Are those who flourished at school healthier adults? What role for adult education?

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on the Wider
Benefits of Learning

ARE THOSE WHO FLOURISHED AT SCHOOL HEALTHIER ADULTS?

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Executive summary

Background

This report concerns a two-part project about the importance for adult health and well-being of (1) school success and (2) participation in adult learning and addresses the following questions:

- At school, are there signals that indicate whether pupils are likely to experience poor health and well-being in adulthood?

- Is participation in adult learning likely to be a source of help in sustaining and transforming adult health both for those who succeeded at school and those who did not?

- Might adult education have a role in ameliorating health inequalities?

We know that health and well-being is, on the whole, better for adults with more years of schooling and higher qualifications. Does this mean that at school, predicted qualifications or qualifications attained are the best signal available of a child's likely adult health and well-being? In the first part of this project, we therefore examine which aspects of schooling are markers for health and well-being in adulthood, using not only measures of attainment such as qualifications, but also measures of engagement.

Our research questions about adult learning arise from an interest in the potential role for adult learning in improving health and well-being amongst adults generally, and in offsetting the disadvantage associated with not flourishing at school, thereby reducing health inequalities. Qualitative research (e.g. James, 2004; Hammond, 2004) indicates that for some adults, including adults who left school with few qualifications, taking courses contributes to positive well-being and health. However, there is still a paucity of quantitative evidence for the generalisability of such findings to other adults living in Britain. We therefore use quantitative data to examine relationships between participation in adult learning and trajectories in health and well-being for adults who did and did not flourish at school.

Some definitions

We define flourishing at school not just in terms of examinations passed but more generally, in terms of functioning well intellectually, psychologically and socially at school. Our focus is on flourishing at *secondary* school, not because we consider primary school experience to be unimportant for health and well-being later on, but for methodological reasons.

Health and well-being encompasses physical and mental health, health behaviours and well-being.

In order to make comparisons between the health and well-being in adulthood of different groups of cohort members, we calculate odds ratios. These are the odds of a poor as opposed to a good health outcome at age 33 for those who didn't flourish at

school (or for those who did not participate in adult learning), compared to the odds of having a poor as opposed to a good health outcome at age 33 for the rest of the cohort.

Key findings

In terms of flourishing at school we find:

- Part of the reason for inequalities in adult health and well-being is the difference between those who did and did not flourish at secondary school.

- Both attainment and engagement at secondary school matter for adult health and well-being. Amongst cohort members who had poor school attainment, those who were more engaged at school had better adult health and well-being than those who were less engaged at school.

- For example, the odds of smoking at 33 are 4.7 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school ($p<.001$). For men, the ratio of odds is 3.5 ($p<.001$), which is not so high but nevertheless very striking.

In terms of adult learning, we find the following:

- Participation in adult learning is associated with empowerment and small improvements in lifestyle, but not with positive changes in mental or physical health for those who did not flourish at secondary school.

- The same associations between adult learning and adult health and well-being are found for those who did flourish at secondary school, so participation in adult learning is not associated with a change in the gap in adult health and well-being between those who did and did not flourish at secondary school.

And comparing the health outcomes associated with flourishing at school with those associated with participation in adult learning, we find:

- Flourishing at secondary school is associated with a broader range of positive health and well-being outcomes (well-being, lifestyle, mental and physical health) than participation in adult learning, which is associated with positive changes in well-being and lifestyle but not mental and physical health.

- The positive outcomes in adult health and well-being associated with flourishing at secondary school are much greater in magnitude than the positive changes in adult health and well-being associated with participation in adult learning.

The limitations of our data restrict the extent to which we can draw conclusions about the *causal effects* of adult education on health and well-being in adulthood. Nevertheless, we discuss our findings in the light of qualitative studies that provide useful insights into the roles of adult learning in promoting health and well-being.

Methods and caveats

We use data from the National Child Development Study (NCDS). This contains six sweeps of information about over 17,000 individuals who were born in Britain during one week in March 1958.

Using this information, we compare the adult health and well-being of individuals who are similar in terms of social and family background, but who differ in terms of flourishing at school and participation in adult learning (measured by participation in taught courses).

We use eight proxy measures for failure to flourish at secondary school. These encompass attainment, attendance, social adjustment and attitudes. In addition, we construct two measures that combine aspects of attainment and engagement.

The adult health and well-being variables cover fourteen outcomes measured at ages 33 and 42. They include aspects of well-being and mental health and some physical conditions and health behaviours.

First we estimate the associations between failure to flourish at secondary school and health and well-being at age 33, controlling for social, psychological and economic factors up to the age of seven.

We then estimate associations between participation in adult learning and changes in health and well-being between the ages of 33 and 42. We do not think that our dataset, rich as it is, includes all the controls we need and so we interpret the associations found as upper bounds of effects of adult education on trajectories in adult health and well-being. We therefore remain cautious in drawing conclusions about the *effects* of adult learning on health and well-being.

Results

The adult health and well-being of cohort members who did not flourish at school

Those who flourished at school have better outcomes in all the main aspects of well-being than those who did not flourish. The magnitudes of adjusted associations are substantial and apply to well-being, mental and physical health, and health behaviours.

Both *attainment* and *engagement* at secondary school are markers of adult health and well-being. Those with poor attainment but who were quite engaged at school had relatively poor levels of health and well-being in adulthood compared to cohort members who had attained well at school, but those with poor attainment and poor engagement had worse adult health and well-being than either group.

The magnitudes of adjusted associations vary between different outcomes, but almost all are statistically significant. Some examples are given in the box on page v.

In general our findings apply to both men and women. The main exception is that not flourishing at school is associated with a higher prevalence of migraines for women but not for men.

The contributions of adult learning to sustained and transformed health and well-being

Previous research conducted at the Centre suggested that participation in adult learning is associated with giving up smoking and taking more exercise (Feinstein and Hammond, 2004). The findings presented here provide additional evidence for these associations. Similar associations are found even after adjusting for social and family background, childhood health and attainment, and socio-economic circumstances, qualifications, health and well-being in adulthood.

In addition, after adjusting for these factors, we find that those who participate in adult learning have positive transformations in well-being, optimism, efficacy (perceived control over important factors) and self-rated health. The magnitudes of the associations are not very large, but they are important nevertheless. The adjusted odds for transformed well-being are between 1.2 and 1.3 times greater for those who took courses than they are for those who did not.

After adjusting for background factors and adult circumstances, associations are *not* found between participation in adult learning and sustained or transformed satisfaction with life so far, depression, excessive drinking or obesity.

The same associations between participation in adult learning and positive changes in adult well-being and lifestyle are found for those who did and did not flourish at secondary school. So participation in adult learning is not associated with either widening or closing the gap in health and well-being between those who did and those who did not flourish at secondary school.

Examples of health outcomes for those who did and those who did not flourish at school

The odds of smoking at 33 are 4.7 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.001).

The odds of smoking at 33 are 3.47 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.001).

The odds of drinking heavily at age 33 are about 1.5 higher for those who did not flourish at secondary school than they are for those who did.

The odds of taking exercise less than once a week at age 33 are about 1.5 higher for those who did not flourish at secondary school than they are for those who did.

The odds of having depression at 33 are 2.4 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

The odds of having depression at 33 are 2.0 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

The odds of having low self-efficacy at 33 are 1.9 times higher for women and for men who had no O level equivalents at 16 and were disengaged at school than they are for women and men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

The odds of having had migraines by 33 are 1.3 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.05).

The odds of having had back pain by 33 are 1.3 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.05).

Conclusions

In our data, adults who had flourished at secondary school enjoyed better health and well-being than adults who had not. Flourishing was not only about attainment. Signals about broader child development observed by the children's teachers, their parents, and expressed by the children themselves were strongly associated with differences in adult health and well-being beyond any effect of qualifications attained. Policy makers and service providers need to consider how this information can be used to best effect and respond to the challenges this provides.

The first part of this project is concerned with the role of schools in the generation and/or remediation of health inequalities. Limitations in our methods and data resources limit the extent to which we claim to have assessed the *causal effect* of the school system on health inequalities. On the basis of theory and evidence from other studies, we think it likely that flourishing at secondary school is an element in the

process by which inequalities in adult health and well-being develop, over and above the important contributions made by social, economic and family background, and health and attainment during infancy. However, the key story from this part of the project is that we have found that important signals about adult health exist in childhood and these can be picked up in policy implementation and service development.

The second part of the project concerns the roles of adult education in health and well-being. Adults who participated in adult education during their thirties tended to enjoy positive transformations in their health and well-being more than their counterparts who had not taken courses. Policy makers need to understand the reasons behind these associations. We do not have the evidence necessary to claim that adult learning *causes* these positive changes observed. We still need to identify the extent to which adults who are motivated to participate in adult education are already more likely to have positive outcomes in health and well-being – and why, and to what extent taking courses actually contributes. Qualitative research certainly suggests that participation in adult education can have positive impacts on well-being and this may translate into healthier lifestyles and better mental health (e.g. James, 2004; Hammond, 2004). We do not claim that taking courses is either the unique policy lever that will sustain and transform health and well-being or a panacea to health and well-being for every individual at any stage of life. However, if appropriate provision is available at the right time, it may play an important role in promoting healthy lifestyles, well-being and mental health.

Adult learning is associated with positive outcomes in the health and well-being of adults who did not flourish at secondary school as well as for adults who did. The findings are similar for flourishers and non-flourishers. Thus, whilst adult learning seems to be important for the health and well-being of adults who did not flourish at secondary school, it is not associated with narrowing the gap.

Our findings provide benchmarks with which to compare the relative importance of flourishing at secondary school and participation in adult learning for well-being and health in adulthood. To our knowledge, no other similar comparisons have been made to inform policy in this area. The differences in adult health and well-being between those who flourished at secondary school and those who did not are much more substantial and pervasive than the differences between adults who did and did not participate in adult learning in their thirties. Intuitively, we would expect patterns established in early life to have a more profound effect than those adopted in later life, and the difference in scale and pervasiveness of the results for school and for adult education tend to support this. The finding underlines the importance of understanding why flourishing at secondary school is such an important signal for adult health and well-being. However, it does not negate the value of adult education, which seems to be important in positive outcomes in health and well-being amongst adults, whether or not they flourished at school.

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1. Introduction

1.1 Aims of the research

This paper reports on a project in two parts about the importance for adult health and well-being of (1) school success and (2) participation in adult learning. At school, are there signals which schools or other agencies can pick up on that indicate whether pupils are likely to experience poor health and well-being in adulthood? Is participation in adult learning likely to be a source of help in sustaining and transforming adult health both for those who succeeded at school and those who did not? And might adult education have a role in ameliorating health inequalities?

We know that in Britain and in many other countries health and well-being is, on the whole, better for adults with more years of schooling and higher qualifications. Does this mean that at school, predicted qualifications or qualifications attained are the best signal available of a child's likely health and well-being as they develop into adults? In the first part of this project, we examine which aspects of schooling are markers for health and well-being in adulthood, including not only measures of attainment such as qualifications, but also measures of social inclusion. The strength of these signals may be of interest to teachers, the school system more generally, and to parents.

We therefore examine relationships between adult health and well-being and flourishing at school. Flourishing at school is defined not just in terms of examinations passed but more generally, in terms of functioning well intellectually, psychologically and socially at school.

Our focus is on flourishing at *secondary* school, not because we consider primary school experience to be unimportant for health and well-being later on, but for methodological reasons.

The second part of the project arises from an interest in the potential role for adult learning in improving health and well-being amongst adults generally, and in offsetting the disadvantage associated with not flourishing at school, thereby reducing health inequalities. Qualitative research (e.g. James, 2004; Hammond, 2004) indicates that for some adults, including adults who left school with few qualifications, taking courses contributes to positive well-being and health. However, there is still a paucity of quantitative evidence for the generalisability of such findings to other adults living in Britain. We therefore use quantitative data to examine relationships between participation in adult learning and trajectories in health and well-being for adults who did and did not flourish at school. The limitations of our data restrict the extent to which we can draw conclusions about the *effects* of adult education on trajectories during adulthood in health and well-being. Nevertheless, we discuss our findings in the light of qualitative studies that provide useful insights into the roles of adult learning in promoting health and well-being.

The research questions we address are:

- What are adult well-being and health like for people who did not flourish at secondary school?

- Is adult learning associated with the sustaining and/or positive transformation of well-being and health of this group?

In the light of our findings, we compare the magnitudes of associations between adult health and well-being and flourishing at secondary school on the one hand, and adult learning on the other. We also ask whether participation in adult learning is associated with a change in the gap in adult health between those who did not flourish at secondary school and those who did.

This introduction gives an overview of evidence from other studies concerning effects of education at all stages of the life course on health and well-being. The second chapter describes the methods and data that we use to address the research questions. The results are presented in the third, fourth and fifth chapters. The final chapter discusses what conclusions can be drawn from the findings and implications for policy and future research.

1.2   Why we think that education affects health

The first section of this chapter discusses the evidence that education affects health and well-being, and the second presents a working model of the processes through which this might happen. Evidence about effects of education on health is relevant to the second part of the research, which arises from an interest in the potential role for adult learning in health and well-being. It is also relevant to the first part of the project as contextual background. What theory and evidence is there to suggest that education affects health such that it might be appropriate to consider the school system as a locus for intervention? The third section of this chapter discusses these reasons more fully.

1.2.1   Evidence that education affects health

The association between education and health is well documented. Those with higher qualifications and who have spent more years in education have relatively low mortality rates, low rates of most health conditions including depression and tend to live healthier lifestyles, worldwide and more specifically in Britain (e.g. Blane et al., 1996; McMahon, 1999; Montgomery and Schoon, 1997; Benzeval et al., 1995; Lawlor et al., 2005). Similar correlations are found between these health outcomes and other measures of socio-economic class such as wealth and occupational status (Acheson, 1998; Graham, 2000; Blane et al., 1996; White et al., 1999).

It is difficult to separate out the contributions of income, occupational status and education to health and well-being. Evidence concerning the importance of education as a determinant of health inequalities is contradictory (e.g. Davey-Smith et al., 1998; Blane et al., 1996; White et al., 1999; Smith, 2004). The various markers of socio-economic position are correlated, and impact on one another throughout the life

course. It is likely that the importance of education relative to other indicators of socio-economic position for health inequalities varies over the life course (e.g. Singh-Manoux et al., 2002, 2004).

Evidence that education affects health and well-being is difficult to find. Establishing causality is problematic because experimental data are not available.

Arkes (2003) used an econometric technique that is designed to test for causal relationships. Rather than estimate associations between staying on at school and health, he used intra-state differences in unemployment rates during a person's teenage years as an instrumental variable for staying on at school. The author hypothesises that a higher unemployment rate during a person's teenage years is associated with staying at school for longer because lower wages and fewer jobs reduces the opportunity costs of staying on at school. Using unemployment rates as an instrumental variable for staying on at school helps address the selection bias in who stays on at school. Arkes estimates that a year of school reduced the probability of having a work-limiting health condition by 2.6 percentage points and reduced the probability of requiring personal care by 0.67 percentage points.

Chevalier and Feinstein (forthcoming) also used the method of instrumental variables in their study of the effects of education on adult depression. They use differences between the schools attended by pupils between age 11 and age 16 to provide exogenous variation in the educational success of pupils, which can then be used to predict depression rates at age 42. They find quite substantial protective effects of education on depression, particularly for females.

Spasojevic (2005) capitalised on a unique social experiment, the 1950 Swedish comprehensive school reform, to estimate the causal effect of schooling on adult health outcomes in Sweden. Between 1949 and 1962, a new comprehensive schooling system was implemented randomly in different parts of Sweden. Because of this, persons born between 1945 and 1955 went through two different school systems, one of which involved additional years of schooling. The random implementation of the comprehensive school system therefore constitutes an instrumental variable, (see also Walker et al.). Spasojevic found that additional schooling produced better adult health outcomes, even after controlling for cohort and regional effects, family background characteristics and individuals' incomes.

Feinstein and Hammond (2004) used fixed effects models to assess the contributions of adult learning to health and social capital in terms of changes during adulthood, finding moderate but significant effects. They also controlled for background, childhood, and adult factors. The method can estimate causal effects more robustly than when the *level* of health is the outcome as, in the change model, the effect estimate is based on the classic before-after comparison, i.e. the same individual considered at two points in time. In the case of estimation based on levels, a cross-sectional comparison is made, i.e. of different individuals at a single point in time. In the change model, any sources of confounding bias that are constant over time are removed. Nonetheless, unobserved *changes* in individuals may still cause bias. Therefore, although the method has greater robustness than most other studies in the literature on the effects of adult learning, the authors do not claim to find pure causal effects of adult learning. They conclude that adult learning may have contributed to

the positive changes in the range of health outcomes measured and reject the hypothesis that adult learning is unrelated to positive health development. The extent to which adult learning is an exogenous catalysing force remains unidentified but the evidence of the study was compatible with the hypothesis that adult learning has considerable potential for producing health benefits.

Qualitative research suggests that adult education can both sustain and transform health and well-being (Schuller et al., 2002; 2004). Schuller and his colleagues conducted 145 in-depth biographical interviews about the effects of learning throughout the life course and one of their conclusions is that participation in adult learning can both sustain and transform individuals' lives. The authors explain,

> *A very general but crucial conclusion is that the sustaining effect of education is pervasive, operates at many different levels and is crucial to the lives of countless individuals and communities. It is the transformational effects that often tend to be highlighted, quite reasonably, since they are more readily visible. But our study reveals many of the ways in which education underpins the maintenance of personal well-being and social cohesion. It prevents or inhibits decline and, more positively, reinforces on a continuing and usually unspectacular basis the health of individuals or communities, to an extent that is largely unrecognized or at least left deeply implicit (Schuller et al., 2002, p.iii)*

The empirical research reported here does not develop causal evidence. Rather, we use an epidemiological or descriptive approach to identify aspects of child development that can be picked up by the school system and parents that signal health and well-being later in life. We then examine whether and to what extent participation in learning later in life is associated with the remediation of health inequalities.

1.2.2 A model of the processes through which education affects health and well-being at the level of the individual

A model of the processes through which we hypothesise that education affects health and well-being is given below in Figure 1. It was originally formulated from a review of the relevant literatures (Hammond, 2002), and was developed through a qualitative project involving interviews with learners and practitioners about the meanings of lifelong learning (Hammond, 2004).

