.41, -0.04, 0.27, 0.07, 0.26, -0.32, -0.28, -0.20, -0.19, -0.21, -0.25, 0.63, -0.20, -0.30, -0.48, 0.33, 0.24, 0.37, 0.22, -0.26, -0.14, -0.10, -0.08, -0.10, 0.03, 0.06, 0.06, -0.29, -0.99, -0.92, -0.90, -0.90
ethgrp8	-0.02, -0.17, -0.02, -0.01, -0.11, 0.02, -0.05, 0.14, 0.02, 0.23, -0.15, 0.01, -0.14, -0.05, -0.08, -0.13, 0.35, -0.08, -0.35, -0.28, 0.13, 0.10, 0.10, 0.10, -0.14, -0.09, -0.05, 0.01, 0.00, -0.02, 0.11, 0.11, -0.16, -0.89, -0.91, -0.90
language	0.03, -0.23, -0.15, -0.15, -0.27, -0.37, -0.12, 0.30, 0.07, 0.20, -0.25, -0.10, -0.07, 0.09, -0.07, 0.02, -0.13, -0.29, -0.42, -0.57, 0.38, 0.39, 0.07, 0.04, -0.30, -0.43, -0.13, -0.26, 0.35, 0.21, 0.54, 0.54, -0.43, -0.87, -0.26, 0.45, 0.61, 0.71, -0.45, 0.41, 0.37
W1samborHS	-0.03, -0.22, -0.02, -0.15, -0.17, -0.09, -0.10, 0.42, 0.06, 0.11, -0.18, -0.15, -0.11, -0.06, -0.07, -0.11, 0.41, -0.08, -0.13, -0.25, 0.24, 0.20, 0.28, 0.32, -0.23, -0.26, -0.04, -0.17, 0.06, 0.04, 0.23, 0.23, -0.35, -0.62, 0.04, 0.01, 0.18, 0.24, 0.16, 0.71, 0.47, 0.63
parental_aspiration	-0.07, 0.08, 0.03, 0.03, 0.16, 0.14, 0.08, -0.03, -0.08, -0.14, -0.01, 0.02, 0.06, 0.05, -0.03, 0.06, -0.24, 0.06, 0.12, 0.14, -0.09, -0.09, 0.02, -0.01, 0.07, 0.08, 0.09, -0.02, 0.04, 0.01, -0.07, -0.07, 0.07, 0.32, -0.05, -0.27, -0.25, -0.17, -0.08, -0.28, -0.20, -0.29, -0.24
parental_interest	0.04, -0.04, 0.04, 0.01, -0.09, 0.14, -0.18, -0.13, 0.24, 0.17, -0.05, 0.00, -0.07, 0.01, -0.01, 0.03, -0.01, 0.06, 0.04, 0.10, -0.21, -0.21, -0.17, -0.02, 0.15, 0.12, -0.21, 0.32, -0.34, -0.27, -0.23, -0.23, 0.27, 0.10, 0.01, 0.03, -0.11, -0.20, -0.02, 0.01, -0.07, -0.16, -0.07, -0.06
W1evercarMP0a	-0.08, 0.15, -0.08, 0.15, 0.24, -0.21, 0.08, 0.19, -0.02, -0.01, -0.02, 0.02, -0.05, 0.05, -0.02, 0.05, -0.07, -0.02, 0.03, -0.06, 0.09, 0.09, 0.09, 0.14, 0.18, -0.09, -0.23, 0.12, 0.17, 0.22, 0.22, -0.24, -0.05, 0.17, -0.12, -0.19, -0.10, 0.05, 0.11, 0.09, -0.05, 0.15, 0.04
mbirthag	0.01, -0.03, 0.06, -0.03, -0.05, 0.31, -0.07, -0.04, 0.01, 0.00, 0.09, -0.08, -0.03, -0.05, -0.04, -0.04, 0.00, 0.06, 0.09, 0.00, -0.19, -0.25, -0.10, 0.21, 0.01, 0.00, 0.21, -0.16, -0.19, -0.12, -0.12, 0.13, 0.03, -0.05, 0.02, -0.02, -0.02, 0.04, -0.01, -0.08, -0.02, 0.05
W1agedad	0.00, -0.05, 0.04, -0.08, -0.07, 0.20, -0.05, 0.05, 0.01, 0.08, -0.10, -0.04, -0.08, -0.04, -0.22, -0.04, 0.18, 0.03, -0.02, 0.05, -0.05, -0.05, -0.16, -0.10, 0.12, -0.09, -0.07, 0.04, 0.04, -0.08, -0.15, 0.00, 0.02, 0.07, 0.25, -0.07, 0.12, 0.10, 0.17, 0.09, -0.05
W1famtyp	0.01, 0.09, -0.01, 0.05, 0.14, -0.21, 0.14, 0.11, -0.06, -0.14, 0.02, 0.04, -0.01, -0.05, -0.03, -0.04, 0.11, -0.07, -0.01, -0.17, 0.27, 0.24, 0.38, 0.12, -0.47, 0.01, -0.06, -0.38, 0.28, 0.32, 0.09, 0.09, -0.49, -0.06, 0.24, -0.29, -0.19, -0.18, 0.36, 0.25, 0.03, -0.11, 0.13, 0.02
separation	0.00, -0.07, 0.04, -0.06, -0.11, 0.24, -0.15, -0.07, 0.05, 0.17, 0.02, -0.03, 0.02, 0.05, -0.01, 0.03, -0.06, 0.09, 0.02, 0.13, -0.30, -0.27, -0.39, -0.14, 0.36, -0.02, -0.10, 0.40, -0.27, -0.31, -0.11, -0.11, 0.48, 0.06, -0.23, 0.29, 0.20, 0.26, -0.38, -0.18, 0.04, 0.20, -0.10, -0.04
W1NoldsibHS	0.03, -0.01, 0.06, -0.05, 0.05, -0.08, 0.06, 0.11, -0.03, -0.05, -0.01, -0.04, -0.06, 0.01, -0.04, 0.06, -0.07, 0.11, -0.07, -0.03, 0.17, 0.17, 0.02, -0.05, 0.05, -0.18, -0.12, 0.20, 0.11, -0.23, -0.05, 0.06, 0.28, 0.36, 0.06, -0.03, 0.25, 0.05, 0.01
W1NyoungsibHS	0.01, -0.03, -0.08, -0.04, -0.02, -0.13, -0.04, 0.09, 0.02, -0.03, -0.07, -0.01, -0.02, 0.03, 0.04, -0.02, 0.07, -0.05, -0.02, -0.07, 0.18, 0.17, 0.15, 0.11, -0.15, -0.17, -0.17, 0.11, 0.12, 0.26, 0.26, -0.23, -0.21, 0.04, -0.07, 0.22, 0.32, 0.02, 0.03, 0.23, 0.17, -0.06
financial_position_ml	0.02, 0.04, -0.07, 0.00, 0.06, -0.34, 0.12, 0.11, -0.01, -0.08, -0.05, -0.01, 0.03, 0.02, 0.00, -0.02, 0.13, -0.09, 0.00, -0.13, 0.31, 0.29, 0.28, 0.02, -0.28, -0.11, 0.09, -0.58, 0.41, 0.39, 0.24, 0.24, -0.57, -0.36, 0.09, 0.11, 0.41, 0.49, 0.19, 0.26, 0.17, 0.51, 0.12, 0.00
financial_position_irt_grm	0.03, 0.10, -0.08, 0.02, 0.09, -0.47, 0.12, 0.16, -0.03, -0.11, -0.05, 0.02, 0.01, -0.04, 0.03, -0.07, 0.21, -0.16, -0.05, -0.24, 0.45, 0.43, 0.41, 0.07, -0.43, -0.18, 0.20, -0.49, 0.44, 0.46, 0.38, 0.38, -0.62, -0.33, 0.11, 0.02, 0.25, 0.39, 0.19, 0.24, 0.12, 0.36, 0.21, -0.04
jobtime	-0.13, -0.01, 0.07, -0.01, 0.04, 0.00, 0.03, -0.10, 0.01, -0.08, -0.06, -0.04, -0.02, 0.09, -0.03, 0.13, -0.31, 0.10, 0.18, 0.23, -0.25, -0.26, -0.05, -0.03, 0.11, 0.20, 0.12, -0.10, -0.08, -0.19, -0.19, 0.19, 0.41, -0.10, -0.25, -0.36, -0.44, -0.18, -0.29, -0.17, -0.39, -0.24, 0.11
care	0.03, 0.08, -0.05, 0.00, 0.05, -0.20, 0.04, 0.07, 0.04, 0.01, -0.03, -0.07, 0.12, 0.00, -0.02, -0.04, 0.06, -0.03, -0.05, -0.14, 0.12, 0.12, 0.12, 0.06, -0.09, -0.07, -0.02, -0.16, 0.16, 0.13, 0.17, 0.17, -0.25, -0.15, -0.03, 0.09, 0.17, 0.13, 0.01, 0.02, 0.06, 0.18, 0.09, -0.06

Upper-right block (inter-correlations of the final variables). Column order: (a) parental interest, (b) evercar, (c) mbirthag, (d) agedad, (e) famtyp, (f) separat, (g) Noldsib, (h) young sibs, (i) financial pos ml, (j) financial pos grm, (k) jobtime.

Row (diagonal)	a	b	c	d	e	f	g	h	i	j	k
W1evercarMP0a (evercar)	-0.13										
mbirthag	0.07	-0.07									
W1agedad (agedad)	0.00	0.08	0.67								
W1famtyp (famtyp)	-0.24	0.26	-0.16	-0.21							
separation (separat)	0.23	-0.31	0.32	0.39	-0.84						
W1NoldsibHS (Noldsib)	-0.16	0.04	0.42	0.38	-0.03	0.07					
W1NyoungsibHS (young sibs)	-0.09	0.13	-0.47	-0.34	-0.01	-0.12	-0.30				
financial_position_ml	-0.18	0.15	-0.16	-0.05	0.49	-0.37	0.06	0.08			
financial_position_irt_grm	-0.25	0.15	-0.16	-0.02	0.50	-0.44	0.15	0.17	0.67		
jobtime	0.04	-0.08	-0.01	-0.04	-0.07	0.04	-0.09	0.00	-0.05	-0.13	
care	-0.07	0.05	-0.06	-0.02	0.04	-0.09	0.06	0.17	0.24	0.26	0.00

4.2.1 Cluster analyses of 'yys' variables.

This section aims to establish which of the 'yys' variables could be meaningfully combined to reduce multicollinearity. It will be necessary to establish both an empirical and a theoretical justification for any combination of variables, with a focus on preserving any meaningful information. The variables analysed in this section are the 14 'yys' variables listed in Table 4.2a, except that W1yys22YP and W1yys23YP are combined to form 'academic confidence' as explained in Section 4.2.

To begin the cluster analyses the augmented scree plot of Figure 4.2.1a was generated. This shows that the variables in question have one predominant component, with four additional components lying above the final baseline scree. The counterfactual test suggests that two distinct components exist. An inspection of Table 4.2a suggests that the main component here may be whether the individual likes school, with additional components relating to their academic confidence, interest in lessons and so forth. Quantitatively the first two components explain 53% of the total variance, whilst the first five components account for 73%.

Figure 4.2.1a – Augmented scree plot for the 'yys' variables

In order to investigate the alignments between variables they were first recoded such that a larger score always indicates a greater affinity for schooling[5], before being plotted against the first and second component scores as recommended by Everitt (1993). Component scores are appropriate to the present aim of analysing clustering since they decompose the observed data, whereas factor scores estimate a latent factor by accounting for specific variance and measurement error (Kline 1994).

Figure 4.2.1b – Principal components plot of the 'yys' variables

Figure 4.2.1b shows variables as geometrically close together if they provide similar contributions to the first two principal components. Since Component 1 alone accounts for 43% of the total variance it is particularly important that variables should be positioned close to each other with respect to that axis, however the scale of the axis means that this is the case for many pairs of points. Since only two dimensions can readily be represented in this manner Figure 4.2.1b may not adequately distinguish variables which differ in some other dimension. To address this shortcoming a plot of the form developed by Andrews (1972) was generated for Figure 4.2.1c. For each variable this plots a function of the form:

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[5] The variables with reversed coding are those whose names omit "W1___YP".

$$f_x(t) := \frac{x_1}{\sqrt{2}} + x_2 \sin(t) + x_3 \cos(t) + x_4 \sin(2t) + x_5 \cos(2t) + \cdots$$

Where the x_i are the first principal components of variable x. Here five components were retained since the augmented scree plot demonstrated that further components essentially only explained individual variables.

Figure 4.2.1c – Andrews' plot of the 'yys' variables

The Andrews' plot provides an effective visual representation of the extent to which any pair of variables represent analogous information (Everitt 1993). It suggests possible clusters comprising:

yys1; yys6	Being happy at school; liking being at school
yys11; yys18	Finding lessons interesting; liking your teachers

And to a lesser extent:

yys12; 'academic confidence'	Receiving good marks; believing that yourself and your teacher think you are good at school work
yys8; yys9	Counting the minutes until lessons end; being bored in lessons

Whilst Figure 4.2.1b suggests possible clusters comprising:

yys12; 'academic confidence'	Receiving good marks; believing that yourself and your teacher think you are good at school work
yys2; yys10; yys4; yys9	School is a waste of time; lesson work is a waste of time; Not wanting to go to school; being bored in lessons
yys3; yys11; yys18; yys1; yys6	Finding school work worthwhile; finding lessons interesting; liking your teachers; being happy at school; liking being at school

These candidate groupings were synthesised alongside theoretical priors to form the outcomes listed below. It is essential to assess the theoretic validity of variable combinations since their component loadings will not capture any interactions with external variables. Figures 4.2b/c reflect those external interactions, wherefore they were used to screen the proposed groupings for any disparate external effects.

- Define the sum of yys1 and yys6 as 'positive about school'
- Define the sum of yys11 and yys18 as 'positive about classes'
- Define the sum of yys12 and 'academic confidence' as 'positive about ability'
- Define the sum of yys2, yys4, yys8, yys9, and yys10 as 'dislike schooling'

Figure 4.2c supports the omission of yys3 from any grouping since its R^2 value is markedly below that of any other variable under analysis. Figure 4.2b shows remarkably few intra-cluster differences in correlations with external variables and so these clusters were adopted.

4.3 Survey design effects and imputation

Standard estimation procedures and statistical inference are based on an assumption of randomized sampling, however the LSYPE features a complex sampling procedure where schools were the primary sampling units (PSUs). Within each sampled school individual participants were selected, which implies that standard errors should be clustered at the school level. However the sampled schools were originally selected according to strata based upon their type, deprivation, region, and admissions policy[6]. This further reduces the degrees of freedom in the model thereby affecting the critical values required for t and F tests. Rather than

$$\#df = \#\text{obs.} - \#\text{regressors} - 1$$

we will have

$$\#df = \#\text{PSUs} - \#\text{strata}$$ (StataCorp. 2015a).

Furthermore neither schools nor pupils were sampled randomly within their strata; rather sampling probabilities were determined by ethnicity and school size. Weighted estimation should therefore be used to provide externally valid estimates, where each individual's weight is inversely proportional to their net sampling probability. The LSYPE user guide (DfE 2011) provides code to account for the survey design implications discussed heretofore within Stata's complex survey analysis suite (DfE 2011, p.75). The standard errors thereby calculated are additionally heteroskedasticity robust.

The LSYPE dataset provides a selection of alternative weights to account for longitudinal loss of participants. However Table 4.3a demonstrates that none of these is particularly pertinent to the current study: the two most relevant weights both omit hundreds of useable observations and include hundreds which are not useable. Therefore appropriate weights were derived using the same methodology as DfE (2011).

The first step in determining those weights was to use a logit regression to identify which variables (here the full set of variables operationalised by this study were tested) could explain drop-out at a 10% significance level. The 22 significant factors were then included in a logit regression to calculate 'dropoutprob' as the reciprocal of the estimated probability of remaining in sample, whereafter the highest and lowest 1% were trimmed and the resultant probability rescaled to have a mean of 1. These weights were then multiplied by the sampling

---

[6] 'Type' partitioned one stratum for pupil referral units, and three strata for independent schools which were based upon their results, boarding status, and gender mix

weights and the result again rescaled to give a mean of 1 – the outputs from which are the requisite weights.

Table 4.3a – Cross-tabulation of available weights:

Needed in at least one multivariate estimation			Unusable for estimation		
	W6 weight available			W6 weight available	
W5 weight available	N	Y	W5 weight available	N	Y
N	784	329	N	4,509	70
Y	918	8,716	Y	112	684

The final survey design factor to be addressed was finite population bias (FPB). This arises where the sample contains a non-negligible proportion of the population, since it is selected without replacement and so every observation is guaranteed to be distinct from all other observations. FPB may be unmentioned by DfE (2011) since it reportedly "is probably not very important in modern large-scale surveys" (Wolter 2007, p.46). Nevertheless in this survey design FPB occurs at the stage of sampling PSUs from Strata (Wolter 2007), and the population of schools in each stratum is manifestly finite. Berenson et al. (2012) suggest that where a sample exceeds 5% of the population FPB correction should be utilised, and 646 out of 4513 (14% of) maintained schools in England in 2004 took part in the LSYPE (DfE 2011, 2012a). The FPB standard error correction factor is

$$\frac{N - n}{N - 1} \approx \left(1 - \frac{n}{N}\right)$$

Where n is the sample size and N the population size. To properly correct for FPB in a complex survey this factor should be known for each stratum, however data are only available aggregated at the level of maintained and independent schools, whence the FPB corrections used will be approximate. In light of the observations of Wolter (2007) the extent of this inaccuracy is likely to be slight.

 Piesse and Kalton (2009) recommend the imputation of specific missing responses in the LSYPE data. Accordingly Section 5.2 adopts imputation as one of three approaches to missing data by using the methodology described here.

Multiple imputation by chained equations was used to address missing data in 15 variables X_i. The X_i were first regressed on the complete collection of variables operationalised during

this study, whereafter all those with a significance of at least 10% were retained as W_{ij}. Thereafter each X_i was regressed on its W_{ij} together with any closely related variables from the Wave 2 data, and any of these regressors which were significant at the 10% level were retained as the basis for imputation. These are listed in Table 5.2a.

Rubin (1996) and StataCorp. (2015b) respectively suggest that 5 and 20 alternative imputations be computed, however they agree that more imputations provide greater accuracy; 50 imputations were therefore generated. The imputations utilised the augmented procedure developed by White et al. (2010) for instances of perfect prediction, since it allows the imputations to make use of highly relevant information. This is achieved through the manufacture of a small number of low-weighted duplicate observations which differ only to populate the empty cell, which has the limitation that it may induce an over-prevalence of rare categorical values in the imputed data (White et al. 2010).

4.4 Constructed counterfactual analysis

The present study is unusual in that it aims to establish not only which factors are important in determining youth employment outcomes, but also which factors are not. This task is confounded by the complex relationships between the many possible explanatory variables which were explored in Section 4.2. Standard univariate regression analysis cannot determine whether a coefficient is merely channelling the effects of other correlated variables, whilst multivariate analysis can yield both falsely insignificant and falsely significant results in the face of multicollinearity. Comparing the two sets of coefficients will not always reveal the true relationships between regressors and outcomes, as the following example illustrates.

4.4.1 An artificial dataset to exemplify confounding variables

An empty dataset with 500 observations was generated. Each observation was assigned a score of 1 for the dummy variable 'degree' with probability 0.5. Thereafter individuals with a 'degree' were assigned a 1 for the variable `no_student_debt' with a probability of 0.15, whilst subjects without a 'degree' were assigned a 1 for `no_student_debt' with a probability of 0.85. Finally positive values for 'binary_NEET' were assigned with probabilities of 0.1 and 0.2 respectively for individuals with and without a 'degree'. This artificial view of real life has one variable 'degree' which affects employment outcomes but also a perfectly irrelevant collinear variable of 'no_student_debt'[7].

Table 4.4.1a shows the univariate and multivariate regression results of simple linear probability specifications which attempt to explain the outcome 'binary_NEET'. With this randomly generated set of data both univariate specifications show reasonably significant results with the expected signs, both of which retain sign but lose significance and some magnitude in a multivariate specification. With only the information of these results and disregarding theoretical priors the most likely conclusion would be that 'degree' is a collinear factor and 'no_student_debt' a significant contributory factor. Furthermore if these were just two results within many the conclusion might be drawn that neither variable makes a significant independent contribution to the outcome of interest. This section describes a constructed counterfactual analysis which can provide additional information in this situation.

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[7] Note that the collinear variable is not a perfect reflection of the true causal variable, since in either state of 'degree' there is a 15% probability of the unexpected value being obtained: in the hypothetical context perhaps some graduates have paid off their loan, and some university drop-outs have not.

Table 4.4.1a Univariate and multivariate specifications to explain binary_NEET

OLS Regression: dependent variable: binary_NEET

Number of obs =   500

	Coef.	Std. Err.	t	P>|t|
degree	-0.0668	0.0319	-2.10	0.037

	Coef.	Std. Err.	t	P>|t|
no_student_debt	0.0745	0.0318	2.34	0.020

	Coef.	Std. Err.	t	P>|t|
degree	-0.0259	0.0474	-0.55	0.585
no_student_debt	0.0553	0.0474	1.17	0.244

The problem illustrated above is that of a missing counterfactual – the univariate effect that each variable would produce were it to have no idiosyncratic predictive power. However this counterfactual is constructible from the data by use of the following process:

  i.   Regress the variable being examined X on all other candidate explanatory variables W_i.

  ii.   Generate the fitted values $\hat{X}$ of this regression

  iii. Generate a normally distributed random variable Y

  iv. Generate the counterfactual variable $\tilde{X}$ as the linear combination of $\hat{X}$ with Y such that:

      a. The proportion of the variance of X which is explained by the W_i is the same as the proportion of the variance of $\tilde{X}$ which is explained by the W_i,

      b. The variance of $\tilde{X}$ is equal to the variance of X.

The univariate regression results on $\tilde{X}$ will then be directly comparable to those on X, excepting only whatever genuinely unique contribution is made by X, thus X makes no unique contribution if its results are identical to those of $\tilde{X}$. It is important to note that 'genuinely unique' here is with respect to the other candidate explanatory variables – that is no specification error due to omitted variables will be detected.

The derivation behind step iv. is given in Section 4.4.2, and its application is shown if Table 4.4.1b. Here it is evident that the 'counterfactual_degree' variable can account for less than half[8] of the true effect and is much less statistically significant, whereas the 'counterfactual_debt' variable accounts for all of the true effect and is slightly more

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[8] Note that the absolute difference in coefficients will be dependent upon the units of measurement, whereas the ratio of the coefficients is invariant under linear scaling.

statistically significant. The last observation in particular suggests that 'no_student_debt' is merely acting as an imprecise conduit of other variables.

Constructed counterfactual analysis is used with the main dataset in Section 5.1.2 to assist in the identification of irrelevant variables.

Table 4.4.1b Constructed Counterfactual Analysis of the exemplar dataset

OLS Regression: dependent variable: binary_NEET

Number of obs =   500

	Coef.	Std. Err.	t	P>|t|
degree	-0.0668	0.0319	-2.10	0.037

	Coef.	Std. Err.	t	P>|t|
counterfactual_degree	-0.0299	0.0320	-0.94	0.350

	Coef.	Std. Err.	t	P>|t|
no_student_debt	0.0745	0.0318	2.34	0.020

	Coef.	Std. Err.	t	P>|t|
counterfactual_debt	0.0766	0.0318	2.41	0.016

4.4.2 Derivation of a constructed counterfactual variable

Here variables are named as per steps i. to iv. of the preceding section. The randomly generated normally distributed variable Y is first scaled such that its variance $= 1$. The simple case with a single variable W is described below, since the case with multiple other candidate explanatory variables W_i is identical except for additional vector notation (note that e_y will remain a scalar value).

Suppose:

$$X = \alpha_X + \gamma W + e_x$$

$$Y = \alpha_Y + \beta W + e_y$$

with:

$$\sigma_Y = 1$$

Then define:

$$\hat{X} := \frac{\alpha_X + \gamma W}{\sigma_{\alpha_X + \gamma W}}$$

The fitted values of X regressed on W, scaled so that $Var(\hat{X}) = 1$

$$k := 1 - \frac{Var(e_x)}{Var(X)}$$

The R^2 value of X regressed on W

$$\tilde{X} := c\hat{X} + Y$$

Where c is some scalar value

and we have:

$$\tilde{X} = c\alpha_X + \alpha_Y + (c\gamma + \beta)W + e_y$$

whereby the R^2 value of $\tilde{X}$ regressed on W (and a constant term) will be given by:

$$R^2 = 1 - \frac{Var(e_y)}{Var(c\hat{X} + Y)}$$

Setting $R^2 = k$ and rearranging gives:

$$\left[c^2 Var(\hat{X}) + Var(Y) + 2c Cov(\hat{X}, Y)\right].(k-1) = -Var(e_y)$$

but since $Var(\hat{X}) = Var(Y) = 1$ we have:

$$c^2(1-k) + 2c(1-k)Cov(\hat{X}, Y) - Var(e_y) + (1-k) = 0$$

which is quadratic in c, whence:

$$c = \frac{-2(1-k)Cov_{\hat{X}Y} \pm \sqrt{4(1-k)^2 Cov_{\hat{X}Y}^2 - 4(1-k)(1-k-Var_{e_y})}}{2(1-k)}$$

where the notation has been simplified to reduce the over prevalence of parentheses. Simplifying gives:

$$c = -Cov_{\hat{X}Y} \pm \sqrt{Cov_{\hat{X}Y}^2 - \frac{1-k-Var_{e_y}}{1-k}}$$

Each value on the RHS is known, whence a value of c can be determined which ensures that when regressed on W the linear combination $\tilde{X} := c\hat{X} + Y$ has the same R^2 value as does X.

□

It is then a trivial matter to rescale $\tilde{X}$ such that its variance is equal to that of X.

Note that the final expression has real roots if $1 - k - Var_{e_y} < 0$, that is whenever Y is less well predicted by W than is X. This is a sufficient but non-necessary condition, however whenever this condition is not satisfied there will be no need to construct a counterfactual since X will be essentially independent of W.

Note also that the choice of positive or negative root will not affect the R^2 of the counterfactual. Since the surd is always larger in absolute value (given the above note) a positive root should always be selected so that the component of $\tilde{X}$ which is determined by $\hat{X}$ is orientated in the same direction as $\hat{X}$.

Note finally that a small error in matching the R^2 emerges ($\Delta R^2 = 0.0052$ in the generated example) where the coefficient of Y regressed on W has the opposite sign to the coefficient of X regressed on W. This has been traced in Stata to a tiny inconsistency in calculating $Cov(a, b) \neq -Cov(-a, b)$. For this reason the respective R^2 values will be given for comparative purposes when using constructed counterfactual analyses.

5 Analyses and results

5.1 Identification of insignificant variables and specifications

The objective of this section is to identify those variables and specifications which do not provide unique information. To facilitate this a series of initial univariate regressions were run using each explanatory variable in turn. The results therefrom are shown in Tables 5.1c and 5.1d, and discussed thereafter. To support the interpretation of these results Table 5.1a summarises the variables which emerged from Chapter 4, and Table 5.1b summarises the outcome specifications emergent from Section 2.1. Where necessary the potential predictors have been recoded and/or renamed so that the expected sign on each variable has an intuitive interpretation. The final column of Table 5.1a gives the (unadjusted) R^2 of each variable when regressed upon all of the others in the list as an indication of the potential multicollinearities involved.