A few studies have attempted to trace the processes through which education impacts on health (e.g. Blane et al., 1996; Ross and Mirowsky, 1999). However, different disciplines provide partial evidence and insights. For example, studies of educational interventions concern the immediate outcomes specified in Figure 1, whilst health psychology addresses the determinants of health, which are described as channels in the same figure. A combination of complementary studies therefore underpins the model.

The model provides an illustration of the immediate impacts of education on cognitive development, which encompasses key skills, critical awareness, independence of thought, and problem-solving skills; and psychosocial development, encompassing efficacy, self-worth, identity, hopes and aspirations, social attitudes, a sense of belonging, communication skills, new friendships and contacts. This overlaps to some

extent with peer group memberships and networks, which in turn relate to status. The final, but not the least important, immediate outcome in the model is qualifications. The immediate outcomes of learning can be thought of as capabilities (see Schuller et al., 2004). They impact on physical and mental health and well-being through a number of channels.

The first channel is economic and includes occupational security and status, job satisfaction, freedom from financial hardship and financial anxiety, and income. The second is access to health-related services. Where resources are limited, access may depend not only on level of need, but also on whether the individual wishing to use the service communicates their needs effectively, with pertinence and in a manner that the service providers understand and respect. Health practices are influenced by access to relevant information and advice, efficacy, self-worth, identity, autonomy, future orientation and peer groups, each of which are hypothesised to be affected by education. Resilience (the capacity to cope with stressful circumstances) depends to a substantial degree on many of the psychosocial and cognitive qualities and resources that can be developed through education.

The model requires further development. Firstly, the impacts of education are not always beneficial to the individual or to their communities and societies, and the model does not indicate this. Education can be empowering, but because it involves challenge, a risk is attached. Negative experiences in an educational setting can undermine self-esteem and identity, confuse occupational decisions and lead to alienation.

Second, the model does not reflect the dynamic nature of the relationships involved. Education affects health, but health also affects participation in education. Similarly, increases in efficacy and changed peer groups may lead to participation in education, and changes in occupation, financial circumstances or health behaviours may lead to changed peer groups, status, identity and aspirations. In fact, most of the relationships specified in the model could run causally in either direction. It is likely that the model shows an isolated part of a dynamic system of development.

Figure 1: A model of the processes through which education affects health and well-being

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│  ┌──────────┐    ┌──────────────┐    ┌──────────────┐   ┌──────────────┐ │
│  │ Education│──▶ │ Immediate    │──▶ │ Channels     │──▶│ Health       │ │
│  └──────────┘    │ outcomes of  │    │              │   │              │ │
│                  │ learning     │    │ Economic     │   │ Well-being   │ │
│                  │              │    │              │   │              │ │
│                  │ Cognitive    │    │ Access to    │   │ Mental       │ │
│                  │ development  │    │ services     │   │ health       │ │
│                  │              │    │              │   │              │ │
│                  │ Psychosocial │    │ Health       │   │ Physical     │ │
│                  │ development  │    │ literacy     │   │ health       │ │
│                  │              │    │              │   └──────────────┘ │
│                  │ Peer group   │    │ Health       │                    │
│                  │ memberships  │    │ practices    │                    │
│                  │ and networks │    │              │                    │
│                  │              │    │ Coping       │                    │
│                  │ Status       │    │ with stress  │                    │
│                  │              │    └──────────────┘                    │
│                  │ Qualifications│                                       │
│                  └──────────────┘                                        │
└─────────────────────────────────────────────────────────────────────────┘
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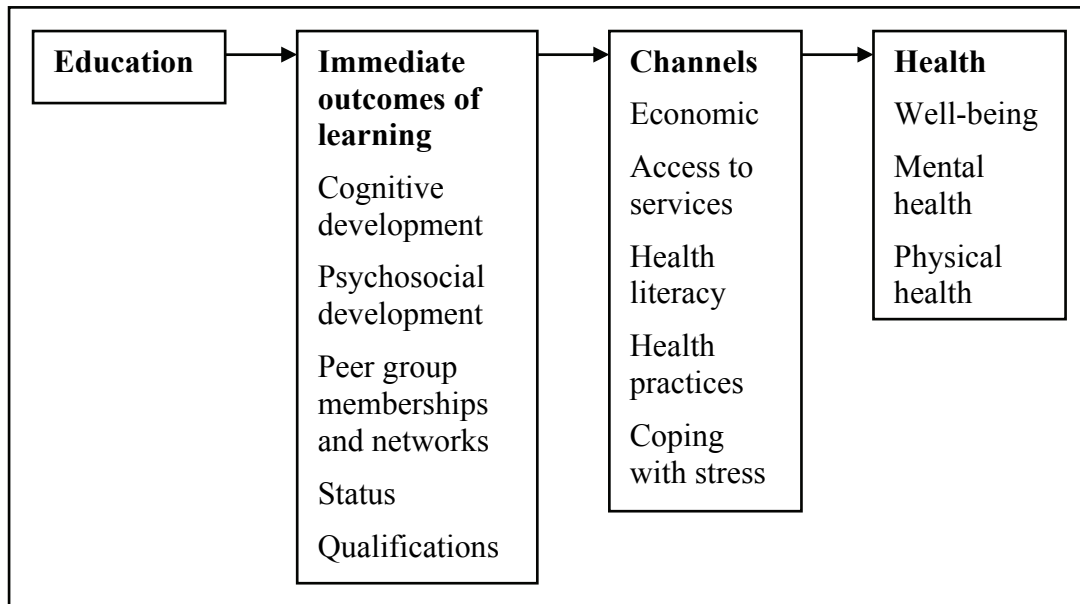
Third, the relationships illustrated in the model operate within the psychological, family, social and economic contexts of the individual. Educational provision combines with the individual's psychological, family, social, and other contexts to generate a range of educational experiences. Individuals' contexts also contribute to psychosocial development, cognitive development, status, peer groups, economic outcomes, health practices, coping with stress, well-being and mental and physical health, quite independently from the provision of education. In addition, contexts moderate the relationships specified in the model. The impacts on health and well-being of education depend upon the match between the educational provision and the interests, strengths and needs of the learner (Hammond, 2004).

Fourth, we do not expect education to impact on different types of health outcome through the same processes. For example, the contribution of education to well-being may operate primarily through improved economic conditions and coping effectively with stressful circumstances, whilst the adoption of positive health practices and better access to health-related services might be more important in relation to physical health. In addition, impacts on well-being and mental health may be more immediate than they are on physical health. Thus, we do not predict that correlations between education and different types of health outcome will be of the same magnitudes.

Fifth, the model can be applied to education experienced at any stage of the life course. However, the impacts on adult health and well-being of education experienced during infancy, childhood, adolescence and adulthood are likely to differ.

Education contributes to psychosocial development, cognitive development and qualification levels at all stages of the life course, but there are reasons to hypothesise that, as with other outcomes of education (Carneiro and Heckman, 2003), the benefits to health and well-being will be greater if education is experienced earlier. We think it likely that the earlier that education is experienced, the greater its potential to

contribute to the four channels described in the model (economic, access to health services, health practices and coping with stress) and ultimately to well-being and mental and physical health. Thus, we expect to find associations between school education and health and well-being in adulthood that are greater in magnitude and more pervasive than for adult learning.

1.2.3   Flourishing at secondary school and adult health and well-being

The notion of flourishing is useful because it applies the construct of well-being to a particular setting, in this case secondary school and does so in a developmental way that recognises the importance of time and process. Thus flourishing is not a static concept that can be applied in a single slice of time but refers to an individual's developing agency and well-being over time. Keyes (2003) analysed the relationships between different aspects of well-being and mental health and defined a notion of flourishing that includes both affect (i.e. feelings) and functioning (i.e. development, capability and behaviour.) For Keyes, positive functioning includes self-acceptance, personal growth, purpose in life, efficacy, autonomy, positive relationships, a sense of belonging to a social group, social acceptance, social contribution, and seeing one's social context as possessing potential for growth. These outcomes are also considered to be important as building blocks of educational success and well-being in adult life and, therefore, might be thought of as important indicators of success during childhood. Keyes' investigations and those he cites suggest that flourishing is distinct from but negatively associated with depression.

We suggest that the extent to which children flourish at secondary school depends on the matches between their interests and aspirations and the ethos, objectives and practices in the school. It also depends on their relationships with teachers and peers, how they 'fit in' and whether they feel that they belong. Flourishing at secondary school is about social inclusion as well as cognitive success.

Ryan and Deci (2000) argued that individuals thrive in contexts that meet certain core needs: the need for competence, autonomy and relatedness (or connectedness). Similarly, Eccles et al. (1997) argued that we can understand adolescents' attachment and engagement in various contexts by comparing the extent to which each of the adolescents' major contexts provide for these basic needs as well as for the need to be respected and to make meaningful contributions. More specifically, Eccles et al. argued that adolescents have substantial control over how much time and energy they invest in being an active participant in various contexts (e.g. school versus time with their peers; time with peers versus time with family) and that adolescents will become most invested in those contexts that best meet their developmental and psychological needs. If these needs are not being met at school, Eccles et al. predicted that the adolescents would detach themselves from the school context and shift their time and energy investments to a better fitting context such as their peer group. The more that individuals flourish in school contexts the greater will be their lifetime attachment to learning. Moreover, given the length of time that pupils spend in school (cf Rutter et al., 1981) the more that they flourish socially at school, the better will be their sense of social well-being and social inclusion, potentially over a lifetime.

Flourishing at secondary school depends to a large extent on background and the contexts the child lives in, but also on the child's own developing agency in terms of

personality, attributes, well-being and capabilities. Thus, economic, social, family and physiological factors probably contribute to flourishing at secondary school. In addition, as explained in the previous paragraph, aspects of the school are likely to make a difference.

We hypothesise that flourishing at secondary school is likely to be an element in the process by which inequalities in adult health and well-being develop. This is illustrated in Figure 2 below.

Figure 2: Relationships between flourishing at secondary school and adult health and well-being
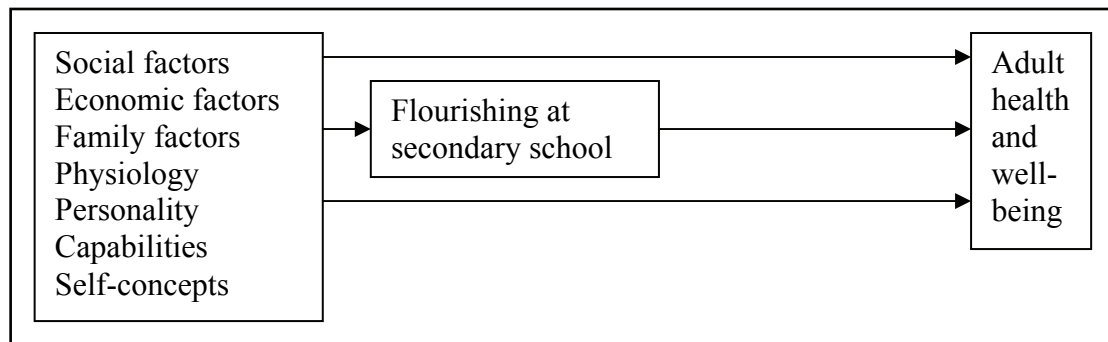
The same economic, social, family and child factors that influence flourishing at secondary school probably also influence the development of health and well-being through the life course. Therefore, correlations of flourishing measures with adult health do *not* indicate effects of the former. In econometric language, flourishing is not exogenous. Thus flourishing at school acts both as a proxy measure for these background factors (such as income and social class) but may also play a role in the processes by which they lead to inequalities in health and well-being in adulthood. In addition, flourishing or failure to flourish may itself have important independent effects as children develop long-term self-concepts and attitudes that follow from their experiences of inclusion, success and well-being (or otherwise) in school. Thus, aspects of school provision may moderate the effects of background on the development of health and well-being.

In this study we cannot assess the extent to which the statistical association of flourishing at secondary school and adult health is explained by each of the aspects referred to above, i.e. causation, mediation or spurious confounding. Nevertheless, where associations are found, we believe that they may be of value in indicating the extent to which understanding the possible role of flourishing at secondary school will help in addressing and redressing health inequalities. In particular, the finding that the signal was significantly predictive prompts the question: how can policy makers and service providers most effectively track and respond to these signals?

2.   Methods and data

2.1   Overview of methods used

The research questions set out in Section 1 are:

1. What are adult well-being and health like for people who did not flourish at secondary school?

2. Does adult learning contribute to sustaining or transforming the well-being and health of this group?

These research questions are illustrated in Figure 3, where arrow 1 represents the first research question and arrow 2 represents the second. Arrow 2a represents stage 2a described below.

We address these questions in 3 stages:

1. The adult well-being and health of those who did not flourish at secondary school.

2a. Participation in adult learning of those who did not flourish at secondary school.

2. The associations between adult learning and well-being and health for those who did not flourish at secondary school.

The methods are presented under these 3 headings in Sections 2.2, 2.3 and 2.4, and so are the results in Sections 3, 4, and 5. The data and variables are described after the methods sections, in Section 2.5.

To facilitate interpretation, we use similar methodological approaches to estimate the separate associations of school and adult learning with health and well-being during adulthood, and use the same adult outcomes.

For research question 1, we consider states of health and well-being at age 33. For research question 2, we estimate the associations between participation in adult learning and changes in health and well-being between the ages of 33 and 42. This has the methodological advantage of eliminating many sources of confounding bias (see below).

Associations between flourishing at secondary school and adult health and well-being may reflect effects of school flourishing, albeit through a variety of untested channels. In addition, they may reflect the impacts of background variables that affect both flourishing at secondary school and health and well-being in adulthood. For example, good health during early childhood may promote both flourishing at secondary school and positive health and well-being later in life. Although this part of the analysis is mainly descriptive, the fact remains that we are more interested in the first hypothesis. We refer to the second as confounding bias.

We reduce the contribution of confounding bias by including in our models variables which capture those factors which we believe affect school flourishing and health and

well-being at age 33. Of course it is impossible to include every source of confounding bias, as these are not all measured in the survey. However, we include those variables which capture the key elements of confounding bias up to the age of 7: family and social circumstances, attainment and health. Details of the control variables are given in Section 2.5.5 and Appendix 2.

In relation to our second research question, associations between participation in adult learning between 33 and 42 and changes in health and well-being over the same period can be explained in three ways: (1) effects of adult learning on health and well-being (our specific hypothesis); (2) confounding bias; and (3) effects of changes in health and well-being on participation in adult learning, which we refer to as reverse causality. As for research question 1, we address the problem of confounding bias by introducing controls in our models. These include the controls at age 7 used for research question 1 with additional controls for socio-economic status, qualifications, health and well-being at age 33. They are described in more detail in Section 2.5.5 and Appendix 2. There is little that we can do to assess the extent to which reverse causality accounts for any correlations found because we do not have precisely dated information about the sequences of events.

Figure 3: The research questions
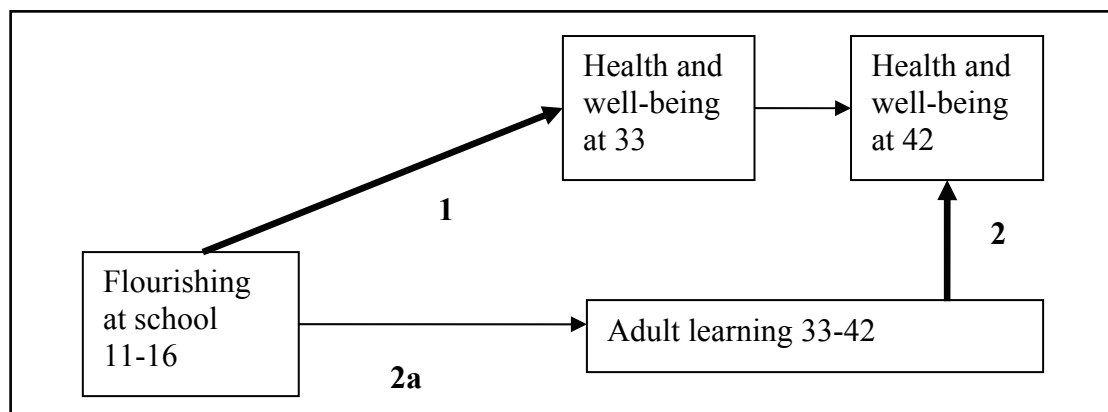
We do not believe that our analyses exclude all selection bias (i.e. confounding bias and reverse causality) in relation to either research question. Therefore we are cautious in drawing causal inferences from our findings. However, the changes in magnitude, statistical significance and direction of associations that result from controlling for confounding bias are clues to the nature and extent of the residual confounding bias for which we have not controlled. For example, if adding in our controls for social and family background, early attainment, childhood health and life circumstances at age 33 hardly changes the associations between participation in adult learning and adult health and well-being, then this suggests that confounding bias is not an important problem and that the association between taking courses and adult health and well-being is likely to be unaffected by confounding bias. If the controls reduce the magnitudes of associations by a substantial amount, then this implies that confounding bias contributes positively to the size of associations and that our findings, which exclude some but not all confounding bias, should be interpreted at best as the upper bounds of effects.

We estimate associations between participation in adult learning and changes in adult health for those who did and did not flourish at secondary school. Under the assumption that selection bias in adult learning is the same for flourishers and non-flourishers, we can assess whether participation in adult learning is associated with reductions in the health gap between those who flourished at secondary school and those who did not.

The findings about the relative sizes of conditional associations provide clues about the relative importance of learning at different stages of life. This raises questions for future research and provides useful if tentative findings to guide policy where previously there were none.

2.2 Methods (1): The adult well-being and health of those who did not flourish at school

Analyses were conducted in two stages. The first stage provides descriptions of the raw associations between failure to flourish at secondary school and health and well-being in adulthood. The second investigates whether poor secondary school experiences are associated with poorer well-being and health in adulthood, after controlling for biological and social background.

We use eight proxy measures for failure to flourish to identify eight groups who failed to flourish at secondary school. Details of the variables used are given in Section 2.5.1. For each group in turn, we examine the health and well-being at age 33 of members of the group compared to the rest of the cohort. Thus, for every health and well-being outcome, eight comparisons are made.