Table 5.1a – Descriptions and interdependence of the final regressors

Variable	Description	+ indicates	R^2
W1chea1HS	whether YP has any long-standing illness, disability, or infirmity; and whether it affects school work	worse health	0.10
birthweight	low-normal-high birth weights	higher birth weight	0.27
atypical_gestation	whether premature or late birth	further from term	0.25
SEN	whether YP has any learning related SEN.	more current	0.15
IndSchool	whether the school attended at age 13 was independent.	yes	0.16
school_quality	factor comprising perceptions, classroom behaviour, teacher quality	higher quality	0.36
W1nurschHS	whether either pre-school or nursery was attended.	yes	0.03
careers_advice	maximum usefulness of careers advice from school	more useful	0.14
extra_tuition	How much extra tuition has been received	more	0.13
gor	Government Office Regions:	dummies	
	1 North East		0.35
	2 North West		0.55

	3 Yorkshire and the Humber		0.47
	4 East Midlands		0.47
	5 West Midlands		0.49
	6 East of England		0.51
	7 London	Omitted	
	8 South East		0.59
	9 South West		0.49
housing_density	Area type (urban - rural - sparse)	increasingly dense	0.16
IMDRSCORE	Index of Multiple Deprivation	More deprived	0.40
tenure	housing tenure	increasingly independent	0.29
W1inyrmov	The number of school moves experienced excluding those during the summer holidays	more moves	0.07
W1vehnoHH	the number of vehicles the household has	more vehicles	0.19
mobile_phone	level of mobile phone access (none - basic phone - phone with internet)	increasing phone access	0.13
reads	frequency of reading for pleasure	increasing frequency	0.15
computing_access	level of computing access (none - basic - computer with internet)	increasing IT access	0.18
parental_education	grouped highest qualification level of main and second parents,	increasingly qualified	0.35
parental_occupation	Standard Occupational Classifications	increasingly respected	0.34
parental_employment	current employment status and duration	longer	0.25
finacial_difficulties	factor comprising relative income, how well the household is managing, benefit reciept	increasing difficulties	0.35
jobtime	amount of time YP spends working	more	0.08
carer	level of burden of YP's caring responsibilities	more burdensome	0.05
MRetwrk	Child' when the mother returned to work (full-time)	older	0.95
Mretwrk_sq	the square of the above	older^2	0.95
mbirthag	mother's age at birth.	older	0.52
W1agedad	father's current age.	older	0.47

parent_age (replaces mbirthag and W1agedad in multivariate analyses)	Parental age at the child's birth; motivation in Section 5.1.2 and derivation in Appendix III-k.	older	
W1NoldsibHS	number of older siblings	more	0.30
W1NyoungsibHS	number of younger siblings	more	0.35
broken_family	current familial context.	increasingly broken	0.18
separation	whether/when parents separated	Separated earlier	0.23
W1evercarMP0a	whether YP has ever been in care?	yes	0.02
W1ethgrpYP	7 ethnic groups:	dummies	
	1 White	Omitted	
	2 Mixed		0.07
	3 Indian		0.42
	4 Pakistani		0.33
	5 Bangladeshi		0.27
	6 Black Caribbean		0.15
	7 Black African		0.24
	8 Other		0.14
english_fluency	level of personal and household familiarity with English	increasingly fluent	0.38
born_abroad	whether YP born outside the UK?	yes	0.16
religiosity	How important is religion to your way of life?	more important	0.37
parental_aspiration	factor measuring the extent to which education is valued	more valued	0.11
parental_interest	factor comprising engagement with the YP's school and education	more involved	0.27
parental_relationships	Quality of relationship with parents (factor)	better relationship	0.26
values_helping	How important is helping others in selecting a job?	more important	0.12
values_salary	How important is a high salary in selecting a job?	more important	0.15
values_selfemployment	How important is being your own boss in selecting a job?	more important	0.16
values_interest	How important is interesting work in selecting a job?	more important	0.07
values_promotion	How important are advancement opportunities in selecting a job?	more important	0.17

values_hours	How important are regular hours in selecting a job?	more important	0.07
values_schoolwork	School work is worth doing,	strongly agree	0.15
work_ethic	Quantity of out-of-lesson studying	more	0.26
job_aspiration	Import of employment / career (factor)	more important	0.09
inward_confidence	The difference between W1yys22YP and W1yys23YP	More inward	0.03
positive_about_ability	(the sum of) I get good marks for my work; How good do you think you are at school work? How good do school teachers think you are?	More positive	0.15
positive_about_school	(sum of) I am happy at school; On the whole I like being at school	More positive	0.37
positive_about_classes	(sum of) The work in lessons in interesting; I like my teachers	More positive	0.44
dislike_schooling	(the sum of) School is a waste of time for me; Most of the time I don't want to go to school; I often count the minutes until a lesson ends; I am bored in lessons; The work in lessons is a waste of time	more negative	0.47
bullied	Reports of being bullied in the last 12 months	more reported	0.14
W1palhomeYP	How many times have you had friends round to your house in the last 7 days?	more often	0.28
W1paloutYP	How many times have you gone out with friends in the last 7 days?	more often	0.40
sport_freq	Frequency of doing sport	more often	0.25
played_sport	Whether played sport in the last 4 weeks,	yes	0.24
played_instrument	Whether played an instrument in the last 4 weeks,	yes	0.13
community_work	Whether done community work in the last 4 weeks,	yes	0.05
youth_group	Whether attended a youth group in the last 4 weeks,	yes	0.08
entertainment	Whether cinema/concert/sports match in the last 4 weeks,	yes	0.11

gone_out	Whether party/pub/dance/nightclub in the last 4 weeks,	yes	0.13
hung_out	Whether hung out on the street in the last 4 weeks,	yes	0.21
substance_abuse	Level of substance abuse (factor)	more	0.35
behaviour2	Factor comprising antisocial behaviours, poor behaviour in school, receipt of behaviour support, and truancy.	more antisocial	0.43
suspended	How often suspended from school	more often	0.16
expel	Whether ever expelled from school	yes	0.05
police	Frequency of police contact	more	0.13
ever_abs_3	Whether YP has ever been continuously absent for 3+ months.	no	0.07
abs_1_this_yr	Whether YP has been continuously absent for 1+month out of the last 12.	no	0.06

Table 5.1b – Descriptions of the outcome specifications

Outcome	Description	Number of Obs.
monthsNEET	Number of months NEET during the first 4 academic years (45 months) after school leaving age (Sept 2006 to May 2010); including only those individuals with complete records.	8,452
monthsNEETcount	As above, but including all individuals with any recorded activity (all have at least 5 months, and 99.2% have at least 10).	11,739
monthsNEET2	Number of months NEET during the first 2 academic years (20 months) after KS5 leaving age (from October 2008); including only those individuals with complete records.	8,485
monthsNEET2count	As above, but including all individuals with any recorded activity (98.7% have at least 8, although 125 have only one record)	9,900
monthsNEET2_exclHE	Number of months NEET during the first 2 academic years after KS5 leaving age; coding as missing those in full time HE for at least half of that 20 month period; including only those individuals with complete records.	3,926
13monthsNEET	Binary indicator of 13 or more months NEET during the first 4 academic years after school leaving age; including only those individuals with complete records.	8,452

13monthsNEET2	Binary indicator of 13 or more months NEET during the first 2 academic years after KS5 leaving age; including only those individuals with complete records.	8,485
3monthsNEET	Binary indicator of 3 or more months NEET during the first 4 academic years after school leaving age; including only those individuals with complete records.	8,452
3monthsNEETcount	As above, but including all individuals with at least 6 recorded months.	11,654
3monthsNEET2	Binary indicator of 3 or more months NEET during the first 2 academic years after KS5 leaving age; including only those individuals with complete records.	8,485
3monthsNEET2count	As above, but including all individuals with at least 6 recorded months within that time period.	9,775

Table 5.1c – Univariate regression results for females

	(1) monthsNEET (tobit)	(2) monthsNEETcount (tobit)	(3) monthsNEET2 (tobit)	(4) monthsNEET2count (tobit)	(5) monthsNEET2_exclHE (tobit)	(6) 13monthsNEET (logit)	(7) 13monthsNEET2 (logit)	(8) 3monthsNEET (logit)	(9) 3monthsNEETcount (logit)	(10) 3monthsNEET2 (logit)	(11) 3monthsNEET2count (logit)
Max ‖ Min N:	4230 ‖ 3329	5626 ‖ 4302	4252 ‖ 3340	4900 ‖ 3808	1871 ‖ 1402	4230 ‖ 3329	4252 ‖ 3340	4230 ‖ 3329	5605 ‖ 4289	4252 ‖ 3340	4855 ‖ 3778
W1chea1HS	4.036 (0.000)***	3.176 (0.000)***	5.195 (0.000)***	4.198 (0.000)***	4.967 (0.000)***	0.434 (0.000)***	0.439 (0.000)***	0.282 (0.001)***	0.264 (0.000)***	0.370 (0.000)***	0.339 (0.000)***
birthweight	-1.389 (0.214)	-1.027 (0.254)	-0.891 (0.472)	-1.156 (0.258)	-1.422 (0.277)	-0.168 (0.165)	-0.155 (0.244)	-0.080 (0.373)	-0.098 (0.210)	-0.065 (0.524)	-0.114 (0.213)
atypical_gestation	1.408 (0.226)	1.511 (0.122)	1.541 (0.240)	1.526 (0.178)	2.388 (0.118)	0.207 (0.072)*	0.203 (0.148)	0.077 (0.381)	0.094 (0.238)	0.067 (0.512)	0.094 (0.349)
SEN	5.754 (0.000)***	4.422 (0.000)***	6.376 (0.000)***	4.819 (0.000)***	3.957 (0.000)***	0.448 (0.000)***	0.581 (0.000)***	0.417 (0.000)***	0.364 (0.000)***	0.431 (0.000)***	0.355 (0.000)***
IndSchool	-6.379 (0.021)**	-5.480 (0.007)**	-7.157 (0.029)**	-5.557 (0.024)**	0.814 (0.804)	-0.640 (0.099)*	-0.941 (0.035)**	-0.346 (0.107)	-0.354 (0.063)*	-0.441 (0.096)*	-0.489 (0.041)**
school_quality	-4.875 (0.000)***	-4.406 (0.000)***	-4.737 (0.000)***	-3.977 (0.000)***	-1.539 (0.048)**	-0.376 (0.000)***	-0.372 (0.000)***	-0.355 (0.000)***	-0.363 (0.000)***	-0.354 (0.000)***	-0.344 (0.000)***
W1nurschHS	-3.936 (0.004)***	-3.778 (0.000)***	-4.059 (0.007)***	-3.796 (0.002)***	-4.350 (0.011)**	-0.497 (0.000)***	-0.516 (0.001)***	-0.272 (0.010)***	-0.314 (0.000)***	-0.267 (0.017)**	-0.288 (0.005)***
careers_advice	-1.945 (0.000)***	-1.685 (0.000)***	-1.959 (0.000)***	-1.742 (0.000)***	-1.600 (0.005)***	-0.210 (0.000)***	-0.305 (0.000)***	-0.136 (0.000)***	-0.122 (0.000)***	-0.133 (0.001)***	-0.141 (0.000)***
extra_tuition	-2.291 (0.064)*	-2.548 (0.011)**	-2.257 (0.116)	-1.807 (0.133)	1.106 (0.502)	-0.120 (0.437)	-0.273 (0.171)	-0.147 (0.184)	-0.226 (0.022)**	-0.176 (0.144)	-0.227 (0.052)*
North_East	1.696 (0.505)	1.487 (0.390)	3.057 (0.248)	2.028 (0.311)	3.398 (0.245)	0.248 (0.256)	-0.025 (0.944)	0.101 (0.540)	0.119 (0.387)	0.239 (0.203)	0.186 (0.283)
North_West	0.141 (0.935)	0.222 (0.867)	-0.710 (0.745)	-0.637 (0.714)	1.613 (0.433)	0.043 (0.809)	0.250 (0.213)	-0.005 (0.971)	-0.002 (0.986)	-0.087 (0.593)	-0.062 (0.684)
Yorkshire_and_the_Humber	2.034 (0.319)	1.097 (0.480)	1.599 (0.437)	1.322 (0.442)	2.648 (0.218)	0.192 (0.338)	0.235 (0.283)	0.057 (0.705)	0.018 (0.886)	0.058 (0.701)	0.078 (0.577)
East_Midlands	-1.294 (0.425)	-0.659 (0.603)	-1.707 (0.341)	-0.690 (0.637)	-2.818 (0.215)	-0.161 (0.361)	-0.154 (0.442)	-0.148 (0.211)	-0.043 (0.675)	-0.143 (0.310)	-0.048 (0.713)
West_Midlands	1.163 (0.447)	0.687 (0.592)	0.393 (0.794)	-0.359 (0.766)	0.700 (0.678)	0.259 (0.077)*	0.120 (0.477)	0.080 (0.471)	0.064 (0.557)	0.071 (0.535)	-0.002 (0.985)
East_of_England	-2.421 (0.111)	-2.656 (0.044)**	-2.491 (0.171)	-2.941 (0.056)*	-4.588 (0.026)**	-0.256 (0.154)	-0.119 (0.563)	-0.144 (0.213)	-0.196 (0.082)*	-0.202 (0.163)	-0.262 (0.060)*
South_East	-0.533 (0.715)	-0.316 (0.780)	-0.103 (0.949)	-0.048 (0.970)	-2.925 (0.074)*	-0.180 (0.306)	-0.151 (0.415)	-0.025 (0.824)	-0.028 (0.780)	-0.025 (0.830)	-0.056 (0.611)
South_West	-2.707 (0.133)	-0.265 (0.859)	-1.354 (0.464)	0.763 (0.628)	-3.317 (0.086)*	-0.408 (0.086)*	-0.428 (0.127)	-0.220 (0.159)	-0.020 (0.881)	-0.113 (0.432)	0.047 (0.732)
housing_density	-2.937 (0.002)***	-2.600 (0.001)***	-2.532 (0.016)**	-2.024 (0.023)**	-2.949 (0.012)**	-0.420 (0.001)***	-0.420 (0.010)***	-0.189 (0.010)***	-0.190 (0.003)***	-0.142 (0.101)	-0.123 (0.139)
IMDRSCORE	0.338 (0.000)***	0.261 (0.000)***	0.335 (0.000)***	0.265 (0.000)***	0.292 (0.000)***	0.032 (0.000)***	0.033 (0.000)***	0.025 (0.000)***	0.021 (0.000)***	0.024 (0.000)***	0.022 (0.000)***
tenure	-4.091 (0.000)***	-3.252 (0.000)***	-4.084 (0.000)***	-3.375 (0.000)***	-3.066 (0.000)***	-0.383 (0.000)***	-0.407 (0.000)***	-0.310 (0.000)***	-0.272 (0.000)***	-0.297 (0.000)***	-0.283 (0.000)***
W1inyrmov	2.142 (0.013)**	2.239 (0.000)***	2.368 (0.014)**	2.126 (0.006)***	2.082 (0.038)**	0.176 (0.038)**	0.201 (0.037)**	0.143 (0.027)**	0.207 (0.000)***	0.151 (0.031)**	0.160 (0.013)**
W1vehnoHH	-5.643 (0.000)***	-4.679 (0.000)***	-6.044 (0.000)***	-5.048 (0.000)***	-5.186 (0.000)***	-0.731 (0.000)***	-0.718 (0.000)***	-0.459 (0.000)***	-0.414 (0.000)***	-0.491 (0.000)***	-0.463 (0.000)***
mobile_phone	-1.384 (0.159)	-1.833 (0.022)**	-1.685 (0.139)	-1.477 (0.103)	-2.895 (0.036)**	-0.151 (0.185)	-0.123 (0.394)	-0.130 (0.110)	-0.168 (0.022)**	-0.151 (0.089)*	-0.159 (0.050)**
reads	-1.901 (0.000)***	-1.581 (0.000)***	-1.772 (0.000)***	-1.487 (0.000)***	-0.255 (0.554)	-0.136 (0.000)***	-0.203 (0.000)***	-0.120 (0.000)***	-0.116 (0.000)***	-0.113 (0.000)***	-0.107 (0.000)***
computing_access	-9.502 (0.000)***	-7.743 (0.000)***	-9.361 (0.000)***	-7.926 (0.000)***	-6.745 (0.000)***	-0.855 (0.000)***	-0.894 (0.000)***	-0.670 (0.000)***	-0.629 (0.000)***	-0.670 (0.000)***	-0.668 (0.000)***
parental_education	-2.210 (0.000)***	-1.864 (0.000)***	-2.098 (0.000)***	-1.728 (0.000)***	-1.085 (0.000)***	-0.204 (0.000)***	-0.219 (0.000)***	-0.162 (0.000)***	-0.159 (0.000)***	-0.149 (0.000)***	-0.146 (0.000)***
parental_occupation	-2.218 (0.000)***	-1.873 (0.000)***	-2.009 (0.000)***	-1.768 (0.000)***	-1.189 (0.000)***	-0.214 (0.000)***	-0.233 (0.000)***	-0.154 (0.000)***	-0.153 (0.000)***	-0.136 (0.000)***	-0.145 (0.000)***
parental_employment	-3.164 (0.000)***	-2.531 (0.000)***	-3.313 (0.000)***	-2.834 (0.000)***	-3.320 (0.000)***	-0.301 (0.000)***	-0.326 (0.000)***	-0.227 (0.000)***	-0.202 (0.000)***	-0.238 (0.000)***	-0.237 (0.000)***
finacial_difficulties	7.745 (0.000)***	6.669 (0.000)***	8.138 (0.000)***	6.848 (0.000)***	6.583 (0.000)***	0.779 (0.000)***	0.836 (0.000)***	0.584 (0.000)***	0.554 (0.000)***	0.606 (0.000)***	0.601 (0.000)***
jobtime	-0.666 (0.152)	-0.782 (0.035)**	-0.523 (0.312)	-0.281 (0.498)	-1.804 (0.003)***	-0.079 (0.161)	-0.013 (0.837)	-0.067 (0.099)*	-0.083 (0.014)**	-0.069 (0.129)	-0.045 (0.260)
carer	8.308 (0.000)***	5.694 (0.001)***	8.141 (0.000)***	6.489 (0.000)***	7.736 (0.001)***	0.723 (0.000)***	0.724 (0.000)***	0.534 (0.000)***	0.351 (0.009)***	0.524 (0.001)***	0.464 (0.002)***
MRetwrk	1.336 (0.000)***	1.210 (0.000)***	1.525 (0.000)***	1.324 (0.000)***	1.539 (0.000)***	0.148 (0.000)***	0.180 (0.000)***	0.095 (0.000)***	0.095 (0.000)***	0.110 (0.000)***	0.109 (0.000)***
MRetwrk_sq	0.229 (0.000)***	0.200 (0.000)***	0.255 (0.000)***	0.220 (0.000)***	0.270 (0.000)***	0.024 (0.000)***	0.028 (0.000)***	0.016 (0.000)***	0.016 (0.000)***	0.018 (0.000)***	0.018 (0.000)***
mbirthag	-3.019 (0.000)***	-2.545 (0.000)***	-2.832 (0.000)***	-2.218 (0.000)***	-1.296 (0.040)**	-0.295 (0.000)***	-0.412 (0.000)***	-0.210 (0.000)***	-0.204 (0.000)***	-0.178 (0.000)***	-0.162 (0.000)***
W1agedad	-0.352 (0.000)***	-0.227 (0.001)***	-0.277 (0.010)***	-0.187 (0.027)**	-0.068 (0.552)	-0.040 (0.000)***	-0.045 (0.001)***	-0.023 (0.002)***	-0.018 (0.003)***	-0.017 (0.052)*	-0.013 (0.094)*
W1NoldsibHS	2.161 (0.000)***	2.094 (0.000)***	1.930 (0.000)***	1.901 (0.000)***	0.887 (0.109)	0.154 (0.003)***	0.093 (0.113)	0.167 (0.000)***	0.182 (0.000)***	0.154 (0.000)***	0.182 (0.000)***
W1NyoungsibHS	3.093 (0.000)***	2.476 (0.000)***	3.658 (0.000)***	2.894 (0.000)***	3.765 (0.000)***	0.323 (0.000)***	0.432 (0.000)***	0.190 (0.000)***	0.176 (0.000)***	0.234 (0.000)***	0.197 (0.000)***
broken_family	3.415 (0.000)***	2.873 (0.000)***	3.400 (0.000)***	2.995 (0.000)***	2.241 (0.000)***	0.282 (0.000)***	0.283 (0.000)***	0.251 (0.000)***	0.244 (0.000)***	0.260 (0.000)***	0.264 (0.000)***
separation	5.663 (0.000)***	4.899 (0.000)***	5.375 (0.000)***	4.728 (0.000)***	3.358 (0.000)***	0.499 (0.000)***	0.489 (0.000)***	0.386 (0.000)***	0.396 (0.000)***	0.372 (0.000)***	0.400 (0.000)***
W1evercarMP0a	17.849 (0.000)***	14.695 (0.000)***	20.620 (0.000)***	18.679 (0.000)***	12.737 (0.002)***	1.642 (0.000)***	1.550 (0.000)***	1.288 (0.000)***	1.133 (0.000)***	1.540 (0.000)***	1.589 (0.000)***
Mixed	2.669 (0.235)	1.680 (0.314)	5.347 (0.045)**	4.244 (0.044)**	4.811 (0.134)	0.128 (0.632)	0.300 (0.324)	0.384 (0.055)*	0.299 (0.064)*	0.472 (0.034)**	0.464 (0.017)**
Indian	-8.503 (0.000)***	-7.879 (0.000)***	-10.288 (0.000)***	-9.330 (0.000)***	2.487 (0.357)	-0.933 (0.011)**	-1.668 (0.011)**	-0.640 (0.000)***	-0.665 (0.000)***	-0.734 (0.001)***	-0.784 (0.000)***
Pakistani	2.363 (0.329)	2.725 (0.136)	1.966 (0.424)	1.964 (0.324)	11.208 (0.000)***	0.233 (0.264)	0.361 (0.127)	0.182 (0.340)	0.207 (0.200)	0.057 (0.750)	0.080 (0.630)
Bangladeshi	1.673 (0.415)	1.017 (0.546)	1.780 (0.465)	1.617 (0.427)	9.321 (0.003)***	0.068 (0.755)	0.134 (0.592)	0.181 (0.275)	0.080 (0.584)	0.185 (0.352)	0.202 (0.268)
Black_Caribbean	0.402 (0.865)	-1.010 (0.599)	1.548 (0.568)	0.936 (0.675)	2.916 (0.419)	0.017 (0.948)	0.170 (0.552)	0.199 (0.369)	0.028 (0.882)	0.188 (0.359)	0.097 (0.618)
Black_African	-3.273 (0.166)	-6.537 (0.000)***	-4.984 (0.112)	-6.633 (0.012)**	2.720 (0.574)	-0.911 (0.022)**	-0.894 (0.061)*	-0.119 (0.578)	-0.448 (0.015)**	-0.527 (0.062)*	-0.693 (0.010)**
Other_ethnicity	-7.111 (0.050)*	-5.835 (0.028)**	-7.604 (0.052)*	-6.619 (0.040)**	0.451 (0.938)	-0.720 (0.151)	-1.931 (0.000)***	-0.295 (0.349)	-0.291 (0.241)	-0.357 (0.304)	-0.355 (0.263)
english_fluency	0.291 (0.701)	0.442 (0.438)	0.425 (0.622)	0.541 (0.444)	-4.153 (0.000)***	0.053 (0.505)	0.031 (0.718)	-0.024 (0.706)	0.012 (0.815)	0.016 (0.818)	0.032 (0.609)
born_abroad	-1.154 (0.525)	-2.434 (0.100)*	-1.246 (0.593)	-1.340 (0.475)	0.803 (0.800)	-0.168 (0.503)	-0.147 (0.615)	0.119 (0.449)	-0.048 (0.724)	-0.056 (0.759)	-0.035 (0.828)
religiosity	-1.786 (0.000)***	-1.592 (0.000)***	-1.713 (0.000)***	-1.458 (0.000)***	-0.045 (0.917)	-0.184 (0.000)***	-0.196 (0.000)***	-0.106 (0.000)***	-0.109 (0.000)***	-0.117 (0.000)***	-0.124 (0.000)***
parental_aspiration	-2.779 (0.000)***	-1.913 (0.000)***	-2.096 (0.005)***	-1.689 (0.006)***	1.178 (0.144)	-0.212 (0.002)***	-0.252 (0.002)***	-0.166 (0.001)***	-0.126 (0.005)***	-0.145 (0.011)**	-0.137 (0.010)**
parental_interest	-8.152 (0.000)***	-6.762 (0.000)***	-7.471 (0.000)***	-6.272 (0.000)***	-5.070 (0.000)***	-0.748 (0.000)***	-0.821 (0.000)***	-0.580 (0.000)***	-0.531 (0.000)***	-0.558 (0.000)***	-0.539 (0.000)***
parental_relationships	-3.773 (0.000)***	-3.189 (0.000)***	-3.188 (0.000)***	-2.879 (0.000)***	-1.845 (0.025)**	-0.329 (0.000)***	-0.379 (0.000)***	-0.256 (0.000)***	-0.255 (0.000)***	-0.224 (0.000)***	-0.234 (0.000)***
values_helping	-0.810 (0.188)	-0.491 (0.298)	-0.480 (0.475)	-0.166 (0.765)	-0.777 (0.294)	-0.054 (0.427)	-0.059 (0.455)	-0.078 (0.114)	-0.058 (0.162)	-0.039 (0.455)	-0.010 (0.840)
values_salary	0.298 (0.657)	0.433 (0.428)	0.067 (0.931)	-0.126 (0.849)	-0.483 (0.547)	0.055 (0.496)	0.103 (0.294)	0.012 (0.826)	0.042 (0.366)	-0.025 (0.678)	-0.034 (0.567)
values_selfemployment	1.350 (0.001)***	1.151 (0.000)***	1.404 (0.003)***	1.303 (0.001)***	1.334 (0.010)**	0.169 (0.000)***	0.191 (0.000)***	0.091 (0.007)***	0.085 (0.003)***	0.092 (0.012)**	0.102 (0.003)***
values_interest	-1.986 (0.001)***	-1.664 (0.001)***	-2.001 (0.003)***	-1.782 (0.001)***	-0.797 (0.281)	-0.189 (0.001)***	-0.196 (0.003)***	-0.139 (0.004)***	-0.125 (0.002)***	-0.108 (0.028)**	-0.127 (0.005)***
values_promotion	-1.389 (0.012)**	-1.155 (0.009)***	-1.094 (0.070)*	-1.093 (0.025)**	-0.652 (0.341)	-0.066 (0.266)	-0.109 (0.114)	-0.086 (0.037)**	-0.079 (0.028)**	-0.090 (0.043)**	-0.097 (0.019)**
values_hours	-0.506 (0.262)	-0.232 (0.513)	-0.766 (0.126)	-0.493 (0.218)	-1.218 (0.038)**	-0.058 (0.215)	-0.073 (0.177)	-0.024 (0.505)	-0.005 (0.883)	-0.046 (0.244)	-0.028 (0.442)
values_schoolwork	-2.815 (0.000)***	-2.560 (0.000)***	-2.234 (0.000)***	-2.054 (0.000)***	-0.647 (0.376)	-0.181 (0.001)***	-0.177 (0.005)***	-0.173 (0.000)***	-0.177 (0.000)***	-0.155 (0.001)***	-0.158 (0.000)***
work_ethic	-5.603 (0.000)***	-4.584 (0.000)***	-5.406 (0.000)***	-4.470 (0.000)***	-2.729 (0.000)***	-0.491 (0.000)***	-0.549 (0.000)***	-0.420 (0.000)***	-0.383 (0.000)***	-0.391 (0.000)***	-0.401 (0.000)***
job_aspiration	-0.734 (0.307)	-0.724 (0.177)	-0.192 (0.816)	-0.328 (0.611)	-0.564 (0.565)	-0.025 (0.767)	-0.027 (0.797)	-0.017 (0.752)	-0.030 (0.493)	0.020 (0.751)	0.001 (0.987)
inward_confidence	-1.041 (0.248)	-0.492 (0.490)	-0.869 (0.394)	-0.707 (0.399)	-0.992 (0.357)	-0.098 (0.354)	-0.179 (0.161)	-0.080 (0.248)	-0.039 (0.502)	-0.065 (0.416)	-0.070 (0.338)
positive_about_ability	2.505 (0.000)***	2.288 (0.000)***	2.359 (0.000)***	2.132 (0.000)***	0.539 (0.248)	0.215 (0.000)***	0.220 (0.000)***	0.202 (0.000)***	0.193 (0.000)***	0.178 (0.000)***	0.186 (0.000)***
positive_about_school	-3.011 (0.000)***	-2.736 (0.000)***	-2.871 (0.000)***	-2.446 (0.000)***	-1.829 (0.000)***	-0.260 (0.000)***	-0.272 (0.000)***	-0.211 (0.000)***	-0.224 (0.000)***	-0.200 (0.000)***	-0.201 (0.000)***
positive_about_classes	-2.164 (0.000)***	-1.959 (0.000)***	-1.734 (0.000)***	-1.452 (0.000)***	-0.493 (0.259)	-0.159 (0.000)***	-0.164 (0.000)***	-0.148 (0.000)***	-0.153 (0.000)***	-0.127 (0.000)***	-0.121 (0.000)***
dislike_schooling	1.441 (0.000)***	1.279 (0.000)***	1.300 (0.000)***	1.127 (0.000)***	0.772 (0.000)***	0.128 (0.000)***	0.134 (0.000)***	0.100 (0.000)***	0.105 (0.000)***	0.094 (0.000)***	0.097 (0.000)***
bullied	2.450 (0.000)***	2.085 (0.000)***	2.345 (0.000)***	2.023 (0.000)***	1.552 (0.001)***	0.181 (0.000)***	0.198 (0.000)***	0.173 (0.000)***	0.169 (0.000)***	0.167 (0.000)***	0.161 (0.000)***
W1palhomeYP	2.935 (0.000)***	2.853 (0.000)***	2.796 (0.000)***	2.649 (0.000)***	1.141 (0.080)*	0.268 (0.000)***	0.267 (0.000)***	0.170 (0.000)***	0.204 (0.000)***	0.181 (0.000)***	0.217 (0.000)***
W1paloutYP	2.818 (0.000)***	2.364 (0.000)***	2.380 (0.000)***	1.998 (0.000)***	-0.188 (0.760)	0.248 (0.000)***	0.197 (0.005)***	0.163 (0.000)***	0.167 (0.000)***	0.151 (0.001)***	0.155 (0.000)***
sport_freq	-1.992 (0.000)***	-1.772 (0.000)***	-1.900 (0.000)***	-1.752 (0.000)***	-1.345 (0.000)***	-0.195 (0.000)***	-0.219 (0.000)***	-0.139 (0.000)***	-0.143 (0.000)***	-0.134 (0.000)***	-0.148 (0.000)***
played_sport	-6.744 (0.000)***	-5.426 (0.000)***	-6.783 (0.000)***	-5.875 (0.000)***	-4.871 (0.000)***	-0.556 (0.000)***	-0.612 (0.000)***	-0.441 (0.000)***	-0.399 (0.000)***	-0.493 (0.000)***	-0.482 (0.000)***
played_instrument	-7.625 (0.000)***	-6.431 (0.000)***	-6.360 (0.000)***	-5.292 (0.000)***	-0.408 (0.788)	-0.736 (0.000)***	-0.829 (0.000)***	-0.470 (0.000)***	-0.462 (0.000)***	-0.440 (0.000)***	-0.434 (0.000)***
community_work	-1.356 (0.497)	-0.737 (0.635)	0.077 (0.972)	-0.280 (0.883)	-0.729 (0.777)	-0.306 (0.206)	-0.146 (0.591)	-0.057 (0.723)	-0.006 (0.966)	0.047 (0.787)	0.004 (0.981)
youth_group	-0.991 (0.408)	-1.088 (0.272)	-0.147 (0.911)	-0.381 (0.736)	0.334 (0.823)	-0.091 (0.474)	-0.181 (0.228)	-0.018 (0.850)	-0.041 (0.630)	-0.048 (0.640)	-0.055 (0.590)
entertainment	-6.868 (0.000)***	-6.226 (0.000)***	-5.892 (0.000)***	-4.899 (0.000)***	-3.654 (0.004)***	-0.468 (0.000)***	-0.640 (0.000)***	-0.499 (0.000)***	-0.539 (0.000)***	-0.400 (0.000)***	-0.403 (0.000)***
gone_out	-1.289 (0.169)	-0.971 (0.192)	-0.245 (0.816)	-0.010 (0.991)	-2.301 (0.059)*	-0.009 (0.928)	-0.060 (0.632)	-0.063 (0.396)	-0.064 (0.322)	-0.005 (0.950)	0.018 (0.812)
hung_out	4.135 (0.000)***	4.048 (0.000)***	4.183 (0.000)***	3.906 (0.000)***	0.023 (0.987)	0.237 (0.040)**	0.272 (0.039)**	0.246 (0.002)***	0.304 (0.000)***	0.262 (0.003)***	0.292 (0.000)***
substance_abuse	4.539 (0.000)***	4.144 (0.000)***	4.527 (0.000)***	4.112 (0.000)***	1.431 (0.097)*	0.275 (0.000)***	0.297 (0.001)***	0.351 (0.000)***	0.362 (0.000)***	0.367 (0.000)***	0.402 (0.000)***
behaviour2	8.520 (0.000)***	6.975 (0.000)***	8.104 (0.000)***	6.835 (0.000)***	4.781 (0.000)***	0.650 (0.000)***	0.686 (0.000)***	0.652 (0.000)***	0.590 (0.000)***	0.616 (0.000)***	0.596 (0.000)***
suspended	9.851 (0.000)***	6.419 (0.000)***	9.440 (0.000)***	6.880 (0.000)***	7.090 (0.000)***	0.753 (0.000)***	0.745 (0.000)***	0.739 (0.000)***	0.542 (0.000)***	0.690 (0.000)***	0.580 (0.000)***
expel	17.330 (0.207)	18.694 (0.001)***	14.144 (0.208)	9.618 (0.133)	8.277 (0.651)	1.702 (0.035)**	1.007 (0.324)	0.777 (0.335)	2.021 (0.000)***	1.092 (0.177)	0.614 (0.387)
police	8.958 (0.000)***	6.205 (0.000)***	8.706 (0.000)***	6.718 (0.000)***	5.882 (0.000)***	0.578 (0.000)***	0.719 (0.000)***	0.607 (0.000)***	0.526 (0.000)***	0.605 (0.000)***	0.540 (0.000)***
ever_abs_3	20.080 (0.000)***	14.757 (0.000)***	20.748 (0.000)***	15.407 (0.000)***	18.746 (0.000)***	1.800 (0.000)***	2.035 (0.000)***	1.327 (0.000)***	1.077 (0.000)***	1.424 (0.000)***	1.225 (0.000)***
abs_1_this_yr	7.881 (0.006)***	8.059 (0.000)***	8.394 (0.002)***	7.809 (0.000)***	4.275 (0.187)	0.561 (0.040)**	0.631 (0.038)**	0.349 (0.105)	0.546 (0.002)***	0.599 (0.008)***	0.694 (0.000)***

Notes: P values in parentheses   *P<0.10,   **P<0.05,   ***P<0.01

Table 5.1d – Univariate regression results for males

	(1) monthsNEET (tobit)	(2) monthsNEETcount (tobit)	(3) monthsNEET2 (tobit)	(4) monthsNEET2count (tobit)	(5) monthsNEET2_exclHE (tobit)	(6) 13monthsNEET (logit)	(7) 13monthsNEET2 (logit)	(8) 3monthsNEET (logit)	(9) 3monthsNEETcount (logit)	(10) 3monthsNEET2 (logit)	(11) 3monthsNEET2count (logit)
Max ‖ Min N:	4039 ‖ 3318	5760 ‖ 4546	4050 ‖ 3326	4753 ‖ 3847	2008 ‖ 1608	4039 ‖ 3318	4050 ‖ 3326	4039 ‖ 3318	5699 ‖ 4503	4050 ‖ 3326	4677 ‖ 3794
W1chea1HS	3.246 (0.000)***	3.263 (0.000)***	3.723 (0.000)***	3.368 (0.000)***	3.329 (0.000)***	0.361 (0.000)***	0.366 (0.001)***	0.236 (0.000)***	0.276 (0.000)***	0.296 (0.000)***	0.310 (0.000)***
birthweight	-1.169 (0.132)	-1.421 (0.020)**	-1.190 (0.173)	-0.916 (0.224)	-1.134 (0.235)	0.005 (0.961)	-0.203 (0.093)*	-0.075 (0.299)	-0.093 (0.150)	-0.057 (0.504)	-0.047 (0.557)
atypical_gestation	-0.967 (0.319)	-0.490 (0.517)	-0.086 (0.934)	-0.274 (0.759)	-0.376 (0.743)	-0.186 (0.181)	0.031 (0.841)	-0.085 (0.337)	-0.049 (0.519)	-0.071 (0.474)	-0.115 (0.235)
SEN	4.786 (0.000)***	3.902 (0.000)***	4.573 (0.000)***	4.020 (0.000)***	3.014 (0.000)***	0.468 (0.000)***	0.450 (0.000)***	0.380 (0.000)***	0.333 (0.000)***	0.402 (0.000)***	0.392 (0.000)***
IndSchool	-6.530 (0.011)**	-5.876 (0.033)**	-5.030 (0.071)*	-4.448 (0.092)*	0.558 (0.870)	-0.739 (0.033)**	-0.653 (0.123)	-0.478 (0.038)**	-0.466 (0.089)*	-0.434 (0.089)*	-0.419 (0.122)
school_quality	-5.140 (0.000)***	-4.228 (0.000)***	-4.279 (0.000)***	-3.602 (0.000)***	-1.581 (0.010)**	-0.510 (0.000)***	-0.552 (0.000)***	-0.431 (0.000)***	-0.373 (0.000)***	-0.388 (0.000)***	-0.369 (0.000)***
W1nurschHS	-1.211 (0.267)	-1.106 (0.212)	-1.559 (0.176)	-1.266 (0.207)	-1.541 (0.210)	-0.237 (0.075)*	-0.137 (0.403)	-0.053 (0.592)	-0.058 (0.511)	-0.080 (0.470)	-0.049 (0.648)
careers_advice	-1.939 (0.000)***	-1.880 (0.000)***	-1.842 (0.000)***	-1.759 (0.000)***	-1.746 (0.000)***	-0.192 (0.000)***	-0.241 (0.000)***	-0.147 (0.000)***	-0.159 (0.000)***	-0.140 (0.000)***	-0.155 (0.000)***
extra_tuition	-3.552 (0.001)***	-4.118 (0.000)***	-3.770 (0.002)***	-3.763 (0.000)***	-1.187 (0.363)	-0.330 (0.030)**	-0.332 (0.075)*	-0.276 (0.005)***	-0.379 (0.000)***	-0.315 (0.007)***	-0.348 (0.003)***
North_East	3.048 (0.177)	4.662 (0.010)***	3.213 (0.209)	3.896 (0.037)**	3.637 (0.173)	0.362 (0.150)	0.549 (0.060)*	0.285 (0.179)	0.508 (0.007)***	0.290 (0.158)	0.504 (0.004)***
North_West	1.685 (0.217)	1.590 (0.126)	2.566 (0.065)*	2.664 (0.024)**	3.950 (0.002)***	0.149 (0.268)	0.341 (0.034)**	0.123 (0.299)	0.164 (0.115)	0.187 (0.111)	0.221 (0.048)**
Yorkshire_and_the_Humber	1.502 (0.363)	1.508 (0.244)	1.245 (0.443)	1.478 (0.284)	1.402 (0.367)	0.143 (0.392)	0.243 (0.153)	0.039 (0.799)	0.072 (0.554)	0.060 (0.687)	0.125 (0.387)
East_Midlands	0.830 (0.581)	0.108 (0.938)	-1.400 (0.346)	-1.255 (0.337)	-2.481 (0.122)	0.009 (0.962)	0.017 (0.927)	0.005 (0.970)	-0.044 (0.749)	-0.111 (0.437)	-0.091 (0.524)
West_Midlands	-0.432 (0.719)	0.463 (0.650)	-0.973 (0.458)	-0.536 (0.632)	-1.965 (0.167)	0.006 (0.970)	-0.126 (0.503)	0.068 (0.536)	0.102 (0.292)	-0.045 (0.711)	0.005 (0.966)
East_of_England	-2.044 (0.128)	-2.251 (0.066)*	-1.536 (0.227)	-2.241 (0.055)*	-2.422 (0.031)**	-0.153 (0.358)	-0.403 (0.052)*	-0.216 (0.096)*	-0.265 (0.033)**	-0.064 (0.614)	-0.182 (0.142)
South_East	-1.618 (0.213)	-1.892 (0.066)*	-0.813 (0.521)	-1.169 (0.271)	-1.803 (0.141)	-0.108 (0.475)	-0.304 (0.092)*	-0.071 (0.581)	-0.106 (0.336)	-0.055 (0.655)	-0.132 (0.252)
South_West	-0.364 (0.799)	-0.232 (0.849)	0.627 (0.624)	0.199 (0.861)	-2.041 (0.139)	-0.101 (0.581)	-0.091 (0.647)	0.029 (0.830)	0.003 (0.983)	0.115 (0.333)	0.072 (0.551)
housing_density	-2.363 (0.002)***	-2.286 (0.000)***	-1.950 (0.009)***	-2.045 (0.002)***	-2.582 (0.002)***	-0.362 (0.002)***	-0.546 (0.001)***	-0.197 (0.007)***	-0.197 (0.004)***	-0.115 (0.101)	-0.148 (0.030)**
IMDRSCORE	0.244 (0.000)***	0.222 (0.000)***	0.215 (0.000)***	0.203 (0.000)***	0.174 (0.000)***	0.023 (0.000)***	0.025 (0.000)***	0.019 (0.000)***	0.020 (0.000)***	0.018 (0.000)***	0.020 (0.000)***
tenure	-3.059 (0.000)***	-2.513 (0.000)***	-2.726 (0.000)***	-2.243 (0.000)***	-2.012 (0.000)***	-0.280 (0.000)***	-0.290 (0.000)***	-0.236 (0.000)***	-0.225 (0.000)***	-0.240 (0.000)***	-0.226 (0.000)***
W1inyrmov	1.793 (0.032)**	1.878 (0.003)***	2.006 (0.024)**	1.947 (0.007)***	1.707 (0.054)*	0.162 (0.077)*	0.223 (0.034)**	0.114 (0.084)*	0.155 (0.015)**	0.172 (0.015)**	0.185 (0.003)***
W1vehnoHH	-3.814 (0.000)***	-3.499 (0.000)***	-3.729 (0.000)***	-3.288 (0.000)***	-3.591 (0.000)***	-0.421 (0.000)***	-0.522 (0.000)***	-0.316 (0.000)***	-0.326 (0.000)***	-0.343 (0.000)***	-0.350 (0.000)***
mobile_phone	-3.025 (0.000)***	-2.907 (0.000)***	-3.214 (0.000)***	-2.972 (0.000)***	-4.650 (0.000)***	-0.245 (0.010)**	-0.225 (0.065)*	-0.286 (0.000)***	-0.308 (0.000)***	-0.300 (0.000)***	-0.302 (0.000)***
reads	-1.603 (0.000)***	-1.474 (0.000)***	-1.401 (0.000)***	-1.246 (0.000)***	-0.373 (0.206)	-0.155 (0.000)***	-0.132 (0.000)***	-0.122 (0.000)***	-0.136 (0.000)***	-0.113 (0.000)***	-0.113 (0.000)***
computing_access	-6.939 (0.000)***	-5.970 (0.000)***	-5.923 (0.000)***	-5.156 (0.000)***	-3.430 (0.000)***	-0.607 (0.000)***	-0.597 (0.000)***	-0.615 (0.000)***	-0.586 (0.000)***	-0.523 (0.000)***	-0.530 (0.000)***
parental_education	-1.962 (0.000)***	-1.734 (0.000)***	-1.766 (0.000)***	-1.540 (0.000)***	-1.005 (0.000)***	-0.195 (0.000)***	-0.216 (0.000)***	-0.155 (0.000)***	-0.159 (0.000)***	-0.154 (0.000)***	-0.154 (0.000)***
parental_occupation	-1.663 (0.000)***	-1.562 (0.000)***	-1.521 (0.000)***	-1.366 (0.000)***	-0.769 (0.000)***	-0.160 (0.000)***	-0.182 (0.000)***	-0.146 (0.000)***	-0.150 (0.000)***	-0.141 (0.000)***	-0.146 (0.000)***
parental_employment	-2.304 (0.000)***	-1.950 (0.000)***	-2.071 (0.000)***	-1.770 (0.000)***	-1.976 (0.000)***	-0.226 (0.000)***	-0.215 (0.000)***	-0.192 (0.000)***	-0.188 (0.000)***	-0.179 (0.000)***	-0.174 (0.000)***
finacial_difficulties	5.847 (0.000)***	4.998 (0.000)***	5.326 (0.000)***	4.632 (0.000)***	3.939 (0.000)***	0.577 (0.000)***	0.616 (0.000)***	0.511 (0.000)***	0.493 (0.000)***	0.498 (0.000)***	0.498 (0.000)***
jobtime	-1.687 (0.000)***	-1.149 (0.000)***	-1.798 (0.000)***	-1.685 (0.000)***	-2.556 (0.000)***	-0.217 (0.000)***	-0.214 (0.002)***	-0.142 (0.000)***	-0.097 (0.001)***	-0.160 (0.000)***	-0.155 (0.000)***
carer	5.663 (0.000)***	5.352 (0.000)***	5.892 (0.000)***	4.677 (0.000)***	3.928 (0.020)**	0.674 (0.000)***	0.351 (0.145)	0.652 (0.000)***	0.558 (0.000)***	0.557 (0.000)***	0.529 (0.000)***
MRetwrk	1.045 (0.000)***	1.011 (0.000)***	0.939 (0.000)***	0.834 (0.000)***	0.965 (0.000)***	0.088 (0.000)***	0.105 (0.000)***	0.080 (0.000)***	0.096 (0.000)***	0.082 (0.000)***	0.084 (0.000)***
MRetwrk_sq	0.182 (0.000)***	0.170 (0.000)***	0.167 (0.000)***	0.147 (0.000)***	0.180 (0.000)***	0.016 (0.000)***	0.018 (0.000)***	0.014 (0.000)***	0.016 (0.000)***	0.014 (0.000)***	0.014 (0.000)***
mbirthag	-1.868 (0.000)***	-1.861 (0.000)***	-1.302 (0.002)***	-1.314 (0.000)***	0.088 (0.838)	-0.140 (0.008)***	-0.150 (0.023)**	-0.177 (0.000)***	-0.195 (0.000)***	-0.153 (0.000)***	-0.175 (0.000)***
W1agedad	-0.126 (0.033)**	-0.173 (0.001)***	-0.029 (0.676)	-0.030 (0.616)	0.194 (0.006)***	0.000 (0.964)	-0.005 (0.724)	-0.011 (0.089)*	-0.016 (0.006)***	-0.003 (0.673)	-0.005 (0.438)
W1NoldsibHS	2.706 (0.000)***	2.276 (0.000)***	2.670 (0.000)***	2.347 (0.000)***	2.142 (0.000)***	0.272 (0.000)***	0.332 (0.000)***	0.237 (0.000)***	0.235 (0.000)***	0.220 (0.000)***	0.225 (0.000)***
W1NyoungsibHS	0.567 (0.210)	0.758 (0.027)**	0.346 (0.471)	0.411 (0.310)	0.113 (0.830)	0.051 (0.384)	-0.005 (0.946)	0.051 (0.210)	0.067 (0.053)*	0.061 (0.167)	0.066 (0.123)
broken_family	3.276 (0.000)***	2.563 (0.000)***	3.274 (0.000)***	2.656 (0.000)***	2.639 (0.000)***	0.330 (0.000)***	0.318 (0.000)***	0.285 (0.000)***	0.249 (0.000)***	0.304 (0.000)***	0.264 (0.000)***
separation	4.291 (0.000)***	3.905 (0.000)***	3.997 (0.000)***	3.626 (0.000)***	2.557 (0.000)***	0.450 (0.000)***	0.424 (0.000)***	0.346 (0.000)***	0.354 (0.000)***	0.380 (0.000)***	0.389 (0.000)***
W1evercarMP0a	14.520 (0.000)***	10.390 (0.000)***	15.278 (0.000)***	11.974 (0.000)***	12.637 (0.000)***	1.287 (0.000)***	1.364 (0.000)***	1.055 (0.000)***	0.924 (0.000)***	1.242 (0.000)***	1.177 (0.000)***
Mixed	0.665 (0.729)	0.263 (0.862)	1.008 (0.628)	0.302 (0.865)	-1.780 (0.440)	-0.132 (0.603)	-0.010 (0.970)	0.187 (0.329)	0.090 (0.580)	0.130 (0.524)	-0.002 (0.991)
Indian	-5.768 (0.003)***	-6.291 (0.000)***	-8.478 (0.002)***	-7.422 (0.001)***	6.577 (0.084)*	-0.548 (0.059)*	-0.513 (0.184)	-0.528 (0.008)***	-0.624 (0.000)***	-0.941 (0.000)***	-0.885 (0.000)***
Pakistani	0.777 (0.613)	2.182 (0.140)	1.429 (0.403)	2.199 (0.147)	9.031 (0.000)***	0.220 (0.206)	0.105 (0.609)	0.010 (0.951)	0.149 (0.299)	0.113 (0.505)	0.219 (0.190)
Bangladeshi	0.447 (0.790)	0.286 (0.824)	0.710 (0.735)	1.126 (0.455)	11.237 (0.000)***	0.236 (0.247)	0.410 (0.103)	-0.031 (0.837)	-0.017 (0.906)	-0.016 (0.927)	0.114 (0.409)
Black_Caribbean	1.488 (0.543)	2.049 (0.242)	2.474 (0.391)	1.499 (0.511)	4.664 (0.096)*	-0.660 (0.068)*	-0.594 (0.179)	0.164 (0.538)	0.332 (0.099)*	0.230 (0.456)	0.161 (0.540)
Black_African	-6.990 (0.001)***	-6.683 (0.001)***	-5.010 (0.040)**	-3.077 (0.147)	9.768 (0.005)***	-0.741 (0.031)**	-0.416 (0.256)	-0.382 (0.008)***	-0.573 (0.002)***	-0.340 (0.141)	-0.357 (0.104)
Other_ethnicity	-0.609 (0.848)	-1.871 (0.475)	-0.849 (0.820)	-1.263 (0.711)	4.364 (0.232)	-0.151 (0.709)	0.331 (0.425)	-0.016 (0.958)	-0.143 (0.573)	-0.058 (0.870)	-0.146 (0.673)
english_fluency	1.504 (0.011)**	1.293 (0.011)**	1.850 (0.004)***	1.417 (0.010)***	-1.978 (0.028)**	0.150 (0.021)**	0.133 (0.104)	0.114 (0.050)*	0.111 (0.022)**	0.166 (0.008)***	0.130 (0.030)**
born_abroad	-4.214 (0.023)**	-5.273 (0.001)***	-5.280 (0.007)***	-4.669 (0.008)***	1.796 (0.499)	-0.436 (0.045)**	-0.116 (0.640)	-0.399 (0.017)**	-0.531 (0.000)***	-0.538 (0.004)***	-0.523 (0.005)***
religiosity	-1.400 (0.000)***	-1.229 (0.000)***	-1.105 (0.000)***	-0.925 (0.000)***	0.317 (0.339)	-0.163 (0.000)***	-0.166 (0.000)***	-0.104 (0.000)***	-0.102 (0.000)***	-0.097 (0.001)***	-0.093 (0.001)***
parental_aspiration	-2.414 (0.000)***	-2.018 (0.000)***	-1.961 (0.001)***	-1.483 (0.001)***	0.834 (0.160)	-0.290 (0.000)***	-0.302 (0.000)***	-0.136 (0.004)***	-0.140 (0.000)***	-0.158 (0.002)***	-0.142 (0.002)***
parental_interest	-6.627 (0.000)***	-5.495 (0.000)***	-6.086 (0.000)***	-5.143 (0.000)***	-4.544 (0.000)***	-0.680 (0.000)***	-0.679 (0.000)***	-0.578 (0.000)***	-0.528 (0.000)***	-0.533 (0.000)***	-0.505 (0.000)***
parental_relationships	-3.243 (0.000)***	-2.817 (0.000)***	-2.390 (0.001)***	-1.968 (0.001)***	-0.671 (0.385)	-0.314 (0.000)***	-0.307 (0.003)***	-0.285 (0.000)***	-0.288 (0.000)***	-0.211 (0.001)***	-0.216 (0.000)***
values_helping	-0.472 (0.252)	-0.307 (0.355)	-0.097 (0.829)	-0.068 (0.856)	-0.104 (0.835)	0.001 (0.989)	0.016 (0.805)	-0.054 (0.163)	-0.042 (0.215)	0.001 (0.975)	0.003 (0.937)
values_salary	0.034 (0.952)	-0.019 (0.967)	0.290 (0.653)	0.228 (0.692)	0.502 (0.462)	-0.001 (0.987)	0.071 (0.450)	0.006 (0.915)	-0.007 (0.893)	-0.011 (0.855)	-0.005 (0.931)
values_selfemployment	-0.105 (0.739)	-0.215 (0.367)	-0.183 (0.614)	-0.160 (0.597)	-0.469 (0.216)	-0.024 (0.588)	0.022 (0.678)	0.001 (0.976)	-0.007 (0.768)	-0.018 (0.583)	-0.011 (0.729)
values_interest	-2.036 (0.000)***	-1.894 (0.000)***	-2.092 (0.000)***	-1.972 (0.000)***	-1.980 (0.001)***	-0.185 (0.003)***	-0.134 (0.088)*	-0.180 (0.000)***	-0.179 (0.000)***	-0.203 (0.000)***	-0.209 (0.000)***
values_promotion	-1.558 (0.001)***	-1.315 (0.000)***	-1.812 (0.000)***	-1.609 (0.000)***	-1.189 (0.045)**	-0.175 (0.001)***	-0.181 (0.007)***	-0.123 (0.005)***	-0.099 (0.008)***	-0.144 (0.002)***	-0.132 (0.003)***
values_hours	-0.744 (0.053)*	-0.532 (0.071)*	-0.719 (0.101)	-0.575 (0.112)	-0.734 (0.127)	-0.076 (0.113)	-0.066 (0.279)	-0.076 (0.033)**	-0.059 (0.039)**	-0.068 (0.092)*	-0.058 (0.106)
values_schoolwork	-2.936 (0.000)***	-2.641 (0.000)***	-2.460 (0.000)***	-2.174 (0.000)***	-1.617 (0.003)***	-0.252 (0.000)***	-0.268 (0.000)***	-0.208 (0.000)***	-0.222 (0.000)***	-0.179 (0.000)***	-0.178 (0.000)***
work_ethic	-4.271 (0.000)***	-3.852 (0.000)***	-3.893 (0.000)***	-3.419 (0.000)***	-1.588 (0.000)***	-0.441 (0.000)***	-0.385 (0.000)***	-0.389 (0.000)***	-0.376 (0.000)***	-0.383 (0.000)***	-0.381 (0.000)***
job_aspiration	-2.779 (0.000)***	-2.341 (0.000)***	-2.515 (0.000)***	-2.282 (0.000)***	-2.304 (0.001)***	-0.231 (0.002)***	-0.225 (0.015)**	-0.266 (0.000)***	-0.228 (0.000)***	-0.216 (0.000)***	-0.225 (0.000)***
inward_confidence	0.672 (0.367)	1.219 (0.031)**	0.714 (0.429)	1.079 (0.146)	0.517 (0.559)	0.079 (0.454)	0.102 (0.486)	0.048 (0.497)	0.095 (0.089)*	0.047 (0.567)	0.090 (0.226)
positive_about_ability	2.178 (0.000)***	1.823 (0.000)***	2.023 (0.000)***	1.736 (0.000)***	0.221 (0.536)	0.161 (0.000)***	0.197 (0.000)***	0.171 (0.000)***	0.162 (0.000)***	0.185 (0.000)***	0.181 (0.000)***
positive_about_school	-1.863 (0.000)***	-1.592 (0.000)***	-1.492 (0.000)***	-1.324 (0.000)***	-0.691 (0.015)**	-0.199 (0.000)***	-0.190 (0.000)***	-0.144 (0.000)***	-0.137 (0.000)***	-0.122 (0.000)***	-0.122 (0.000)***
positive_about_classes	-1.885 (0.000)***	-1.441 (0.000)***	-1.514 (0.000)***	-1.287 (0.000)***	-0.449 (0.221)	-0.189 (0.000)***	-0.164 (0.001)***	-0.162 (0.000)***	-0.138 (0.000)***	-0.124 (0.000)***	-0.114 (0.000)***
dislike_schooling	0.967 (0.000)***	0.800 (0.000)***	0.860 (0.000)***	0.774 (0.000)***	0.446 (0.001)***	0.106 (0.000)***	0.104 (0.000)***	0.080 (0.000)***	0.077 (0.000)***	0.065 (0.000)***	0.070 (0.000)***
bullied	1.938 (0.000)***	1.718 (0.000)***	1.531 (0.000)***	1.380 (0.000)***	1.120 (0.003)***	0.200 (0.000)***	0.145 (0.003)***	0.175 (0.000)***	0.173 (0.000)***	0.138 (0.000)***	0.138 (0.000)***
W1palhomeYP	1.245 (0.002)***	1.127 (0.000)***	0.713 (0.114)	0.742 (0.047)**	-0.702 (0.150)	0.051 (0.364)	-0.066 (0.342)	0.138 (0.000)***	0.138 (0.000)***	0.076 (0.078)*	0.098 (0.013)**
W1paloutYP	2.247 (0.000)***	1.959 (0.000)***	1.559 (0.001)***	1.333 (0.001)***	-0.663 (0.177)	0.198 (0.000)***	0.089 (0.210)	0.183 (0.000)***	0.203 (0.000)***	0.161 (0.000)***	0.163 (0.000)***
sport_freq	-1.235 (0.000)***	-1.380 (0.000)***	-1.101 (0.002)***	-1.024 (0.001)***	-1.395 (0.000)***	-0.131 (0.000)***	-0.133 (0.005)***	-0.108 (0.000)***	-0.121 (0.000)***	-0.087 (0.005)***	-0.086 (0.003)***
played_sport	-4.721 (0.000)***	-4.471 (0.000)***	-4.398 (0.000)***	-3.651 (0.000)***	-4.695 (0.000)***	-0.517 (0.000)***	-0.474 (0.000)***	-0.442 (0.000)***	-0.408 (0.000)***	-0.359 (0.000)***	-0.312 (0.001)***
played_instrument	-4.649 (0.000)***	-3.279 (0.000)***	-4.068 (0.000)***	-3.223 (0.000)***	-1.151 (0.313)	-0.477 (0.000)***	-0.554 (0.000)***	-0.360 (0.000)***	-0.291 (0.000)***	-0.310 (0.002)***	-0.282 (0.003)***
community_work	-5.648 (0.002)***	-5.119 (0.001)***	-5.669 (0.007)***	-5.300 (0.005)***	-3.876 (0.091)*	-0.761 (0.013)**	-0.890 (0.032)**	-0.448 (0.018)**	-0.431 (0.010)**	-0.499 (0.027)**	-0.507 (0.021)**
youth_group	-1.287 (0.183)	-1.378 (0.066)*	-1.137 (0.293)	-0.846 (0.355)	-2.018 (0.062)*	-0.223 (0.069)*	-0.255 (0.090)*	-0.105 (0.263)	-0.121 (0.116)	-0.084 (0.425)	-0.034 (0.726)
entertainment	-4.713 (0.000)***	-4.581 (0.000)***	-4.058 (0.000)***	-3.404 (0.000)***	-2.770 (0.003)***	-0.460 (0.000)***	-0.380 (0.002)***	-0.349 (0.000)***	-0.390 (0.000)***	-0.339 (0.000)***	-0.309 (0.000)***
gone_out	0.237 (0.772)	-0.712 (0.283)	0.131 (0.890)	-0.009 (0.991)	-2.055 (0.035)**	-0.135 (0.183)	-0.013 (0.917)	-0.018 (0.816)	-0.080 (0.228)	0.041 (0.632)	0.066 (0.419)
hung_out	3.084 (0.001)***	2.739 (0.000)***	1.973 (0.056)*	1.529 (0.085)*	-2.247 (0.036)**	0.244 (0.032)**	0.124 (0.383)	0.237 (0.004)***	0.233 (0.001)***	0.192 (0.035)**	0.163 (0.057)*
substance_abuse	2.968 (0.000)***	2.669 (0.000)***	2.349 (0.002)***	2.024 (0.001)***	-0.224 (0.776)	0.318 (0.000)***	0.230 (0.041)**	0.223 (0.000)***	0.227 (0.000)***	0.194 (0.003)***	0.203 (0.001)***
behaviour2	6.272 (0.000)***	5.253 (0.000)***	5.546 (0.000)***	4.745 (0.000)***	2.242 (0.001)***	0.640 (0.000)***	0.580 (0.000)***	0.538 (0.000)***	0.512 (0.000)***	0.487 (0.000)***	0.488 (0.000)***
suspended	4.899 (0.000)***	3.945 (0.000)***	4.420 (0.000)***	3.826 (0.000)***	2.962 (0.000)***	0.415 (0.000)***	0.413 (0.000)***	0.416 (0.000)***	0.399 (0.000)***	0.425 (0.000)***	0.407 (0.000)***
expel	21.793 (0.000)***	15.757 (0.000)***	22.285 (0.000)***	18.197 (0.000)***	16.803 (0.000)***	2.136 (0.000)***	2.365 (0.000)***	2.319 (0.000)***	1.932 (0.000)***	2.247 (0.000)***	2.082 (0.000)***
police	5.866 (0.000)***	4.622 (0.000)***	4.929 (0.000)***	4.425 (0.000)***	2.611 (0.000)***	0.506 (0.000)***	0.467 (0.000)***	0.461 (0.000)***	0.457 (0.000)***	0.390 (0.000)***	0.427 (0.000)***
ever_abs_3	18.500 (0.000)***	11.769 (0.000)***	16.624 (0.000)***	13.340 (0.000)***	16.255 (0.000)***	1.766 (0.000)***	1.749 (0.000)***	1.146 (0.000)***	0.881 (0.000)***	1.377 (0.000)***	1.152 (0.000)***
abs_1_this_yr	12.097 (0.000)***	7.919 (0.000)***	11.456 (0.000)***	8.268 (0.001)***	9.263 (0.001)***	0.955 (0.000)***	1.099 (0.001)***	1.091 (0.000)***	0.769 (0.000)***	1.081 (0.000)***	0.906 (0.000)***

Notes: P values in parentheses   *P<0.10,   **P<0.05,   ***P<0.01

5.1.1 Identification of less pertinent specifications

Tables 5.1c/d demonstrate that alternative specifications can produce substantially different findings. Nevertheless the results from columns (1), (3), (8), (10) are often closely aligned with those of their respective __count variables which include individuals with partial activity histories. This tendency was investigated by means of a *t* test to identify which non-count coefficients lay outside the 90% confidence interval around their __count counterparts: 64 out of 680 coefficients had statistically different coefficients and almost all of these preserved the sign and significance of the observed effects. Three coefficients with meaningful differences were found and recorded in Table 5.1.1a; each difference was characterised by the non-count variable finding weaker effects due to the omission of incomplete observations. This provides strong empirical support that the non-count specifications can be dropped from further analyses. That conclusion is corroborated by a theoretical analysis since the __count variables trade-off increased statistical power and empirical validity against an attenuation bias due to the possible foreshortened NEET experience of their additional participants. This trade-off has an ambiguous effect on type II errors but will reduce the likelihood of type I errors with certainty, and as Olson (1976) points out the reduction of type I errors is of primary concern.

The remaining specifications were similarly assessed for their unique contribution and the results of columns (4), (7) and (11) emerge as being qualitatively comparable to columns (2), (6) and (9) respectively. Quantitatively 29 out of 510 estimates of the first lay outside the 90% confidence intervals of the last with several of these representing meaningful differences: generally where the __2 variables have weaker effects which could be due either to sample attrition or to effects fading over time. Such differences were noted in Table 5.1.1a, which therefore provides a complete record of all univariate information lost by reporting only specifications (2), (5), (6) and (9) in future analyses. Those analyses are mindful of this table, which shows in grey variables which are dropped by Section 5.1.

Table 5.1.1a – Notes on discrepancies with alternative specifications

Females

Variable	Notes
Expel	Has a much stronger effect on '3monthsNEETcount' than on '3monthsNEET'. Has a much stronger effect on '3monthsNEETcount' than on '3monthsNEET2count'.
Black_African	Has a much stronger effect on '3monthsNEETcount' than on '3monthsNEET'. Has a much stronger effect on 'monthsNEETcount' than on 'monthsNEET' Has a much stronger effect on 'monthsNEETcount' than on 'monthsNEET2count'.
Other_ethnicity	Has a much weaker effect on '13monthsNEET' than on '13monthsNEET2'.

Males

Variable	Notes
W1agedad	Has a much stronger effect on '3monthsNEETcount' than on '3monthsNEET2count' Has a much stronger effect on 'monthsNEETcount' than on monthsNEET2count'
gone_out	Has an opposite effect on '3monthsNEETcount' than on '3monthsNEET2count', though neither is at all significant.
hung_out	Has a stronger effect on 'monthsNEETcount' than on 'monthsNEET2count'.
birthweight	Has a marginally significant negative coefficient on '13monthsNEET2' but no effect on '13monthsNEET'.
carer	Has a much stronger effect on '13monthsNEET' than on '13monthsNEET2'.
W1palhomeYP	Has an opposite effect on '13monthsNEET' than on '13monthsNEET2'. though neither is at all significant.
W1paloutYP	Has a much stronger effect on '13monthsNEET' than on '13monthsNEET2'.
Black_African	Has a much stronger effect on 'monthsNEETcount' than on 'monthsNEET2count'

5.1.2 Identification of irrelevant variables

The following analysis will identify categories of variables which have limited effect on youth employment outcomes. The results in Tables 5.1c/d are supplemented by Tables 5.1.2a/b which describe constructed counterfactual analyses for the key specifications (2), (5), (6) and (9) identified in Section 5.1.1. This application of counterfactual analysis has the limitation that all of the retained variables must be non-missing which reduces the sample and thus may introduce selection bias to the coefficients. Comparisons would also be affected wherever a variable exerts a unique effect predominantly on omitted individuals, so variables will be dropped with caution.