In addition to the eight groups, we define two sub-groups of adults who had poor school attainment. One sub-group manifested more signs of disengagement at school than the other sub-group. We simultaneously compare the health and well-being at age 33 of members of each sub-group with the health and well-being at age 33 of cohort members who had relatively good school attainment.

We use fourteen outcomes for health and well-being at age 33. More measures are available in the age 33 data, but we restrict ourselves to variables that are measured at both 33 and 42. This is because the second research question is investigated using changes in health and well-being as opposed to absolute levels, which we measure by comparing values of the same outcome at ages 33 and 42.

Because we hypothesise that relationships between failure to flourish at secondary school and health and well-being at age 33 vary by gender, we conduct separate sets of analyses for men and women.

In order to make comparisons between the health and well-being in adulthood of different groups of cohort members, we calculate odds ratios. These are the odds of a poor as opposed to a good health outcome (at age 33) for those who didn't flourish at school (based on one of the proxy measures), compared to the odds of having a poor as opposed to a good health outcome (at age 33) for the rest of the cohort.

For example, if the prevalence of depression at age 33 amongst cohort members who truanted from school were the same as the prevalence for depression at age 33 amongst those who did not truant, then the odds of having depression at age 33 would be the same for the two groups and the odds ratio would be one. If, on the other hand, depression were more prevalent amongst truanters than amongst non-truanters, then the odds ratio for having depression at age 33 for truanters (as opposed to non-truanters) would be greater than one. Conversely, if truanters were less likely to be depressed at age 33 than non-truanters, then the odds ratio for truanters having depression at age 33 would be less than one.

We use logit analyses to deal with the fact that our dependent variables are binary. In the results we report odds ratios and p-values. Separate analyses are run for each health and well-being outcome and for each of the eight groups. A single analysis is run for the two subgroups of cohort members with poor school attainment so that we can compare the health and well-being at age 33 of each subgroup simultaneously with the health and well-being at age 33 of those with relatively good school attainment.

As explained in Section 2.1 above, the odds ratios are not evidence for causal effects of failure to flourish at secondary school. The odds ratios can be explained by any combination of (1) causal effects of failure to flourish at school and (2) confounding bias. In the second stage of the analysis, we attempt to minimise effects of confounding bias by estimating the same differences controlling for a range of background factors which we think might influence both failure to flourish at secondary school and adult well-being and health. We use information from the survey conducted when the cohort members were first born and when they were 7 years old. This information is provided before the information used to measure failure to flourish at secondary school, which is taken from subsequent sweeps, at ages 11 and 16.

The control variables are described in Section 2.5.5. As mentioned above, they do not encompass every aspect of out-of-school circumstance which might affect adult health and well-being and we are cautious in drawing causal inferences. Instead, we report the adjusted associations that remain after conditioning out many but not all sources of confounding bias.

2.3   Methods (2): Participation in adult learning of those who did not flourish at school

Initially, we examine raw associations between failure to flourish at school and participation in adult learning between the ages of 33 and 42. We then investigate adjusted associations between failure to flourish at school and rates of participation in adult learning, controlling for many of the important influences of social background.

In the interest of simplicity and to facilitate interpretation, odds ratios are used to describe associations, and the control variables that are included in the model are the same as those used to investigate research question 1, (described in Section 2.5.5). Once again, we do not believe that we have controlled for all background circumstances other than flourishing at school which could affect participation in

adult learning, and we are therefore cautious in drawing causal inferences from this model.

2.4   Methods (3): Associations between adult learning and well-being and health for those who failed to flourish at school

In this third stage, we address the second research question: Is adult learning associated with the sustaining and/or positive transformation of well-being and health for those who did not flourish at secondary school?

In order to answer this question, we investigate whether patterns in the health and well-being of cohort members between the ages of 33 and 42 differ systematically between those who took courses between these ages and those who did not. We make these investigations for the whole group of cohort members and also for five of the groups who failed to flourish at secondary school, based on the proxy measures described in Section 2.5.1.

The analyses are run for adults with no O level equivalents at age 16, for adults who reported truanting at 16 and for adults who reported negative attitudes towards school at 16. These three groups are relatively large, comprising 50% or more of the sample. We do not run the analyses on the smaller groups (those with poor maths, poor reading, poor attendance, or poor adjustment manifested by internalising or externalising behaviours) because the results of analyses with small sample sizes are difficult to interpret. The exception is the two groups who had no O level equivalents at age 16 and were either engaged or disengaged at school. Although the sample sizes are relatively small for these groups, we include them because they are of particular theoretical interest; our research question concerns the contribution of adult learning to the health and well-being of those who failed to flourish at secondary school and the group with no O level equivalents and also disengaged for school may be those who flourished least.

We do not differentiate between participation in different types of course because our focus is on groups of adults who participate in adult learning. Sample sizes are already relatively small and we do not reduce them further by breaking down the analyses by type of course taken (but see Feinstein and Hammond, 2004).

As before, we use logit analyses and report odds ratios and their p-values for sustained or transformed health and well-being contingent upon participation in adult learning.

We interpret the associations between participation in adult learning and health and well-being in the context of the relatively poor health and well-being in adulthood of those who failed to flourish at secondary school. Therefore, we use the same age 33 outcome measures at this stage of the analysis as we did in the first stage (see Section 2.2). However, we do not use as our outcomes absolute levels of health and well-being at 33, but rather, changes between the ages of 33 and 42. This is because our objective is to investigate the sustaining and transforming effects of adult learning (see Section 2.1). In addition, estimating odds ratios for changes rather than absolute levels has methodological advantages, increasing the extent to which we can control for confounding bias. Even so, sources of time-varying confounding bias remain.

The model is run for each health and well-being outcome separately. Odds ratios of sustained or transformed health and well-being contingent upon participation in adult learning are reported, together with the associated p-values.

The analyses are run for the whole cohort and for five groups of cohort members who failed to flourish at school. In order to test whether associations between adult learning and changes in health and well-being differ between those who did and did not flourish at school, we conduct additional analyses, which are described in Appendix 6. We cannot run the analyses for all of the groups that we identify using the measures described in Section 2.5.1 because some of the groups have sample sizes that are too small.

We also estimate the contributions of adult learning to the health and well-being of men and women separately. This is because we expect that changes in health and well-being during adulthood differ between men and women. Details of the tests pertaining to gender are given in Appendix 5.

In the final section, we compare the separate contributions of school and adult learning to health and well-being during adulthood. We also consider whether participation in adult learning is associated with changes in the gap in adult health and well-being between those who flourished at secondary school and those who did not.

2.5   Data and variables

We use data from the National Child Development Study (NCDS). This is a survey of all those born in Great Britain between March 3rd and 9th in 1958. 17,733 mothers had live babies during that week and 17,415 completed the initial survey. Additional information was collected on the cohort members at ages 7, 11, 16, 23, 33 and 42, the last survey being completed in 2000. During childhood, information was collected from the cohort members' parents or carers, schools and health visitors. Medical examinations and cognitive tests were carried out, and data were collated from the examination boards. Since the beginning of the 1980's, the surveys have been completed by the cohort members themselves. The dataset thus provides enormously rich longitudinal information for a very large number of individuals.

Attrition rates are low, with 11,419 cohort members participating in the last sweep of the survey in 1999. From previous sweeps, we have information about who does not take part in subsequent sweeps. These individuals tend to come from ethnic minority and relatively low socio-economic background, grow up in poor housing, and have low attainment, aspirations and poor health as children (Shepherd, 1993). They are therefore relatively likely to have poor health and well-being as adults, and not have flourished at secondary school, and not have participated in adult learning. Consequently, their exclusion from the survey is likely to lead to underestimates of the associations between school or adult learning and adult health and well-being.

2.5.1 Proxy measures for failure to flourish at school

As explained in Section 2.2, the proxy measures for failure to flourish at school are derived from data collected about cohort members at the ages of 11 and 16 and so they relate to secondary school.

Poor maths. Members of this group are identified using scores on maths tests at ages 11 and 16. The maths tests used at ages 11 and 16 were constructed by the National Foundation for Educational Research (NFER) for use in the study. Cohort members are assigned to the poor maths group if they scored in the bottom 20% at age 11 and at 16.

Poor reading. Members of this group are identified using scores on a reading comprehension test that was constructed by the NFER specifically for use in the study. The same test was used at ages 11 and 16. Cohort members are assigned to the poor reading group if they scored in the bottom 20% at age 11 and at 16.

No Os. This group consists of members of the cohort who had no O levels and no other qualification at an equivalent level or above at age 16.

Self-reported truants are those who, at the age of 16 answered yes to the question:

> *"Have you stayed away from school at all this year when you should have been there?"*

This group probably includes a variety of individuals ranging from persistent truants to those who selectively missed a particular subject and individuals who truanted on just one occasion.

Poor attenders are identified using information supplied by teachers about the proportion of half days that the cohort member was absent during the autumn term of 1973, when cohort members were 15. Poor attenders are those cohort members whose school attendance during this period falls into the bottom 20%.

School externalisers and school internalisers are identified using two instruments for psychological and social adjustment at school; the Bristol Social Adjustment Guide at age 11 and the Rutter teacher scale at age 16 (Stott, 1966; Rutter, Tizard and Whitmore, 1970). At each age, factor analysis identifies two factors, one for externalising behaviours (for example, playing up and being naughty or aggressive), and the other for internalising behaviours (for example, behaving in a withdrawn or depressed manner). At each age, we have ranked boys and girls separately for their externalising and internalising behaviours. Those who score above the median at age 11 and 16, and in the top 20% at either 11 or 16 (or both) on the externalising behaviour factor are categorised as school externalisers, and those who score similarly highly on the internalising factor are categorised as school internalisers.

Negative attitudes towards school. At age 16, cohort members are asked to rate their level of agreement with the following statements:

> *"I feel school is largely a waste of time"*
> *"I am quiet in the classroom and get on with my work"*
> *"I think homework is a bore"*
> *"I find it difficult to keep my mind on my work"*
> *"I never take work seriously"*
> *"I don't like school"*

Cohort members are scored on a scale of negative attitudes towards school derived from their ratings for the six statements. They are allocated to the negative attitudes towards school group if their score falls above the median.

We construct two supplementary groups based on combinations of the previous groups.

No Os engaged is a sub-group of those who had no O levels or their equivalents at age 16. They are those who did not also show signs of being disengaged from school. In order to fall into this group, the cohort member must have no Os (or equivalent), but *not* show signs of more than one out of poor attendance (self-reported truant or poor attender), poor adjustment (school externaliser or internaliser), and negative attitudes towards school).

No Os disengaged is a sub-group of those who had no O levels or their equivalents at age 16. They are those who also show signs of being disengaged from school. In order to fall into this group, the cohort member must have no Os, and show signs of at least two out of poor attendance (self-reported bunker or poor attender), poor adjustment (school externaliser or internaliser), and negative attitudes towards school.

Summary statistics for these proxy measures of failure to flourish at school are given in Table 1. Additional descriptive information about the groups identified by some of these proxy measures is given in Appendix 1.

2.5.2   Participation in adult learning

Participation in adult learning is measured using an indicator of whether the cohort member took any taught courses or not between the ages of 33 and 42, between 1991 and 2000. This measure gives participation rates that are consistent with other British surveys (see Feinstein et al., 2003, pp.17-19). Using this measure, well over half (58%) participated in adult learning between the ages of 33 and 42, with similar levels amongst men and women (58% and 59%, respectively).

Other research conducted by the Centre for Research on the Wider Benefits of Learning used more detailed information from the same survey (NCDS) concerning the number and type of courses taken between the ages of 33 and 42 (Feinstein and Hammond, 2004). We examined the contributions of taking different numbers and different types of courses to a range of health and social capital outcomes (Feinstein and Hammond, 2004). Although we have conducted preliminary analyses here to examine the associations of different numbers and different types of courses with

changes in health and well-being, the sample sizes are small and differ from one another and this makes interpretation of findings problematic. Because of this and also in the interest of brevity we do include the findings in this report. However, the results reported here, using a binary indicator of participation in adult learning are similar to the results of our preliminary analyses using other more detailed measures.

Table 1: Proxy measures for failure to flourish at school

	NAME	DEFINITION	TYPE	N.OBS	MEAN
	Attainment				
1.	Poor maths	In bottom 20% maths score 11 and 16	Binary	10312	.12
2.	Poor reading	In bottom 20% reading score 11 and 16	Binary	10369	.16
3.	No Os	No O level equivalents at 16	Binary	14331	.53
	Attendance				
4.	Truants	Self-report stayed off school when should have been there 16	Binary	12027	.52
5.	Poor attenders	Attendance at 16[1] in bottom 20%	Binary	8751	.20
	Adjustment				
6.	Externalisers	Externalising at school over median at 11and16 and top 20% at 11or16[2]	Binary	9999	.20
7.	Internalisers	Internalising at school over median at 11and16 and top20% at 11 or 16[3]	Binary	9999	.18
	Attitudes				
8.	Negative attitudes	Top 50% in expressing negative attitudes towards school at 16	Binary	11519	.50
	Combinations				
9.	No Os and engaged	No Os and <2 of poor attendance, adjustment and attitudes	Binary	10920	.29
10.	No Os and disengaged	No Os and 2+ of poor attendance, adjustment and attitudes	Binary	10920	.21

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[1] Observations are dropped if parent reports that the child was off school for over a month for reasons of ill-health or emotional disturbance during the year that they became 16.
[2] Boys and girls ranked separately.
[3] Boys and girls ranked separately.

2.5.3   Health and well-being at age 33

The health and well-being outcomes used span well-being, mental health, physical health and health practices. Summary statistics for the health and well-being outcomes at age 33 are given in Table 2.

Our well-being variables encompass life satisfaction, optimism, efficacy, and self-rated health. Each of these aspects of well-being is dynamic. This introduces measurement error, which we assume to be random.

Table 2:   Summary statistics for well-being and health variables at age 33

	OUTCOME	TYPE	OBS.	MEAN
1.	Low life satisfaction so far	Binary	10629	.43
2.	Low optimism	Binary	10565	.42
3.	Low efficacy	Binary	10393	.28
4.	Low self-reported health	Binary	11274	.25
5.	Depression	Binary	11327	.07
6.	Migraines	Binary	11373	.19
7.	Back pain	Binary	11373	.47
8.	Hay fever or allergic rhinitis	Binary	11373	.32
9.	Asthma or bronchitis	Binary	11373	.18
10.	Skin problems	Binary	11374	.17
11.	Smoking	Binary	11353	.33
12.	Excessive drinking	Binary	11405	.19
13.	Little exercise	Binary	11311	.31
14.	Obesity	Binary	11020	.11

Notes: The table is based on the full sample at age 33. For all outcomes, a value of 1 indicates a normatively bad outcome and 0 indicates a normatively good one.

Self-rated health is a perception of health, which will be related – for some individuals more than others – to objective health status. It is a useful overall indicator of health and well-being, derived from an answer selected in response to the question:

> *"How would you describe you health generally? Would you say it is (1) excellent, (2) good, (3) fair, or (4) poor?"*

Efficacy concerns perceived control over important life circumstances. This emerged as an important outcome of adult learning in our qualitative research (Schuller et al., 2002). It is derived from three items in which the cohort member chooses which statement out of a pair is the more true for them:

> *"I never seem to get what I want from life"*
> *"I usually get what I want out of life"*
> *"I usually have a free choice and control over my life"*
> *"Whatever I do has no real effect on what happens to me"*
> *"Usually I can run my life more or less as I want to"*
> *"I usually find life's problems just too much for me"*

Life satisfaction is measured using a question asking the respondent to rate their satisfaction with their life during the previous ten years.

Optimism is measured using a question asking the respondent to rate how they predict their life will be in ten years time. Answers are strongly correlated with the life satisfaction measure ($\rho = 0.59$ at 33, $\rho = 0.66$ at 42) and the two measures have been combined as a single measure of life satisfaction in the past (e.g. Feinstein and Hammond, 2004). Here we use them separately so that we can test whether school experience and adult learning relate to the two aspects of life satisfaction (recalled perceptions versus optimism) in different ways.

Depression is measured using the Malaise Inventory, which consists of 24 questions designed to identify individuals experiencing clinical depression (Rutter et al., 1970). Factors that contribute to the onset and recovery of depression are of policy interest because, besides the personal misery it entails, depression has been shown to have large family and social costs.

Very few cohort members report ever having had widely recognised conditions, such as heart disease, diabetes, and cancer. This is because these conditions become more prevalent later in life. We use here variables that indicate the presence of other health conditions, which are more prevalent earlier in life. Each variable indicates whether the cohort member reports ever having had the condition by the age of 33 or 42. More details about how the variables are constructed are given in Appendix 2.

Migraines. Migraine is a common neurological condition in the developed world, affecting 10% of the UK population (Migraine Action, UK). It is a debilitating condition, which undermines the quality of life of sufferers and their families. Migraine Action claim that migraine is responsible for the loss of over 18 million working days each year, which costs the economy an annual figure of around £750 million.

Back pain. The Department of Health's Statistical Bulletin in 1998 reported that 40% of adults in Britain had suffered from back pain in the previous twelve months. It also highlighted the widening gap between the social classes in terms of suffering. While 37% of professional, intermediate and skilled non-manual workers reported back pain, 44% of skilled, partly skilled and unskilled workers were sufferers. On the basis of the survey, it was estimated that around 11 million working days and an estimated £5 billion are lost to industry every year on account of back pain.

Hay fever and allergic rhinitis. Allergic rhinitis has symptoms similar to hay fever, but the symptoms continue after the hay fever season has ended. Both conditions are allergic responses to allergens, in the case of hay fever to pollen and in the case of allergic rhinitis, to any allergen that is present for more of the year. The conditions affect about 1 in 10 people in Britain, many of them under 40 years old. The prevalence of the condition decreases with age (BUPA, 2000).

Asthma or bronchitis. Over five million people in Britain suffer from asthma. This is one in eight children and one in thirteen adults. The rates of asthma have increased enormously over the last twenty-five year; by a multiple of three amongst adults and by a multiple of six for children. The costs to the NHS of asthma are around £850 million each year (National Asthma Campaign). Bronchitis has similar symptoms to asthma. The National Institute of Health report that chronic bronchitis, emphysema and asthma as a group are the fourth leading cause of death in the United States.