- values_helping; values_salary;

  These two variables show no significant effects in any specification of tables 5.1c/d – accordingly these were dropped from further analyses.

  The irrelevance of values_salary is particularly interesting given that standard micro-founded macroeconomic theory is built upon the assumption that each individual's actions are primarily driven by a desire for consumption ergo wealth. A possible reconciliation is that motivations of this type may become more dominant at later ages.

- dislike_schooling; bullied; SEN; W1chea1HS;

  The counterfactual counterparts of these variables explain their effects almost entirely across specifications, hence they were dropped hereinafter.

  It is interesting that SEN and (below) positive_about_ability are unrelated to NEET outcomes in these data, since they were expected to be the strongest proxy indicators of academic performance (positive_about_ability constitutes self-reported measures of attainment/ability, whilst SEN has been shown to significantly affect academic attainment (Dyson et al. 2004)). This suggests that the bias due to lacking academic attainment measures may be modest, possibly due these data being collected at age 14.

- financial_difficulties; parental_education; W1NoldsibHS; separation; positive_about_classes; substance_abuse; played_instrument; IndSchool; IMDRSCORE; positive_about_ability;

  In almost all specifications the counterfactual counterparts of these variables explain their effects very well, hence they were dropped hereinafter. Noteworthy variables in this list include:

  - Parental education: is often considered to be a key pre-correlate of employment outcomes (Bradley and Nguyen 2004), however these data suggest that it is potentially only an indicator for parental occupation and parental employment in this context.

  - Financial difficulty: is often considered salient (Bäckman and Nilsson 2011), but these data suggest that it may have little direct influence on employment outcomes beyond acting as an indicator for variables such as computing access and housing tenure.

  - Substance abuse: is generally considered to have a detrimental effect on employment outcomes, although there is debate on this topic (Janlert 1997). The present results suggest that age 14 is too early for any causal link to be detected.

  - Indschool: is particularly interesting politically – these results suggest that the relative employment success of independent school pupils may be explained by the other social advantages of the individuals who happen to receive independent schooling

- birthweight; atypical_gestation; W1nurschHS; values_promotion; values_hours; inward_confidence; community_work;

  In almost all specifications across the genders these variables have very little statistical significance even as univariate predictors, especially when the counterfactual influence is accounted for.

  - Since birthweight was identified by Table 5.1.1a as having a stronger effect on an omitted specification (_13monthsNEET2) than its included counterpart, the counterfactual analysis was also run for that cell as a robustness check – neither result was close to being significant.

- values_selfemployment; W1palhomeYP; W1paloutYP; bullied; hung_out;

  Across the specifications and genders these variables have little relevance or at times a lower effect than their counterfactual counterparts. In those instances the variable's unique effect has an opposite sign to its net univariate effect, although those differences were sufficiently small and isolated in these variables that they were dropped from further analyses. Other variables display systemically lower net effects and have therefore been retained, these include: abs_1_this_year, W1inyrmov, born_abroad, and jobtime as well as many of the regional and ethnic dummies, with less

marked effects evident in other factors pertaining to culture, deprivation and aspiration. This effect is almost exclusively seen in the female table, and predominantly in specification (5) where those who attend higher education are excluded. One explanation for this could be the existence of cultural norms grounded in regional, ethnic, and socioeconomic contexts which negatively affect the empowerment of women, but which may be absent or overcome by those who attend higher education.

- mbirthag; W1agedad

Section 4.2 identified that these two variables are highly collinear, however Tables 5.1.2a/b suggest that they each make idiosyncratic contributions. Therefore a new combined variable for parental age at childbirth was formed as the weighted sum of these variables, the derivation of which is detailed in Appendix III-k. Its square (parent_age_sq) was also operationalised since Section 2.5d identified nonlinear effects of parental age.

Table 5.1.2a – Counterfactual regression results for females

	(2) monthsNEETcount (tobit)	(2a) (2) regressed on counterfactual	(5) monthsNEET2_exclHE (tobit)	(5a) (5) regressed on counterfactual	(6) 13monthsNEET (logit)	(6a) (6) regressed on counterfactual	(9) 3monthsNEETcount (logit)	(9a) (9) regressed on counterfactual	(end) R2(indep) || R2(counterf)
Number of obs:	2992		1011		2380		2983		
W1chea1HS	2.166 (0.039) **	2.545 (0.007) ***	2.564 (0.111)	4.305 (0.002)***	0.408 (0.009)***	0.427 (0.013)**	0.213 (0.025)***	0.277 (0.003)***	0.136 || 0.136
birthweight	-0.300 (0.784)	0.560 (0.582)	-1.511 (0.334)	1.959 (0.215)	-0.226 (0.194)	-0.006 (0.974)	-0.071 (0.516)	0.094 (0.355)	0.297 || 0.284
atypical_gestation	-0.102 (0.934)	1.426 (0.207)	-0.178 (0.928)	4.030 (0.021)**	0.154 (0.348)	0.400 (0.031)**	-0.009 (0.937)	0.196 (0.099)*	0.288 || 0.267
SEN	3.658 (0.000) ***	3.167 (0.000) ***	2.052 (0.141)	3.987 (0.001)***	0.476 (0.000) ***	0.508 (0.001)***	0.343 (0.000)***	0.327 (0.000)***	0.152 || 0.130
IndSchool	-1.895 (0.575)	-4.095 (0.139)	4.027 (0.188)	8.022 (0.054)*	-0.018 (0.964)	0.022 (0.963)	-0.166 (0.631)	-0.369 (0.195)	0.253 || 0.251
school_quality	-4.197 (0.000) ***	-3.576 (0.000) ***	-1.850 (0.057) *	-0.568 (0.495)	-0.307 (0.008)***	-0.313 (0.002)***	-0.426 (0.000)***	-0.308 (0.000)***	0.392 || 0.416
W1nurschHS	-2.727 (0.066) *	-0.022 (0.986)	-1.651 (0.497)	3.337 (0.081)*	-0.308 (0.177)	0.132 (0.545)	-0.173 (0.206)	0.050 (0.689)	0.051 || 0.039
careers_advice	-1.694 (0.000) ***	-0.845 (0.043) **	-1.568 (0.017) **	0.672 (0.272)	-0.267 (0.000)***	-0.040 (0.589)	-0.130 (0.001)***	-0.052 (0.213)	0.151 || 0.143
extra_tuition	-1.028 (0.365)	0.180 (0.871)	2.493 (0.167)	3.693 (0.032)**	0.000 (0.999)	0.121 (0.523)	-0.094 (0.462)	0.076 (0.502)	0.099 || 0.065
North_East	-0.271 (0.876)	5.184 (0.022) **	0.526 (0.870)	11.111 (0.002)***	-0.331 (0.300)	0.836 (0.028)**	0.071 (0.696)	0.524 (0.017)**	0.418 || 0.419
North_West	-1.234 (0.484)	2.056 (0.166)	-0.512 (0.841)	5.370 (0.018)**	-0.013 (0.959)	0.490 (0.031)**	-0.210 (0.202)	0.115 (0.419)	0.579 || 0.574
Yorkshire_and_the_Humber	-0.571 (0.794)	2.389 (0.164)	0.523 (0.846)	5.762 (0.021)**	-0.038 (0.895)	0.433 (0.102)	-0.151 (0.495)	0.162 (0.344)	0.502 || 0.497
East_Midlands	0.256 (0.886)	3.250 (0.062) *	-0.512 (0.863)	6.431 (0.018)**	0.032 (0.902)	0.519 (0.065)*	0.036 (0.828)	0.297 (0.082)*	0.486 || 0.478
West_Midlands	-0.630 (0.668)	2.227 (0.154)	-1.844 (0.389)	4.667 (0.039)**	0.257 (0.208)	0.576 (0.025)**	0.090 (0.545)	0.274 (0.089)*	0.516 || 0.514
East_of_England	1.286 (0.443)	3.584 (0.033) **	-0.146 (0.953)	5.036 (0.046)**	0.163 (0.529)	0.459 (0.079)*	0.080 (0.598)	0.314 (0.044)**	0.546 || 0.534
South_East	0.911 (0.463)	3.040 (0.031) **	-1.467 (0.437)	3.340 (0.116)	-0.080 (0.713)	0.246 (0.273)	0.100 (0.434)	0.292 (0.038)**	0.638 || 0.640
South_West	-0.964 (0.566)	2.522 (0.168)	-0.984 (0.738)	6.062 (0.035)**	-0.445 (0.215)	0.239 (0.416)	0.013 (0.941)	0.295 (0.114)	0.534 || 0.539
housing_density	-1.318 (0.120)	-0.271 (0.782)	-1.087 (0.434)	1.736 (0.236)	-0.292 (0.084)*	-0.003 (0.985)	-0.082 (0.327)	0.032 (0.751)	0.173 || 0.151
IMDRSCORE	0.195 (0.000) ***	0.163 (0.000) ***	0.200 (0.000) ***	0.197 (0.000)***	0.034 (0.000)***	0.027 (0.000)***	0.016 (0.000)***	0.016 (0.000)***	0.422 || 0.418
tenure	-2.613 (0.000) ***	-1.804 (0.000) ***	-2.215 (0.000) ***	-0.782 (0.150)	-0.353 (0.000)***	-0.246 (0.000)***	-0.239 (0.000)***	-0.151 (0.000)***	0.381 || 0.370
W1inyrmov	0.493 (0.531)	1.277 (0.097) *	-0.058 (0.966)	3.474 (0.004)***	-0.099 (0.478)	0.252 (0.068)*	0.037 (0.636)	0.155 (0.043)**	0.068 || 0.065
W1vehnoHH	-2.781 (0.000) ***	-1.845 (0.001) ***	-2.658 (0.010) **	-0.750 (0.383)	-0.536 (0.000)***	-0.281 (0.004)***	-0.272 (0.000)***	-0.125 (0.024)**	0.276 || 0.268
mobile_phone	-1.951 (0.074) *	0.418 (0.607)	-1.212 (0.492)	1.524 (0.226)	-0.157 (0.409)	0.109 (0.462)	-0.216 (0.056)*	0.081 (0.322)	0.114 || 0.074
reads	-1.186 (0.001) ***	-0.663 (0.031) **	0.193 (0.722)	0.887 (0.047)**	-0.090 (0.092)*	-0.018 (0.737)	-0.087 (0.005)***	-0.045 (0.144)	0.143 || 0.143
computing_access	-6.789 (0.000) ***	-3.735 (0.000) ***	-5.000 (0.001) ***	-0.740 (0.526)	-0.815 (0.000)***	-0.405 (0.002)***	-0.538 (0.000)***	-0.313 (0.000)***	0.270 || 0.246
parental_education	-1.084 (0.000) ***	-1.029 (0.000) ***	0.089 (0.803)	0.032 (0.915)	-0.108 (0.003)***	-0.104 (0.002)***	-0.098 (0.000)***	-0.081 (0.000)***	0.371 || 0.351
parental_occupation	-1.666 (0.000) ***	-1.064 (0.000) ***	-0.970 (0.004) ***	-0.178 (0.572)	-0.185 (0.000)***	-0.130 (0.000)***	-0.152 (0.000)***	-0.087 (0.000)***	0.392 || 0.381
parental_employment	-2.195 (0.000) ***	-1.091 (0.000) ***	-2.874 (0.000) ***	-0.470 (0.213)	-0.348 (0.000)***	-0.134 (0.003)***	-0.184 (0.000)***	-0.090 (0.000)***	0.338 || 0.313
finacial_difficulties	4.920 (0.000) ***	4.046 (0.000) ***	4.397 (0.001) ***	4.414 (0.000)***	0.667 (0.000)***	0.618 (0.000)***	0.433 (0.000)***	0.390 (0.000)***	0.397 || 0.413
jobtime	0.142 (0.757)	0.840 (0.065) *	-0.912 (0.178)	1.699 (0.016)**	0.032 (0.685)	0.132 (0.103)	-0.008 (0.870)	0.103 (0.026)**	0.076 || 0.066
carer	-0.129 (0.952)	4.775 (0.018) **	4.396 (0.208)	10.111 (0.002)***	0.011 (0.979)	1.005 (0.006)***	-0.158 (0.492)	0.489 (0.016)**	0.073 || 0.078
MRetwrk	0.475 (0.009) ***	0.548 (0.001) ***	0.259 (0.364)	0.501 (0.068)*	0.066 (0.037)**	0.081 (0.005)***	0.042 (0.020)**	0.051 (0.002)***	0.946 || 0.944
MRetwrk_sq	0.092 (0.001) ***	0.080 (0.002) ***	0.082 (0.076) *	0.080 (0.043)**	0.014 (0.003)***	0.013 (0.004)***	0.008 (0.004)***	0.007 (0.004)***	0.949 || 0.947
mbirthag	-1.775 (0.000) ***	-1.489 (0.001) ***	-0.189 (0.818)	0.137 (0.850)	-0.267 (0.001)***	-0.205 (0.008)***	-0.165 (0.000)***	-0.111 (0.016)**	0.532 || 0.536
W1agedad	-0.310 (0.000) ***	-0.171 (0.014) **	-0.119 (0.362)	0.132 (0.222)	-0.049 (0.002)***	-0.021 (0.083)*	-0.027 (0.001)***	-0.013 (0.067)*	0.494 || 0.498
W1NoldsibHS	1.762 (0.000) ***	1.314 (0.003) ***	0.468 (0.523)	1.698 (0.009)***	0.067 (0.439)	0.144 (0.060)*	0.158 (0.001)***	0.133 (0.002)***	0.301 || 0.300
W1NyoungsibHS	2.119 (0.000) ***	1.452 (0.001) ***	3.108 (0.000) ***	2.545 (0.001)***	0.458 (0.000)***	0.314 (0.000)***	0.152 (0.002)***	0.145 (0.001)***	0.325 || 0.303
broken_family	8.082 (0.000) ***	1.684 (0.000) ***	5.109 (0.019) **	1.806 (0.002)***	0.923 (0.000)***	0.254 (0.000)***	0.849 (0.000)***	0.178 (0.000)***	0.198 || 0.200
separation	3.357 (0.000) ***	2.879 (0.000) ***	1.110 (0.326)	3.077 (0.001)***	0.310 (0.003)***	0.454 (0.000)***	0.340 (0.000)***	0.301 (0.000)***	0.250 || 0.261
W1evercarMP0a	4.850 (0.452)	7.021 (0.031) **	-108.844 (0.000) ***	13.849 (0.005)***	1.049 (0.323)	1.223 (0.037)**	0.691 (0.396)	0.815 (0.013)**	0.041 || 0.040
Mixed	0.026 (0.992)	3.456 (0.109)	1.397 (0.760)	9.402 (0.004)***	0.148 (0.789)	0.724 (0.057)*	0.059 (0.843)	0.401 (0.063)*	0.061 || 0.048
Indian	-4.859 (0.072) *	0.842 (0.672)	5.937 (0.069) **	7.564 (0.017)**	-0.966 (0.228)	0.254 (0.446)	-0.539 (0.013)**	0.133 (0.509)	0.266 || 0.170
Pakistani	-2.618 (0.368)	2.458 (0.228)	8.742 (0.111)	8.867 (0.005)***	-0.100 (0.814)	0.609 (0.082)*	-0.274 (0.378)	0.272 (0.180)	0.207 || 0.137
Bangladeshi	-5.218 (0.209)	3.696 (0.105)	-2.333 (0.795)	9.808 (0.006)***	-1.660 (0.078)*	0.771 (0.053)*	-0.327 (0.418)	0.402 (0.078)*	0.138 || 0.085
Black_Caribbean	-1.695 (0.607)	4.724 (0.062) *	12.093 (0.050) *	11.656 (0.003)***	0.543 (0.196)	0.935 (0.035)**	-0.136 (0.679)	0.516 (0.042)**	0.056 || 0.059
Black_African	-3.299 (0.258)	3.182 (0.211)	-108.896 (0.000) ***	11.299 (0.004)***	0.000 (0.000)***	0.757 (0.092)*	0.000 (1.000)	0.382 (0.127)	0.162 || 0.122
Other_ethnicity	-15.567 (0.000) ***	3.065 (0.301)	3.630 (0.672)	12.937 (0.006)***	-1.132 (0.048)**	0.865 (0.101)	-1.566 (0.000)***	0.358 (0.221)	0.142 || 0.107
english_fluency	2.613 (0.002) ***	1.252 (0.036) **	0.540 (0.769)	2.048 (0.037)**	0.645 (0.002)***	0.221 (0.040)**	0.267 (0.004)***	0.143 (0.018)**	0.363 || 0.198
born_abroad	-1.505 (0.566)	1.143 (0.519)	1.181 (0.807)	6.501 (0.020)**	0.037 (0.938)	0.302 (0.331)	0.023 (0.932)	0.195 (0.276)	0.122 || 0.077
religiosity	-1.388 (0.000) ***	-0.554 (0.090) *	0.132 (0.805)	0.963 (0.048)**	-0.201 (0.001)***	-0.024 (0.652)	-0.116 (0.000)***	-0.037 (0.252)	0.244 || 0.158
parental_aspiration	-1.803 (0.002) ***	-0.111 (0.861)	0.735 (0.463)	2.348 (0.017)**	-0.167 (0.104)	0.096 (0.393)	-0.152 (0.010)***	0.022 (0.737)	0.070 || 0.055
parental_interest	-5.206 (0.000) ***	-3.252 (0.000) ***	-2.422 (0.033) **	0.010 (0.992)	-0.570 (0.000)***	-0.317 (0.009)***	-0.439 (0.000)***	-0.253 (0.000)***	0.340 || 0.338
parental_relationships	-2.218 (0.001) ***	-2.517 (0.000) ***	-0.695 (0.490)	0.293 (0.764)	-0.292 (0.009)***	-0.136 (0.241)	-0.203 (0.002)***	-0.201 (0.004)***	0.300 || 0.300
values_selfemployment	0.942 (0.019) **	0.966 (0.016) **	0.743 (0.257)	1.926 (0.002)***	0.116 (0.097)*	0.183 (0.009)***	0.081 (0.046)**	0.104 (0.009)***	0.148 || 0.136
values_interest	-0.978 (0.129)	0.119 (0.846)	-0.595 (0.536)	2.153 (0.023)**	-0.087 (0.371)	0.109 (0.314)	-0.087 (0.146)	0.037 (0.555)	0.076 || 0.068
values_promotion	-0.420 (0.413)	0.264 (0.642)	0.683 (0.405)	1.891 (0.036)**	0.054 (0.571)	0.124 (0.206)	-0.032 (0.527)	0.054 (0.333)	0.159 || 0.149
values_hours	-0.649 (0.173)	0.516 (0.271)	-0.721 (0.333)	1.423 (0.048)**	-0.004 (0.958)	0.102 (0.211)	-0.051 (0.267)	0.071 (0.133)	0.074 || 0.066
values_schoolwork	-2.717 (0.000) ***	-1.611 (0.004) ***	-0.749 (0.389)	0.576 (0.475)	-0.228 (0.003)***	-0.105 (0.274)	-0.224 (0.000)***	-0.110 (0.048)**	0.185 || 0.183
work_ethic	-3.883 (0.000) ***	-2.275 (0.000) ***	-2.042 (0.011) **	0.273 (0.701)	-0.469 (0.000)***	-0.184 (0.027)**	-0.384 (0.000)***	-0.193 (0.000)***	0.295 || 0.297
job_aspiration	-1.339 (0.091) *	0.046 (0.950)	-0.873 (0.510)	2.171 (0.050)**	-0.107 (0.433)	0.137 (0.285)	-0.071 (0.315)	0.045 (0.541)	0.105 || 0.101
inward_confidence	-0.429 (0.628)	0.630 (0.409)	-1.206 (0.399)	2.561 (0.028)**	-0.046 (0.781)	0.160 (0.238)	-0.093 (0.283)	0.090 (0.240)	0.039 || 0.035
positive_about_ability	2.533 (0.000) ***	2.038 (0.000) ***	0.557 (0.398)	1.791 (0.001)***	0.187 (0.013)**	0.258 (0.000)***	0.246 (0.000)***	0.205 (0.000)***	0.175 || 0.193
positive_about_school	-2.498 (0.000) ***	-1.627 (0.000) ***	-1.833 (0.000) ***	-0.214 (0.603)	-0.275 (0.000)***	-0.126 (0.015)**	-0.236 (0.000)***	-0.136 (0.000)***	0.382 || 0.396
positive_about_classes	-1.937 (0.000) ***	-1.942 (0.000) ***	-0.541 (0.265)	-0.271 (0.553)	-0.166 (0.002)***	-0.159 (0.005)***	-0.169 (0.000)***	-0.165 (0.000)***	0.477 || 0.495
dislike_schooling	1.218 (0.000) ***	1.082 (0.000) ***	0.768 (0.000) ***	0.900 (0.000)***	0.139 (0.000)***	0.137 (0.000)***	0.109 (0.000)***	0.107 (0.000)***	0.512 || 0.524
bullied	1.665 (0.000) ***	1.700 (0.000) ***	1.150 (0.068) *	2.307 (0.000)***	0.160 (0.019)**	0.223 (0.002)***	0.158 (0.000)***	0.191 (0.000)***	0.150 || 0.138
W1palhomeYP	2.080 (0.000) ***	2.022 (0.000) ***	1.106 (0.164)	2.065 (0.010)**	0.267 (0.002)***	0.297 (0.001)***	0.170 (0.001)***	0.203 (0.000)***	0.327 || 0.316
W1paloutYP	1.659 (0.001) ***	2.258 (0.000) ***	-0.027 (0.971)	1.943 (0.010)**	0.220 (0.008)***	0.306 (0.001)***	0.153 (0.004)***	0.220 (0.000)***	0.417 || 0.400
sport_freq	-1.456 (0.000) ***	-1.192 (0.000) ***	-0.785 (0.130)	-0.047 (0.921)	-0.165 (0.001)***	-0.104 (0.057)*	-0.140 (0.000)***	-0.090 (0.006)***	0.217 || 0.224
played_sport	-4.711 (0.000) ***	-2.223 (0.031) **	-4.092 (0.009) ***	1.731 (0.253)	-0.562 (0.001)***	-0.100 (0.571)	-0.391 (0.000)***	-0.159 (0.125)	0.186 || 0.191
played_instrument	-3.857 (0.000) ***	-3.671 (0.002) ***	2.512 (0.112)	2.184 (0.215)	-0.525 (0.007)***	-0.261 (0.190)	-0.304 (0.003)***	-0.256 (0.030)**	0.185 || 0.185
community_work	-0.797 (0.717)	1.854 (0.413)	0.597 (0.855)	8.742 (0.010)***	-0.204 (0.586)	0.522 (0.186)	-0.176 (0.407)	0.291 (0.202)	0.059 || 0.057
youth_group	-2.502 (0.038) **	0.541 (0.647)	-0.999 (0.598)	3.751 (0.035)**	-0.379 (0.067)*	0.193 (0.353)	-0.147 (0.217)	0.106 (0.361)	0.089 || 0.092
entertainment	-5.461 (0.000) ***	-2.431 (0.015) **	-3.450 (0.025) **	1.554 (0.301)	-0.572 (0.001)***	-0.134 (0.450)	-0.525 (0.000)***	-0.163 (0.104)	0.141 || 0.124
gone_out	-0.399 (0.666)	1.476 (0.113)	0.096 (0.948)	3.020 (0.042)**	0.329 (0.037)**	0.256 (0.133)	0.020 (0.826)	0.189 (0.050)**	0.141 || 0.120
hung_out	3.684 (0.000) ***	4.299 (0.000) ***	1.037 (0.513)	4.337 (0.008)***	0.272 (0.104)	0.618 (0.001)***	0.371 (0.000)***	0.444 (0.000)***	0.225 || 0.209
substance_abuse	3.820 (0.000) ***	3.569 (0.000) ***	2.685 (0.012) **	3.762 (0.001)***	0.304 (0.007)***	0.439 (0.001)***	0.395 (0.000)***	0.378 (0.000)***	0.362 || 0.330
behaviour2	5.882 (0.000) ***	5.239 (0.000) ***	4.272 (0.000) ***	4.906 (0.000)***	0.557 (0.000)***	0.655 (0.000)***	0.571 (0.000)***	0.532 (0.000)***	0.457 || 0.456
suspended	6.184 (0.000) ***	3.215 (0.000) ***	5.974 (0.000) ***	3.882 (0.000)***	0.726 (0.000)***	0.395 (0.001)***	0.521 (0.000)***	0.334 (0.000)***	0.131 || 0.127
expel	-101.874 (0.000) ***	5.642 (0.303)	-108.917 (0.000) ***	18.064 (0.033)***	0.000 (0.000)***	1.120 (0.251)	0.000 (0.000)***	0.792 (0.151)	0.027 || 0.027
police	5.000 (0.000) ***	3.391 (0.000) ***	3.496 (0.033) **	4.479 (0.000)***	0.476 (0.000)***	0.507 (0.000)***	0.558 (0.000)***	0.348 (0.000)***	0.094 || 0.090
ever_abs_3	7.907 (0.153)	5.702 (0.048) **	14.597 (0.037) **	11.745 (0.007)***	1.344 (0.023)**	0.933 (0.068)*	0.511 (0.263)	0.677 (0.018)**	0.094 || 0.090
abs_1_this_yr	2.750 (0.326)	6.552 (0.008) ***	-1.372 (0.765)	11.672 (0.002)***	-1.190 (0.207)	1.187 (0.007)***	0.310 (0.318)	0.667 (0.006)***	0.086 || 0.114

Notes: P values in parentheses   *P<0.10,   **P<0.05,   ***P<0.01

Table 5.1.2b – Counterfactual regression results for males

	(2)	(2a)	(5)	(5a)	(6)	(6a)	(9)	(9a)	(end)
	monthsNEETcount (tobit)	(2) regressed on counterfactual	monthsNEET2_exclHE (tobit)	(5) regressed on counterfactual	13monthsNEET (logit)	(6) regressed on counterfactual	3monthsNEETcount (logit)	(9) regressed on counterfactual	R2(indep) ‖ R2(counterf)
Number of obs:	3137		1138		2359		3114		
W1chea1HS	2.537 (0.000) ***	2.177 (0.002) ***	2.183 (0.034) **	2.455 (0.028)**	0.379 (0.001)***	0.442 (0.002)***	0.238 (0.001)***	0.254 (0.002)***	0.119 ‖ 0.123
birthweight	-1.513 (0.052) *	0.412 (0.581)	-0.306 (0.795)	1.618 (0.191)	0.129 (0.382)	0.343 (0.018)**	-0.227 (0.010)***	0.056 (0.508)	0.232 ‖ 0.214
atypical_gestation	-1.135 (0.213)	1.212 (0.159)	-2.060 (0.169)	1.659 (0.220)	-0.541 (0.018)**	0.206 (0.229)	-0.051 (0.633)	0.187 (0.062)*	0.214 ‖ 0.207
SEN	2.880 (0.000) ***	2.862 (0.000) ***	1.083 (0.197)	1.745 (0.081)*	0.359 (0.000)***	0.468 (0.000)***	0.289 (0.000)***	0.314 (0.000)***	0.174 ‖ 0.187
IndSchool	-7.878 (0.000) ***	-7.254 (0.000) ***	-0.815 (0.798)	5.351 (0.087)*	-1.100 (0.019)**	-0.515 (0.182)	-0.708 (0.012)**	-0.547 (0.015)**	0.270 ‖ 0.299
school_quality	-4.026 (0.000) ***	-2.831 (0.000) ***	-0.629 (0.372)	0.153 (0.818)	-0.565 (0.000)***	-0.276 (0.001)***	-0.381 (0.000)***	-0.249 (0.000)***	0.399 ‖ 0.419
W1nurschHS	1.161 (0.326)	0.097 (0.914)	-0.460 (0.788)	1.108 (0.190)	-0.066 (0.749)	0.240 (0.180)	0.175 (0.190)	0.063 (0.539)	0.037 ‖ 0.036
careers_advice	-1.167 (0.001) ***	-0.691 (0.019) **	-0.578 (0.257)	0.170 (0.720)	-0.109 (0.054)*	-0.011 (0.843)	-0.094 (0.017)**	-0.049 (0.137)	0.147 ‖ 0.141
extra_tuition	-3.946 (0.000) ***	-0.446 (0.591)	-1.664 (0.419)	1.650 (0.232)	-0.443 (0.084)*	0.156 (0.355)	-0.370 (0.005)***	-0.007 (0.945)	0.110 ‖ 0.082
North_East	2.555 (0.149)	2.332 (0.180)	-0.376 (0.884)	0.486 (0.861)	0.279 (0.312)	0.366 (0.242)	0.273 (0.222)	0.321 (0.114)	0.385 ‖ 0.351
North_West	1.690 (0.150)	1.016 (0.368)	5.668 (0.000) ***	3.450 (0.033)**	0.347 (0.069)*	0.241 (0.225)	0.111 (0.381)	0.111 (0.388)	0.611 ‖ 0.604
Yorkshire_and_the_Humber	0.827 (0.627)	0.833 (0.531)	3.051 (0.178)	1.031 (0.589)	0.240 (0.344)	0.181 (0.435)	0.025 (0.892)	0.108 (0.464)	0.525 ‖ 0.494
East_Midlands	1.817 (0.200)	1.009 (0.491)	-0.280 (0.893)	-1.226 (0.609)	0.127 (0.596)	0.085 (0.741)	0.120 (0.442)	0.134 (0.412)	0.505 ‖ 0.473
West_Midlands	0.948 (0.448)	0.449 (0.697)	0.946 (0.586)	0.036 (0.985)	0.272 (0.206)	0.157 (0.478)	0.156 (0.260)	0.138 (0.286)	0.552 ‖ 0.541
East_of_England	-3.612 (0.010) **	-2.629 (0.048) **	-3.282 (0.060) *	-3.143 (0.115)	-0.319 (0.160)	-0.253 (0.249)	-0.330 (0.040)**	-0.165 (0.270)	0.546 ‖ 0.522
South_East	-1.792 (0.154)	-1.762 (0.158)	-3.591 (0.029) **	-3.245 (0.061)*	-0.368 (0.058)*	-0.285 (0.146)	-0.173 (0.273)	-0.115 (0.422)	0.628 ‖ 0.606
South_West	0.902 (0.491)	0.824 (0.570)	-2.984 (0.074) *	-3.189 (0.148)	0.019 (0.934)	0.037 (0.886)	0.121 (0.460)	0.182 (0.287)	0.543 ‖ 0.516
housing_density	-1.867 (0.026) **	-0.814 (0.274)	-2.904 (0.010) **	-0.138 (0.908)	-0.349 (0.030)**	0.112 (0.451)	-0.171 (0.068)*	-0.039 (0.640)	0.151 ‖ 0.138
IMDRSCORE	0.205 (0.000) ***	0.157 (0.000) ***	0.122 (0.000) ***	0.131 (0.000)***	0.023 (0.000)***	0.023 (0.000)***	0.019 (0.000)***	0.017 (0.000)***	0.381 ‖ 0.345
tenure	-2.434 (0.000) ***	-1.386 (0.000) ***	-1.185 (0.008) ***	-0.278 (0.413)	-0.252 (0.000)***	-0.097 (0.032)**	-0.241 (0.000)***	-0.135 (0.000)***	0.351 ‖ 0.334
W1inyrmov	0.269 (0.700)	0.960 (0.113)	-0.334 (0.747)	1.936 (0.038)**	-0.112 (0.507)	0.265 (0.021)**	-0.043 (0.620)	0.118 (0.093)*	0.113 ‖ 0.113
W1vehnoHH	-2.580 (0.000) ***	-1.893 (0.000) ***	-2.567 (0.001) ***	-0.856 (0.182)	-0.320 (0.003)***	-0.116 (0.153)	-0.257 (0.000)***	-0.161 (0.001)***	0.267 ‖ 0.261
mobile_phone	-2.550 (0.000) ***	0.018 (0.976)	-4.415 (0.000) ***	-0.218 (0.821)	-0.206 (0.112)	0.143 (0.239)	-0.294 (0.000)***	0.030 (0.675)	0.109 ‖ 0.091
reads	-1.209 (0.000) ***	-0.913 (0.000) ***	0.233 (0.517)	0.372 (0.307)	-0.145 (0.001)***	-0.052 (0.227)	-0.108 (0.000)***	-0.078 (0.002)***	0.180 ‖ 0.189
computing_access	-5.779 (0.000) ***	-3.048 (0.000) ***	-2.399 (0.038) **	-0.891 (0.301)	-0.561 (0.000)***	-0.262 (0.018)**	-0.608 (0.000)***	-0.279 (0.000)***	0.218 ‖ 0.224
parental_education	-1.250 (0.000) ***	-0.980 (0.000) ***	0.118 (0.669)	-0.033 (0.881)	-0.128 (0.000)***	-0.083 (0.003)***	-0.120 (0.000)***	-0.093 (0.000)***	0.380 ‖ 0.381
parental_occupation	-1.393 (0.000) ***	-0.940 (0.000) ***	-0.386 (0.111)	-0.082 (0.712)	-0.159 (0.000)***	-0.079 (0.007)***	-0.143 (0.000)***	-0.088 (0.000)***	0.376 ‖ 0.384
parental_employment	-1.992 (0.000) ***	-0.947 (0.000) ***	-1.707 (0.000) ***	-0.508 (0.076)*	-0.253 (0.000)***	-0.074 (0.047)**	-0.192 (0.000)***	-0.087 (0.000)***	0.289 ‖ 0.251
finacial_difficulties	4.208 (0.000) ***	3.952 (0.000) ***	1.435 (0.102)	2.599 (0.001)***	0.435 (0.000)***	0.566 (0.000)***	0.419 (0.000)***	0.415 (0.000)***	0.369 ‖ 0.334
jobtime	-0.425 (0.156)	0.328 (0.344)	-1.815 (0.001) ***	0.096 (0.862)	-0.123 (0.058)*	0.121 (0.072)*	-0.048 (0.216)	0.056 (0.156)	0.084 ‖ 0.067
carer	7.356 (0.000) ***	3.960 (0.008) ***	4.478 (0.029) **	4.578 (0.057)*	0.779 (0.002)***	0.856 (0.004)***	0.867 (0.000)***	0.475 (0.006)***	0.060 ‖ 0.056
MRetwrk	0.763 (0.000) ***	0.808 (0.000) ***	0.723 (0.001) ***	0.855 (0.000)***	0.083 (0.004)***	0.100 (0.000)***	0.079 (0.000)***	0.085 (0.000)***	0.947 ‖ 0.943
MRetwrk_sq	0.140 (0.000) ***	0.112 (0.000) ***	0.151 (0.000) ***	0.116 (0.000)***	0.016 (0.000)***	0.013 (0.001)***	0.014 (0.000)***	0.012 (0.000)***	0.950 ‖ 0.945
mbirthag	-1.075 (0.005) ***	-0.907 (0.005) ***	0.795 (0.167)	0.877 (0.110)	-0.079 (0.294)	-0.012 (0.867)	-0.122 (0.007)***	-0.069 (0.067)*	0.535 ‖ 0.523
W1agedad	-0.182 (0.002) ***	-0.113 (0.024) **	0.126 (0.183)	0.146 (0.067)*	-0.008 (0.537)	-0.001 (0.913)	-0.018 (0.012)**	-0.009 (0.108)	0.478 ‖ 0.476
W1NoldsibHS	2.272 (0.000) ***	1.620 (0.000) ***	1.286 (0.034) **	1.491 (0.004)***	0.267 (0.000)***	0.280 (0.000)***	0.240 (0.000)***	0.172 (0.000)***	0.313 ‖ 0.290
W1NyoungsibHS	0.691 (0.094) *	1.001 (0.008) ***	0.699 (0.265)	1.031 (0.071)*	0.084 (0.277)	0.155 (0.036)**	0.072 (0.129)	0.125 (0.005)***	0.330 ‖ 0.310
broken_family	5.029 (0.000) ***	1.120 (0.000) ***	3.118 (0.077) *	0.566 (0.190)	0.593 (0.005)***	0.201 (0.000)***	0.557 (0.000)***	0.122 (0.000)***	0.208 ‖ 0.195
separation	1.746 (0.001) ***	1.620 (0.000) ***	-0.705 (0.403)	0.681 (0.325)	0.249 (0.012)**	0.242 (0.004)***	0.167 (0.007)***	0.193 (0.000)***	0.252 ‖ 0.252
W1evercarMP0a	15.547 (0.010) **	4.132 (0.093) *	15.217 (0.010) ***	7.122 (0.068)*	1.687 (0.012)**	1.101 (0.022)**	1.100 (0.062)*	0.534 (0.059)*	0.047 ‖ 0.040
Mixed	0.954 (0.639)	1.421 (0.376)	1.082 (0.694)	3.653 (0.163)	-0.335 (0.403)	0.539 (0.091)*	0.244 (0.345)	0.246 (0.184)	0.052 ‖ 0.052
Indian	-7.738 (0.000) ***	-0.694 (0.639)	5.793 (0.039) **	4.184 (0.100)*	-0.942 (0.003)***	0.237 (0.406)	-0.923 (0.000)***	0.048 (0.778)	0.269 ‖ 0.167
Pakistani	-0.415 (0.880)	1.835 (0.225)	4.306 (0.414)	5.471 (0.026)**	0.201 (0.600)	0.612 (0.039)**	-0.016 (0.952)	0.306 (0.082)*	0.187 ‖ 0.119
Bangladeshi	5.511 (0.037) **	2.125 (0.212)	13.881 (0.032) **	4.411 (0.111)	-0.096 (0.892)	0.639 (0.053)*	0.743 (0.016)**	0.332 (0.093)*	0.111 ‖ 0.057
Black_Caribbean	5.010 (0.104)	1.920 (0.304)	13.174 (0.000) ***	4.549 (0.131)	-0.132 (0.823)	0.630 (0.082)*	0.490 (0.199)	0.307 (0.160)	0.062 ‖ 0.050
Black_African	-4.884 (0.118)	0.605 (0.743)	4.691 (0.565)	4.313 (0.162)	-0.714 (0.233)	0.501 (0.155)	-0.664 (0.071)*	0.158 (0.459)	0.177 ‖ 0.136
Other_ethnicity	-0.290 (0.928)	0.760 (0.734)	5.125 (0.206)	7.253 (0.046)**	-0.519 (0.372)	0.535 (0.209)	-0.015 (0.971)	0.232 (0.380)	0.207 ‖ 0.155
english_fluency	1.349 (0.111)	0.548 (0.232)	-4.357 (0.000) ***	0.212 (0.787)	0.277 (0.049)**	0.183 (0.039)**	0.092 (0.376)	0.081 (0.125)	0.373 ‖ 0.191
born_abroad	-5.161 (0.021) **	-0.723 (0.587)	3.779 (0.344)	3.660 (0.099)*	-0.355 (0.362)	0.164 (0.519)	-0.588 (0.020)**	0.014 (0.929)	0.202 ‖ 0.154
religiosity	-0.816 (0.003) ***	-0.411 (0.073) *	0.962 (0.029) **	0.652 (0.092)*	-0.118 (0.016)**	0.005 (0.911)	-0.073 (0.023)**	-0.028 (0.280)	0.247 ‖ 0.174
parental_aspiration	-2.075 (0.000) ***	-0.913 (0.053) *	1.495 (0.047) **	1.490 (0.053)*	-0.297 (0.000)***	0.010 (0.909)	-0.165 (0.003)***	-0.061 (0.260)	0.131 ‖ 0.132
parental_interest	-4.565 (0.000) ***	-2.893 (0.000) ***	-2.947 (0.001) ***	-0.488 (0.535)	-0.491 (0.000)***	-0.224 (0.023)**	-0.483 (0.000)***	-0.261 (0.000)***	0.277 ‖ 0.274
parental_relationships	-2.571 (0.000) ***	-1.528 (0.002) ***	-0.119 (0.900)	0.391 (0.639)	-0.244 (0.029)**	-0.092 (0.346)	-0.268 (0.000)***	-0.130 (0.022)**	0.252 ‖ 0.239
values_selfemployment	-0.202 (0.503)	0.279 (0.332)	-0.728 (0.121)	0.078 (0.866)	-0.032 (0.616)	0.085 (0.146)	0.005 (0.882)	0.042 (0.207)	0.117 ‖ 0.121
values_interest	-1.961 (0.000) ***	-0.368 (0.415)	-2.264 (0.004) ***	0.589 (0.412)	-0.236 (0.010)**	0.090 (0.328)	-0.182 (0.004)***	-0.006 (0.909)	0.083 ‖ 0.088
values_promotion	-0.867 (0.044) **	-0.281 (0.504)	-0.621 (0.364)	0.048 (0.949)	-0.128 (0.118)	0.054 (0.517)	-0.064 (0.198)	-0.003 (0.953)	0.134 ‖ 0.134
values_hours	-0.325 (0.364)	0.071 (0.835)	-0.868 (0.094) *	0.290 (0.593)	-0.060 (0.344)	0.081 (0.217)	-0.060 (0.155)	0.028 (0.471)	0.082 ‖ 0.078
values_schoolwork	-1.825 (0.000) ***	-1.013 (0.011) **	-0.474 (0.470)	0.302 (0.631)	-0.138 (0.066)*	-0.045 (0.540)	-0.183 (0.000)***	-0.077 (0.083)*	0.177 ‖ 0.167
work_ethic	-3.061 (0.000) ***	-2.563 (0.000) ***	-0.151 (0.804)	0.081 (0.879)	-0.419 (0.000)***	-0.237 (0.000)***	-0.293 (0.000)***	-0.238 (0.000)***	0.318 ‖ 0.364
job_aspiration	-2.102 (0.001) ***	-0.395 (0.454)	-1.465 (0.083) *	0.520 (0.525)	-0.233 (0.045)**	0.058 (0.573)	-0.236 (0.001)***	0.001 (0.986)	0.091 ‖ 0.089
inward_confidence	0.063 (0.920)	0.329 (0.558)	-0.262 (0.786)	1.207 (0.186)	-0.076 (0.492)	0.197 (0.084)*	0.021 (0.788)	0.063 (0.332)	0.040 ‖ 0.039
positive_about_ability	1.639 (0.000) ***	1.361 (0.000) ***	-0.570 (0.248)	0.411 (0.322)	0.107 (0.058)*	0.213 (0.000)***	0.181 (0.000)***	0.145 (0.000)***	0.156 ‖ 0.150
positive_about_school	-1.469 (0.000) ***	-1.190 (0.000) ***	-0.610 (0.061) *	-0.035 (0.915)	-0.189 (0.000)***	-0.103 (0.007)***	-0.124 (0.000)***	-0.106 (0.000)***	0.406 ‖ 0.388
positive_about_classes	-1.416 (0.000) ***	-1.117 (0.000) ***	-0.414 (0.300)	0.183 (0.628)	-0.190 (0.000)***	-0.091 (0.030)**	-0.146 (0.000)***	-0.094 (0.000)***	0.433 ‖ 0.422
dislike_schooling	0.693 (0.000) ***	0.714 (0.000) ***	0.252 (0.110)	0.367 (0.014)**	0.095 (0.000)***	0.112 (0.000)***	0.070 (0.000)***	0.075 (0.000)***	0.468 ‖ 0.470
bullied	1.174 (0.000) ***	1.059 (0.000) ***	0.548 (0.253)	0.905 (0.054)*	0.129 (0.016)**	0.207 (0.000)***	0.118 (0.000)***	0.116 (0.001)***	0.149 ‖ 0.144
W1palhomeYP	1.054 (0.006) ***	1.262 (0.001) ***	-0.721 (0.250)	0.344 (0.561)	0.048 (0.561)	0.225 (0.003)***	0.088 (0.040)**	0.144 (0.001)***	0.261 ‖ 0.242
W1paloutYP	1.667 (0.000) ***	1.487 (0.000) ***	-1.153 (0.055) *	-0.479 (0.388)	0.177 (0.017)**	0.198 (0.023)**	0.175 (0.000)***	0.159 (0.000)***	0.379 ‖ 0.366
sport_freq	-1.158 (0.000) ***	-0.441 (0.058) *	-1.092 (0.021) **	-0.142 (0.694)	-0.121 (0.018)**	-0.025 (0.590)	-0.095 (0.003)***	-0.021 (0.434)	0.198 ‖ 0.174
played_sport	-3.394 (0.000) ***	-1.332 (0.073) *	-3.681 (0.014) **	-0.024 (0.983)	-0.516 (0.001)***	0.057 (0.691)	-0.290 (0.006)***	-0.078 (0.356)	0.176 ‖ 0.163
played_instrument	-2.601 (0.001) ***	-2.171 (0.012) **	0.744 (0.602)	1.338 (0.320)	-0.396 (0.011)**	-0.034 (0.837)	-0.207 (0.027)**	-0.154 (0.112)	0.133 ‖ 0.136
community_work	-1.222 (0.497)	0.746 (0.655)	2.101 (0.414)	3.758 (0.174)	-0.062 (0.859)	0.434 (0.196)	0.019 (0.925)	0.189 (0.329)	0.066 ‖ 0.060
youth_group	-1.062 (0.239)	0.495 (0.582)	-1.693 (0.209)	1.407 (0.328)	-0.193 (0.251)	0.220 (0.207)	-0.101 (0.332)	0.115 (0.258)	0.093 ‖ 0.080
entertainment	-3.105 (0.000) ***	-1.483 (0.035) **	-2.092 (0.062) *	0.095 (0.932)	-0.471 (0.001)***	-0.015 (0.910)	-0.279 (0.001)***	-0.096 (0.236)	0.113 ‖ 0.111
gone_out	-1.160 (0.129)	0.326 (0.655)	-3.180 (0.008) ***	-0.337 (0.769)	-0.261 (0.068)*	0.190 (0.186)	-0.087 (0.331)	0.075 (0.368)	0.137 ‖ 0.121
hung_out	2.114 (0.005) ***	2.100 (0.005) ***	-3.273 (0.006) ***	-0.113 (0.924)	0.127 (0.375)	0.352 (0.016)**	0.209 (0.013)**	0.264 (0.002)***	0.201 ‖ 0.176
substance_abuse	1.285 (0.026) **	1.764 (0.001) ***	-1.402 (0.163)	0.115 (0.892)	0.170 (0.153)	0.320 (0.002)***	0.166 (0.020)**	0.217 (0.000)***	0.338 ‖ 0.311
behaviour2	4.101 (0.000) ***	3.420 (0.000) ***	0.963 (0.234)	0.810 (0.297)	0.552 (0.000)***	0.476 (0.000)***	0.436 (0.000)***	0.382 (0.000)***	0.434 ‖ 0.440
suspended	3.696 (0.000) ***	3.116 (0.000) ***	1.549 (0.040) **	1.921 (0.008)***	0.299 (0.001)***	0.488 (0.000)***	0.391 (0.000)***	0.335 (0.000)***	0.231 ‖ 0.256
expel	20.649 (0.000) ***	13.323 (0.002) ***	18.819 (0.000) ***	15.843 (0.015)**	1.737 (0.090)*	2.498 (0.002)***	1.905 (0.020)**	1.484 (0.003)***	0.121 ‖ 0.124
police	3.123 (0.001) ***	3.110 (0.000) ***	1.675 (0.089) *	1.306 (0.161)	0.361 (0.001)***	0.476 (0.000)***	0.356 (0.000)***	0.350 (0.000)***	0.186 ‖ 0.199
ever_abs_3	13.531 (0.000) ***	5.140 (0.021) **	20.454 (0.000) ***	8.003 (0.017)**	2.013 (0.000)***	1.063 (0.013)**	1.233 (0.001)***	0.582 (0.024)**	0.124 ‖ 0.131
abs_1_this_yr	5.255 (0.032) **	5.316 (0.005) ***	5.217 (0.074) *	5.932 (0.043)**	0.518 (0.213)	1.050 (0.005)***	0.693 (0.009)***	0.633 (0.004)***	0.102 ‖ 0.088

Notes: P values in parentheses   *P<0.10,   **P<0.05,   ***P<0.01

5.1.3 Screening of categorical variables to ensure appropriate ordinality

The final set of checks before the multivariate analyses of Section 5.2 was to plot item characteristic curves for each categorical variable against NEET outcomes to establish whether the categorical distinctions within that variable were appropriate. Most variables were found empirically to reflect their theoretical ordinality, however several represented an unnecessarily fine partition into poorly distinguishable categories which would reduce their impact in analyses. These were recoded to combine adjacent categories where this was theoretically appropriate. A summary of the actions taken is given by Table 5.1.3a, whilst Appendix III-L discusses the methodology and each outcome in detail.

Table 5.1.3a – Summary of changes to categorical variables post screening

Variable	Outcomes
Careers_advice	Combine 1/2 (no advice / not at all useful / not very useful advice) 4/5 (very/quite useful advice)
Extra_tuition	Combine 1 /2 (any extra tuition / multiple extra tuition)
Housing_density	Combine 2 / 3 (rural / sparsely populated)
Tenure	Combine 1 / 2 / 3 (rented from a council / rented from a housing association / privately rented) 5/6 (outright ownership / mortgaged).
W1inyrmov	Combine 1 / 2 / 3 (1/2/3 relocations without of summer holidays)
W1vehnoHH	Combine 2 / 3 / 4 / 5 to create a 'two or more vehicles' category
Mobile_phone	Combine 1 / 2 (those whose mobile phone has internet access / those whose mobile phone doesn't)
Reads	Combine 3 / 4 / 5 (less than once per week / hardly ever / never)
Parental_occupation	Combine : 1/2 – process, plant and machine operatives / elementary occupations; 3/4/5 – personal service / sales and technical service / skilled trades; 6/7 – associate professional & technical / administrative & secretarial; 8/9 – managers, senior officials / professionals.
jobtime	Operationalise as three dummies: 0_hrs_work: those who do no part time work, 1-8_hrs_work: those who do 1 to 8hrs of part time work per week,

	9plus_hrs_work: those who do at least 9 hours of work per week
W1NyoungsibHS	Combine 0 / 1 (0 or 1 younger siblings) 2 /3 (2 or 3 younger siblings)
Broken_family	Combine 3 / 4 / 5 (cohabiting couple / lone father / lone mother)
English_fluency	Operationalise as four dummies: englang_YP_and_HH (English is the main or bilingual language of both the young person and the household) englang_YP_not_HH (…of the YP but not the HH) englang_HH_not_YP (…of the HH but not the YP) englang_HH_nor_YP (…of neither)
Religiosity	Combine 0 / 1 (not religious / not at all important 3 / 4 (religion fairly / very important to way of life)
Values_interest	Combine 1 / 2 (A job with interesting work doesn't matter to me / Don't know whether it matters to me)
Values_schoolwork	Combine 1 / 2 / 3 (strongly disagreeing that schoolwork is worth doing / disagreeing that schoolwork is worth doing / not knowing whether schoolwork is worth doing)

5.2 Multivariate results and discussion

This Section analyses the data derived by Chapter 4 and refined in Section 5.1 – descriptions of each variable can be found in Tables 5.1a/b. Three analyses are undertaken: multivariate regression, multivariate regression with 15 variables dropped to increase the sample size, and multivariate regression imputing missing values. Each of these three empirical frameworks has particular limitations, which are discussed below. This section analyses the three models in parallel, thereby maximising the robustness of its conclusions.

The initial multivariate analysis shown in Table 5.2c disregards around one third of the sample due to missing data, which will bias results to the extent that those individuals differ systematically from those with complete responses. Systematic differences are not unlikely since differential response rates by observable characteristics are well documented within this data set (DfE 2011). Such bias cannot be corrected by any recalculation of weights, although that would serve to maximise the external validity of the results.

The bias described above can be minimised by maximising the admissible sample. This could be achieved by dropping those variables with the greatest amount of missing data, thereby arriving at the results shown in Table 5.2d. However such action can induce omitted variables bias as demonstrated by the male coefficients for parental_employment: Tables 5.2c/e suggest that these are attributable to conflation with parental_occupation.

An alternative approach which attempts to mitigate the aforementioned limitations is the imputation of missing values. Rubin (1996) suggests that multiple imputation is the optimal approach for missing data in large publicly administered datasets, however results will remain biased wherever the true values of missing data differ systematically from those of observationally equivalent individuals with complete responses. This is particularly likely where data are missing due to refusals of an individual question, although Table A1 in Appendix II suggests that such situations are relatively infrequent. Furthermore since less than 1% of values were imputed (Table 5.2a overleaf) the potential for bias is small (Royston 2004).

Table 5.2b details the relationships exploited during the imputation process, along with a measure of their predictive power. The latter is particularly low for W1inyrmov and W1evercarMP0a, which suggests that their imputed coefficients should be interpreted with caution.

Table 5.2a – Summary of the Multiple Imputation outcomes

| | Observations per m | | | | |
Variable	Complete	Incomplete	Imputed	Total	% imputed
expel	11,648	1,019	330	12,667	2.6%
ever_abs_3	11,624	1,043	349	12,667	2.8%
W1evercarMP0a	11,659	1,008	971	12,667	7.7%
abs_1_this_yr	11,457	1,210	499	12,667	3.9%
W1inyrmov	12,439	228	142	12,667	1.1%
tenure	12,486	181	137	12,667	1.1%
parental_occupation	12,014	653	621	12,667	4.9%
work_ethic	12,463	204	127	12,667	1.0%
suspended	11,513	1,154	431	12,667	3.4%
police	11,579	1,088	383	12,667	3.0%
W1NyoungsibHS	12,493	174	17	12,667	0.1%
MRetwrk	11,576	1,091	822	12,667	6.5%
Mretwrk_sq	11,576	1,091	822	12,667	6.5%
parent_age	12,501	166	28	12,667	0.2%
parent_age_sq	12,501	166	28	12,667	0.2%
All Obs.	591,833	10,476	5,707	608,016	0.9%

The tobit regression coefficients of tables 5.2c/d represent the ceteris paribus change in latent expected outcome due to a one unit change in the independent variable, where the latent outcome is the hypothetical uncensored distribution of months NEET. This will accurately reflect the expected effects for an individual not constrained by the censoring, but overstate the effects for individuals who are in any case unlikely to become NEET.

The logistic regression coefficients represent the ceteris paribus change in expected log odds ratio due to a one unit change in the independent variable. To evaluate these coefficients average marginal effects m are calculated, which are the (weighted) average difference across individuals in the expected probability of attaining the outcome following a one unit increase of the variable. For a dichotomous variable such as SEN this has the simple interpretation that having SEN raises an individual's probability of becoming NEET by m, whilst for an ordinal variable m would be the average effect on NEET probability of each stepwise category increase.

Table 5.2b – The predictors used in imputing missing data

Variable	predictors	R^2
ever_abs_3	W1chea1HS (0); abs_1_this_yr (0); W1inyrmov (0); expel (0); Bangladeshi (0); hung_out (.001); financial_difficulties (.001); W1NyoungsibHS (.011); W1paloutYP (.021); W1vehnoHH (.023); played_sport (.056);	0.181
abs_1_this_yr	ever_abs_3 (0); W2abs1myMP (0); financial_difficulties (0); police (0); behaviour2 (0); W1chea1HS (0); played_sport (.003); IMDRSCORE (.005); Black_Caribbean (.013); Yorkshire_and_the_Humber (.017); parental_interest (.047); East_Midlands (.06); values_helping (.089);	0.104
tenure	tenure_W2 (0); IDACIRSCORE (0); parent_age (0); Pakistani (0); West_Midlands (0); born_abroad (0); parent_age_sq (0); parental_employment (.001); W1vehnoHH (.001); financial_difficulties (.002); North_West (.002); Bangladeshi (.002); broken_family (.003); Indian (.004); East_Midlands (.006); englang_HH_nor_YP (.02); housing_density (.036); parental_education (.037); _9plus_hrs_work (.04); North_East (.041); behaviour2 (.047); computing_access (.064); W1nurschHS (.072); parental_occupation (.081); englang_YP_not_HH (.088); parental_relationships (.091); values_salary (.094);	0.750
parental_occupation	parental_education (0); financial_difficulties (0); computing_access (0); tenure (0); parental_interest (0); East_Midlands (0); W1vehnoHH (0); MRetwrk (0); Mixed (0); IndSchool (0); Black_African (0); Other_ethnicity (0); played_instrument (0); Black_Caribbean (.001); North_East (.005); Yorkshire_and_the_Humber (.008); positive_about_ability (.011); IMDRSCORE (.013); school_quality (.018); values_helping (.029); positive_about_classes (.03); played_sport (.059); parental_employment (.074);	0.190
work_ethic	work_ethic_W2 (0); school_quality (0); IndSchool (0); parental_interest (0); IMDRSCORE (0); behaviour2 (0); reads (0); North_East (0); East_Midlands (0); W1paloutYP (0); SEN (0); IDACIRSCORE (0); values_hours (0); positive_about_ability (0); South_West (.001); East_of_England (.001); religiosity (.003); Indian (.006); careers_advice (.008); Black_African (.018); computing_access (.021); W1vehnoHH (.024); Other_ethnicity (.03); Bangladeshi (.034); police (.038); values_selfemployment (.038); mobile_phone (.054); Pakistani (.067); parental_employment (.087); entertainment (.087); financial_difficulties (.088);	0.167
W1evercarMP0a	W1NyoungsibHS (0); positive_about_ability (.011); Mixed (.02); parental_aspiration (.026); financial_difficulties (.032); W1vehnoHH (.037); entertainment (.042); tenure (.05); inward_confidence (.093);	0.047
expel	suspended (0); ever_abs_3 (0); W1inyrmov (.002); born_abroad (.006); police (.008); behaviour2 (.009); values_selfemployment (.014); IDACIRSCORE (.023); parental_relationships (.033); carer (.043); values_interest (.058); IMDRSCORE (.06);	0.414
suspended	W2SuspendMP (0); behaviour2 (0); bullied (0); expel (0); police (0); parent_age (0); parental_education (0); Black_Caribbean (0); positive_about_school (0); work_ethic (.001); Black_African (.001); W1NoldsibHS (.003); W1vehnoHH (.003); reads (.005); dislike_schooling (.007); inward_confidence (.01); SEN (.011); _9plus_hrs_work (.03); played_sport (.048); values_promotion (.052); parental_aspiration (.078);	0.253
police	police_W2 (0); behaviour2 (0); suspended (0); W1paloutYP (0); religiosity (0); W1NoldsibHS (.001); entertainment (.001); substance_abuse (.001); school_quality (.002); North_East (.003); financial_difficulties (.005); parental_relationships (.006); Black_Caribbean (.006); parent_age (.007); community_work (.008); _1to8_hrs_work (.013); inward_confidence (.014); abs_1_this_yr (.022); work_ethic (.025); played_sport (.031); values_salary (.047); reads (.048); born_abroad (.067); IndSchool (.071);	0.227
W1inyrmov	born_abroad (0); ever_abs_3 (0); parental_employment (0); South_East (0); South_West (0); bullied (0); East_of_England (0); expel (0); W1NyoungsibHS (0); Black_African (0); IndSchool (0); W1chea1HS (.001); _1to8_hrs_work (.002); parental_education (.002); tenure (.005); parent_age (.009); MRetwrk_sq (.009); Yorkshire_and_the_Humber (.01); housing_density (.015); MRetwrk (.016); carer (.021); East_Midlands (.028); mobile_phone (.031); parent_age_sq (.034); reads (.076); careers_advice (.085);	0.050
W1NyoungsibHS	W2sibs (0); W1NoldsibHS (0); parent_age_sq (0); MRetwrk_sq (0); MRetwrk (0); Indian (0); parental_interest (0); W1inyrmov (.001); englang_YP_not_HH (.005); englang_HH_nor_YP (.009); parental_employment (.016); religiosity (.019); values_selfemployment (.041); W1evercarMP0a (.069); parental_education (.085); South_West (.086);	0.581
W1NoldsibHS	W2sibs (0); W1NyoungsibHS (0); parent_age (0); tenure (0); MRetwrk (0); parental_interest (0); reads (0); MRetwrk_sq (0); Pakistani (0); parental_occupation (0); behaviour2 (0); school_quality (0); North_East (0); Black_Caribbean (0); played_sport (0); parental_aspiration (0); parental_relationships (0); Indian (0); Yorkshire_and_the_Humber (0); parent_age_sq (0); extra_tuition (.001); SEN (.001); W1palhomeYP (.004); suspended (.005); positive_about_ability (.005); values_helping (.006); parental_employment (.007); entertainment (.009); North_West (.013); W1nurschHS (.015); played_instrument (.026); broken_family (.031);	0.256
MRetwrk	parental_employment (0); broken_family (0); W1NoldsibHS (0); Black_Caribbean (0); Pakistani (0); W1NyoungsibHS (0); tenure (0); parental_occupation (0); Black_African (0); parental_interest (0); substance_abuse (0); hung_out (0); _1to8_hrs_work (0); parent_age (0); computing_access (.001); parental_education (.001); parent_age_sq (.002); Yorkshire_and_the_Humber (.003); Bangladeshi (.004); values_schoolwork (.012); South_West (.012); W1nurschHS (.015); mobile_phone (.017); englang_HH_not_YP (.027); englang_YP_not_HH (.028); East_Midlands (.04); values_helping (.058); West_Midlands (.066); North_East (.081); West_Midlands (.066); Indian (.088);	0.233
parent_age	W2agemum (0); W1NoldsibHS (0); Bangladeshi (0); W1NyoungsibHS (0); housing_density (0); Yorkshire_and_the_Humber (0); parental_employment (0); North_West (0); tenure (0); North_East (.001); played_instrument (.001); W1inyrmov (.003); hung_out (.004); religiosity (.005); extra_tuition (.007); reads (.017); broken_family (.019); East_Midlands (.02); financial_difficulties (.029); values_selfemployment (.03); East_of_England (.04); West_Midlands (.042); youth_group (.042); entertainment (.044); sport_freq (.053); suspended (.056); behaviour2 (.087); IndSchool (.088); South_West (.094); W1palhomeYP (.097);	0.910
W1chea1HS	W2disabYP (0); SEN (0); computing_access (0); dislike_schooling (.007); englang_YP_not_HH (.009); positive_about_classes (.013); financial_difficulties (.038); IDACIRSCORE (.04); born_abroad (.048); abs_1_this_yr (.079);	0.825

Notes:	P values in parantheses,
	Pseudo-R2 quoted for logit specifications (Binary variables) and ologit specifications (Categorical variables), R2 quoted for linear regression (Mretwrk & parent_age)

The observed effects are small and usually insignificant for born_abroad, religiosity, values_interest, values_schoolwork and youth_group. School quality is also largely insignificant except for males in Table 5.2d, however that result is probably spurious due to the omitted variables parental_occupation, work_ethic, and police, with which school_quality is closely associated (Table 5.2b). This conclusion is corroborated by the strong counterfactual influence observed by Table 5.1.2b, however it is in contrast to Bradley and Nguyen (2004) who found school quality to be of salient importance. This may be due to their operationalisation of school quality as the school's exam performance, which may be only loosely related to the factor combination of perceptions, classroom behaviour, and teaching standards measured herein.