Skin problems. This category includes many conditions, most of which are allergic ones like eczema and rosacea. Skin problems are visible and therefore it is unlikely that there will problems with obtaining a diagnosis, although access to appropriate treatment may be more difficult.

Although health practices are not categorised as a health outcome in the model presented in Figure 1 (in the model they are one of the channels), we include them in our analyses because, by definition, they relate to health. We predict that whereas education can have immediate impacts on health practices, the effects on physical health will be cumulative and manifested later. Thus, if adult learning contributes to changes in health behaviours, their impacts on physical health may not be evident within the duration covered by our dataset. We therefore think of health practices as a proxy for some of the physical conditions to come. We note, however, that many health conditions may not be much affected by health practices during adulthood. The main conditions affected by adult health practices include coronary heart disease and respiratory conditions.

Smoking is measured by whether or not the cohort member reports smoking at least one cigarette per week.

Excessive drinking is derived from self-reported information about how many units of alcohol the cohort member consumes each week. Excessive drinking is defined according to medical guidelines, which advise that moderate drinking is not detrimental to one's health, but that excessive drinking is. Excessive drinking is defined as 14 plus units per week for women and 21 plus units per week for men.

Exercise is measured at ages 33 and 42 by the number of times that cohort members take strenuous exercise in an average week. It would be useful to have information on the nature of the exercise taken but this was not available at both periods. We construct binary variables to indicate whether or not the sample member took serious exercise at least once per week.

Obesity is not strictly a health behaviour. It could be categorised as a physical condition or even a state of well-being. It is defined here as having a body mass index

(BMI) over 30. REF describes a BMI of 30 or over as seriously overweight. BMI is a measure of one's weight to one's height, represented by the formula:

$$BMI = M \div H^2$$

Where M = mass in kg and H = height in metres.

2.5.4   Changes in health and well-being between 33 and 42

The variables used to measure sustained and transformed health and well-being are constructed in the following manner. First, we make binary indicators of health and well-being at ages 33 and 42. Sustaining variables only apply to cohort members for whom the health outcome is positive at age 33. They take a value of one if the outcome is also positive at age 42 and a value of zero if, at age 42, the health outcome has deteriorated and is no longer positive. Transforming variables apply to cohort members with a poor health outcome at age 33. They take a value of one if the outcome is positive at age 42 and a value of zero if the health outcome is still poor at 42. See Figure 4.

Our information about physical health conditions is taken from questions in which the cohort member is asked whether they have ever had a particular condition. This means that we do not have the information required to construct the transforming variable, which would be interpreted as recovery from the condition. Thus, only the sustaining variable is constructed for each physical health condition. It only applies to individuals who did not report the condition at age 33 and indicates whether or not they report it at age 42.

Figure 4: Measures of sustained and transformed health

Poor health outcome		Value of binary variables	
At age 33	At age 42	Sustained health	Transformed health
No	Yes	1	Not applicable
No	Yes	0	Not applicable
Yes	No	Not applicable	1
Yes	Yes	Not applicable	0

All health and well-being outcomes are measured using binary variables. The variables used to measure health and well-being at age 33, which are the outcomes relating to research question 1, are the same binary indicators as those used to construct the variables for sustained and transformed health and well-being between 33 and 42, which are used to investigate research question 2. This simplifies the presentation of our results and also facilitates comparison of the different associations of school flourishing and adult learning to health with well-being during adulthood. However, the use of binary variables bears on their validity as measures of a construct. When multiple responses can be given to a question, we combine responses to create a binary variable and potentially valuable information is lost. We have experimented using continuous as well as binary measures of adult health and well-

being, and our findings are not different. Summary statistics for sustained and transformed health and well-being are given in Tables 3 and 4.

2.5.5 Controls for social, family, cognitive and biological background factors

The control variables used to investigate research questions encompass social and family risks, health factors, and cognitive ability up to the age of 7. The same controls are used when we estimate associations between adult learning and sustained or transformed health and well-being (research question 2), with additional controls for social circumstances and health and well-being at age 33. Summary statistics are given in Appendix 2.

Table 3:   Summary statistics for the variables used to measure sustained health and well-being between ages 33 and 42

	OUTCOME	TYPE	OBS.	MEAN
1.	Sustained satisfaction with life so far	Binary	6027	.63
2.	Sustained optimism	Binary	6153	.51
3.	Sustained efficacy	Binary	7463	.75
4.	Sustained self-rated health	Binary	8455	.72
5.	Sustained absence from depression	Binary	10562	.78
6.	Sustained no migraines	Binary	9172	.78
7.	Sustained no back pain	Binary	6060	.77
8.	Sustained no hay fever or allergic rhinitis	Binary	7752	.80
9.	Sustained no asthma or bronchitis	Binary	9270	.80
10.	Sustained no skin problems	Binary	9422	.75
11.	Sustained non-smoker	Binary	6681	.94
12.	Sustained no excessive drinking	Binary	6293	.87
13.	Sustained exercise	Binary	6755	.74
14.	Sustained not obese	Binary	8273	.92

Table 4:   Summary statistics for the variables used to measure transformed health and well-being between ages 33 and 42

	OUTCOME	TYPE	OBS.	MEAN
1.	Transformed satisfaction with life so far	Binary	4602	.29
2.	Transformed optimism	Binary	4412	.24
3.	Transformed efficacy	Binary	2930	.40
4.	Transformed self-rated health	Binary	2819	.44
5.	Recovery from depression	Binary	765	.32
11.	Gave up smoking	Binary	3102	.23
12.	Gave up excessive drinking	Binary	1769	.53
13.	Took more exercise	Binary	2991	.49
14.	Stopped being obese	Binary	992	.24

3. Results (1): The adult well-being and health of those who did not flourish at secondary school

In this section we address our first research question: What are adult well-being and health like for people who failed to flourish at secondary school? First we describe the adult health and well-being outcomes of those whom we classify as not flourishing at school. We then investigate the extent to which any associations found are explained by background factors, such as social risks, childhood health and early measures of ability. The full results can be found in Appendices 3 and 4. Here (in the main text), we present odds ratios that compare the odds of having a poor health outcome between each group that failed to flourish at secondary school and the rest of the cohort, after controlling for background factors. The level of statistical significance is represented by stars. See Tables 5, 6 and 7.

The first columns of Table 5, 6 and 7 indicate the group of cohort members to which the results in subsequent columns apply. Subsequent columns give odds ratios and p-values for different health and well-being outcomes at age 33 for men and women separately.

For example, the odds ratio of having depression for women who fall into the truanting group compared to women who do not is 1.98, with a p-value of less than .0005. When controls are added, the odds ratio falls to 1.74. In other words, the odds of having depression amongst female cohort members who used to truant from secondary school are about one and three quarters times as great as the odds for female cohort members who are otherwise similar but who did not truant from secondary school. The difference in rates of depression between the two groups of women is statistically significant at p<0.0005.

Key finding: After controlling for social and family background and childhood health, associations between failure to flourish at school and health and well-being at age 33 are pervasive and important. They are statistically significant for most health and well-being outcomes and for most measures of failure to flourish; and the magnitudes of the associations are not trivial.

Specific finding: We find associations between failure to flourish at school and health and well-being at age 33 for twelve of our fourteen health and well-being outcomes at p<0.05. These outcomes encompass well-being, mental health, health practices, and physical conditions.

Specific finding: The magnitudes of these associations, after controlling for childhood risk factors, are greater in relation to most of the well-being outcomes, depression, smoking, excessive drinking, exercise, and back pain, and less important for some of the health conditions, and for obesity and optimism.

Key finding: Both attainment and engagement at secondary school are important in relation to health and well-being in adulthood. The likelihoods of having poorer health outcomes are generally higher for cohort members who had low attainment and were relatively disengaged at school than they are for cohort members who are otherwise similar but were engaged at school although with low levels of attainment. The

greatest differences between these two sub-groups are for smoking, excessive drinking and depression.

Key finding: Generally, our results apply to both men and women. The main exception is that failure to flourish at school is associated with increased chances of having had migraines by 33 for women but not for men.

For almost every association, adding controls to the models reduces to a small degree the magnitudes and statistical significance of associations between failure to flourish and health or well-being at age 33. As discussed in Section 2.1, this indicates that there is selection bias in failure to flourish at school, which we reduce by introducing controls. Any remaining selection bias probably operates in the same direction as that which we have eradicated, thereby increasing the magnitudes and statistical significance of our associations, which could therefore be interpreted as the upper bounds of effects.

The pseudo R-square values given in Appendix 3 indicate that even with full controls, our models do not predict the health and well-being of each cohort member much better than if we assumed that they all had the same mean value on each outcome. This is not surprising since we have been unable to include all sources of childhood influence on adult health and well-being, and we have not attempted to include the many influences that are bound to occur between the ages of 16 and 33.

Examples of the magnitudes of associations between failure to flourish at school and poor health and well-being at age 33 with controls are given below:

Specific finding: The odds of smoking at 33 are 4.7 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.001).

Specific finding: The odds of smoking at 33 are 3.47 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.001).

Specific finding: The odds of drinking heavily at age 33 are about 1.5 higher for those who did not flourish at secondary school than they are for those who did.

Specific finding: The odds of taking exercise less than once a week at age 33 are about 1.5 higher for those who did not flourish at secondary school than they are for those who did.

Specific finding: The odds of having depression at 33 are 2.4 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

Specific finding: The odds of having depression at 33 are 2.0 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for

men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

Specific finding: The odds of having low efficacy at 33 are 1.9 times higher for women and for men who had no O level equivalents at 16 and were disengaged at school than they are for women and men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

Specific finding: The odds of having had migraines by 33 are 1.3 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.05).

Specific finding: The odds of having had back pain by 33 are 1.3 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.05).

Specific finding: We find some evidence that failure to flourish at school is associated with reduced chances of suffering from hay fever, allergic rhinitis, and skin problems at age 33, before we adjust for childhood factors. When controls are added to the models, the evidence for associations between failure to flourish at school and these conditions at age 33 is weak, and where it exists, contradictory. Interpretations for these findings are discussed in Section 6.1.

Table 5: Odds ratios for poor well-being and health at age 33 for each group that did not flourish at school compared to the rest of the cohort (1)

GROUP	LOW SATISFACTION WITH LIFE SO FAR		LOW OPTIMISM		LOW EFFICACY		POOR SELF-RATED HEALTH		DEPRESSION	
	F	M	F	M	F	M	F	M	F	M
Poor maths	1.34*	1.34*	1.16	1.35*	2.01**	1.78**	1.42**	1.13	2**	1.59
Poor reading	1.16	0.83	0.99	0.97	1.74**	1.32*	1.62**	1.59**	1.92**	1.32
No Os	1.25**	1.24**	0.91	0.96	1.53**	1.69**	1.48**	1.35**	1.73**	1.77**
Truants	1.26**	1.06	1.02	1.03	1.38**	1.05	1.1	1.19*	1.74**	1.4*
Poor attenders	1.13	1.23	1.05	.99	1.14	1.22	.99	1.34*	1.1	1.38
Externalisers	1.38**	1.04	1.08	0.94	1.45**	1.14	1.32**	1.34**	1.65**	2.29**
Internalisers	1.31**	1.53**	1.16	1.33**	1.59**	1.59**	1.21	1.29*	1.63**	1.35
Negative attitudes	1.3**	1.25**	1.14*	1.17*	1.65**	1.49**	1.2*	1.35**	1.7**	1.31
No Os engaged	1.14	1.17	0.88	0.95	1.37**	1.54**	1.39**	1.15	1.26	1.29
No Os disengaged	1.54**	1.41**	1	1.09	1.85**	1.89**	1.45**	1.62**	2.41**	2.04**

Notes: For the first eight groups, odds ratios and related p-values are taken from separate logistic regressions for each health outcome and for each group. For the ninth and tenth groups, the odds ratios and p-values are taken from a single regression which compares the health and well-being at age 33 of each sub-group simultaneously with the health and well-being at age 33 of cohort members who had the equivalent of at least one O level at age 16. P-values are not given but * denotes a p-value between .05 and .01, and ** denotes a p-value of less than .01. F stands for female and M for male. The controls are described in Section 2.5.5 and summary statistics are given in Appendix 2.

Table 6: Odds ratios for poor well-being and health at age 33 for each group that did not flourish at school compared to the rest of the cohort (2)

GROUP	MIGRAINE		BACK PAIN		HAY FEVER OR ALLERGIC RHINITIS		ASTHMA OR BRONCHITIS		SKIN PROBLEMS	
	F	M	F	M	F	M	F	M	F	M
Poor maths	1.02	1.24	1.18	1.31*	0.8	1.09	0.82	1.32	0.65*	0.86
Poor reading	1.09	1.2	0.93	0.99	0.8	0.94	1.01	1.04	0.76	0.99
No Os	1.11	0.93	0.97	1.16*	0.78**	0.86*	1.27**	1.06	0.94	0.91
Truants	1.28**	0.86	1.25**	1.2**	0.93	0.93	1.16	1.02	1.18*	0.96
Poor attenders	1.3*	1.19	1.05	1.2	0.89	0.85	1.24	1.08	0.96	0.95
Externalisers	1.18	0.86	1.14	1.28*	0.84	1	1.42**	1.32*	1.06	1.21
Internalisers	1.18	1.26	1.23*	0.94	1.23*	1.25*	0.95	1.3*	1.34*	1.19
Negative attitudes	0.98	0.89	1.1	1.21**	1.02	0.83**	1.02	1.04	1.19*	0.94
No Os engaged	1.03	0.91	0.92	1.05	0.78**	0.95	1.16	1	0.88	0.83
No Os disengaged	1.29*	0.89	1.05	1.26*	0.76*	0.9	1.4**	1.16	0.98	0.92

Notes: For the first eight groups, odds ratios and related p-values are taken from separate logistic regressions for each health outcome and for each group. For the ninth and tenth groups, the odds ratios and p-values are taken from a single regression which compares the health and well-being at age 33 of each sub-group simultaneously with the health and well-being at age 33 of cohort members who had the equivalent of at least one O level at age 16. P-values are not given but * denotes a p-value between .05 and .01, and ** denotes a p-value of less than .01. F stands for female and M for male. The controls are described in Section 2.5.5 and summary statistics are given in Appendix 2.

Table 7: **Odds ratios for poor well-being and health at age 33 for each group that did not flourish at school compared to the rest of the cohort (3)**

GROUP	SMOKING		EXCESSIVE DRINKING		EXERCISE		OBESITY	
	F	M	F	M	F	M	F	M
Poor maths	1.47**	1.43**	0.96	0.71**	1.15	1.09	1.09	1.21
Poor reading	1.8**	1.32**	1.3	0.83	1.01	1.46**	1.3	1.53**
No Os	2.74**	2.14**	1.09	1.24**	1.32**	1.29**	1.25*	1.1
Truants	1.96**	1.86**	1.4**	1.47**	1.15*	1.09	1.07	0.89
Poor attenders	1.91**	1.57**	1.07	1.26*	1.15	1.4**	1.19	.81
Externalisers	3.60**	2.27**	1.79**	1.72**	1	1.18	1.38*	1.24
Internalisers	1.23*	1.41**	0.91	0.85	1	1.27*	1.55**	0.87
Negative attitudes	1.99**	2.1**	1.74**	1.44**	1.09	1.31**	1.09	1.03
No Os engaged	1.79**	1.46**	0.92	1.1	1.26*	1.04	1.14	1.08
No Os disengaged	4.69**	3.39**	1.73**	1.78**	1.27*	1.59**	1.1	0.98

Notes: For the first eight groups, odds ratios and related p-values are taken from separate logistic regressions for each health outcome and for each group. For the ninth and tenth groups, the odds ratios and p-values are taken from a single regression which compares the health and well-being at age 33 of each sub-group simultaneously with the health and well-being at age 33 of cohort members who had the equivalent of at least one O level at age 16. P-values are not given but * denotes a p-value between .05 and .01, and ** denotes a p-value of less than .01. F stands for female and M for male. The controls are described in Section 2.5.5 and summary statistics are given in Appendix 2.

4.   Results (2): Participation in adult learning of those who did not flourish at secondary school

The participation in adult learning for those who failed to flourish at school is shown in Table 8. This table shows, for example, that the odds ratio of taking any courses at all between the ages of 33 and 42 for women who fall into the poor maths group compared to the rest of the cohort is 0.4, with a p-value of less than .0005. When controls are added, the odds ratio rises to 0.6 with a p-value of 0.001.

Key finding: Cohort members who did not flourish at school are much less likely to have participated in adult learning between the ages of 33 and 42. Adjusting for social and family background and childhood health reduces the magnitudes and statistical significance of the associations but they remain important. The odds for participating in adult learning between the ages of 33 and 42 for cohort members who did not flourish at secondary school can be as low as 0.4 times the odds of participating in adult learning for the rest of the cohort, depending on gender and how failure to flourish is measured.

Key finding: Both poor attainment and disengagement at school are associated with lower odds of taking courses between 33 and 42. After including controls, the odds of taking courses for the groups with poor attainment (poor maths, reading and no Os) vary between 0.4 and 0.6 times the odds of taking courses for the rest of the cohort. The odds for the groups identified by measures of engagement vary between half and one times the odds of taking courses for the rest of the cohort.

Key finding: The findings apply to both men and women.

Specific finding: The results suggest that failure to flourish at school may have a slightly greater impact on women than on men because the odds ratios for women are, on the whole lower for women than for men.