A similar conflation may account for the observed benefits of reading in Table 5.2d, although consistently negative estimates of occasional significance in Tables 5.2c/e suggest that reading may be marginally beneficial. Similarly weak benefits are observed for careers advice which questions the import placed upon it by D'Arcy and Finch (2016). Nevertheless it is possible that guidance may be more efficacious later in life than at age 14.

A further spurious result is observed for W1inyrmov, which has very little impact on NEET outcomes, except for a theoretically improbable beneficial effect for males in two imputed specifications. The counterfactual results of Table 5.1.2b reveal that those results are driven by multicollinearity.

Housing density is insignificant in most specifications, however specification (6) reveals a consistent negative effect on the likelihood of becoming long-term NEET for both genders. It is possible that this may reflect the urban focus of government deprivation initiatives during the period under analysis (Crowley et al. 2012).

Increasing the number of vehicles in a household has a positive effect of moderate significance and magnitude on employment outcomes in many specifications across genders. This may be a direct opportunity effect relating to the increased availability of transport, or an indirect effect with the number of household vehicles acting as an indicator of social advantage. A similar composite effect may operate for mobile phone and home computing access, each of which provide frequently significant benefits with expected magnitude of 2-4 months NEET or a 2-5% increase in fixed-term NEET probability.

Providing care for others has a reasonably large and sometimes significant detrimental impact, particularly for males, whereas extra tuition has a surprising detrimental impact for

females. The latter is often both small and insignificant, but significant and very large in some specifications. This is particularly surprising since any conflating effect of academic attainment would produce the opposite sign, which suggests again that the omission of attainment data may lead to minimal specification error in age 14 measurements.

The regional dummies provide a comparison with the omitted category of London, which emerges as having significantly poorer employment outcomes for females than many other parts of the country. This is consistent with the regional youth inactivity rates at the time (ONS 2008b). The male coefficients show conspicuously different effects; these mimic the regional unemployment rates in ONS 2008b. This suggests that the concept of NEET may differ fundamentally between genders.

This difference is reflected in the effects of parental employment and parental occupations. The former has large and significant effects for females, whereas the latter has these for males. A possible explanation for this difference could be that parental attitudes to employment may influence females' participation decisions, whilst higher level connections to and understanding of the world of work may affect males in their attempts to gain employment.

Another interesting gender difference can be observed in the effects of part-time work. This initially reduces NEET incidence in both males and females, however females working for over 8 hours per week lose those benefits whereas males benefit a fortiori. A possible mechanism for this effect is provided by the work of Holford (2015) who finds that part-time work tends to crowd out academic study in females but active recreation in males.

Ethnic effects are also differentiated by gender: male coefficients are only sporadically significant, whereas 'white' females consistently experience substantially and significantly poorer employment outcomes than their peers. Finding white disadvantage is unusual (Heath et al. 2008) but not unprecedented since Gregg and Tominey (2004) observe similar outcomes for salaries.

Related to ethnicity is an individual's grounding in the English language. Unexpectedly those individuals with minimal familiarity with the English language have a pervasive employment advantage (although the large female coefficients of englang_HH_not_YP in Table 5.2c are unreliable since they were based on at most 13 individuals). It may be that those individuals are better connected with employment opportunities in their local ethnic community, particularly since the LSYPE oversampled schools with large ethnic populations. The

imprecise estimates observed here could reflect the conflicting influence of an English communication barrier against this postulated community support.

The support of married parents is often associated with advantage of modest size and significance when compared with cohabiting, single, or parentless households. These effects are probably not transmitted through a lack of resources, since they are observed whilst controlling for factors such as W1vehnoHH. Re-run analyses including the financial difficulties variable also showed no change. This refutes the suggestion of Sparkes and Glennerster (2002) that single-parenthood might affect employment outcomes primarily through financial hardship.

The broken_family effects are also independent of parental interest and aspiration, which themselves convincingly reduce NEET outcomes. However the former seems to operate through increasing HE take-up since its coefficients in specification (5) are often positive. This is unsurprising since the variables which constitute parental_aspiration focus on attitudes to education.

An extreme case of familial disadvantage is having been in care. The detrimental effects of this are substantial: possibly worth in excess of 10 months' NEET or a 12% greater risk of becoming long-term NEET. The estimations are nevertheless imprecise which suggests that some individuals have positive care experiences, and as above these effects seem to act predominantly on HE participation.

The coefficients on MRetwrk and MRetwrk_sq match the priors from the literature well, with all sixteen coefficient pairs indicating that the employment prospects of a child are optimal where a mother returns to work when they are aged 2-3. These variables are highly statistically significant throughout Table 5.2c, but markedly less so in the imputed estimations. This may arise from a limitation in the approach used to impute passive variables in Stata 14.1 (Vink and van Buuren 2013), or it may reflect a systematic difference in the additional responses made available by the imputation of other variables. Table 5.2f suggests that either of these explanations may be plausible since both types of additional observation are present in the case of MRetwrk.

Theoretical priors are also supported by the parent age coefficients which show improving outcomes with diminishing returns to age. The effects are significant mainly in the imputed specifications, which nevertheless represent predominantly observed responses (Table 5.2f). Those specifications consistently indicate that optimal childbirth age for either gender is

around the late twenties, which is earlier than might be considered optimal from the parents' point of view (Gustafsson 2001).

Table 5.2f – The relative prevalence of additional responses and imputed values used by the estimations of Table 5.2e for selected variables

		Observations used in estimating			
Variable	Extra Obs. Type	months NEET count	months NEET2 _exclHE	13months NEET	3months NEET count
W1evercarMP0a	response	1,237	439	793	1,223
	imputed	256	66	177	253
W1inyrmov	response	1,375	469	870	1,359
	imputed	118	36	100	117
parent_age	response	1,487	504	968	1,470
	imputed	6	1	2	6
MRetwrk	response	924	295	608	913
	imputed	569	210	362	563

The effects of parent age were observed holding the number of younger siblings constant. Increasing the latter has a universally significant negative effect on female employment outcomes, whereby those with 4+ younger siblings can expect to experience around 5 more months NEET than those with none. However the effect on males is much more moderate, which suggests the transmission mechanism that female fertility decisions may be influenced by those of their mother (Lyngstad and Prskawetz 2010). This mechanism aught not regard the relative ages of siblings and so regressions were rerun including W1NoldsibHS both instead of and as well as W1NyoungsibHS. Those results showed that females are almost unaffected by having older siblings, whereas males may experience significant negative effects. This suggests that more complex mechanisms are involved.

Fertility decisions may well explain the significant benefits for females who are positive about school, since Table 5.2g shows that liking school significantly affects fertility even when HE attendance is controlled for. Given that 'positive_about_school' is scored between 2 and 10 its marginal effects are comparable to those of HE attendance, which is generally considered to be a key determinant of fertility (McCrary and Royer 2011). These findings suggest that the HE-fertility effect may be overstated in the literature due to the confounding influence of traits such as liking school.

Table 5.2g – Logistic regression and average marginal effects of teenage motherhood on HE attendance and positivity about school

svy: logit: depvar: W7OwnChi2

		Number of obs =	12307
		No. Subpop obs =	4194

	Coef.	Std. Err.	t	P>|t|
HE_binary	-2.0908	0.2006	-10.42	0.000
positive_about_school	-0.2529	0.0340	-7.43	0.000

	dy/dx	Std. Err.	t	P>|t|
HE_binary	-0.1339	0.0144	-9.29	0.000
positive_about_school	-0.0162	0.0022	-7.44	0.000

Liking school has no effect for males, who instead may benefit from job_aspiration, whilst work ethic exerts a consistent positive effect on the employment prospects of both genders. These observations suggest that the government's initiative to engage the children of troubled families with schooling (DCLG 2012) could improve their future employment prospects.

There is reasonable evidence that increased sports participation may also be modestly beneficial for both genders, with active leisure such as seeing entertainment or going out with friends also having sporadically significant positive effects of modest magnitude. This suggests that the policy of HM Government (2016) to increase sports participation in response to childhood obesity may yield wider benefits.

Antisocial behaviour, police contact, and suspension each have a strong negative effect on employment outcomes across both genders and most specifications. By contrast there is no evidence for any detrimental effects of expulsion, indeed positive effects are found for females though these are unreliable as they represent only 10 observations. Nevertheless these findings support the suggestion made in Appendix III-m that expulsion decisions may well be motivated by factors other than antisocial behaviour.

One such factor may be school attendance, where interestingly no statistically significant effects are found for those who miss 1-2 months of school, although the effects missing 3 months of school are large and often statistically significant for both genders. This suggests that alternative use of pre-year-9 curriculum time, for example in encouraging sports participation and developing positive attitudes to work and schooling, may yield long term benefits for pupils.

Table 5.2c – Multivariate regression results: all selected results

	Females							Males					
	(2) monthsNEET count (tobit)	(5) monthsNEET2_exclHE (tobit)	(6) 13monthsNEET (logit)	(6m) Average marginal effects of (6)	(9) 3monthsNEET count (logit)	(9m) Average marginal effects of (9)		(2) monthsNEET count (tobit)	(5) monthsNEET2_exclHE (tobit)	(6) 13monthsNEET (logit)	(6m) Average marginal effects of (6)	(9) 3monthsNEET count (logit)	(9m) Average marginal effects of (9)
Number of obs:	4200	1446	3249		4177		Number of obs:	4206	1518	3090		4170	
pseudo-R2:	0.047	0.043	0.174		0.107		pseudo-R2:	0.040	0.039	0.126		0.088	
school_quality	0.168 (0.737)	1.331 (0.109)	0.216** (0.030)	0.016** (0.033)	-0.025 (0.677)	-0.004 (0.677)	school_quality	-0.788* (0.070)	0.350 (0.591)	-0.093 (0.289)	-0.009 (0.289)	-0.044 (0.431)	-0.008 (0.431)
careers_advice	-0.355 (0.447)	-0.687 (0.364)	-0.106 (0.270)	-0.008 (0.272)	-0.010 (0.841)	-0.002 (0.841)	careers_advice	-0.182 (0.653)	-1.047* (0.086)	-0.024 (0.748)	-0.002 (0.749)	-0.017 (0.739)	-0.003 (0.739)
extra_tuition	0.713 (0.625)	5.418** (0.032)	0.435 (0.102)	0.031 (0.105)	0.038 (0.836)	0.006 (0.836)	extra_tuition	-1.585 (0.210)	2.112 (0.303)	-0.066 (0.806)	-0.006 (0.806)	-0.152 (0.332)	-0.026 (0.331)
North_East	-6.435*** (0.003)	-6.583* (0.062)	-0.706* (0.070)	-0.051* (0.073)	-0.597*** (0.013)	-0.094** (0.013)	North_East	1.224 (0.487)	3.372 (0.218)	0.323 (0.388)	0.030 (0.387)	0.243 (0.308)	0.042 (0.309)
North_West	-4.358*** (0.005)	-4.893* (0.061)	-0.334 (0.270)	-0.024 (0.273)	-0.428** (0.012)	-0.067** (0.012)	North_West	2.409** (0.055)	5.652*** (0.004)	0.648** (0.027)	0.059** (0.025)	0.226 (0.146)	0.039 (0.146)
Yorkshire_and_the_Humber	-3.453** (0.033)	-3.320 (0.201)	-0.264 (0.416)	-0.019 (0.418)	-0.353* (0.064)	-0.055* (0.063)	Yorkshire_and_the_Humber	1.922 (0.220)	6.267*** (0.010)	0.722** (0.028)	0.066** (0.027)	0.128 (0.515)	0.022 (0.515)
East_Midlands	-2.639 (0.109)	-5.535** (0.046)	-0.432 (0.195)	-0.031 (0.200)	-0.247 (0.184)	-0.039 (0.185)	East_Midlands	2.131 (0.137)	3.634 (0.101)	0.631** (0.047)	0.058** (0.045)	0.162 (0.364)	0.028 (0.363)
West_Midlands	-3.398** (0.046)	-4.704* (0.063)	-0.077 (0.798)	-0.006 (0.798)	-0.231 (0.234)	-0.036 (0.233)	West_Midlands	2.429* (0.074)	3.264 (0.142)	0.693** (0.032)	0.064** (0.032)	0.307* (0.063)	0.053* (0.062)
East_of_England	-2.658 (0.117)	-2.957 (0.263)	0.003 (0.991)	0.000 (0.991)	-0.282 (0.142)	-0.044 (0.142)	East_of_England	-0.324 (0.837)	2.087 (0.333)	0.474 (0.162)	0.043 (0.160)	-0.059 (0.761)	-0.010 (0.761)
South_East	-2.386* (0.096)	-5.462** (0.026)	-0.252 (0.408)	-0.018 (0.410)	-0.248 (0.138)	-0.039 (0.138)	South_East	1.029 (0.451)	2.440 (0.237)	0.376 (0.231)	0.034 (0.229)	0.182 (0.302)	0.031 (0.303)
South_West	-4.288** (0.023)	-5.146* (0.072)	-0.723* (0.068)	-0.052* (0.068)	-0.371* (0.080)	-0.058* (0.079)	South_West	0.414 (0.796)	0.333 (0.881)	0.275 (0.441)	0.025 (0.439)	0.104 (0.620)	0.018 (0.621)
housing_density	-0.690 (0.492)	-0.427 (0.791)	-0.352* (0.079)	-0.025* (0.082)	0.030 (0.788)	0.005 (0.788)	housing_density	-1.130 (0.200)	-1.537 (0.205)	-0.478*** (0.010)	-0.044** (0.010)	-0.102 (0.359)	-0.018 (0.359)
tenure	-1.456*** (0.006)	-1.509* (0.077)	-0.191* (0.069)	-0.014* (0.069)	-0.152*** (0.009)	-0.024*** (0.009)	tenure	-1.206*** (0.007)	-0.852 (0.185)	-0.146 (0.119)	-0.013 (0.120)	-0.115** (0.032)	-0.020** (0.031)
W1inyrmov	-0.055 (0.950)	0.253 (0.869)	-0.087 (0.647)	-0.006 (0.647)	0.071 (0.479)	0.011 (0.479)	W1inyrmov	0.208 (0.773)	-1.163 (0.311)	-0.257 (0.135)	-0.024 (0.133)	-0.026 (0.786)	-0.004 (0.786)
W1vehnoHH	-0.566 (0.402)	-0.807 (0.444)	-0.234 (0.066)	-0.017* (0.068)	-0.053 (0.486)	-0.008 (0.486)	W1vehnoHH	-0.426 (0.446)	-2.183** (0.011)	-0.226** (0.036)	-0.021** (0.036)	0.015 (0.826)	0.003 (0.826)
mobile_phone	-2.001 (0.109)	-3.567* (0.083)	-0.106 (0.665)	-0.008 (0.664)	-0.270* (0.057)	-0.042* (0.057)	mobile_phone	-2.999*** (0.001)	-4.236*** (0.001)	-0.248 (0.181)	-0.023 (0.179)	-0.393*** (0.001)	-0.068*** (0.000)
reads	-0.640 (0.173)	0.102 (0.898)	-0.071 (0.407)	-0.005 (0.408)	-0.042 (0.432)	-0.007 (0.433)	reads	-0.230 (0.535)	0.665 (0.222)	-0.057 (0.437)	-0.005 (0.439)	-0.019 (0.677)	-0.003 (0.677)
computing_access	-2.367*** (0.000)	-3.183*** (0.003)	-0.339*** (0.003)	-0.024*** (0.003)	-0.167** (0.017)	-0.026** (0.017)	computing_access	-1.190** (0.033)	1.095 (0.173)	-0.044 (0.708)	-0.004 (0.708)	-0.176*** (0.009)	-0.030*** (0.009)
parental_occupation	-0.986** (0.017)	0.504 (0.451)	-0.067 (0.370)	-0.005 (0.370)	-0.107** (0.025)	-0.017** (0.024)	parental_occupation	-1.086*** (0.001)	0.078 (0.873)	-0.112* (0.079)	-0.010* (0.078)	-0.132*** (0.002)	-0.023*** (0.002)
parental_employment	-0.406 (0.149)	-1.381*** (0.004)	-0.137** (0.009)	-0.010*** (0.009)	-0.015 (0.626)	-0.002 (0.627)	parental_employment	-0.028 (0.904)	-0.066 (0.841)	-0.016 (0.739)	-0.001 (0.739)	0.000 (0.995)	0.000 (0.995)
_1to8_hrs_work	-2.248** (0.023)	-2.767* (0.060)	-0.017 (0.923)	-0.001 (0.923)	-0.378*** (0.001)	-0.059*** (0.000)	_1to8_hrs_work	-1.806** (0.016)	-3.069*** (0.006)	-0.220 (0.154)	-0.020 (0.153)	-0.243** (0.016)	-0.042** (0.017)
_9plus_hrs_work	1.433 (0.595)	-1.219 (0.797)	0.052 (0.933)	0.004 (0.933)	0.122 (0.694)	0.019 (0.694)	_9plus_hrs_work	-1.599 (0.377)	-6.452** (0.037)	-0.793* (0.078)	-0.073* (0.078)	-0.207 (0.418)	-0.036 (0.418)
carer	1.494 (0.355)	1.714 (0.445)	0.322 (0.205)	0.023 (0.205)	0.050 (0.758)	0.008 (0.758)	carer	2.095 (0.127)	1.172 (0.537)	0.132 (0.628)	0.012 (0.627)	0.386** (0.028)	0.066** (0.028)
MRetwrk	-1.147** (0.036)	-1.606* (0.072)	-0.272** (0.013)	-0.020** (0.014)	-0.110* (0.077)	-0.017* (0.077)	MRetwrk	-1.560*** (0.001)	-2.080*** (0.004)	-0.213** (0.024)	-0.020** (0.024)	-0.150*** (0.008)	-0.026*** (0.008)
MRetwrk_sq	0.195** (0.025)	0.270* (0.066)	0.040** (0.018)	0.003** (0.018)	0.020** (0.040)	0.003** (0.040)	MRetwrk_sq	0.291*** (0.000)	0.371*** (0.001)	0.035** (0.022)	0.003** (0.021)	0.029*** (0.001)	0.005*** (0.001)
parent_age	-0.403 (0.507)	-0.404 (0.716)	-0.068 (0.536)	-0.005 (0.535)	-0.065 (0.357)	-0.010 (0.357)	parent_age	-0.509* (0.056)	-1.010** (0.010)	-0.059 (0.257)	-0.005 (0.258)	-0.038 (0.280)	-0.006 (0.280)
parent_age_sq	0.006 (0.559)	0.010 (0.580)	0.001 (0.565)	0.000 (0.564)	0.001 (0.437)	0.000 (0.438)	parent_age_sq	0.004** (0.033)	0.009*** (0.002)	0.001 (0.104)	0.000 (0.106)	0.000 (0.225)	0.000 (0.224)
W1NyoungsibHS	1.666* (0.052)	2.685** (0.043)	0.326** (0.017)	0.023** (0.018)	0.068 (0.486)	0.011 (0.486)	W1NyoungsibHS	-0.301 (0.691)	1.631 (0.153)	0.167 (0.256)	0.015 (0.258)	-0.071 (0.450)	-0.012 (0.449)
broken_family	1.481* (0.091)	-0.990 (0.489)	-0.167 (0.376)	-0.012 (0.378)	0.260** (0.011)	0.041** (0.011)	broken_family	1.164 (0.161)	2.548** (0.032)	0.220 (0.191)	0.020 (0.192)	0.148 (0.157)	0.026 (0.155)
W1evercarMP0a	1.665 (0.785)	-11.453 (0.166)	0.505 (0.543)	0.036 (0.542)	-0.080 (0.899)	-0.013 (0.899)	W1evercarMP0a	11.346*** (0.000)	5.972 (0.140)	1.339*** (0.006)	0.123** (0.006)	0.955** (0.011)	0.165** (0.011)
Mixed	0.220 (0.916)	-1.480 (0.612)	-0.203 (0.564)	-0.015 (0.564)	0.127 (0.629)	0.020 (0.629)	Mixed	0.283 (0.867)	0.809 (0.714)	-0.627* (0.092)	-0.058* (0.093)	0.119 (0.584)	0.021 (0.584)
Indian	-5.697* (0.042)	-1.733 (0.565)	-0.828 (0.259)	-0.059 (0.260)	-0.663*** (0.008)	-0.104*** (0.008)	Indian	-1.892 (0.396)	6.170 (0.245)	0.294 (0.525)	0.027 (0.527)	-0.514** (0.037)	-0.089** (0.036)
Pakistani	-4.720* (0.063)	-8.052 (0.177)	-0.350 (0.510)	-0.025 (0.511)	-0.421 (0.139)	-0.066 (0.140)	Pakistani	-2.815 (0.178)	-4.975 (0.268)	-0.093 (0.823)	-0.009 (0.823)	-0.661** (0.013)	-0.114** (0.013)
Bangladeshi	-8.877** (0.015)	-14.704** (0.042)	-1.309* (0.063)	-0.094* (0.067)	-0.772** (0.049)	-0.121* (0.050)	Bangladeshi	0.986 (0.754)	2.224 (0.763)	-0.048 (0.945)	-0.004 (0.945)	-0.166 (0.690)	-0.029 (0.690)
Black_Caribbean	-8.527*** (0.000)	-2.892 (0.490)	-0.683 (0.109)	-0.049 (0.110)	-0.897*** (0.000)	-0.141*** (0.000)	Black_Caribbean	1.338 (0.501)	6.685** (0.040)	-0.536 (0.249)	-0.049 (0.253)	0.218 (0.405)	0.038 (0.405)
Black_African	-12.315*** (0.000)	-11.466** (0.028)	-2.528*** (0.003)	-0.182*** (0.003)	-1.194*** (0.000)	-0.187*** (0.000)	Black_African	-0.544 (0.802)	6.887 (0.132)	0.057 (0.905)	0.005 (0.905)	-0.009 (0.977)	-0.001 (0.977)
Other_ethnicity	-12.582*** (0.000)	0.297 (0.964)	-1.742*** (0.004)	-0.125*** (0.005)	-1.252*** (0.001)	-0.196*** (0.001)	Other_ethnicity	2.848 (0.337)	3.947 (0.300)	0.330 (0.522)	0.030 (0.523)	0.241 (0.535)	0.042 (0.534)
englang_YP_not_HH	0.804 (0.771)	11.577** (0.041)	-0.291 (0.659)	-0.021 (0.659)	0.132 (0.643)	0.021 (0.643)	englang_YP_not_HH	-0.778 (0.763)	5.129 (0.240)	-0.594 (0.125)	-0.054 (0.130)	0.087 (0.793)	0.015 (0.793)
englang_HH_not_YP	-101.321*** (0.000)	-113.154*** (0.000)	perfect prediction	perfect prediction	perfect prediction	perfect prediction	englang_HH_not_YP	-4.525 (0.403)	-15.703 (0.126)	-0.129 (0.871)	-0.012 (0.871)	-0.440 (0.532)	-0.076 (0.532)
englang_HH_nor_YP	-5.095* (0.072)	-6.819 (0.244)	-2.653** (0.010)	-0.191** (0.011)	-0.476 (0.148)	-0.075 (0.148)	englang_HH_nor_YP	-7.585*** (0.005)	-4.007 (0.320)	-1.246** (0.014)	-0.114** (0.015)	-0.467 (0.201)	-0.081 (0.201)
born_abroad	1.800 (0.355)	2.765 (0.459)	0.606* (0.076)	0.044* (0.075)	0.256 (0.262)	0.040 (0.265)	born_abroad	-2.609 (0.189)	3.254 (0.236)	0.301 (0.338)	0.028 (0.336)	-0.501** (0.038)	-0.086** (0.038)
religiosity	-0.030 (0.949)	0.138 (0.853)	-0.106 (0.218)	-0.008 (0.216)	0.041 (0.472)	0.006 (0.472)	religiosity	-0.405 (0.333)	0.445 (0.485)	-0.129 (0.129)	-0.012 (0.131)	-0.020 (0.714)	-0.003 (0.714)
parental_aspiration	-0.912* (0.054)	0.653 (0.391)	-0.093 (0.319)	-0.007 (0.319)	-0.113** (0.043)	-0.018** (0.041)	parental_aspiration	-0.888** (0.027)	0.435 (0.477)	-0.216*** (0.005)	-0.020*** (0.005)	-0.021 (0.696)	-0.004 (0.696)
parental_interest	-0.758 (0.196)	0.359 (0.708)	-0.121 (0.261)	-0.009 (0.262)	-0.070 (0.308)	-0.011 (0.309)	parental_interest	-0.954* (0.065)	-0.638 (0.401)	-0.033 (0.744)	-0.003 (0.744)	-0.135** (0.040)	-0.023** (0.039)
values_interest	-0.787 (0.208)	-0.500 (0.584)	-0.102 (0.346)	-0.007 (0.345)	-0.090 (0.186)	-0.014 (0.185)	values_interest	-1.077** (0.055)	-1.284 (0.107)	-0.162 (0.130)	-0.015 (0.131)	-0.099 (0.175)	-0.017 (0.176)
values_schoolwork	-0.015 (0.981)	2.055** (0.042)	0.092 (0.452)	0.007 (0.450)	0.034 (0.650)	0.005 (0.649)	values_schoolwork	-0.650 (0.222)	-1.130 (0.139)	-0.059 (0.576)	-0.005 (0.576)	-0.081 (0.229)	-0.014 (0.230)
work_ethic	-1.378*** (0.001)	-1.072 (0.114)	-0.253*** (0.001)	-0.018*** (0.001)	-0.136*** (0.005)	-0.021*** (0.005)	work_ethic	-1.092*** (0.000)	-0.206 (0.677)	-0.193*** (0.003)	-0.018*** (0.003)	-0.113*** (0.003)	-0.020*** (0.003)
job_aspiration	0.045 (0.941)	-0.396 (0.673)	-0.037 (0.736)	-0.003 (0.736)	0.029 (0.651)	0.005 (0.651)	job_aspiration	-1.392*** (0.003)	-0.355 (0.617)	-0.068 (0.496)	-0.006 (0.497)	-0.200*** (0.001)	-0.035*** (0.001)
positive_about_school	-1.096*** (0.000)	-1.108*** (0.003)	-0.175*** (0.000)	-0.013*** (0.000)	-0.109*** (0.000)	-0.017*** (0.000)	positive_about_school	-0.114 (0.595)	-0.290 (0.354)	-0.062 (0.110)	-0.006 (0.109)	0.001 (0.974)	0.000 (0.974)
sport_freq	-0.932 (0.280)	-1.096 (0.389)	-0.244* (0.098)	-0.018* (0.098)	-0.108 (0.260)	-0.017 (0.260)	sport_freq	-1.436 (0.151)	-1.333 (0.397)	-0.154 (0.423)	-0.014 (0.425)	-0.166 (0.168)	-0.029 (0.168)
played_sport	-0.745 (0.351)	-0.169 (0.888)	-0.013 (0.931)	-0.001 (0.931)	-0.032 (0.725)	-0.005 (0.725)	played_sport	-1.414* (0.069)	-1.752 (0.140)	-0.219 (0.147)	-0.020 (0.144)	-0.093 (0.328)	-0.016 (0.328)
youth_group	-1.495 (0.115)	-1.009 (0.497)	-0.285 (0.109)	-0.020 (0.114)	-0.099 (0.349)	-0.015 (0.350)	youth_group	-0.241 (0.743)	-0.215 (0.838)	-0.060 (0.698)	-0.006 (0.698)	-0.029 (0.753)	-0.005 (0.752)
entertainment	-1.893** (0.014)	0.035 (0.977)	-0.051 (0.731)	-0.004 (0.730)	-0.261*** (0.004)	-0.041*** (0.003)	entertainment	-1.289** (0.036)	-0.334 (0.710)	-0.118 (0.310)	-0.011 (0.309)	-0.120 (0.125)	-0.021 (0.124)
gone_out	-1.583** (0.044)	-1.702 (0.178)	-0.054 (0.714)	-0.004 (0.715)	-0.114 (0.185)	-0.018 (0.185)	gone_out	-0.192 (0.760)	-1.671* (0.073)	-0.226* (0.080)	-0.021* (0.082)	-0.031 (0.703)	-0.005 (0.703)
behaviour2	2.243*** (0.000)	2.453*** (0.007)	0.136 (0.207)	0.010 (0.207)	0.268*** (0.000)	0.042*** (0.000)	behaviour2	1.461*** (0.002)	0.851 (0.215)	0.361*** (0.000)	0.033*** (0.000)	0.168*** (0.004)	0.029*** (0.004)
suspended	1.886*** (0.008)	2.207** (0.033)	0.371*** (0.004)	0.027*** (0.004)	0.249*** (0.002)	0.039*** (0.002)	suspended	0.933** (0.026)	0.939 (0.118)	0.084 (0.298)	0.008 (0.299)	0.139*** (0.008)	0.024*** (0.008)
expel	-9.736 (0.337)	-138.700*** (0.000)	perfect prediction	perfect prediction	-0.736 (0.463)	-0.115 (0.462)	expel	0.173 (0.969)	-1.242 (0.847)	0.049 (0.957)	0.004 (0.957)	-0.295 (0.624)	-0.051 (0.624)
police	1.807 (0.178)	2.087 (0.327)	0.031 (0.916)	0.002 (0.916)	0.314** (0.042)	0.049** (0.041)	police	1.277 (0.127)	1.230 (0.339)	0.159 (0.349)	0.015 (0.348)	0.217** (0.046)	0.037** (0.046)
ever_abs_3	6.521* (0.072)	16.356*** (0.000)	1.330*** (0.008)	0.096*** (0.008)	0.383 (0.312)	0.060 (0.311)	ever_abs_3	4.537* (0.090)	10.119** (0.010)	0.981 (0.104)	0.090 (0.104)	0.391 (0.257)	0.067 (0.257)
abs_1_this_yr	0.819 (0.718)	-2.261 (0.540)	-0.691 (0.106)	-0.050 (0.107)	-0.091 (0.726)	-0.014 (0.726)	abs_1_this_yr	-0.708 (0.710)	0.004 (0.999)	-0.540 (0.213)	-0.050 (0.215)	0.129 (0.576)	0.022 (0.576)

Notes: P values in parentheses   *P<0.10, **P<0.05, ***P<0.01

Table 5.2d – Multivariate regression results: larger sample by dropping 15 regressors