Table 8:   Odds ratios for participation in adult learning between 33 and 42 for each group that did not flourish at secondary school compared to the rest of the cohort

GROUP	PARTICIPATION IN ADULT LEARNING			
	Female		Male	
	No controls	Full controls	No controls	Full controls
Poor maths	.447	.645	.497	.707
	0	**.001**	**0**	**.019**
Poor reading	.314	.394	.485	.663
	0	**0**	**0**	**.001**
No Os	.455	.554	.569	.724
	0	**0**	**0**	**0**
Truants	.944	1.05	.819	.922
	.377	**.475**	**.003**	**.257**
Poor attenders	.701	.821	.718	.869
	0	**.053**	**.001**	**.201**
Externalisers	.690	.809	.635	.727
	0	**.037**	**0**	**.002**
Internalisers	.610	.760	.829	1.026
	0	**.009**	**.064**	**.812**
Negative Attitudes	.70	.79	.78	.89
	0	**0**	**0**	**.122**
No Os Engaged	.60	.71	.77	.91
	0	**0**	**.001**	**.243**
No Os Disengaged	.53	.69	.60	.76
	0	**0**	**0**	**.006**

Notes: The odds ratios and p-values are taken from separate logistic regressions for each group and for men and women separately. P-values are given in smaller bold font underneath the odds ratios. F stands for female and M for male. The controls that we use are described in Section 2.5.5 and summary statistics are given in Appendix 2. For example, the odds ratio of taking at least one course between the ages of 33 and 42 for women in the poor maths group compared to the rest of the cohort is 0.447, p<.0005. When controls are added, the odds ratio rises to 0.645 but is still statistically significant (p=.001).

5.   Results (3): Associations between adult learning and changes in adult health and well-being

In order to examine the associations between adult learning and changes in adult health and well-being, we follow the methodology set out in Section 2.4. The results are summarised in Tables 9 and 10. Table 9, for example, shows that for all members of the cohort who took exercise more than once a week at age 33, the odds ratio for also taking exercise at least once a week at age 42 contingent on participation in adult learning is 1.39 (p<.0005). When controls are added for social and family background, childhood health, and socio-economic status, qualifications and health and well-being at age 33, this odds ratio is reduced by a small amount to 1.22 (p=.001).

We describe our main findings for the whole cohort first followed by the main findings for those who failed to flourish at secondary school.

Table 9: Odds ratios for sustained well-being and health between 33 and 42 contingent on participation in adult learning between 33 and 42

GROUP	MODEL	LSAT	OPT	EFFIC	SRH	DEPR	MIGR	BPAIN	HAY	ASTHM	SKIN	SMK	ALC	EXER	OBES
All	No controls	.98	1.07	1.35	1.04	1.26	1.01	1.17	.86	1.01	.84	.99	1	1.39	1.14
		.713	**.235**	**0**	**.503**	**.001**	**.912**	**.08**	**.129**	**.892**	**.009**	**.894**	**.955**	**0**	**.108**
	Full controls	.91	1.08	1.09	.9	1	.96	.99	.85	.89	.84	.87	.99	1.22	.98
		.179	**.22**	**.268**	**.095**	**.973**	**.601**	**.932**	**.127**	**.199**	**.017**	**.217**	**.89**	**.001**	**.821**
No Os	No controls	1.05	1.19	1.25	1.11	1.11	1.21	1.5	0.73	1.11	0.87	0.86	0.91	1.39	1.01
		0.618	**0.039**	**0.028**	**0.264**	**0.269**	**0.114**	**0.003**	**0.031**	**0.412**	**0.182**	**0.347**	**0.416**	**0**	**0.948**
	Full controls	1	1.21	1.15	0.97	0.92	1.1	1.22	0.76	0.97	0.88	0.84	0.86	1.23	0.89
		0.996	**0.051**	**0.226**	**0.763**	**0.439**	**0.487**	**0.192**	**0.098**	**0.845**	**0.275**	**0.313**	**0.24**	**0.03**	**0.36**
Truants	No controls	0.98	1.24	1.35	1.05	1.14	0.98	1.15	1.05	1.03	0.91	0.7	0.96	1.33	1
		0.874	**0.014**	**0.005**	**0.575**	**0.209**	**0.862**	**0.314**	**0.775**	**0.797**	**0.366**	**0.029**	**0.721**	**0.001**	**0.969**
	Full controls	0.93	1.25	1.12	0.91	0.95	0.99	1.02	1	0.92	0.94	0.65	0.91	1.18	0.85
		0.482	**0.024**	**0.325**	**0.372**	**0.696**	**0.925**	**0.897**	**0.999**	**0.571**	**0.609**	**0.018**	**0.495**	**0.083**	**0.226**
Negative attitudes	No controls	1.02	1.19	1.47	1.12	1.16	0.98	1.23	0.86	0.98	0.78	1.03	1.04	1.48	1.16
		0.829	**0.07**	**0**	**0.25**	**0.166**	**0.902**	**0.146**	**0.378**	**0.865**	**0.027**	**0.869**	**0.751**	**0**	**0.269**
	Full controls	0.98	1.28	1.29	1	1.01	1.01	1.21	0.91	0.82	0.77	0.91	0.99	1.36	1.04
		0.855	**0.02**	**0.039**	**0.985**	**0.95**	**0.972**	**0.248**	**0.604**	**0.199**	**0.032**	**0.592**	**0.944**	**0.003**	**0.796**
No Os engaged	No controls	0.93	1.02	1.45	1.08	1.2	1.03	1.25	0.71	1.01	0.8	1.2	0.96	1.22	1.08
		0.581	**0.869**	**0.012**	**0.582**	**0.218**	**0.888**	**0.266**	**0.111**	**0.952**	**0.152**	**0.422**	**0.807**	**0.11**	**0.635**
	Full controls	0.83	1.06	1.43	1	1.07	0.94	1.03	0.88	0.95	0.84	1.1	1.02	1.08	0.93
		0.246	**0.685**	**0.047**	**0.975**	**0.717**	**0.775**	**0.919**	**0.612**	**0.818**	**0.307**	**0.725**	**0.919**	**0.585**	**0.719**
No Os disengaged	No controls	1.23	1.25	0.98	1.01	0.95	1.35	1.61	0.63	1.09	0.98	0.51	0.79	1.56	0.89
		0.245	**0.156**	**0.89**	**0.972**	**0.741**	**0.162**	**0.049**	**0.083**	**0.695**	**0.918**	**0.018**	**0.28**	**0.005**	**0.565**
	Full controls	1.17	1.24	0.72	0.83	0.74	1.1	1.84	0.48	0.76	1.06	0.62	0.74	1.61	0.72
		0.479	**0.262**	**0.142**	**0.349**	**0.136**	**0.717**	**0.056**	**0.036**	**0.316**	**0.785**	**0.218**	**0.244**	**0.011**	**0.193**

Notes: The odds ratios and p-values are estimated from separate logistic regressions for each group and for each sustained outcome. P-values are given in smaller bold font underneath the odds ratios. The controls are described in Section 2.5.5 and summary statistics are given in Appendix 2. Sustained outcomes are measured only for cohort members who had good health or well-being at age 33. They indicate whether this good health or well-being outcome is sustained at age 42. For example, for all cohort members who took high levels of exercise at age 33, the odds ratio of sustaining this level of exercise at the age of 42 for those who participated in adult learning between the ages of 33 and 42 compared to those who did not is 1.39, p<.0005. When controls are added, this drops to 1.22, p=.001.

Table 10: Odds ratios for transformed well-being and health between 33 and 42 contingent on participation in adult learning between 33 and 42

SAMPLE	MODEL	LS	OPT	EFF	SRH	DEP	SMK	ALC	EXE	OBS
All	No controls	1.08	1.15	1.33	1.46	1.29	1.47	1.22	1.27	0.92
		0.28	**0.055**	**0**	**0**	**0.129**	**0**	**0.034**	**0.001**	**0.583**
	Full controls	1.06	1.24	1.34	1.23	1.16	1.26	1.19	1.2	0.98
		0.411	**0.007**	**0.001**	**0.031**	**0.462**	**0.014**	**0.099**	**0.02**	**0.9**
No Os	No controls	1.078	1.192	1.301	1.668	1.35	1.347	1.155	1.275	.95
		.466	**.126**	**.021**	**0**	**.183**	**.02**	**.34**	**.026**	**.809**
	Full controls	1.056	1.251	1.427	1.623	1.216	1.284	1.091	1.295	1.247
		.633	**.084**	**.006**	**.001**	**.531**	**.079**	**.613**	**.034**	**.426**
Truants	No controls	1.054	1.359	1.241	1.506	1.342	1.186	1.099	1.262	.94
		.627	**.009**	**.084**	**.002**	**.227**	**.2**	**.516**	**.044**	**.792**
	Full controls	1.088	1.495	1.253	1.48	.896	1.032	1.049	1.157	1.206
		.484	**.002**	**.132**	**.012**	**.783**	**.837**	**.772**	**.271**	**.576**
Negative attitudes	No controls	1.12	1.35	1.28	1.48	1.46	1.12	1.09	1.3	0.91
		0.328	**0.013**	**0.048**	**0.004**	**0.154**	**0.41**	**0.557**	**0.032**	**0.682**
	Full controls	1.13	1.57	1.22	1.47	1.63	0.98	1.21	1.22	0.87
		0.329	**0.001**	**0.146**	**0.011**	**0.194**	**0.879**	**0.27**	**0.127**	**0.661**
No Os engaged	No controls	1	1.13	1.1	1.42	1.83	0.94	1.2	1.29	1.06
		0.989	**0.447**	**0.561**	**0.054**	**0.123**	**0.774**	**0.422**	**0.124**	**0.84**
	Full controls	1.02	1.39	1.34	1.36		0.9	1.2	1.24	1.64
		0.916	**0.099**	**0.18**	**0.24**		**0.644**	**0.559**	**0.272**	**0.4**
No Os disengaged	No controls	1.14	1.48	1.44	2.07	1	1.71	1.12	1.29	0.95
		0.468	**0.061**	**0.069**	**0.001**	**0.992**	**0.014**	**0.655**	**0.185**	**0.891**
	Full controls	1.01	1.67	1.7	2.13		2.07	1	1.13	
		0.97	**0.062**	**0.05**	**0.01**		**0.011**	**0.998**	**0.637**	

Notes: The odds ratios and p-values are taken estimated from separate logistic regressions for each group and for each transformed outcome. P-values are given in smaller bold font underneath the odds ratios. The controls are described in Section 2.5.5 and summary statistics are given in Appendix 2. Transformed outcomes are measured only for cohort members who had poor health or well-being at age 33. For example, for the all those who had low levels of optimism, the odds ratio of having high levels of optimism at age 42 are 1.15, p=.055. When controls are added, the odds ratio rises to 1.24, p=.007.

5.1 Associations between adult learning and sustained and transformed health and well-being – for the whole cohort

Key finding: After controlling for background and childhood factors, and socio-economic status, qualifications, health and well-being at age 33, we find associations between participation in adult learning and transformed well-being (optimism, efficacy and self-rated health), giving up smoking, and both transformed and sustained exercise. The magnitudes of the associations are not terribly large, but they are not trivial either. The odds of having sustained and transformed outcomes (controls added) are greater for those who participated in adult learning than they are for those who did not by factors varying between 1.2 and 1.3.

Key finding: We do not find associations between participation in adult learning and sustained or transformed depression, excessive drinking, obesity, or satisfaction with life so far.

Key finding: We find much more evidence of associations between participation in adult learning and transformed as opposed to sustained health.

Specific finding: The exception is exercise; both sustained and transformed exercise are associated with participation in adult learning.

This contrast is not what one would expect from the sample sizes used to estimate associations between adult learning and sustained and transformed health, which are greater for sustained than for transformed health outcomes. All other things being equal, this would tend to reduce the statistical significance of associations between participation in adult learning and transformed health and well-being relative to sustained health and well-being.

Specific finding: Even with our controls, we find an association between participation in adult learning and the onset of skin problems.

The pseudo R-squares, given in Appendix 4, indicate that these models do not predict very accurately the sustained and transformed health and well-being of the cohort members. This is not surprising. We doubt that we have controlled for every source of confounding bias, and we certainly have not controlled for the many factors between the ages of 33 and 42 which will influence participation in adult learning and the health and well-being outcomes at age 42. Nevertheless, we have strong theoretical reasons for the view that adult learning is an important element in the processes through which health and well-being are sustained and transformed in adulthood, and the statistical significance of the coefficients for adult learning provide evidence that this is so.

5.2 Associations between adult learning and sustained and transformed health and well-being – for those who did not flourish at secondary school

Key finding: On the whole, the associations between adult learning and sustained and transformed health and well-being for those who failed to flourish at secondary school apply to the same outcomes and are of similar magnitudes to those found for the whole cohort. Moreover, some of the associations between adult learning and sustained and transformed health and well-being, after adding our controls, are greater in magnitude for those who failed to flourish at school than for the sample as a whole.

Specific finding: For cohort members who had no O level equivalents at 16 and who were also disengaged at school, the odds for giving up smoking are 2.1 times greater than the odds of giving up smoking for the rest of this sub-group who did not take courses. For the whole cohort, the odds of giving up smoking amongst adult learners are greater than they are for the rest of the cohort (who did not take courses between 33 and 42), but only by a factor of 1.3.

Specific finding: For cohort members who had no O level equivalents at 16 and who were also disengaged at school, the odds for having transformed efficacy1.7 times greater than the odds of giving up smoking for the rest of this sub-group who did not take courses. For the whole cohort, the odds of having transformed efficacy amongst adult learners are greater than they are for the rest of the cohort (who did not take courses between 33 and 42), but only by a factor of 1.3.

Specific finding: For cohort members who had no O level equivalents at 16 and who were also disengaged at school, the odds for having transformed self-rated health are 2.1 times greater than the odds of giving up smoking for the rest of this sub-group who did not take courses. For the whole cohort, the odds of having transformed self-rated health amongst adult learners are greater than they are for the rest of the cohort (who did not take courses between 33 and 42), but only by a factor of 1.2.

We test whether the associations between adult learning and each sustained and transformed health and well-being differ between those who did and did not flourish at secondary school. The results, which are given in Appendix 6, find no evidence for differences in effects. Nevertheless, for five of the six associations found for the whole cohort, the magnitudes of equivalent associations are greater for those who had no O level equivalents and showed signs of disengagement at age 16.

Specific finding: In addition, we find associations between adult learning and sustained well-being (optimism and efficacy), after adjusting for our control variables, which were not found for the whole sample.

The magnitudes of associations and their statistical significance are not much changed when controls are added to the models. This tells us that selection bias – to the extent that we have controlled for it here – does not account for much of the raw association between participation in adult learning and having sustained or transformed health and well-being.

5.3   Gender differences

Specific finding: Additional analyses reported in Tables A5.1, A5.2, A5.3, A5.4, A5.5 and A5.6 in Appendix 5 indicate some intriguing gender differences. There is a statistically significant gender difference in the contribution of adult learning to recovery from depression (after adding in the controls). Women who were depressed at 33 are much more likely to recover from depression if they have participated in adult learning (OR=1.7, p=.06), whereas men who were depressed at age 33 are much less likely to recover from depression if they have participated in adult learning (OR=0.3, p=.07). These results are not statistically significant at the usual level of confidence of .05, but we include them here because the difference in associations is so marked. Also, the sample sizes for these comparisons are particularly small because only 7% of cohort members were depressed at age 33; if the sample size had been larger, the results might have been more statistically significant.

Specific finding: There is another statistically significant gender difference in the contribution of adult learning to transformed obesity (again, after adding in the controls). Men who were obese at age 33 and who participated in adult learning are much less likely to have transformed obesity than those who took no courses (OR=0.5, p=.03). Women, on the other hand are more likely to have transformed obesity if they participated in adult learning (OR=1.5, p=0.1).

Specific finding: If we conduct separate analyses for men and women, we find some new associations that were not found for the whole cohort. For women, participation in adult learning is associated with not having sustained satisfaction with life so far (OR=0.8, p=.05) and the onset of hay fever or allergic rhinitis (OR=0.8, p=.05). For men, adult learning is associated with the onset of skin problems (OR=0.8, p=.03).

Specific finding: There are methodological difficulties with estimating the contributions of adult learning for groups of cohort members identified as failing to flourish at school because the sizes of the samples are small. Nevertheless, we find evidence for gender differences amongst these groups that are broadly similar to the gender differences found for the whole cohort.

6. Conclusions and discussion

6.1 What is adult well-being and health like for people who did not flourish at secondary school?

In our data, adults who had flourished at secondary school enjoyed better health and well-being than adults who had not. Flourishing was not only about attainment. Having relatively low qualifications at 16 is associated with relatively poor health and well-being in adulthood, but the magnitudes of associations are greater for those who also showed signs of disengagement at school. Signals about broader child development which we have used to measure disengagement at school, such as externalising or internalising behaviours, negative attitudes towards school, poor attendance and truancy, that were observed by the children's teachers, their parents, and expressed by the children themselves were strongly associated with differences in adult health and well-being beyond any effect of qualifications attained.

Limitations in our methods and data resources limit the extent to which we claim to have assessed the *effect* of the school system on health inequalities. In the introduction (Section 1.2) we discuss possible channels through which education might affect health and hypothesise that failure to flourish at school proxies for aspects of experience both inside and outside school that influence the trajectories that young adults follow, with long term consequences for health and well-being. However, the key story from this part of the project remains that we have found that school attainment and engagement, although not necessarily causal influencers of adult health, nevertheless provide us with a powerful prediction of likely patterns in adult health and health behaviours. In line with the principles laid down by the Every Child Matters legislation (HM Government, 2003) policy makers and service providers need to consider how this information can be used to best effect and respond to the challenges this provides

Not flourishing at secondary school is associated with low values on many of the measures for positive health and well-being at age 33 beyond any signal provided by failure to achieve qualifications. These measures encompass well-being, freedom from depression, migraines, back pain, smoking and drinking and taking exercise. As one might expect the magnitudes of the associations vary between outcomes (e.g. Davey-Smith, 2003). After controlling for childhood risk factors, the odds ratios for smoking at age 33 contingent on failure to flourish at secondary school are as high as 3.6. The odds ratios for depression at 33 are around 2, and for well-being, heavy drinking and taking little exercise, they are about 1.5. The odds ratios for having physical health conditions are generally lower, around 1.3. See Box 1 for more details.

Box 1: Some examples of the magnitudes of associations between flourishing at secondary school and adult health and well-being, after controlling for health, social, psychological and economic factors at ages 7 and 33

The odds of smoking at 33 are 4.7 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.001).
The odds of smoking at 33 are 3.47 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.001).

The odds of drinking heavily at age 33 are about 1.5 higher for those who did not flourish at secondary school than they are for those who did.

The odds of taking exercise less than once a week at age 33 are about 1.5 higher for those who did not flourish at secondary school than they are for those who did.

The odds of having depression at 33 are 2.4 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

The odds of having depression at 33 are 2.0 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

The odds of having low efficacy at 33 are 1.9 times higher for women and for men who had no O level equivalents at 16 and were disengaged at school than they are for women and men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.01).

The odds of having had migraines by 33 are 1.3 times higher for women who had no O level equivalents at 16 and were disengaged at school than they are for women who did have O level equivalents at 16, almost all of whom were engaged at school (p<.05).

The odds of having had back pain by 33 are 1.3 times higher for men who had no O level equivalents at 16 and were disengaged at school than they are for men who did have O level equivalents at 16, almost all of whom were engaged at school (p<.05).

We have identified roughly half of the sub-group of cohort members with poor attainment at age 16 as individuals who were also disengaged at secondary school. The sub-group who were disengaged and attained poorly at secondary school constitutes 21% of the cohort. Defining this group so that they constitute a reasonably high proportion of the cohort has methodological advantages in terms of the sizes of our sub-samples. However, if we had used a more stringent measure of poor attainment and disengagement, thus identifying a smaller proportion of cohort members who were more severely disengaged and poorly attaining at secondary school, the differences in health and well-being between the two groups of adults (flourishers and non-flourishers) would have been greater.

Additional analyses reported in Appendix 1 show that members of the cohort who did not flourish at secondary school were more likely to smoke and to smoke more cigarettes at age 16 than their counterparts who had more positive experiences at school. For this cohort, smoking at ages 16 and 33 is correlated (Goodman-Kruskal gamma = 0.51). It is possible that smoking at age 16, which is associated with failure

to flourish at secondary school, establishes patterns of health-related behaviours that are difficult to shift throughout adulthood for physiological, psychological and social reasons.

After adding in our controls, associations between flourishing at secondary school and physical health conditions at age 33 are not always found and where they are, they are of small magnitudes. This may reflect the lack of variation in physical health at age 33 – most of the cohort are healthy. We may have obtained different results if we had been able to measure the cohort's physical health during their fifties and sixties.

Three of the physical health conditions we examine in adulthood are allergic conditions; hay fever or allergic rhinitis, asthma or bronchitis and skin problems. Other research suggests that allergic conditions – particularly hay fever – are *more* prevalent amongst people from relatively advantaged backgrounds (Heinrich, 1998). In line with this research, we find that before adjusting for controls, failure to flourish at school is associated with reduced chances of suffering from hay fever, allergic rhinitis, and skin problems at age 33. An explanation for these findings is that the homes of children from more advantaged backgrounds are cleaner and so these children are less exposed to the immunological challenges that afford protection against the development of allergies. In addition, we hypothesise that individuals who failed to flourish at secondary school grow up into adults who are less effective in obtaining a diagnosis and appropriate treatment for conditions that are not easily diagnosed and treated. Such an argument has been suggested in relation to M.E./chronic fatigue syndrome, which is more commonly diagnosed amongst individuals from higher social classes (Wessely et al., 1998; Hammond, 2002).

Our findings apply to both men and women. The only exception is in relation to migraines; not flourishing at secondary school is associated with a greater chance of suffering from migraines at age 33 for women but not for men. This probably reflects gender differences in the meanings of disengagement from school and poor school attainment and in determinants and susceptibility to migraine. Certainly migraines are more prevalent amongst women than amongst men. Studies using the International Headache Society diagnostic criteria estimate the prevalence of migraines to be 15-18% for women and around 6% for men (Lusic, 2001).

6.2 Is adult learning associated with sustained or transformed well-being and health for the whole cohort and for those who did not flourish at secondary school?

As explained in the introduction, we expect adult learning to be positively associated with health and well-being. This is what we find. After adjusting for social and family background, childhood health and attainment, and socio-economic circumstances, qualifications and health and well-being in adulthood, we find associations between participation in adult learning and positive changes in many of our health and well-being outcomes; transformed well-being (optimism, efficacy and self-rated health), giving up smoking and both transformed and sustained exercise. The magnitudes of the associations are not terribly large, but they are important nevertheless. Odds ratios for sustained and transformed outcomes contingent on participation in adult learning, after controls have been added, range between 1.2 and 1.3.

After controlling for background factors and adult circumstances, associations are not found between participation in adult learning and sustained or transformed satisfaction with life so far, depression, excessive drinking or obesity.

To what extent do the associations that we have found reflect causal effects of adult learning? By using controls and models that examine changes rather than absolute levels of health and well-being, we eliminate many sources of confounding bias. Nevertheless, problems with time-varying confounding bias remain. The methodology does not address the problem of reverse causality. As explained in Section 2.1, we find associations between participation in adult learning between the ages of 33 and 42 and transformed or sustained health and well-being over the same period. Our data do not include details about the timings of participation in adult learning and changing levels of health and well-being.

For some outcomes, it is feasible that changes in the outcome lead to participation in adult learning. For example, higher levels of efficacy, optimism, and exercise might contribute to an individual's decision to take a course. On the other hand, it is more difficult to imagine how giving up smoking might lead to participation in adult learning. A deterioration in self-rated health might lead to taking a course under some circumstances and constitute a barrier to participation in others.

Overall, we infer that the associations found between adult learning and sustained and transformed health and well-being may reflect important contributions of adult learning to adult health and well-being. This conclusion is partly informed by qualitative research investigating wider benefits of learning, which found that, for some individuals, taking courses leads to improvements in well-being, lifestyle and mental health (Hammond, 2004; James, 2004).

The associations we report are average values for the whole cohort and participation in any type of adult learning. We know from other research that the associations between adult learning and health and well-being vary depending on the participant and the type of course (Feinstein and Hammond, 2004). Qualitative studies highlight the importance of matching provision to learners' interests, strengths and needs and of participation at times when learners are receptive to the benefits of taking courses (Hammond, 2004; Campaign for Learning, 2001).

We do not think of adult learning as a panacea for everyone, regardless of their stage in life. Nor do we claim that taking courses is the unique policy lever that will sustain or transform health and well-being. However, if appropriate provision is available at the right time, it may play an important role in promoting well-being and healthy lifestyles.

The associations between participation in adult learning and changes in health and well-being that we found for the whole cohort are found also for those who failed to flourish at school. In fact, for those who failed to flourish at secondary school, we find additional associations that are statistically significant between adult learning and sustained well-being (optimism and efficacy) after adjusting for our control variables, which were not found for the whole sample, and some of the associations with other health and well-being outcomes are greater in magnitude for those who failed to flourish at school than for the sample as a whole. Examples are given in Box 2.

Box 2: Odds ratios for transformed health outcomes contingent on participation in adult learning for those who did not flourish at secondary school and for the whole cohort

For cohort members who had no O level equivalents at 16 and who were also disengaged at school, the odds for giving up smoking are 2.1 times greater than the odds of giving up smoking for the rest of this sub-group who did not take courses. For the whole cohort, the odds of giving up smoking amongst adult learners are greater than they are for the rest of the cohort (who did not take courses between 33 and 42), but only by a factor of 1.3.

For cohort members who had no O level equivalents at 16 and who were also disengaged at school, the odds for having transformed efficacy1.7 times greater than the odds of giving up smoking for the rest of this sub-group who did not take courses. For the whole cohort, the odds of having transformed efficacy amongst adult learners are greater than they are for the rest of the cohort (who did not take courses between 33 and 42), but only by a factor of 1.3.

For cohort members who had no O level equivalents at 16 and who were also disengaged at school, the odds for having transformed self-rated health are 2.1 times greater than the odds of giving up smoking for the rest of this sub-group who did not take courses. For the whole cohort, the odds of having transformed self-rated health amongst adult learners are greater than they are for the rest of the cohort (who did not take courses between 33 and 42), but only by a factor of 1.2.

Although these differences appear substantial, none of them are statistically significant. More details are given in Appendix 6. Taken together, our results do, nonetheless, provide a powerful argument that the contribution of adult learning to positive changes in well-being and smoking are as great *or greater* for those who did not flourish at secondary school as they are for those who did. To err on the side of caution, however, we conclude that participation in adult learning is not associated with either reducing or widening the gap in well-being and healthy lifestyle between those who did not flourish at secondary school and those who did. In any case, the difference is not substantial enough to reduce the gap greatly.

Adult learning is associated with positive changes in well-being and health practices for more adults who flourished at secondary school than adults who did not. This is because a relatively small proportion of those who did not flourish at secondary school took courses between the ages of 33 and 42. If interventions targeted at adults who had not flourished at secondary school were successful in increasing participation in adult learning, it is possible that those adults who took courses as a result of the interventions would also enjoy better well-being and live healthier lifestyles. However, we do not have evidence that this would be so; our results apply to cohort members who participated in adult learning under the conditions that existed during the 1990's.

The findings suggest that adult learning may play a more important role in transforming people's health and well-being than in sustaining or enriching positive states of health and well-being. On the basis of 140 in-depth biographical interviews, Schuller and his colleagues concluded that adult learning had important sustaining as well as transforming effects on a wide range of social outcomes (Schuller et al., 2002; see Section 1.2.1). We can add to their conclusion. The qualitative research identified the importance of adult learning in sustaining health and well-being for some

individuals. Our quantitative evidence suggests that, averaged out across the whole cohort, sustained health and well-being was not much associated with adult learning although transformed health and well-being was. However, this result applies to effects of adult learning between the ages of 33 and 42, and sustaining effects may be more important later in life.

Other analyses investigating the contributions of adult learning to changes in social attitudes suggest that adult learning contributes more to sustaining than transforming pro-social attitudes. Participation in adult learning is associated with not developing racist and authoritarian attitudes, rather than shifting the attitudes of individuals who already hold racist and authoritarian views (Preston and Feinstein, 2004).

In the research previously cited, Schuller and his colleagues suggest that adult learning involves an element of risk to well-being because it challenges the status quo. Re-assessment of one's roles in life may lead to empowerment but also to the realisation of missed opportunities, particularly amongst women (e.g. Bynner and Hammond, 2004). This is one explanation for why adult learning is associated with not having sustained satisfaction with life so far for women.

Associations between participation in adult learning and the onset of hay fever or allergic rhinitis and skin problems may reflect the consequences of stress on immunological functioning. We think it likely that taking courses can contribute to stress, especially in the light of the case study findings reported by Schuller et al. (2004). It is also possible that adults participating in adult learning are more likely to recognise and report existing conditions that are not easily diagnosed, such as allergic rhinitis.

The gender differences reported in Section 5.3, which relate to depression and obesity, raise interesting questions for future research. They may reflect gender differences in the diagnosis of depression and in the meanings of depression and obesity, and also in what adult learning meant to men and women over this period, during good health and during recovery from depression.

The Wanless reports and Public Health White Paper published in November 2004 emphasise the importance of preventative health care. Health literacy and mentoring through health trainers are highlighted as approaches to the promotion of health and the management of chronic conditions. This research provides evidence that taking mainstream courses not directly concerned with health during mid adulthood contributes to a range of positive health outcomes such as giving up smoking, taking more exercise, sustaining high levels of exercise, and transformed efficacy and optimism. We do not claim, however, that adult learning alone is the unique policy lever that will improve health and well-being, nor do we claim that it is a panacea that will make uniform and positive contributions to all learners, regardless of their background and current circumstances.

6.3　　　Life course and policy implications

An intervention designed to promote social inclusion in schools in Australia appears to have had fairly immediate impacts on adolescents' health in terms of timing of first sexual debut, smoking and drinking alcohol (personal correspondence with Bonell). This intervention was designed to promote engagement and participation amongst all members of the school community through direct work with staff and pupils in schools (described in Patten et al., 2003). It was not designed specifically to promote health amongst pupils, but this appears to have been an outcome of the intervention.

The associations we have found between failure to flourish in secondary school and adult health are much greater and more pervasive than the associations between adult learning and changes in adult health. However, it is difficult to draw conclusions from this about the relative benefits likely to result from educational investments made at these different points of the life course. This is partly because of the selection bias problem. Even though we have controlled for health, social, psychological and economic factors at ages seven and 33, we do not claim at all to have conditioned out all confounding bias. Moreover, we think it likely that the selection bias into not flourishing at secondary school is much greater than the selection bias into adult learning. This would partly explain the difference in magnitudes and pervasiveness in associations with adult health between flouring at school and participation in adult learning. Nevertheless, we are struck by the size and pervasiveness of the associations between flourishing at secondary school and adult health and well-being and consider it a signal that may be of value to policy makers concerned with adult health and/or with education through the lifecourse.

When we come to consider the extent to which adult learning can redress the health inequalities that exist between those who did and did not flourish at secondary school, selection bias is still a problem. Under the assumption that selection biases for participation in adult learning of flourishers and non-flourishers are likely to be of a similar order, we find that adult learning is not associated with sufficiently greater benefits for non-flourishers than flourishers to redress the gap.

This finding applies to provision during the 1990s. Current drives to widen participation and improve provision for those who did not flourish at secondary school may do more to offset this gap.

The interventions described at the beginning of this section and the evidence presented in this report suggest that school and adult education can do more than just help people to acquire skills in order to derive economic benefits. It can also support the development of skills and capabilities that are important in other domains of adult life. If the education system could respond to the signals that we have shown are available to it in relation to adult health, benefits would result that are clearly relevant to the Department of Health and the Treasury. As so often in the work of the WBL Research Centre, this shows the relevance across Government of educational issues.

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Appendix 1: The groups who failed to flourish at school

In this appendix, we examine the characteristics of groups whom we identify as failing to flourish at school. For example, are they mostly boys? What do we know about their family backgrounds, childhood health and health behaviours and their early abilities? What were their experiences at school? How many of them left full-time education at 16?

Some simple descriptive statistics that relate to these questions are given in Appendix Table A1.1. They show that boys are over-represented in each group identified using a proxy measure for failure to flourish, except for the truants and the internalisers. Also, those who did not flourish at school had higher levels of family risk, poorer health throughout their childhood, smoked more, and were more likely to leave school at 16 than the cohort as a whole. The patterns of drinking are more complex, probably reflecting socio-economic differences in attitudes towards alcohol consumption and drinking practices.

Appendix table A1.1: Characteristics of those who did not flourish at secondary school

	NO OS AT 16		TRUANTS		EXTERNALISERS		INTERNALISERS		NEGATIVE ATTITUDES		NO OS AND DISENGAGED		TOTAL COHORT	
Proportion of boys	.54		.51		.54		.51		.56		.56		.52	
	GIRLS	BOYS	GIRLS	BOYS	BOYS	BOYS	GIRLS	BOYS	BOYS	BOYS	GIRLS	BOYS	GIRLS	BOYS
Mean number of family risk factors	2.96	2.88	2.69	2.7	2.9	3	2.92	2.82	2.9	2.95	3.15	3.12	2.47	2.47
Proportion with health condition@16 and 7	9.7	9.9	8.2	9.2	9.8	9.4	11.6	10.8	10	10.3	9.8	10.7	8.1	8.4
Proportion who left school at 16	92	91.1	81.3	82.6	89	91.6	88.8	88.2	94.9	92.6	97.4	96.6	71.1	71.1
Smoked 10+ per week at 16	34.1	40.2	34	42.4	50.6	54.4	27.2	37.6	49	55.5	48.2	57.1	23.9	29.8
Drank alcohol in previous week at 16	35.5	50.2	47.2	60.1	43.5	58.4	32.3	44.1	47.6	61.4	40.9	57.6	39.6	51.9

Appendix 2: Details of variables

In this appendix, we present summary statistics for the control variables described in Section 2.5.5 (see Appendix Table 2). The age 33 variables are only used in analyses that involve research question 2, but the rest of the variables are used as control variables in all of the analyses reported in Sections 3, 4 and 5. We also discuss briefly some of the decisions made in deriving the physical health variables and the adult learning variable.

Coding the physical health variables

At ages 33 and 42, cohort members were asked whether they had ever suffered from specific health conditions, such as migraines or skin problems. A consequence of these questions is that, logically, there should be no instances where the cohort member reports ever having had the condition at age 33 and not ever having had it at age 42. Unfortunately, many cohort members contradicted their answers in this way. We do not use these observations since it is unclear what the responses mean.

Many cohort members who were surveyed at age 33 did not answer questions about whether they had ever had the particular physical health conditions which we use. Maybe this is because they did not answer this whole section of the survey. Alternatively, they may not have answered the questions because they had not suffered from the condition. Certainly, it seems implausible that if the cohort member had suffered from a condition that they would pass over questions about it. We therefore look to see whether each cohort member answered the preceding questions in the survey, which concern their self-rated health. For those who did answer these questions, we impute missing values to be zero for the questions about the specific health conditions. This is done for 33 cohort members for bronchitis; 41 for hay fever; 35 for migraines; 33 for skin problems; 47 for back pain. Missing values on the physical conditions at age 42 are treated as missing because the public dataset has already been cleaned.

Coding the variable for adult learning

In 2000, the NCDS survey asked cohort members to give details of courses that they had taken since the previous sweep in 1991. From this information, we can construct a continuous variable that indicates how many courses were taken over this period and a binary variable that indicates whether or not the cohort member took any courses at all. We choose to use just one variable to indicate participation in adult learning. This is the binary indicator of participation or no participation.

Using each type of variable (continuous and binary) has advantages and disadvantages, and how these weigh up depends on the purposes of the analysis. The continuous variable uses all the information available, but it assumes that participation in adult learning means the same whether it is the first, second, third, or tenth course taken during the time period. In terms of the associations between participation in adult learning and health and well-being, which is our second research question, there is evidence that these associations are greater in relation to taking the first course than they are for the tenth (Feinstein et al., 2003).