	Females							Males					
	(2)	(5)	(6)	(6m)	(9)	(9m)		(2)	(5)	(6)	(6m)	(9)	(9m)
	monthsNEET count (tobit)	monthsNEET2 _exclHE (tobit)	13monthsNEET (probit)	Average marginal effects of (6)	3monthsNEET count (probit)	Average marginal effects of (9)		monthsNEET count (tobit)	monthsNEET2 _exclHE (tobit)	13monthsNEET (probit)	Average marginal effects of (6)	3monthsNEET count (probit)	Average marginal effects of (9)
Number of obs:	5359	1893	3787		5300		Number of obs:	5359	1893	3787		5300	
pseudo-R2:	0.046	0.042	0.170		0.104		pseudo-R2:	0.037	0.033	0.122		0.088	
school_quality	-0.268 (0.566)	1.039 (0.184)	0.074 (0.387)	0.006 (0.389)	-0.058 (0.263)	-0.010 (0.262)	school_quality	-1.499*** (0.001)	0.020 (0.976)	-0.160** (0.038)	-0.017** (0.038)	-0.112** (0.024)	-0.021** (0.024)
careers_advice	-0.128 (0.770)	-1.181 (0.105)	-0.059 (0.469)	-0.005 (0.470)	0.000 (0.996)	0.000 (0.996)	careers_advice	-0.549 (0.158)	-1.224** (0.028)	-0.051 (0.441)	-0.005 (0.442)	-0.063 (0.173)	-0.012 (0.173)
extra_tuition	0.637 (0.650)	4.241* (0.082)	0.353 (0.111)	0.030 (0.113)	-0.042 (0.787)	-0.007 (0.787)	extra_tuition	-3.073*** (0.005)	-0.223 (0.900)	-0.124 (0.592)	-0.013 (0.592)	-0.276** (0.038)	-0.051** (0.037)
North_East	-4.844*** (0.005)	-5.165* (0.091)	-0.493* (0.054)	-0.042* (0.058)	-0.502*** (0.005)	-0.084*** (0.005)	North_East	1.352 (0.456)	0.897 (0.766)	0.087 (0.780)	0.009 (0.780)	0.282 (0.181)	0.052 (0.181)
North_West	-4.373*** (0.001)	-6.932*** (0.003)	-0.546** (0.027)	-0.046** (0.028)	-0.428*** (0.004)	-0.072*** (0.004)	North_West	1.525 (0.274)	1.925 (0.428)	0.167 (0.523)	0.018 (0.521)	0.273* (0.076)	0.050* (0.075)
Yorkshire_and_the_Humber	-3.019** (0.043)	-4.654** (0.047)	-0.390 (0.115)	-0.033 (0.117)	-0.359** (0.023)	-0.060** (0.023)	Yorkshire_and_the_Humber	0.107 (0.945)	-0.048 (0.985)	0.140 (0.619)	0.015 (0.618)	0.073 (0.664)	0.013 (0.664)
East_Midlands	-3.331** (0.031)	-7.448*** (0.003)	-0.540** (0.043)	-0.046** (0.045)	-0.330** (0.040)	-0.055** (0.041)	East_Midlands	0.840 (0.595)	-1.624 (0.530)	0.068 (0.822)	0.007 (0.822)	0.156 (0.373)	0.029 (0.373)
West_Midlands	-2.696* (0.066)	-5.112** (0.022)	-0.197 (0.399)	-0.017 (0.402)	-0.229 (0.158)	-0.038 (0.158)	West_Midlands	1.282 (0.370)	-1.595 (0.535)	0.188 (0.505)	0.020 (0.505)	0.247 (0.115)	0.045 (0.114)
East_of_England	-4.472*** (0.004)	-7.987*** (0.001)	-0.524** (0.040)	-0.045** (0.042)	-0.435*** (0.008)	-0.073*** (0.009)	East_of_England	-0.870 (0.580)	-2.239 (0.367)	-0.093 (0.743)	-0.010 (0.744)	-0.051 (0.770)	-0.009 (0.770)
South_East	-3.408** (0.013)	-7.216*** (0.001)	-0.598** (0.017)	-0.051** (0.017)	-0.347** (0.018)	-0.058** (0.018)	South_East	-0.511 (0.722)	-1.648 (0.508)	-0.044 (0.874)	-0.005 (0.874)	0.109 (0.513)	0.020 (0.513)
South_West	-4.030** (0.019)	-7.175*** (0.005)	-0.785** (0.016)	-0.067** (0.016)	-0.421** (0.023)	-0.071** (0.023)	South_West	0.279 (0.864)	-0.878 (0.734)	-0.058 (0.853)	-0.006 (0.853)	0.147 (0.423)	0.027 (0.424)
housing_density	-0.637 (0.497)	-0.361 (0.812)	-0.349** (0.037)	-0.030** (0.039)	0.008 (0.937)	0.001 (0.937)	housing_density	-0.754 (0.356)	-0.544 (0.621)	-0.298* (0.059)	-0.031* (0.059)	-0.066 (0.486)	-0.012 (0.486)
W1vehnoHH	-1.828*** (0.003)	-1.792* (0.063)	-0.344*** (0.001)	-0.029*** (0.001)	-0.185*** (0.004)	-0.031*** (0.004)	W1vehnoHH	-0.975* (0.055)	-1.913** (0.019)	-0.194** (0.037)	-0.020** (0.036)	-0.049 (0.402)	-0.009 (0.402)
mobile_phone	-2.903*** (0.007)	-4.504** (0.023)	-0.204 (0.309)	-0.017 (0.310)	-0.325*** (0.006)	-0.054*** (0.006)	mobile_phone	-2.985*** (0.001)	-4.679*** (0.000)	-0.251* (0.093)	-0.026* (0.092)	-0.342*** (0.001)	-0.063*** (0.001)
reads	-0.665 (0.136)	-0.520 (0.501)	-0.126* (0.070)	-0.011* (0.072)	-0.046 (0.329)	-0.008 (0.329)	reads	-0.699* (0.054)	0.035 (0.946)	-0.067 (0.289)	-0.007 (0.290)	-0.086** (0.045)	-0.016** (0.045)
computing_access	-3.310*** (0.000)	-2.881*** (0.003)	-0.412*** (0.000)	-0.035*** (0.000)	-0.275*** (0.000)	-0.046*** (0.000)	computing_access	-1.954*** (0.000)	0.477 (0.499)	-0.123 (0.202)	-0.013 (0.202)	-0.245*** (0.000)	-0.045*** (0.000)
parental_employment	-0.918*** (0.000)	-2.030*** (0.000)	-0.175*** (0.000)	-0.015*** (0.000)	-0.071*** (0.001)	-0.012*** (0.001)	parental_employment	-0.639*** (0.000)	-0.882*** (0.002)	-0.104*** (0.002)	-0.011*** (0.002)	-0.071*** (0.001)	-0.013*** (0.001)
_1to8_hrs_work	-3.163*** (0.001)	-3.611** (0.014)	-0.191 (0.233)	-0.016 (0.234)	-0.428*** (0.000)	-0.072*** (0.000)	_1to8_hrs_work	-2.230*** (0.001)	-3.823*** (0.000)	-0.249** (0.064)	-0.026* (0.063)	-0.214** (0.011)	-0.039** (0.011)
_9plus_hrs_work	0.574 (0.805)	-1.830 (0.664)	-0.137 (0.799)	-0.012 (0.799)	0.170 (0.511)	0.029 (0.511)	_9plus_hrs_work	-4.025** (0.035)	-7.886** (0.016)	-0.923** (0.045)	-0.097** (0.045)	-0.462* (0.076)	-0.085* (0.075)
carer	2.398* (0.088)	1.911 (0.390)	0.345* (0.079)	0.029* (0.077)	0.124 (0.369)	0.021 (0.369)	carer	3.117*** (0.008)	2.331 (0.173)	0.362 (0.102)	0.038 (0.101)	0.440*** (0.002)	0.081*** (0.002)
broken_family	2.098*** (0.008)	-0.550 (0.673)	0.092 (0.498)	0.008 (0.497)	0.257*** (0.002)	0.043*** (0.002)	broken_family	1.920*** (0.008)	1.914* (0.057)	0.305** (0.013)	0.032** (0.013)	0.215** (0.012)	0.040** (0.011)
Mixed	-0.995 (0.587)	-0.533 (0.865)	-0.379 (0.244)	-0.032 (0.244)	0.060 (0.774)	0.010 (0.774)	Mixed	-0.768 (0.619)	-3.093 (0.215)	-0.473 (0.101)	-0.050 (0.102)	-0.001 (0.995)	0.000 (0.995)
Indian	-7.216*** (0.003)	-5.766 (0.103)	-1.060*** (0.038)	-0.090** (0.040)	-0.813*** (0.000)	-0.136*** (0.000)	Indian	-3.290* (0.075)	3.359 (0.429)	-0.172 (0.653)	-0.018 (0.652)	-0.538*** (0.007)	-0.099*** (0.007)
Pakistani	-2.802 (0.147)	-6.505 (0.134)	-0.607 (0.118)	-0.052 (0.122)	-0.357* (0.078)	-0.060* (0.078)	Pakistani	0.504 (0.749)	3.118 (0.317)	-0.026 (0.929)	-0.003 (0.929)	-0.059 (0.770)	-0.011 (0.770)
Bangladeshi	-8.721*** (0.000)	-12.981*** (0.005)	-1.320*** (0.004)	-0.112*** (0.005)	-0.940*** (0.000)	-0.157*** (0.000)	Bangladeshi	-1.077 (0.569)	4.380 (0.327)	0.061 (0.857)	0.006 (0.857)	-0.327 (0.189)	-0.060 (0.190)
Black_Caribbean	-8.535*** (0.000)	-6.140 (0.128)	-1.131*** (0.002)	-0.096*** (0.002)	-0.753*** (0.002)	-0.126*** (0.002)	Black_Caribbean	-0.527 (0.765)	2.320 (0.437)	-0.991** (0.022)	-0.104** (0.023)	0.129 (0.540)	0.024 (0.540)
Black_African	-12.428*** (0.000)	-8.884 (0.129)	-2.436*** (0.000)	-0.207*** (0.000)	-1.267*** (0.000)	-0.212*** (0.000)	Black_African	-3.558 (0.104)	7.926* (0.098)	-0.604 (0.176)	-0.063 (0.178)	-0.265 (0.292)	-0.049 (0.292)
Other_ethnicity	-12.310*** (0.000)	-12.017* (0.067)	-2.789*** (0.000)	-0.237*** (0.000)	-1.037*** (0.001)	-0.174*** (0.001)	Other_ethnicity	1.229 (0.631)	3.793 (0.245)	0.104 (0.795)	0.011 (0.796)	0.078 (0.796)	0.014 (0.796)
englang_YP_not_HH	0.340 (0.875)	9.166* (0.061)	-0.072 (0.882)	-0.006 (0.882)	0.103 (0.638)	0.017 (0.638)	englang_YP_not_HH	-1.174 (0.550)	-4.011 (0.255)	-0.442 (0.163)	-0.046 (0.166)	-0.100 (0.655)	-0.018 (0.655)
englang_HH_not_YP	-9.263 (0.222)	-8.951 (0.643)	-0.660 (0.599)	-0.056 (0.600)	-0.961 (0.244)	-0.161 (0.244)	englang_HH_not_YP	3.358 (0.437)	-2.278 (0.746)	0.781 (0.155)	0.082 (0.153)	0.225 (0.602)	0.041 (0.602)
englang_HH_nor_YP	-1.610 (0.462)	3.800 (0.388)	-0.268 (0.546)	-0.023 (0.546)	-0.078 (0.735)	-0.013 (0.734)	englang_HH_nor_YP	-6.768*** (0.001)	-7.276* (0.090)	-0.867** (0.017)	-0.091** (0.018)	-0.428* (0.078)	-0.079* (0.077)
born_abroad	0.369 (0.814)	0.043 (0.989)	0.217 (0.471)	0.018 (0.471)	0.114 (0.525)	0.019 (0.526)	born_abroad	-2.814* (0.096)	-2.101 (0.431)	-0.125 (0.658)	-0.013 (0.658)	-0.436** (0.022)	-0.080** (0.022)
religiosity	-0.660 (0.129)	0.339 (0.640)	-0.112 (0.152)	-0.010 (0.149)	-0.030 (0.548)	-0.005 (0.548)	religiosity	-0.420 (0.293)	0.659 (0.272)	-0.060 (0.438)	-0.006 (0.438)	-0.020 (0.665)	-0.004 (0.665)
parental_aspiration	-0.489 (0.280)	1.383* (0.061)	-0.069 (0.397)	-0.006 (0.397)	-0.046 (0.355)	-0.008 (0.353)	parental_aspiration	-0.909** (0.012)	0.771 (0.190)	-0.185*** (0.006)	-0.019*** (0.006)	-0.027 (0.546)	-0.005 (0.546)
parental_interest	-1.988*** (0.000)	-0.899 (0.324)	-0.311*** (0.001)	-0.026*** (0.001)	-0.150** (0.012)	-0.025** (0.012)	parental_interest	-1.565*** (0.001)	-1.827*** (0.008)	-0.189** (0.020)	-0.020** (0.019)	-0.185*** (0.001)	-0.034*** (0.001)
values_interest	-0.744 (0.172)	-0.249 (0.776)	-0.116 (0.192)	-0.010 (0.191)	-0.079 (0.165)	-0.013 (0.164)	values_interest	-1.274** (0.010)	-1.289* (0.066)	-0.137 (0.138)	-0.014 (0.139)	-0.120** (0.046)	-0.022** (0.046)
values_schoolwork	-0.030 (0.960)	2.263** (0.025)	0.139 (0.206)	0.012 (0.206)	0.033 (0.601)	0.006 (0.601)	values_schoolwork	-1.125** (0.031)	-1.685** (0.025)	-0.096 (0.307)	-0.010 (0.307)	-0.109** (0.076)	-0.020* (0.076)
job_aspiration	0.362 (0.468)	0.195 (0.824)	0.051 (0.582)	0.004 (0.583)	0.046 (0.351)	0.008 (0.351)	job_aspiration	-1.152** (0.015)	-1.324** (0.045)	-0.143* (0.071)	-0.015* (0.072)	-0.149*** (0.005)	-0.028*** (0.005)
positive_about_school	-1.130*** (0.000)	-1.164*** (0.001)	-0.156*** (0.000)	-0.013*** (0.000)	-0.107*** (0.000)	-0.018*** (0.000)	positive_about_school	0.055 (0.795)	0.132 (0.666)	-0.039 (0.281)	-0.004 (0.280)	0.003 (0.886)	0.001 (0.886)
sport_freq	-1.555* (0.053)	-1.900 (0.123)	-0.302** (0.014)	-0.026** (0.015)	-0.189** (0.022)	-0.032** (0.021)	sport_freq	-1.955* (0.054)	-1.898 (0.214)	-0.201 (0.249)	-0.021 (0.251)	-0.241*** (0.020)	-0.045** (0.019)
played_sport	-1.018 (0.161)	-1.038 (0.384)	-0.059 (0.650)	-0.005 (0.650)	-0.046 (0.561)	-0.008 (0.561)	played_sport	-1.826*** (0.010)	-1.975* (0.095)	-0.219 (0.116)	-0.023 (0.116)	-0.172** (0.032)	-0.032** (0.032)
youth_group	0.246 (0.787)	1.086 (0.433)	-0.004 (0.976)	0.000 (0.976)	0.054 (0.568)	0.009 (0.568)	youth_group	-0.202 (0.776)	-0.408 (0.680)	-0.027 (0.837)	-0.003 (0.837)	-0.031 (0.716)	-0.006 (0.716)
entertainment	-2.815*** (0.000)	-0.502 (0.662)	-0.121 (0.334)	-0.010 (0.331)	-0.342*** (0.000)	-0.057*** (0.000)	entertainment	-1.743*** (0.003)	-0.393 (0.645)	-0.182* (0.065)	-0.019* (0.064)	-0.142** (0.038)	-0.026** (0.037)
gone_out	-1.232* (0.095)	-1.642 (0.193)	-0.066 (0.602)	-0.006 (0.602)	-0.092 (0.231)	-0.015 (0.230)	gone_out	-0.006 (0.992)	-0.231 (0.802)	-0.108 (0.330)	-0.011 (0.330)	-0.039 (0.593)	-0.007 (0.593)
behaviour2	3.638*** (0.000)	3.183*** (0.000)	0.343*** (0.000)	0.029*** (0.000)	0.384*** (0.000)	0.064*** (0.000)	behaviour2	2.653*** (0.000)	1.725*** (0.007)	0.461*** (0.000)	0.048*** (0.000)	0.298*** (0.000)	0.055*** (0.000)

Notes: P values in parentheses   *P<0.10,   **P<0.05,   ***P<0.01

Table 5.2e – Multivariate regression results: some missing responses imputed

Females

	(2) monthsNEET count (reg_adj)	(5) monthsNEET2_exclHE (reg_adj)	(6) 13monthsNEET (logit)	(6m) Average marginal effects of (6)	(9) 3monthsNEET count (logit)	(9m) Average marginal effects of (9)
Number of obs:	4842	1657	3684		4825	
school_quality	0.852 (0.169)	1.440* (0.077)	0.143 (0.130)	0.010 (0.151)	-0.001 (0.982)	0.000 (0.983)
careers_advice	-0.693 (0.219)	-1.233 (0.102)	-0.045 (0.615)	-0.003 (0.642)	-0.011 (0.810)	-0.002 (0.824)
extra_tuition	1.728 (0.235)	7.198** (0.011)	0.500** (0.032)	0.036* (0.068)	-0.016 (0.925)	-0.002 (0.933)
North_East	-6.200*** (0.004)	-4.137 (0.216)	-0.740** (0.013)	-0.053* (0.064)	-0.621*** (0.002)	-0.097*** (0.010)
North_West	-4.148** (0.015)	-5.535** (0.041)	-0.708*** (0.007)	-0.051** (0.026)	-0.521*** (0.001)	-0.082*** (0.002)
Yorkshire_and_the_Humber	-3.039 (0.109)	-3.785 (0.173)	-0.460* (0.088)	-0.033 (0.171)	-0.482*** (0.004)	-0.076** (0.011)
East_Midlands	-2.324 (0.250)	-6.774** (0.022)	-0.748** (0.012)	-0.054** (0.030)	-0.404** (0.020)	-0.063** (0.032)
West_Midlands	-2.004 (0.274)	-2.631 (0.321)	-0.193 (0.446)	-0.014 (0.535)	-0.205 (0.237)	-0.032 (0.293)
East_of_England	-3.483* (0.069)	-4.905* (0.073)	-0.443 (0.104)	-0.032 (0.171)	-0.443** (0.011)	-0.069** (0.023)
South_East	-3.283* (0.060)	-5.823** (0.022)	-0.546** (0.042)	-0.039* (0.084)	-0.375** (0.018)	-0.059** (0.026)
South_West	-4.675** (0.020)	-7.070** (0.012)	-0.941*** (0.005)	-0.068** (0.021)	-0.491** (0.012)	-0.077** (0.020)
housing_density	-0.885 (0.393)	-0.760 (0.606)	-0.308* (0.098)	-0.022 (0.123)	0.040 (0.706)	0.006 (0.719)
tenure	-2.247*** (0.002)	-2.029* (0.027)	-0.189** (0.048)	-0.014* (0.073)	-0.138** (0.011)	-0.022** (0.017)
W1inyrmov	0.504 (0.648)	0.098 (0.949)	-0.023 (0.892)	-0.002 (0.905)	0.122 (0.189)	0.019 (0.224)
W1vehnoHH	-1.483 (0.119)	-2.005* (0.069)	-0.293** (0.017)	-0.021** (0.023)	-0.110 (0.133)	-0.017 (0.150)
mobile_phone	-2.903 (0.125)	-4.567* (0.066)	-0.165 (0.459)	-0.012 (0.512)	-0.266** (0.044)	-0.042* (0.065)
reads	-1.158* (0.063)	-0.735 (0.347)	-0.135* (0.072)	-0.010 (0.122)	-0.040 (0.419)	-0.006 (0.453)
computing_access	-4.548*** (0.000)	-3.111** (0.008)	-0.320*** (0.003)	-0.023*** (0.005)	-0.191*** (0.004)	-0.030*** (0.007)
parental_occupation	-0.649 (0.163)	0.736 (0.236)	-0.062 (0.389)	-0.004 (0.407)	-0.082* (0.057)	-0.013* (0.083)
parental_employment	-0.926** (0.019)	-1.741*** (0.001)	-0.139** (0.004)	-0.010*** (0.009)	-0.010 (0.697)	-0.002 (0.727)
_1to8_hrs_work	-2.402** (0.031)	-2.589* (0.056)	-0.141 (0.413)	-0.010 (0.430)	-0.413*** (0.000)	-0.065*** (0.000)
_9plus_hrs_work	-2.158 (0.480)	-1.187 (0.791)	-0.073 (0.894)	-0.005 (0.908)	0.223 (0.406)	0.035 (0.470)
carer	3.335 (0.176)	1.862 (0.481)	0.336 (0.123)	0.024 (0.163)	0.064 (0.678)	0.010 (0.691)
MRetwrk	-1.172 (0.116)	-1.554 (0.109)	-0.173* (0.079)	-0.012 (0.114)	-0.081 (0.142)	-0.013 (0.191)
MRetwrk_sq	0.224* (0.073)	0.278* (0.087)	0.026* (0.092)	0.002 (0.130)	0.016* (0.058)	0.003* (0.095)
parent_age	-1.504* (0.073)	-1.490 (0.214)	-0.126 (0.199)	-0.009 (0.249)	-0.098* (0.096)	-0.015 (0.163)
parent_age_sq	0.026* (0.073)	0.028 (0.162)	0.002 (0.205)	0.000 (0.257)	0.002 (0.106)	0.000 (0.182)
W1NyoungsibHS	2.339* (0.052)	2.733* (0.052)	0.221* (0.081)	0.016 (0.110)	0.090 (0.311)	0.014 (0.354)
broken_family	0.338 (0.754)	-2.041 (0.138)	-0.052 (0.747)	-0.004 (0.783)	0.234** (0.013)	0.037** (0.023)
W1evercarMP0a	15.231** (0.023)	11.709* (0.052)	1.299*** (0.002)	0.093 (0.180)	0.458 (0.155)	0.072 (0.468)
Mixed	-4.291* (0.053)	-3.652 (0.274)	-0.536* (0.092)	-0.039 (0.121)	-0.072 (0.770)	-0.011 (0.796)
Indian	-6.546*** (0.001)	-3.083 (0.442)	-0.798 (0.180)	-0.057 (0.273)	-0.668*** (0.005)	-0.105*** (0.008)
Pakistani	-5.772** (0.021)	-5.948 (0.371)	-0.138 (0.715)	-0.010 (0.796)	-0.407* (0.076)	-0.064 (0.158)
Bangladeshi	-15.273*** (0.000)	-17.605** (0.021)	-1.504*** (0.009)	-0.108*** (0.041)	-1.231*** (0.000)	-0.193*** (0.002)
Black_Caribbean	-10.420*** (0.000)	-6.171 (0.169)	-0.959*** (0.010)	-0.069** (0.022)	-0.694*** (0.009)	-0.109*** (0.009)
Black_African	-14.999*** (0.000)	-9.474* (0.075)	-2.465*** (0.000)	-0.177*** (0.005)	-1.225*** (0.000)	-0.192*** (0.000)
Other_ethnicity	-12.503*** (0.000)	-9.508 (0.173)	-2.004*** (0.000)	-0.144*** (0.001)	-1.342*** (0.000)	-0.210*** (0.000)
englang_YP_not_HH	-1.636 (0.465)	8.602 (0.280)	-0.751 (0.144)	-0.054 (0.244)	0.022 (0.927)	0.003 (0.940)
englang_HH_not_YP	-3.567 (0.672)	10.684 (0.714)	0.073 (0.958)	perfect prediction in complete responses	-0.940 (0.386)	perfect prediction in complete responses
englang_HH_nor_YP	-4.984*** (0.009)	-0.967 (0.862)	-1.102** (0.020)	-0.079 (0.399)	-0.140 (0.624)	-0.022 (0.672)
born_abroad	-1.996 (0.284)	-1.048 (0.770)	0.199 (0.579)	0.014 (0.589)	0.023 (0.919)	0.004 (0.921)
religiosity	-0.385 (0.440)	0.040 (0.957)	-0.108 (0.180)	-0.008 (0.207)	0.013 (0.809)	0.002 (0.823)
parental_aspiration	-0.454 (0.415)	0.900 (0.230)	-0.101 (0.247)	-0.007 (0.286)	-0.058 (0.267)	-0.009 (0.303)
parental_interest	-1.860** (0.014)	-0.412 (0.677)	-0.178* (0.077)	-0.013 (0.103)	-0.089 (0.157)	-0.014 (0.194)
values_interest	-1.207 (0.107)	-0.097 (0.919)	-0.110 (0.262)	-0.008 (0.313)	-0.079 (0.199)	-0.012 (0.242)
values_schoolwork	0.441 (0.581)	1.914* (0.058)	0.109 (0.325)	0.008 (0.368)	0.013 (0.846)	0.002 (0.861)
work_ethic	-1.502*** (0.010)	-1.240* (0.065)	-0.166** (0.018)	-0.012** (0.030)	-0.134*** (0.002)	-0.021*** (0.005)
job_aspiration	0.393 (0.553)	-0.078 (0.933)	0.029 (0.772)	0.002 (0.794)	0.068 (0.215)	0.011 (0.290)
positive_about_school	-1.439*** (0.000)	-0.779* (0.055)	-0.157*** (0.000)	-0.011*** (0.000)	-0.106*** (0.000)	-0.017*** (0.000)
sport_freq	-2.391** (0.036)	-2.986** (0.019)	-0.276** (0.038)	-0.020* (0.064)	-0.144* (0.092)	-0.023 (0.133)
played_sport	-1.355 (0.118)	-0.687 (0.560)	-0.069 (0.624)	-0.005 (0.651)	-0.036 (0.664)	-0.006 (0.692)
youth_group	-0.503 (0.626)	-1.221 (0.384)	-0.201 (0.204)	-0.014 (0.264)	-0.016 (0.872)	-0.002 (0.882)
entertainment	-1.957** (0.031)	0.006 (0.996)	-0.043 (0.751)	-0.003 (0.771)	-0.287*** (0.000)	-0.045*** (0.001)
gone_out	-0.007 (0.993)	-0.566 (0.566)	-0.005 (0.973)	0.000 (0.975)	-0.066 (0.410)	-0.010 (0.448)
behaviour2	2.110*** (0.005)	1.796* (0.037)	0.191** (0.039)	0.014* (0.076)	0.276*** (0.000)	0.043*** (0.000)
suspended	4.433*** (0.003)	4.841*** (0.000)	0.395*** (0.000)	0.028*** (0.003)	0.194*** (0.007)	0.030** (0.013)
expel	-3.111 (0.803)	-23.961* (0.074)	-1.825* (0.030)	perfect prediction in complete responses	-0.022 (0.973)	-0.003 (0.984)
police	3.967 (0.154)	3.037 (0.248)	-0.014 (0.961)	-0.001 (0.963)	0.335** (0.016)	0.053** (0.030)
ever_abs_3	11.920*** (0.007)	17.069*** (0.000)	1.260*** (0.000)	0.091** (0.015)	0.355 (0.117)	0.056 (0.349)
abs_1_this_yr	2.504 (0.499)	-1.769 (0.642)	-0.228 (0.481)	-0.016 (0.608)	-0.034 (0.878)	-0.005 (0.897)

Males

	(2) monthsNEET count (reg_adj)	(5) monthsNEET2_exclHE (reg_adj)	(6) 13monthsNEET (logit)	(6m) Average marginal effects of (6)	(9) 3monthsNEET count (logit)	(9m) Average marginal effects of (9)
Number of obs:	4960	1789	3555		4910	
school_quality	-0.374 (0.496)	0.349 (0.619)	-0.077 (0.349)	-0.007 (0.380)	-0.046 (0.388)	-0.008 (0.417)
careers_advice	-0.876* (0.056)	-1.100* (0.056)	-0.044 (0.524)	-0.004 (0.568)	-0.040 (0.397)	-0.007 (0.420)
extra_tuition	-0.893 (0.383)	1.316 (0.488)	-0.024 (0.917)	-0.002 (0.928)	-0.173 (0.211)	-0.030 (0.267)
North_East	-1.366 (0.478)	1.273 (0.680)	-0.028 (0.928)	-0.003 (0.941)	0.136 (0.518)	0.024 (0.564)
North_West	2.116 (0.181)	3.655 (0.159)	0.234 (0.354)	0.022 (0.424)	0.221 (0.153)	0.039 (0.156)
Yorkshire_and_the_Humber	0.944 (0.590)	1.917 (0.495)	0.259 (0.353)	0.024 (0.433)	0.025 (0.886)	0.004 (0.899)
East_Midlands	0.477 (0.783)	0.860 (0.752)	0.136 (0.642)	0.013 (0.669)	0.059 (0.739)	0.010 (0.743)
West_Midlands	1.582 (0.350)	0.262 (0.924)	0.301 (0.270)	0.028 (0.352)	0.159 (0.320)	0.028 (0.333)
East_of_England	0.178 (0.916)	-1.107 (0.671)	0.033 (0.905)	0.003 (0.923)	-0.109 (0.538)	-0.019 (0.577)
South_East	0.109 (0.943)	-0.389 (0.883)	0.095 (0.722)	0.009 (0.763)	0.106 (0.533)	0.019 (0.554)
South_West	-0.465 (0.801)	0.041 (0.988)	0.003 (0.992)	0.000 (0.993)	0.072 (0.708)	0.013 (0.734)
housing_density	-1.074 (0.161)	-1.669 (0.116)	-0.411** (0.014)	-0.038** (0.028)	-0.070 (0.478)	-0.012 (0.535)
tenure	-1.446*** (0.009)	-0.889 (0.186)	-0.143* (0.074)	-0.013 (0.128)	-0.103** (0.028)	-0.018* (0.055)
W1inyrmov	-1.092 (0.183)	-2.556** (0.021)	-0.335** (0.044)	-0.031* (0.052)	-0.030 (0.727)	-0.005 (0.754)
W1vehnoHH	-0.600 (0.377)	-2.003** (0.031)	-0.137 (0.164)	-0.013 (0.208)	0.025 (0.694)	0.004 (0.718)
mobile_phone	-1.514 (0.192)	-2.814* (0.057)	-0.087 (0.593)	-0.008 (0.640)	-0.280** (0.011)	-0.049** (0.012)
reads	-0.371 (0.428)	0.438 (0.432)	-0.049 (0.465)	-0.005 (0.516)	-0.030 (0.477)	-0.005 (0.515)
computing_access	-2.045** (0.011)	0.297 (0.710)	-0.087 (0.402)	-0.008 (0.465)	-0.176*** (0.003)	-0.031** (0.010)
parental_occupation	-1.069*** (0.005)	0.110 (0.819)	-0.068 (0.253)	-0.006 (0.289)	-0.094** (0.015)	-0.016** (0.028)
parental_employment	-0.138 (0.630)	-0.342 (0.352)	-0.055 (0.160)	-0.005 (0.248)	-0.020 (0.418)	-0.003 (0.495)
_1to8_hrs_work	-2.058*** (0.005)	-2.866*** (0.001)	-0.148 (0.281)	-0.014 (0.339)	-0.141 (0.110)	-0.025 (0.162)
_9plus_hrs_work	-5.488*** (0.005)	-6.178*** (0.005)	-0.852* (0.055)	-0.079* (0.056)	-0.354 (0.164)	-0.062 (0.164)
carer	4.488** (0.030)	2.039 (0.340)	0.331 (0.146)	0.031 (0.213)	0.421*** (0.004)	0.074** (0.017)
MRetwrk	-0.913 (0.106)	-1.116 (0.120)	-0.103 (0.231)	-0.010 (0.278)	-0.067 (0.232)	-0.012 (0.239)
MRetwrk_sq	0.196** (0.036)	0.210* (0.073)	0.016 (0.257)	0.001 (0.301)	0.015* (0.088)	0.003* (0.091)
parent_age	-1.239* (0.064)	-1.666** (0.026)	-0.176** (0.027)	-0.016* (0.057)	-0.095* (0.087)	-0.017 (0.119)
parent_age_sq	0.022** (0.048)	0.036*** (0.006)	0.004*** (0.007)	0.000** (0.019)	0.002* (0.072)	0.000 (0.101)
W1NyoungsibHS	-0.197 (0.826)	1.315 (0.252)	0.200 (0.140)	0.019 (0.182)	-0.021 (0.803)	-0.004 (0.824)
broken_family	1.619 (0.109)	2.470** (0.031)	0.281* (0.052)	0.026* (0.097)	0.160* (0.092)	0.028 (0.122)
W1evercarMP0a	10.857** (0.022)	3.593 (0.350)	0.423 (0.269)	0.039 (0.406)	0.324 (0.212)	0.057 (0.408)
Mixed	-1.691 (0.360)	-3.634 (0.149)	-0.444 (0.137)	-0.041 (0.238)	0.082 (0.665)	0.014 (0.707)
Indian	-0.765 (0.715)	8.494 (0.133)	0.242 (0.544)	0.023 (0.591)	-0.377* (0.073)	-0.066 (0.115)
Pakistani	-1.169 (0.608)	4.857 (0.292)	0.118 (0.728)	0.011 (0.774)	-0.385* (0.073)	-0.067 (0.149)
Bangladeshi	-1.006 (0.743)	11.828 (0.146)	0.018 (0.967)	0.002 (0.980)	-0.005 (0.988)	-0.001 (0.990)
Black_Caribbean	-1.753 (0.418)	5.508 (0.150)	-0.756* (0.081)	-0.070 (0.113)	0.170 (0.470)	0.030 (0.529)
Black_African	-4.775** (0.025)	13.645** (0.038)	-0.373 (0.420)	-0.035 (0.451)	-0.239 (0.384)	-0.042 (0.419)
Other_ethnicity	4.064 (0.229)	7.082* (0.077)	0.409 (0.342)	0.038 (0.443)	0.210 (0.533)	0.037 (0.592)
englang_YP_not_HH	-1.266 (0.674)	0.402 (0.930)	-0.531 (0.176)	-0.049 (0.176)	-0.120 (0.643)	-0.021 (0.712)
englang_HH_not_YP	6.092 (0.402)	1.343 (0.861)	1.003* (0.067)	0.093 (0.269)	0.382 (0.426)	0.067 (0.672)
englang_HH_nor_YP	-9.158*** (0.000)	-3.266 (0.471)	-1.198*** (0.006)	-0.111** (0.020)	-0.780** (0.013)	-0.137** (0.038)
born_abroad	-0.168 (0.926)	0.261 (0.927)	0.057 (0.851)	0.005 (0.860)	-0.435** (0.035)	-0.076* (0.065)
religiosity	-0.345 (0.430)	-0.144 (0.814)	-0.089 (0.262)	-0.008 (0.303)	-0.022 (0.650)	-0.004 (0.684)
parental_aspiration	-0.655 (0.130)	0.481 (0.401)	-0.203*** (0.005)	-0.019* (0.009)	0.000 (0.999)	0.000 (0.999)
parental_interest	-0.987* (0.094)	-0.861 (0.247)	-0.048 (0.592)	-0.005 (0.642)	-0.143** (0.019)	-0.025** (0.028)
values_interest	-0.762 (0.228)	-0.762 (0.322)	-0.150 (0.119)	-0.014 (0.159)	-0.088 (0.162)	-0.015 (0.226)
values_schoolwork	-0.578 (0.369)	-1.063 (0.170)	-0.052 (0.591)	-0.005 (0.618)	-0.086 (0.168)	-0.015 (0.207)
work_ethic	-1.339*** (0.001)	-0.446 (0.366)	-0.168** (0.005)	-0.016** (0.011)	-0.128*** (0.001)	-0.022*** (0.001)
job_aspiration	-1.133** (0.039)	-1.086 (0.131)	-0.117 (0.180)	-0.011 (0.246)	-0.170*** (0.002)	-0.030** (0.005)
positive_about_school	-0.236 (0.366)	-0.044 (0.884)	-0.046 (0.200)	-0.004 (0.238)	0.002 (0.948)	0.000 (0.955)
sport_freq	-3.169** (0.022)	-2.961* (0.088)	-0.247 (0.169)	-0.023 (0.212)	-0.269** (0.011)	-0.047** (0.027)
played_sport	-1.679* (0.088)	-1.843 (0.157)	-0.137 (0.349)	-0.013 (0.371)	-0.108 (0.198)	-0.019 (0.260)
youth_group	-0.069 (0.930)	0.133 (0.894)	0.012 (0.932)	0.001 (0.941)	-0.019 (0.827)	-0.003 (0.837)
entertainment	-0.906 (0.187)	-0.398 (0.642)	-0.105 (0.310)	-0.010 (0.369)	-0.108 (0.139)	-0.019 (0.167)
gone_out	0.060 (0.928)	-0.236 (0.769)	-0.069 (0.552)	-0.006 (0.598)	-0.027 (0.711)	-0.005 (0.742)
behaviour2	1.385** (0.015)	0.646 (0.320)	0.322*** (0.000)	0.030*** (0.001)	0.180*** (0.001)	0.032*** (0.002)
suspended	1.315* (0.051)	1.337* (0.083)	0.077 (0.335)	0.007 (0.356)	0.095** (0.044)	0.017* (0.071)
expel	5.910 (0.302)	4.986 (0.504)	0.242 (0.737)	0.023 (0.805)	0.496 (0.282)	0.087 (0.464)
police	4.056*** (0.002)	1.542 (0.271)	0.185 (0.209)	0.017 (0.281)	0.264*** (0.006)	0.046** (0.017)
ever_abs_3	4.456 (0.198)	13.369*** (0.009)	1.019*** (0.008)	0.095 (0.104)	0.026 (0.924)	0.005 (0.941)
abs_1_this_yr	-0.570 (0.839)	-0.784 (0.787)	-0.193 (0.595)	-0.018 (0.666)	0.088 (0.678)	0.015 (0.706)

Notes: P values in parentheses   *P<0.10, **P<0.05, ***P<0.01

The coefficients of specifications (2) and (5) are OLS results divided by the proportion of non-censored observations; these provide a good approximation to tobit coefficients (Greene 1981)

(6m) and (9m) are the average marginal effects of these coefficients over the population of complete respondents

6 Conclusions

A large body of literature examines the antecedents of youth joblessness, however many studies investigate an incomplete subset of the factors which the present study has confirmed as salient within the LSYPE dataset. These antecedents predict between 3% and 17% of NEET variance, however those findings are be subject to omitted variables bias due to academic attainment data being unavailable. That bias may nevertheless be small in these age 14 observations, since the three closest proxy measures for attainment had insignificant or contrary effects on NEET outcomes. Future research could link National Pupil Database information to the present dataset to address this shortcoming.

The present study contributes to several long-standing debates in the literature. In one such debate Forcier (1988) and Janlert (1997) consider the employment effects of alcohol (ab)use to be bidirectional, whilst Kandel and Yamaguchi (1987) contend that the influence of substance abuse is often overestimated due to omitted confounding factors. The present analyses established that in these data the association between substance abuse and NEET outcomes was almost entirely explained by other regressors. Central to these analyses was a systematic redress of multicollinearity, whereto a constructed counterfactual technique was developed. That technique has broad applicability for future research.

Current policy concerns were also commented upon in the discussions of Chapter 5. Those discussions frequently exposed contrasting employment determinants by gender, which may contribute to the UK gender pay gap documented by Costa Dias et al. (2016). One such contrast is found in that increased part-time work is associated with improved male employment outcomes but worsened female outcomes. This finding contributes to the knowledge by extending the results of Holford (2015) who studies attainment outcomes. A further contribution of the present study is that it provides a compendium of possible determinants of unemployment for consideration in future research.

Appendix I: References

Aaltonen, M., Macdonald, J..M., Martikainen, P.,Kivivuori, J. (2013) Examining the Generality of the Unemployment-Crime Association. **Criminology**, 51(3): 561-594.

ACEVO (2012) **Youth Unemployment: The Crisis We Cannot Afford**. London: Association of Chief Executives of Voluntary Organisations.

Alcock, P. (1993) **Understanding Poverty**. Basingstoke: Macmillan Press.

Allen, G. and Dempsey, N. (2016) **Prison Population Statistics** [online]. Commons Briefing Paper, No. SN/SG/04334. London: House of Commons Library. Available at: file:///C:/Users/iain/Downloads/SN04334.pdf [Accessed 03 September 2016].

Altindag, D.T. (2012) Crime and Unemployment: Evidence from Europe**. International Review of Law and Economics**, 32(1): 145-157.

Andrews, D.F. (1972) Plots of High-Dimensional Data. **Biometrics**, 28(1): 125-136.

Arulampalam, W. (2001) Is Unemployment Really Scarring? Effects of Unemployment Experiences on Wages. **The Economic Journal**, 111(475): F585-606.

Arulampalam, W., Gregg, P., Gregory, M. (2001) Unemployment Scarring. **The Economic Journal**, 111(475): F577-F584.

Babakus, E., Ferguson, C.E., Jöreskog, K.G. (1987) The Sensitivity of Confirmatory Maximum Likelihood Factor Analysis to Violations of Measurement Scale and Distributional Assumptions. **Journal of Marketing Research**, 24(2): 222-228.

Bäckman, O. and Nilsson, A. (2011) Pathways to Social Exclusion: A Life Course Study. **European Sociological Review**, 27(1): 107-123.

Berenson, M.L., Levine, D.M., Krehbiel, T.C., Stephan, D.F. (2012) **Basic Business Statistics: Concepts and applications**. 12th ed. Boston: Prentice Hall.

Bertrand, M. and Mullainathan, S. (2004) Are Emily and Greg more Employable than Lakisha and Jamal? A Field Experiment on Labour Market Discrimination. **The American Economic Review**, 94(4): 991-1013.

Bradley, S. and Nguyen, A.N. (2004) The school-to-work transition. In Johnes, G. and Johnes, J. (eds.) **International Handbook on the Economics of Education.** Cheltenham: Edward Elgar Publishing limited. pp.484-521.

Breen, R. (1984) Status Attainment or Job Attainment? The Effects of Sex and Class on Youth Unemployment. **The British Journal of Sociology**, 35(3): 363-386

Breen, R. and Jonsson, J.O. (2005) Inequality of Opportunity in Comparative Perspective: Recent Research on Educational Attainment and Social Mobility. **The Annual Review of Sociology,** 31: 223-243.

Brindis, C. (1993) Antecedents and Consequences: the need for Diverse Strategies in Adolescent Pregnancy Prevention. In Lawson, A. and Rhode, D.L. (eds.) **The Politics of Pregnancy: Adolescent Sexuality and Public Policy**. Connecticut: Yale University Press. pp. 257-83.

Bosworth, D. (1994) Truancy and Pupil Performance. **Education Economics**, 2(3): 243-261.

Burchardt, T., Le Grand, J., Piachaud, D. (2002) Degrees of Exclusion: Developing a Dynamic, Multidimensional Measure. In Hills, J., Le Grand, J., Piachaud, D. (eds.) **Understanding Social Exclusion**. Oxford: Oxford University Press. pp.30-43.

Burgard, S.A., Brand, J.E., House, J.S. (2007) Toward a Better Estimation of the Effect of Job Loss on Health. **Journal of Health and Social Behavior**, 48(4): 369-384.

Cattel, R.B. (1978) **The Scientific Use of Factor Analysis in Behavioral and Life Sciences**. New York: Plenum Press.

Card, D. and Lemieux, T. (2000) The Evolution of Work, School, and Living Arrangements among North American Youth. In Blanchflower, D.G. and Freeman, R.B. (eds.) **Youth Employment and Joblessness in Advanced Countries**. Chicago: Chicago University Press. pp.171-214.

Carney, C., McNeish, S., McColl, J. (2005) The Impact of Part Time Employment on Students' Health and Academic Performance: A Scottish Perspective. **The Journal of Further and Higher Education**, 29(4): 307-319.

Caspi, A., Entner Wright, B.R., Moffitt, T.E., Silva, P.A. (1998) Early Failure in the Labor Market: Childhood and Adolescent Predictors of Unemployment in the Transition to Adulthood. **American Sociological Review**, 63(3):   424-451.

Citizen's Advice (2015) **Waiting for Credit: The Delivery of Universal Credit as Experienced by Citizens Advice Clients in England and Wales** [online]. London: Citizens Advice. Available at: http://bit.ly/1NZPfrC [Accessed 17 June 2016].

Coleman, D.A. and Dubuc, S. (2010) The Fertility of Ethnic Minorities in the UK, 1960s–2006. **Population Studies**, 64(1): 19-41.

Conti, G., Heckman, J., Urzua, S., (2010) The Education-Health Gradient. **American Economic Review**, 100(2): 234-238.

Costa Dias, M., Elming, W., Joyce, R. (2016) **The Gender Wage Gap** [online]. IFS Briefing Note, No. BN186. London: the Institute for Fiscal Studies. Available at: https://www.ifs.org.uk/uploads/publications/bns/bn186.pdf [Accessed 24 August 2016].

Crowley, L., Balaram, B., Lee, N. (2012) **People or Place? Urban Policy in the Age of Austerity** [online]. Lancaster: The Work Foundation. Available at: http://www.theworkfoundation.com/downloadpublication/report/321_updated_people%20or%20place_urban%20policy%20in%20the%20age%20of%20austerity.pdf [Accessed 28 August 2016].

D'Arcy and Finch (2016) **Finding Your Routes: Non-Graduate Pathways in the UK's Labour Market**. London: Social Mobility and Child Poverty Commission.

Dar, A. (2016) Work Programme: Background and Statistics. Commons Briefing Paper, No. SN06340. London: House of Commons Library. Available at: http://researchbriefings.files.parliament.uk/ documents/SN06340/SN06340.pdf [Accessed 09 May 2016].

DCLG (2012) **The Troubled Families Programme: Financial Framework for the Troubled Families Programme's Payment-by-results Scheme for Local Authorities** [online]. London: Department for Communities and Local Government. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/11469/2117840.pdf [Accessed 28 August 2016].

DCLG (2015) **English Indices of Deprivation 2015** [online]. London: Department for Communities and Local Government. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015 [Accessed 11 August 2016].

DfE (2010) **Participation in Education, Training and Employment by 16-18 Year Olds in England** [online]. DfE Statistical First Release, No. SFR 18/2010. London: Department for Education. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/218900/main_20text_20sfr182010.pdf [Accessed 26 August 2016].

DfE (2011) **LSYPE User Guide to the Datasets: Wave 1 to Wave 7** [online]. London: Department for Education. Available at: https://www.gov.uk/government/statistics/schools-pupils-and-their-characteristics-january-2012 [Accessed 24 April 2016].

DfE (2012a) **Schools, pupils and their characteristics: January 2012** [online]. London: Department for Education. Available at: https://www.gov.uk/government/statistics/schools-pupils-and-their-characteristics-january-2012 [Accessed 14 August 2016].

Di Tella, R., MacCulloch, R.J., Oswald, A.J. (2000) Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness. **The American Economic Review**, 91(1): 335-341.

Dinno, A. (2009) Implementing Horn's Parallel Analysis for Principal Component Analysis and Factor Analysis. **The Stata Journal**, 9(2): 291-298.

Dorsett, R. and Lucchino, P. (2012) Beyond School-Leaving Age: The First Five Years. In ACEVO (2012) **Youth Unemployment: The Crisis We Cannot Afford**. London: Association of Chief Executives of Voluntary Organisations.

Dyson, A., Farrell, P., Polat, F., Hutcheson, G., Gallannaugh, F. (2004**) Inclusion and Pupil Achievement**. DfES Research Report, No. RR578. London: The Department for Education and Skills.

Egan, M., Daly, M., Delaney, L. (2015) Childhood Psychological Distress and Youth Unemployment: Evidence from Two British Cohort Studies. **Social Science & Medicine**, 124: 11-17.

Embretson, S.E. and Reise, S.P. (2000) **Item Response Theory for Psychologists**. Mahwah: Lawrence Erlbaum Associates.

Everitt, B.S. (1993) **Cluster Analysis**. 3rd ed. London: Edward Arnold.

Falk, A., Huffman, D., Sunde, U. (2006) **Self-Confidence and Search**. IZA Discussion Paper, No. 2525. Bonn: Forschungsinstitut zur Zukunft der Arbeit.

Farley, J.E. (1987) Disproportionate Black and Hispanic Unemployment in U.S. Metropolitan Areas: The Roles ofRacial Inequality, Segregation and Discrimination in Male Joblessness. **American Journal of Economics and Sociology**, 46(2): 129-150.

Farrington, D.P., Gallagher, B., Morley, L., St.Ledger, R.J., West, D.J. (1986) Unemployment, School Leaving, and Crime. **British Journal of Criminology**, 26(4): 335-356.

Fergusson, D.M., Horwood, J., Woodward, L.J. (2001) Unemployment And Psychosocial Adjustment In Young Adults: Causation Or Selection? **Social Science & Medicine** 53(3): 305–320.

Forcier, M.W. (1988) Unemployment and Alcohol Abuse. **Journal of Occupational Medicine**, 30(3): 246-251.

Furnham, A. and Rawles, R. (1996) Job search strategies, attitudes to school and attributions about unemployment. **Journal of Adolescence**, 19(4): 355-369.

Gayle, V., Berridge, D., Davies, R. (2002). Young People's Entry into Higher Education: Quantifying influential factors. **Oxford Review of Education**, 28(1): 5-20.

Genda, Y. and Kurosawa, M. (2001) Transition from School to Work in Japan. **Journal of the Japanese and International Economies**, 15(4): 465-488.

Gilligan, R. (2007) Adversity, Resilience and the Educational Progress of Young People in Public Care. **Emotional and Behavioural Difficulties**, 12(2): 135-145.

Glorfeld, L.W. (1995) An Improvement on Horn's Parallel Analysis Methodology for Selecting the Correct Number of Factors to Retain. **Educational and Psychological Measurement**, 55(3): 377-393.

Green, F., Felstead, A., Burchell, B. (2000) Job Insecurity and the Difficulty of Regaining Employment: An Empirical Study of Unemployment Expectations. **Oxford Bulletin of Economics and Statistics**, 62(s1): 855-883.

Greene, W.H. (1981) On The Asymptotic Bias of the Ordinary Least Squares Estimator of the Tobit Model. **Econometrica**, 49(2): 505-513.

Gregg, P. (2001) The Impact of Youth Unemployment on Adult Unemployment in the NCDS. **The Economic Journal**, 111(475): F626-F653.

Gregg, P. and Machin, S. (2000) Child Development and Success or Failure in the Youth Labour Market. In Blanchflower, D.G. and Freeman, R.B. (eds.) **Youth Employment and Joblessness in Advanced Countries**. Chicago: Chicago University Press. pp.247-288.

Gregg, P. and Tominey, E. (2004) **The Wage Scar from Youth Unemployment**. CMPO Working Paper, No. 04/097. Bristol: Centre for Market and Public Organisation.

Gregg, P. and Wadsworth, J. (2010) Unemployment and inactivity in the 2008–2009 recession. **Economic & Labour Market Review,** 4(8): 44-50.

Gustafsson, S. (2001) Optimal Age at Motherhood: Theoretical and Empirical Considerations on Postponement of Maternity in Europe. **Journal of Population Economics**, 14(2): 225-247.

HM Government (2016) **Childhood Obesity: A Plan for Action**. London: Her Majesty's Government.

Hagger-Johnson, G., Bell, S., Britton, A., Cable, N., Conner, M., O'Connor, D.B., Shickle, D., Shelton, N., Bewick, B.M. (2013) Cigarette Smoking and Alcohol Drinking in a Representative Sample of English School Pupils: Cross-Sectional and Longitudinal Associations. **Preventive Medicine**, 56(5): 304-308.

Haveman, R. and Wolfe, B. (1995) The Determinants of Children's Attainments: A Review of Methods and Findings. **Journal of Economic Literature**, 33(4): 1829-1878.

HDA (2004) **Teenage Pregnancy: an Overview of the Research Evidence** [online]. London: Health Development Agency. Available at: http://webarchive.nationalarchives. gov.uk/+/http:/www.wiredforhealth.gov.uk/PDF/bloopregPO.pdf [Accessed 17 August 2016].

Heath, A.F., Rothon, C., Kilpi, E. (2008) The Second Generation in Western Europe: Education, Unemployment, and Occupational Attainment. **Annual Review of Sociology**, 34:211-235.

Helson, R., Kwan, V.S.Y., John, O.P., Jones, C. (2002) The Growing Evidence for Personality Change in Adulthood: Findings from Research with Personality Inventories. **Journal of Research in Personality**, 36(4): 287-306.

Hobcraft, J. and Kiernan, K. (2001) Childhood Poverty, Early Motherhood and Adult Social Exclusion. **British Journal of Sociology**, 52(3): 495-517

Holford, A. (2015) **Youth unemployment and academic performance: Production functions and policy effects** [online]. Institute for Social and Economic Research working paper series 2015-06. Colchester: University of Essex. Available at:

https://www.iser.sx.ac.uk/research/publications/working-papers/iser/2015-06.pdf [Accessed 01 December 2015].

ILO (2013) **Resolution I: Resolution concerning statistics of work, employment and labour underutilization** [online]. Geneva: International Labour Organisation. Available at: http://www.ilo.org/global/statistics-and-databases/standards-and-guidelines/resolutions-adopted-by-international-conferences-of-labour-statisticians/WCMS_230304/lang--en/index.htm [Accessed 21 November 2015].

Janlert, U. (1997) Unemployment as a Disease and Diseases of the Unemployed. **Scandinavian Journal of Work, Environment and Health**, 23(Supplement 3): 79-83.

Kandel, D.B. and Yamaguchi, K. (1987) Job Mobility and Drug Use: An Event History Analysis. **The American Journal of Sociology**, 92(4): 836-878.

Kennedy, P. (2003) **A Guide to Econometrics**. 5th ed. Oxford: Blackwell Publishing.

Kiessling, A. and Henriksson, P. (2005) Perceived Cognitive Function in Coronary Artery Disease: An Unrecognised Predictor of Unemployment. **Quality of Life Research**, 14(6): 1481-1488.

Kline, P. (1994) **An Easy Guide to Factor Analysis**. London: Routledge.

Kokko, K. and Pulkkinen, L. (2000) Aggression in Childhood and Long-Term Unemployment in Adulthood: A Cycle of Maladaptation and Some Protective Factors. **The Journal of Developmental Psychology**, 36(4): 463-472.

Kokko, K., Bergman, L.R., Pulkkinen, L. (2003) Child Personality Characteristics and Selection into Long-Term Unemployment in Finnish and Swedish Longitudinal Samples**. International Journal of Behavioural Development**, 27(2): 134-144.

Koop, G. (2009) **Analysis of Economic Data**. 3rd ed. Chichester: John Wiley & Sons.

Lauglo, J. (1999) Working Harder to Make the Grade: Immigrant Youth in Norwegian Schools. **Journal of Youth Studies**, 2(1): 77-100.

Leana, C.R. and Feldman, D.C. (1995) Finding new jobs after a plant closing: Antecedents and outcomes of the occurrence and quality of reemployment. **Human Relations**, 48(12): 1381-1401.

Ledesma, R.D. and Valero-Mora, P. (2007) Determining the Number of Factors to Retain in EFA: an Easy-to-use Computer Program for Carrying Out Parallel Analysis. **Practical Assessment, Research & Evaluation**, 12(2): 1-11.

Leventhal, T., Graber, J.A., Brooks-Gunn, J. (2001) Adolescent Transitions to Young Adulthood: Antecedents, Correlates, and Consequences of Adolescent Employment. **Journal of Research on Adolescence**, 11(3): 297–323.

Lupton, R. and Power, A. (2002) Social Exclusion and Neighbourhoods. In Hills, J., Le Grand, J., Piachaud, D. (eds.) **Understanding Social Exclusion**. Oxford: Oxford University Press. pp.30-43.

Lyngstad, T.H. and Prskawetx, A. (2010) Do Siblings' Fertility Decisions Influence Each Other? **Demography**, 47(4): 923-934.

Lynn, R., Hampson, S.L., Magee, M. (1983) Determinents of Educational Achievement at 16+: Intelligence, Personality, Home Background and School. **Personality and Individual Differences**, 4(5): 473-481.

Lynn, R., Hampson, S., Magee, M. (1984) Home background, intelligence, personality and education as predictors of unemployment in young people. **Personality and individual differences**, 5(5): 549-557.

Machin, S., Marie, O., Vujić, S. (2011) The Crime Reducing Effects of Education. **The Economic Journal**, 121(552): 463-484.

Macmillan, L. (2012) The Cost of Youth Unemployment. In ACEVO (2012) **Youth Unemployment: The Crisis We Cannot Afford**. London: Association of Chief Executives of Voluntary Organisations.

Maddala, G.S. (1983) **Limited-dependent and Qualitative Variables in Econometrics**. Cambridge: Cambridge University Press.

Manning, A. (2000) Pretty Vacant: Recruitment in Low-Wage Labour Markets. **Oxford Bulletin of Economics and Statistics**, 62(s1): 747-770.

Määttä, S., Nurmi, J., Majava, E. (2002) Young Adults' Achievement and Attributional Strategies in the Transition from School to Work: Antecedents and Consequences. **European Journal of Personality**, 16(4): 295-311.

McCrary, J. and Royer, H. (2011) **The Effect of Female Education on Fertility and Infant Health: Evidence from School Entry Policies Using Exact Date of Birth**. The American Economic Review, 101(1): 158-195.

Mohammadbeigi, A., Farhadifar, F., Soufi zadeh, N., Mohammadsalehi, N., Rezaiee, M., Aghaei, M. (2013) Fetal Macrosomia: Risk Factors, Maternal, and Perinatal Outcome. **Annals of Medical and Health Sciences Research**, 3(4): 546-550.

Mortimer, J.T. (1994) Individual differences as precursors of youth unemployment. <u>In</u> Petersen, A.C. and Mortimer, J.T. (eds.) **Youth Unemployment and Society**. Cambridge: Cambridge University Press. pp 172-198.

Norström, F., Virtanen, P., Hammarström, A., Gustafsson, P.E., Janlert, U. (2014) How does unemployment affect self-assessed health? A systematic review focusing on subgroup effects. **BMC Public Health**, 14(1): 1310-1323.

Nurmi, J., Salmela-Aro, K., Koivisto, P. (2002) Goal Importance and Related Achievement Beliefs and Emotions during the Transition from Vocational School to Work: Antecedents and Consequences. **Journal of Vocational Behavior**, 60(2): 241-261.

Olson, C.L. (1976) On Choosing a Test Statistic in Multivariate Analysis of Variance. **Psychological Bulletin**, 83(4): 579-586.

ONS (2001) **Birth Statistics: Review of the Registrar General on Births and Patterns of Family Building in England and Wales, 2000** [online]. London: Office for National Statistics. Available at: http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ ons/index.html [Accessed 17 August 2016].

ONS (2008a) **Family Spending – 2007 Edition** [online]. London: Office for National Statistics. Available at: http://webarchive.nationalarchives.gov.uk/20160105160709/http://ons.gov.uk/ons/rel/family-spending/family-spending/2007-edition/index.html [Accessed 26 July 2016].

ONS (2008b) **Regional Labour Market Statistics**. London: Office for National Statistics. Available at: http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-50516 [Accessed 24 August 2016].

Piesse, A. and Kalton, G. (2009) **A Strategy for Handling Missing Data in the Longitudinal Study of Young People in England (LSYPE)**. DCSF Research Report, No. DCSF-RW086. London: The Department for Children, Schools and Families.

Psacharopoulos, G. and Patrinos, H.A. (2004) Returns to Investment in Education: A Further Update. **Education Economics**, 12(2): 111-134.

Royston, P. (2004) Multiple Imputation of Missing Values. **The Stata Journal**, 4(3): 227-241.

Rubin, D.B. (1996) **Multiple Imputation After 18**+ **Years**. Journal of the American Statistical Association, 91(434): 473-489.

Salamanson, Y. and Andrew, S. (2006) Academic Performance in Nursing Students: Influence of Part-Time Employment, Age and Ethnicity. **Journal of Advanced Nursing**, 55(3): 342-349.

Sparkes, J. and Glennerster, H. (2002) Preventing Social Exclusion: Education's Contribution. In Hills, J., Le Grand, J., Piachaud, D. (eds.) **Understanding Social Exclusion**. Oxford: Oxford University Press. pp.178-201.

Specht, J., Egloff, B., Schmuckle, S.C. (2011) Stability and Change of Personality Across the Life Course: The Impact of Age and Major Life Events on Mean-Level and Rank-Order Stability of the Big Five. **Journal of Personality and Social Psychology**, 101(4): 862-882.

StataCorp. (2015a) **Stata Survey Data Reference Manual: Release 14** [online]. Texas: StataCorp. LP. Available at: https://www.stata.com/manuals14/svy.pdf [Accessed 15 August 2016].

StataCorp. (2015b) **Stata Multiple-Imputation Reference Manual: Release 14** [online]. Texas: StataCorp. LP. Available at: https://www.stata.com/manuals14/mi.pdf [Accessed 22 August 2016].

Stewart, J. (2009) **Tobit or not Tobit?** IZA Discussion Paper, No. 4588. Bonn: Forschungsinstitut zur Zukunft der Arbeit.

Ström, S. (2003) Unemployment and Families: A Review of Research. **Social Service Review**, 77(3): 399-430.

Studenmund, A.H. (2006) **Using Econometrics: A Practical Guide**. 5th ed. Cambridge: Pearson Education.

Teichler, U. (2000) Graduate Employment and Work in Selected European Countries. **European Journal of Education**, 35(2): 141-156.

Thornberry, T.P. and Christenson, R.L. (1984) Unemployment and Criminal Involvement: An Investigation of Reciprocal Causal Structures. **American Sociological Review**, 49(3): 398-411.

Townsend, P. (1987) Deprivation. **Journal of Social Policy**, 16(2): 125-146.

UKCES (2011) **The Youth Inquiry: Employers' Perspectives on Tackling Youth Unemployment** [online]. London: The UK Commission for Employment and Skills. Available at: https://www.gov.uk/government/publications/ukces-youth-inquiry [Accessed 20 April 2016].

Vink, G. and van Buuren,S. (2013) Multiple Imputation of Squared Terms**. Sociological Methods and Research**, 42(4): 598-607.

von Wachter, T. (2010) **Testimony Before the Joint Economic Committee of U.S. Congress on "Long-Term Unemployment: Causes, Consequences, and Solutions"**. Congressional Hearing No. 111-584. Washington: U.S. Government Printing Office.

White, I.R., Daniel, R., Royston, P. (2010) Avoiding Bias Due To Perfect Prediction in Multiple Imputation of Incomplete Categorical Variables. **Computational Statistics and Data Analysis**, 54(10): 2267–2275.

WHO (2004) **Low Birthweight: Country, Regional and Global Estimates** [online]. Geneva: World Health Organisation. Available at: http://apps.who.int/iris/bitstream/10665/43184/1/9280638327.pdf [Accessed 26 July 2016].

Winslow, E.B. and Shaw, D.S. (2007) Impact of Neighborhood Disadvantage on Overt Behavior Problems During Early Childhood. **Aggressive Behavior**, 33(3): 207-219.

Wolter, K.M. (2007) **Introduction to Variance Estimation**. 2nd ed. New York: Springer.

Wright, J., Small, S., Raynor, P., Tuffnell, D., Bhopal, R., Cameron, N., Fairley, L., Lawlor, D.A., Parslow, R., Petherick, E.S., Pickett, K.E., Waiblinger,, D., West, J. (2013) Cohort Profile: The Born in Bradford Multi-ethnic Family Cohort Study. **International Journal of Epidemiology**, 42(4): 978-991.