Appendix table A2.1: Summary statistics for control variables

DEFINITION	OBS	MEAN	SD	MIN	MAX
Male	18553	.52	.50	0	1
Family and social background					
Father sc 4,5, sick or unemployed at birth	16513	.22	.41	0	1
Born to mother under 20	17402	.06	.23	0	1
Mother left school at min age	17355	.75	.43	0	1
3+ children under 21 in household at 11	13790	.56	.5	0	1
Father left school at min age	14051	.77	.42	0	1
Free school meals at 11	13955	.10	.30	0	1
Father absent at 0, 7 or 11	12629	.14	.35	0	1
Childhood health					
1+ health condition at 7	14302	.31	.46	0	1
1+ condition constituting handicap at 7	14302	.04	.20	0	1
1+ sensory defect at 7	14133	.18	.38	0	1
1+ sensory defect constituting handicap 7	14053	.00	.04	0	1
Danger of becoming overweight at 7[4]	14544	.23	.42	0	1
Medium Rutter parent score at 7	14544	.32	.47	0	1
High Rutter parent score at 7	13535	.15	.36	0	1
Attainment at age 7					
Poor oral ability at 7	15017	.22	.41	0	1
Limited knowledge at 7	15008	.28	.45	0	1
Poor or non-reader at 7	14993	.26	.44	0	1
Little or no creativity at 7	15001	.33	.47	0	1
Slow at numbers at 7	15013	.35	.48	0	1
Bottom quartile reading test at 7	14931	.26	.44	0	1
2nd quartile reading test at 7	14931	.26	.44	0	1
3rd quartile reading test at 7	14931	.29	.45	0	1
Bottom quartile arithmetic test at 7	14898	.29	.45	0	1
2nd quartile arithmetic test at 7	14898	.28	.45	0	1
3rd quartile arithmetic test at 7	14898	.24	.43	0	1
Bottom quartile drawing test at 7	14648	.28	.45	0	1
2nd quartile drawing test at 7	14648	.27	.44	0	1
3rd quartile drawing test at 7	14648	.22	.42	0	1
Adjustment at 7					
BSAG[5] score 1-5 at 7	14932	.39	.49	0	1
BSAG score 6+ at 7	14932	.51	.50	0	1

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[4] Over 85th percentile by gender
[5] Bristol Social Adjustment Guide ***

Socio-economic status and qualifications in adulthood					
Ses 1 at 33	9853	.05	.21	0	1
Ses 2 at 33	9852	.31	.46	0	1
Ses 3 at 33	9852	.22	.41	0	1
Ses 4 at 33	9852	.18	.38	0	1
Aca 1 at 33	9792	.18	.38	0	1
Aca 2 at 33	9792	.41	.49	0	1
Aca 3 at 33	9792	.11	.31	0	1
Aca 4 at 33	9792	.13	.34	0	1
Aca 5 at 33	9792	.02	.13	0	1
Voc 1 at 33	9792	.13	.33	0	1
Voc 2 at 33	9792	.14	.35	0	1
Voc 3 at 33	9792	.11	.32	0	1
Voc 4 at 33	9792	.17	.38	0	1
Health and well-being at 33					
Satisfaction with life so far at 33	10629	7.42	1.72	0	10
Optimism at 33	10565	8.53	1.41	0	10
Efficacy at 33	10393	2.58	0.77	0	3
Self-rated health at 33	11274	2.68	0.6	1	3
Malaise score at 33	11327	2.4	2.97	0	22
Ever had migraines at 33	11373	0.19	0.4	0	1
Ever had back pain at 33	11373	0.47	0.5	0	1
Ever had hay fever or allergic rhinitis at 33	11373	0.32	0.47	0	1
Ever had asthma or bronchitis at 33	11373	0.18	0.39	0	1
Ever had skin problems at 33	11374	0.17	0.38	0	1
Smokes at 33	11353	0.33	0.47	0	1
Heavy drinker at 33	11405	0.19	0.39	0	1
Level of exercise taken at 33	11311	3.13	2.08	0	6
Body mass index > 30 at 33	11020	0.11	0.32	0	1

Note: Missing values excluded.

The use of binary variables sidesteps this assumption, which means that it is easier to interpret findings. However, binary variables drop much of the available information. Using a binary measure of participation vs. no participation in adult learning assumes that associations with health and well-being (research question 2) are the same however many courses are taken, so long as the adult takes at least one.

A third option is to construct a categorical variable with 4 categories, one for no courses taken, one for taking 1 or 2 courses, one for taking 3-10 courses and the last for taking more than 10 courses. This was the approach we used in the previous research (Feinstein et al., 2003). We have experimented with using different

categories and with running equivalent analyses for each type of variable, and the results tell broadly the same story. In the interest of simplicity, we use the binary variable to present our results.

Appendix 3: Results from analyses of the adult health and well-being of those who did not flourish at secondary school

The first column of Appendix Table A3 indicates the group of cohort members to which the results in subsequent columns apply. The second column indicates the model used to generate these results; i.e., whether controls were included. Subsequent columns give odds ratios and p-values for different health and well-being outcomes at age 33 for men and women separately.

For example, the odds ratio of having depression for women who fall into the truanting group compared to women who do not is 1.98, with a p-value of less than .0005. When controls are added, the odds ratio falls to 1.74. In other words, the odds of having depression amongst female cohort members who used to truant from secondary school are about one and three quarters times as great as the odds for female cohort members who are otherwise similar but who did not truant from secondary school. The difference in rates of depression between the two groups of women is statistically significant at p<0.0005.

Appendix table A3.1: ORs for poor well-being and health at 33 for groups that did not flourish at school compared to the rest for men and women separately (1)

GROUP		LOW SATISFACTION WITH LIFE SO FAR		LOW OPTIMISM		LOW EFFICACY		POOR SELF-RATED HEALTH		DEPRESSION	
		F	M	F	M	F	M	F	M	F	M
Poor maths	No controls	1.57 **0**	1.65 **0**	1.13 **0.309**	1.22 **0.123**	2.98 **0**	2.82 **0**	1.8 **0**	1.62 **0**	3.09 **0**	2.62 **0**
	Full controls	1.34 **0.022**	1.34 **0.036**	1.16 **0.262**	1.35 **0.032**	2.01 **0**	1.78 **0**	1.42 **0.007**	1.13 **0.432**	2 **0**	1.59 **0.072**
Poor reading	No controls	1.36 **0.002**	1.11 **0.29**	1 **0.971**	0.95 **0.616**	2.61 **0**	2.1 **0**	1.94 **0**	2.05 **0**	2.94 **0**	2.24 **0**
	Full controls	1.16 **0.221**	0.83 **0.112**	0.99 **0.944**	0.97 **0.829**	1.74 **0**	1.32 **0.03**	1.62 **0**	1.59 **0**	1.92 **0**	1.32 **0.241**
No Os	No controls	1.36 **0**	1.35 **0**	0.87 **0.02**	0.92 **0.189**	2.13 **0**	2.28 **0**	1.75 **0**	1.72 **0**	2.61 **0**	2.68 **0**
	Full controls	1.25 **0.002**	1.24 **0.002**	0.91 **0.197**	0.96 **0.584**	1.53 **0**	1.69 **0**	1.48 **0**	1.35 **0.001**	1.73 **0**	1.77 **0.002**
Truants	No controls	1.28 **0**	1.12 **0.073**	0.96 **0.546**	0.99 **0.922**	1.54 **0**	1.24 **0.003**	1.23 **0.002**	1.31 **0.001**	1.98 **0**	1.64 **0.002**
	Full controls	1.26 **0.001**	1.06 **0.413**	1.02 **0.777**	1.03 **0.683**	1.38 **0**	1.05 **0.495**	1.1 **0.161**	1.19 **0.032**	1.74 **0**	1.4 **0.042**
Poor attenders	No controls	1.26 **.014**	1.34 **.003**	.97 **.776**	.97 **.778**	1.54 **0**	1.65 **0**	1.21 **.055**	1.69 **0**	1.59 **.003**	1.89 **.003**
	Full controls	1.13 **.206**	1.23 **.052**	1.05 **.647**	.99 **.937**	1.14 **.232**	1.22 **.088**	.99 **.916**	1.34 **.014**	1.1 **.59**	1.38 **.175**
Externalisers	No controls	1.47 **0**	1.18 **0.081**	1.02 **0.83**	0.92 **0.347**	1.82 **0**	1.48 **0**	1.51 **0**	1.62 **0**	2.1 **0**	2.8 **0**
	Full controls	1.38 **0.001**	1.04 **0.699**	1.08 **0.459**	0.94 **0.56**	1.45 **0**	1.14 **0.231**	1.32 **0.005**	1.34 **0.009**	1.65 **0.001**	2.29 **0**
Internalisers	No controls	1.43 **0**	1.71 **0**	1.13 **0.21**	1.28 **0.01**	2.03 **0**	2.02 **0**	1.42 **0**	1.55 **0**	2.08 **0**	1.71 **0.009**
	Full controls	1.31 **0.007**	1.53 **0**	1.16 **0.142**	1.33 **0.006**	1.59 **0**	1.59 **0**	1.21 **0.069**	1.29 **0.024**	1.63 **0.001**	1.35 **0.167**
Negative attitudes	No controls	1.35 **0**	1.33 **0**	1.1 **0.157**	1.14 **0.042**	1.88 **0**	1.74 **0**	1.33 **0**	1.51 **0**	2.03 **0**	1.66 **0.002**
	Full controls	1.3 **0**	1.25 **0.001**	1.14 **0.046**	1.17 **0.022**	1.65 **0**	1.49 **0**	1.2 **0.012**	1.35 **0**	1.7 **0**	1.31 **0.119**
No Os and engaged	No controls	1.2 **0.018**	1.23 **0.008**	0.83 **0.016**	0.88 **0.118**	1.8 **0**	2.01 **0**	1.57 **0**	1.4 **0**	1.83 **0**	1.95 **0.001**
	Full controls	1.14 **0.128**	1.17 **0.067**	0.88 **0.148**	0.95 **0.575**	1.37 **0.002**	1.54 **0**	1.39 **0**	1.15 **0.2**	1.26 **0.144**	1.29 **0.264**
No Os and disengaged	No controls	1.6 **0**	1.55 **0**	0.94 **0.471**	1.04 **0.669**	2.61 **0**	2.6 **0**	1.74 **0**	2.1 **0**	3.61 **0**	3.28 **0**
	Full controls	1.54 **0**	1.41 **0.001**	1 **0.981**	1.09 **0.4**	1.85 **0**	1.89 **0**	1.45 **0.001**	1.62 **0**	2.41 **0**	2.04 **0.003**

Notes: For the first eight groups, odds ratios and p-values are taken from separate logistic regressions for each health outcome and for each group. For the ninth and tenth groups, the odds ratios and p-values are taken from a single regression which compares the health and well-being at age 33 of each sub-group simultaneously with the health and well-being at age 33 of cohort members who had the equivalent of at least one O level at age 16. P-values are given in smaller bold font underneath the odds ratios. F stands for female and M for male. The controls that we use are described in Section 2.5.5 and summary statistics are given in Appendix 2.

Appendix table A3.2: ORs for poor well-being and health at 33 for groups that did not flourish at school compared to the rest for men and women separately (2)

GROUP		MIGRAINE F	MIGRAINE M	BACK PAIN F	BACK PAIN M	HAY FEVER OR ALLERGIC RHINITIS F	HAY FEVER OR ALLERGIC RHINITIS M	ASTHMA OR BRONCHITIS F	ASTHMA OR BRONCHITIS M	SKIN PROBLEMS F	SKIN PROBLEMS M
Poor maths	No controls	1.07 **0.603**	1.34 **0.067**	1.2 **0.094**	1.38 **0.007**	0.69 **0.003**	0.76 **0.039**	0.92 **0.539**	1.15 **0.383**	0.55 **0**	0.71 **0.066**
	Full controls	1.02 **0.88**	1.24 **0.246**	1.18 **0.18**	1.31 **0.039**	0.8 **0.112**	1.09 **0.55**	0.82 **0.192**	1.32 **0.115**	0.65 **0.014**	0.86 **0.477**
Poor reading	No controls	1.11 **0.332**	1.25 **0.099**	0.98 **0.82**	1.11 **0.271**	0.7 **0.001**	0.65 **0**	1.06 **0.602**	0.93 **0.571**	0.64 **0.001**	0.81 **0.139**
	Full controls	1.09 **0.492**	1.2 **0.249**	0.93 **0.511**	0.99 **0.895**	0.8 **0.074**	0.94 **0.61**	1.01 **0.921**	1.04 **0.827**	0.76 **0.073**	0.99 **0.95**
No Os	No controls	1.2 **0.006**	0.99 **0.891**	1.07 **0.248**	1.17 **0.006**	0.73 **0**	0.68 **0**	1.25 **0.001**	1.03 **0.755**	0.84 **0.017**	0.8 **0.007**
	Full controls	1.11 **0.165**	0.93 **0.474**	0.97 **0.611**	1.16 **0.034**	0.78 **0.001**	0.86 **0.042**	1.27 **0.004**	1.06 **0.559**	0.94 **0.46**	0.91 **0.336**
Truants	No controls	1.29 **0**	0.85 **0.091**	1.28 **0**	1.26 **0**	0.88 **0.039**	0.83 **0.006**	1.17 **0.039**	0.99 **0.909**	1.11 **0.153**	0.91 **0.309**
	Full controls	1.28 **0.001**	0.86 **0.135**	1.25 **0**	1.2 **0.004**	0.93 **0.294**	0.93 **0.315**	1.16 **0.058**	1.02 **0.788**	1.18 **0.038**	0.96 **0.679**
Poor attenders	No controls	1.27 **0.014**	1.15 **0.305**	1.12 **0.193**	1.24 **0.023**	0.82 **0.036**	0.68 **0**	1.23 **0.057**	1.06 **0.642**	0.87 **0.215**	0.86 **0.261**
	Full controls	1.3 **0.012**	1.19 **0.23**	1.05 **0.609**	1.2 **0.068**	0.89 **0.257**	0.85 **0.143**	1.24 **0.065**	1.08 **0.578**	0.96 **0.748**	0.95 **0.737**
Externalisers	No controls	1.24 **0.025**	0.91 **0.492**	1.2 **0.038**	1.32 **0.002**	0.78 **0.011**	0.83 **0.052**	1.44 **0**	1.25 **0.057**	1.01 **0.95**	1.11 **0.388**
	Full controls	1.18 **0.107**	0.86 **0.3**	1.14 **0.158**	1.28 **0.01**	0.84 **0.095**	1 **1**	1.42 **0.001**	1.32 **0.028**	1.06 **0.62**	1.21 **0.144**
Internalisers	No controls	1.24 **0.036**	1.27 **0.067**	1.28 **0.006**	0.99 **0.916**	1.12 **0.233**	1.05 **0.63**	1 **0.991**	1.21 **0.116**	1.2 **0.092**	1.09 **0.472**
	Full controls	1.18 **0.134**	1.26 **0.096**	1.23 **0.033**	0.94 **0.537**	1.23 **0.041**	1.25 **0.031**	0.95 **0.661**	1.3 **0.045**	1.34 **0.013**	1.19 **0.186**
Negative attitudes	No controls	0.99 **0.899**	0.89 **0.216**	1.13 **0.052**	1.26 **0**	0.95 **0.423**	0.75 **0**	1.06 **0.454**	1.01 **0.904**	1.13 **0.127**	0.9 **0.253**
	Full controls	0.98 **0.79**	0.89 **0.238**	1.1 **0.128**	1.21 **0.004**	1.02 **0.764**	0.83 **0.009**	1.02 **0.798**	1.04 **0.668**	1.19 **0.033**	0.94 **0.49**
No Os and engaged	No controls	1.07 **0.433**	0.94 **0.584**	1.01 **0.861**	1.07 **0.354**	0.73 **0**	0.75 **0**	1.12 **0.225**	0.92 **0.454**	0.78 **0.009**	0.75 **0.01**
	Full controls	1.03 **0.783**	0.91 **0.469**	0.92 **0.33**	1.05 **0.561**	0.78 **0.007**	0.95 **0.609**	1.16 **0.167**	1 **0.985**	0.88 **0.26**	0.83 **0.126**
No Os and disengaged	No controls	1.32 **0.004**	0.95 **0.689**	1.16 **0.082**	1.33 **0.001**	0.68 **0**	0.67 **0**	1.34 **0.004**	1.06 **0.637**	0.86 **0.16**	0.83 **0.135**
	Full controls	1.29 **0.022**	0.89 **0.449**	1.05 **0.611**	1.26 **0.021**	0.76 **0.011**	0.9 **0.328**	1.4 **0.006**	1.16 **0.273**	0.98 **0.855**	0.92 **0.547**

Notes: For the first eight groups, odds ratios and p-values are taken from separate logistic regressions for each health outcome and for each group. For the ninth and tenth groups, the odds ratios and p-values are taken from a single regression which compares the health and well-being at age 33 of each sub-group simultaneously with the health and well-being at age 33 of cohort members who had the equivalent of at least one O level at age 16. P-values are given in smaller bold font underneath the odds ratios. F stands for female and M for male. The controls that we use are described in Section 2.5.5 and summary statistics are given in Appendix 2.

Appendix table A3.3: ORs for poor well-being and health at 33 for groups that did not flourish at school compared to the rest for men and women separately (3)

GROUP		SMOKING		EXCESSIVE DRINKING		EXERCISE		OBESITY	
		F	M	F	M	F	M	F	M
Poor maths	No controls	2.21 **0**	1.84 **0**	0.58 **0.01**	0.7 **0.009**	1.34 **0.009**	1.41 **0.005**	1.69 **0.001**	1.68 **0.002**
	Full controls	1.47 **0.002**	1.43 **0.008**	0.96 **0.869**	0.71 **0.027**	1.15 **0.292**	1.09 **0.551**	1.09 **0.642**	1.21 **0.33**
Poor reading	No controls	2.44 **0**	1.71 **0**	0.72 **0.063**	0.83 **0.075**	1.25 **0.026**	1.79 **0**	1.88 **0**	1.85 **0**
	Full controls	1.8 **0**	1.32 **0.015**	1.3 **0.216**	0.83 **0.138**	1.01 **0.92**	1.46 **0.001**	1.3 **0.118**	1.53 **0.012**
No Os	No controls	3.01 **0**	2.34 **0**	0.71 **0**	1.11 **0.116**	1.5 **0**	1.45 **0**	1.71 **0**	1.45 **0**
	Full controls	2.74 **0**	2.14 **0**	1.09 **0.483**	1.24 **0.005**	1.32 **0**	1.29 **0.001**	1.25 **0.043**	1.1 **0.4**
Truants	No controls	2.21 **0**	1.96 **0**	1.18 **0.099**	1.48 **0**	1.23 **0.002**	1.15 **0.034**	1.23 **0.032**	1.08 **0.436**
	Full controls	1.96 **0**	1.86 **0**	1.4 **0.002**	1.47 **0**	1.15 **0.043**	1.09 **0.235**	1.07 **0.491**	0.89 **0.3**
Poor attenders	No controls	2.31 **0**	1.92 **0**	.85 **.283**	1.23 **.042**	1.29 **.007**	1.56 **0**	1.59 **0**	.99 **.961**
	Full controls	1.91 **0**	1.57 **0**	1.07 **.666**	1.26 **.033**	1.15 **.171**	1.4 **.001**	1.19 **.23**	.81 **.222**
Externalisers	No controls	4.26 **0**	2.64 **0**	1.36 **0.021**	1.62 **0**	1.13 **0.194**	1.35 **0.001**	1.66 **0**	1.5 **0.003**
	Full controls	3.6 **0**	2.27 **0**	1.79 **0**	1.72 **0**	1 **0.994**	1.18 **0.105**	1.38 **0.02**	1.24 **0.145**
Internalisers	No controls	1.59 **0**	1.64 **0**	0.74 **0.064**	0.83 **0.073**	1.16 **0.134**	1.46 **0**	1.91 **0**	1.03 **0.852**
	Full controls	1.23 **0.044**	1.41 **0.001**	0.91 **0.592**	0.85 **0.147**	1 **0.985**	1.27 **0.017**	1.55 **0.002**	0.87 **0.374**
Negative attitudes	No controls	2.27 **0**	2.2 **0**	1.4 **0.001**	1.41 **0**	1.18 **0.015**	1.39 **0**	1.24 **0.027**	1.26 **0.025**
	Full controls	1.99 **0**	2.1 **0**	1.74 **0**	1.44 **0**	1.09 **0.211**	1.31 **0**	1.09 **0.433**	1.03 **0.773**
No Os and engaged	No controls	1.89 **0**	1.5 **0**	0.57 **0**	0.95 **0.553**	1.43 **0**	1.16 **0.069**	1.63 **0**	1.4 **0.007**
	Full controls	1.79 **0**	1.46 **0**	0.92 **0.583**	1.1 **0.32**	1.26 **0.012**	1.04 **0.664**	1.14 **0.322**	1.08 **0.607**
No Os and disengaged	No controls	5.13 **0**	3.51 **0**	0.95 **0.737**	1.52 **0**	1.49 **0**	1.87 **0**	1.68 **0**	1.5 **0.003**
	Full controls	4.69 **0**	3.39 **0**	1.73 **0.001**	1.78 **0**	1.27 **0.028**	1.59 **0**	1.1 **0.559**	0.98 **0.891**

Notes: For the first eight groups, odds ratios and p-values are taken from separate logistic regressions for each health outcome and for each group. For the ninth and tenth groups, the odds ratios and p-values are taken from a single regression which compares the health and well-being at age 33 of each sub-group simultaneously with the health and well-being at age 33 of cohort members who had the equivalent of at least one O level at age 16. P-values are given in smaller bold font underneath the odds ratios. F stands for female and M for male. The controls that we use are described in Section 2.5.5 and summary statistics are given in Appendix 2.

Appendix 4: Additional statistics relating to the fit and reliability of the models

Appendix table A4.1: Pseudo R-squares and numbers of observations for logits conducted to estimate odds ratios for poor well-being and health at age 33 for each of the groups who failed to flourish at school compared to the rest of the cohort (1)

GROUP		SATISFACTION WITH LIFE SO FAR		OPTIMISM		EFFICACY		SELF-RATED HEALTH		DEPRESSION	
		F	M	F	M	F	M	F	M	F	M
Poor maths	No controls	**.003** 3666	**.003** 3414	**0** 3650	**.001** 3393	**.021** 3564	**.016** 3357	**.006** 3816	**.003** 3639	**.023** 3841	**.013** 3658
	Full controls	**.016** 3666	**.02** 3414	**.02** 3650	**.014** 3393	**.045** 3564	**.054** 3357	**.024** 3811	**.032** 3639	**.071** 3836	**.076** 3653
Poor reading	No controls	**.002** 3681	**0** 3425	**0** 3665	**0** 3403	**.02** 3581	**.012** 3367	**.01** 3835	**.012** 3650	**.025** 3860	**.012** 3669
	Full controls	**.016** 3681	**.02** 3425	**.02** 3665	**.013** 3403	**.046** 3581	**.052** 3367	**.027** 3830	**.036** 3650	**.072** 3855	**.075** 3664
No Os	No controls	**.004** 4750	**.004** 4445	**.001** 4723	**0** 4418	**.024** 4615	**.028** 4368	**.013** 4966	**.012** 4775	**.029** 4997	**.025** 4788
	Full controls	**.015** 4750	**.016** 4445	**.017** 4723	**.011** 4418	**.046** 4615	**.055** 4368	**.026** 4966	**.03** 4775	**.061** 4997	**.081** 4780
Self-reported truants	No controls	**.003** 4194	**.001** 3911	**0** 4176	**0** 3884	**.008** 4085	**.002** 3851	**.002** 4370	**.003** 4190	**.015** 4400	**.007** 4207
	Full controls	**.015** 4194	**.017** 3911	**.016** 4176	**.012** 3884	**.045** 4085	**.051** 3851	**.024** 4370	**.03** 4190	**.07** 4393	**.075** 4202
Poor attenders	No controls	**.001** 3100	**.002** 2997	**0** 3086	**0** 2979	**.005** 3025	**.006** 2946	**.001** 3214	**.007** 3197	**.005** 3239	**.008** 3208
	Full controls	**.017** 3100	**.021** 2994	**.022** 3086	**.013** 2979	**.053** 3020	**.056** 2946	**.031** 3214	**.039** 3197	**.079** 3234	**.051** 3204
High on externalising behaviours	No controls	**.004** 3543	**.001** 3291	**0** 3526	**0** 3269	**.009** 3443	**.004** 3239	**.004** 3692	**.006** 3515	**.013** 3715	**.024** 3530
	Full controls	**.018** 3543	**.018** 3291	**.021** 3526	**.014** 3269	**.047** 3443	**.051** 3239	**.025** 3692	**.034** 3515	**.065** 3709	**.081** 3525
High on internalising behaviours	No controls	**.003** 3543	**.007** 3291	**0** 3526	**.001** 3269	**.012** 3443	**.012** 3239	**.003** 3692	**.005** 3515	**.012** 3715	**.005** 3530
	Full controls	**.017** 3543	**.022** 3291	**.021** 3526	**.015** 3269	**.049** 3443	**.055** 3239	**.024** 3692	**.033** 3515	**.064** 3709	**.069** 3525
Negative attitudes 50%	No controls	**0.004** 4055	**0.004** 3752	**0** 4034	**0.001** 3732	**0.017** 3948	**0.013** 3693	**0.003** 4221	**0.007** 4018	**0.016** 4247	**0.007** 4036
	Full controls	**0.017** 4055	**0.02** 3752	**0.017** 4034	**0.013** 3732	**0.05** 3948	**0.056** 3693	**0.026** 4221	**0.033** 4018	**0.071** 4240	**0.079** 4031
No Os engaged and disengaged	No controls	**0** 3814	**0** 3547	**0.471** 3795	**0.669** 3526	**0** 3711	**0** 3490	**0** 3977	**0** 3806	**0** 3995	**0** 3818
	Full controls	**0.018** 3810	**0.019** 3547	**0.019** 3795	**0.012** 3526	**0.048** 3711	**0.061** 3490	**0.026** 3973	**0.033** 3806	**0.077** 3991	**0.085** 3813

Notes: The pseudo R-squares and numbers of observations are taken from separate logistic regressions for each health and well-being outcome and for each group. Pseudo R-squares are in bold font above the numbers of observations. F is females, M is males. Details of the controls are given in Appendix 2.

Appendix table A4.2: Pseudo R-squares and numbers of observations for logits conducted to estimate odds ratios for poor well-being and health at age 33 for each of the groups who failed to flourish at school compared to the rest of the cohort (2)

GROUP		MIGRAINE		BACK PAIN		HAY FEVER OR ALLERGIC RHINITIS		ASTHMA OR BRONCHITIS		SKIN PROBLEMS	
		F	M	F	M	F	M	F	M	F	M
Poor maths	No controls	**0** 3849	**.001** 3667	**.001** 3850	**.001** 3667	**.002** 3849	**.001** 3667	**0** 3849	**0** 3667	**.004** 3850	**.001** 3667
	Full controls	**.017** 3844	**.03** 3667	**.015** 3845	**.013** 3667	**.018** 3849	**.025** 3667	**.019** 3844	**.024** 3667	**.018** 3850	**.026** 3667
Poor reading	No controls	**0** 3868	**.001** 3678	**0** 3869	**0** 3678	**.002** 3868	**.003** 3678	**0** 3868	**0** 3678	**.003** 3869	**.001** 3678
	Full controls	**.017** 3863	**.03** 3678	**.014** 3864	**.013** 3678	**.018** 3868	**.025** 3678	**.019** 3863	**.023** 3678	**.018** 3869	**.025** 3678
No Os	No controls	**.001** 5016	**0** 4808	**0** 5017	**.001** 4808	**.004** 5016	**.007** 4808	**.002** 5016	**0** 4808	**.001** 5017	**.002** 4808
	Full controls	**.013** 5016	**.02** 4808	**.011** 5017	**.011** 4808	**.013** 5016	**.024** 4808	**.016** 5009	**.018** 4808	**.015** 5017	**.017** 4808
Self-reported truants	No controls	**.003** 4409	**.001** 4219	**.003** 4410	**.002** 4219	**.001** 4409	**.001** 4219	**.001** 4409	**0** 4219	**0** 4410	**0** 4219
	Full controls	**.016** 4409	**.028** 4219	**.015** 4410	**.013** 4219	**.015** 4409	**.024** 4219	**.02** 4402	**.023** 4219	**.016** 4410	**.02** 4219
Poor attenders	No controls	**.002** 3249	**0** 3221	**0** 3250	**.001** 3221	**.001** 3249	**.003** 3221	**.001** 3249	**0** 3221	**0** 3250	**0** 3221
	Full controls	**.017** 3249	**.025** 3217	**.016** 3250	**.014** 3221	**.017** 3249	**.028** 3221	**.022** 3244	**.022** 3221	**.022** 3250	**.026** 3217
High on externalising behaviours	No controls	**.001** 3725	**0** 3541	**.001** 3726	**.002** 3541	**.001** 3725	**.001** 3541	**.003** 3725	**.001** 3541	**0** 3726	**0** 3541
	Full controls	**.018** 3725	**.032** 3541	**.016** 3726	**.015** 3541	**.016** 3725	**.023** 3541	**.02** 3719	**.024** 3541	**.018** 3726	**.026** 3541
High on internalising behaviours	No controls	**.001** 3725	**.001** 3541	**.001** 3726	**0** 3541	**0** 3725	**0** 3541	**0** 3725	**.001** 3541	**.001** 3726	**0** 3541
	Full controls	**.018** 3725	**.033** 3541	**.016** 3726	**.014** 3541	**.017** 3725	**.024** 3541	**.017** 3719	**.024** 3541	**.02** 3726	**.026** 3541
Negative attitudes 50%	No controls	**0** 4256	**0.001** 4046	**0.001** 4257	**0.002** 4046	**0** 4256	**0.004** 4046	**0** 4256	**0** 4046	**0.001** 4257	**0** 4046
	Full controls	**0.015** 4256	**0.029** 4046	**0.014** 4257	**0.012** 4046	**0.014** 4256	**0.025** 4046	**0.021** 4249	**0.021** 4046	**0.019** 4257	**0.021** 4046
No Os engaged and disengaged	No controls	**0.002** 4006	**0** 3829	**0.001** 4007	**0.002** 3829	**0.005** 4006	**0.005** 3829	**0.002** 4006	**0** 3829	**0.002** 4007	**0.002** 3829
	Full controls	**0.017** 4002	**0.029** 3829	**0.013** 4003	**0.013** 3829	**0.015** 4006	**0.025** 3829	**0.02** 4002	**0.023** 3829	**0.018** 4007	**0.02** 3829

Notes: The pseudo R-squares and numbers of observations are taken from separate logistic regressions for each health and well-being outcome and for each group. Pseudo R-squares are in bold font above the numbers of observations. F is females, M is males. Details of the controls are given in Appendix 2.

Appendix table A4.3: Pseudo R-squares and numbers of observations for logits conducted to estimate odds ratios for poor well-being and health at age 33 for each of the groups who failed to flourish at school compared to the rest of the cohort (3)

GROUP		SMOKING		HEAVY DRINKING		EXERCISE		OBESITY	
		F	M	F	M	F	M	F	M
Poor maths	No controls	.011 3846	.006 3659	.003 3861	.002 3675	.001 3824	.002 3647	.004 3739	.004 3549
	Full controls	.051 3846	.031 3659	.041 3856	.016 3675	.017 3819	.023 3647	.084 3734	.081 3545
Poor reading	No controls	.017 3865	.007 3670	.001 3880	.001 3686	.001 3843	.008 3658	.008 3758	.008 3558
	Full controls	.054 3865	.031 3670	.041 3875	.015 3686	.017 3838	.025 3658	.087 3753	.083 3554
No Os	No controls	.051 5011	.03 4796	.004 5030	0 4823	.007 4987	.006 4785	.01 4867	.005 4653
	Full controls	.075 5011	.047 4796	.036 5030	.016 4823	.017 4987	.016 4785	.076 4860	.093 4653
Self-reported truants	No controls	.026 4403	.019 4210	.001 4423	.006 4229	.002 4380	.001 4198	.002 4280	0 4088
	Full controls	.064 4403	.044 4210	.043 4423	.022 4229	.016 4373	.019 4198	.082 4273	.085 4084
Poor attenders	No controls	.021 3246	.011 3213	.001 3257	.001 3232	.002 3230	.005 3205	.005 3157	0 3121
	Full controls	.053 3241	.037 3213	.044 3257	.023 3232	.018 3225	.023 3205	.096 3152	.086 3121
High on externalising behaviours	No controls	.056 3722	.026 3533	.002 3736	.006 3551	0 3702	.002 3521	.006 3622	.004 3429
	Full controls	.09 3722	.047 3533	.043 3736	.023 3551	.018 3696	.023 3521	.097 3616	.084 3425
High on internalising behaviours	No controls	.005 3722	.006 3533	.001 3736	.001 3551	0 3702	.004 3521	.009 3622	0 3429
	Full controls	.053 3722	.033 3533	.037 3736	.017 3551	.018 3696	.023 3521	.098 3616	.084 3425
Negative attitudes 50%	No controls	0.028 4250	0.026 4037	0.004 4270	0.005 4056	0.001 4227	0.005 4026	0.002 4132	0.002 3917
	Full controls	0.066 4250	0.05 4037	0.052 4270	0.022 4056	0.016 4220	0.021 4026	0.084 4125	0.087 3913
No Os engaged and disengaged	No controls	0.067 4001	0.041 3821	0.007 4018	0.006 3840	0.006 3981	0.01 3810	0.009 3892	0.005 3701
	Full controls	0.093 4001	0.059 3821	0.053 4014	0.024 3840	0.019 3977	0.027 3810	0.082 3888	0.095 3697

Notes: The pseudo R-squares and numbers of observations are taken from separate logistic regressions for each health and well-being outcome and for each group. R-squares are in bold font above the numbers of observations. F is females, M is males. Details of the controls are given in Appendix 2.

Appendix table A4.4: Pseudo R-squares and numbers of observations for logits conducted to estimate odds ratios for participation in adult learning between 33 and 42 for each group that did not flourish at school compared to the rest of the cohort

GROUP	PARTICIPATION IN ADULT LEARNING			
	FEMALE		MALE	
	NO CONTROLS	FULL CONTROLS	NO CONTROLS	FULL CONTROLS
Poor maths	.010	.038	.006	.03
	3460	**3460**	**3165**	**3165**
Poor reading	.026	.050	.011	.032
	3475	**3475**	**3175**	**3175**
No Os	.027	.044	.014	.033
	4425	**4418**	**4094**	**4094**
Truants	0	.034	.002	.029
	3945	**3945**	**3610**	**3610**
Poor attenders	.003	.033	.003	.027
	2927	**2927**	**2801**	**2798**
Externalisers	.003	.035	.005	.034
	3331	**3331**	**3044**	**3044**
Internalisers	.006	.036	.001	.032
	3331	**3331**	**3044**	**3044**
Negative attitudes	.006	.036	.003	.029
	3816	**3816**	**3472**	**3472**
No Os and engaged	.006	.036	.003	.029
	3816	**3816**	**3472**	**3472**
No Os and disengaged	.009	.038	.003	.033
	3578	**3574**	**3287**	**3287**

Notes: The pseudo R-squares and numbers of observations are taken from separate logistic regressions for each health and well-being outcome and for each group. P-values are in smaller bold font underneath the odds ratios. F is females, M is males. Details of the controls are given in Appendix 2.

Appendix table A4.5: Pseudo R-squares and number of observations for the logit regressions used to estimate the odds ratios for adult learners compared to non-learners in relation to sustained well-being and health between 33 and 42

GROUP	MODEL	LS	OPT	EFF	SRH	DEP	MIG	BPN	HAY	AST	SKIN	SK	ALC	EXE	OBS
All	No controls	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		5386	5413	6619	7395	9195	7931	5252	6673	8004	8097	6681	6293	6755	8273
	Full controls	**0.06**	**0.05**	**0.08**	**0.07**	**0.14**	**0.06**	**0.05**	**0.06**	**0.06**	**0.03**	**0.04**	**0.03**	**0.05**	**0.05**
		5376	5410	6616	7394	9177	7928	5251	6658	8004	8096	6666	6293	6752	8256
No Os	No controls	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0
		2013	2219	2349	2807	3619	3204	2064	2867	3211	3336	2290	2350	2578	3265
	Full controls	0.06	0.07	0.09	0.08	0.12	0.1	0.09	0.12	0.1	0.05	0.08	0.06	0.07	0.07
		2006	2214	2341	2805	3612	3204	2049	2848	3204	3329	2285	2346	2578	3219
Self-reported truants	No controls	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2043	2122	2497	2817	3528	3043	1939	2656	3110	3133	2357	2333	2578	3215
	Full controls	0.07	0.08	0.09	0.07	0.14	0.09	0.07	0.08	0.09	0.05	0.09	0.05	0.06	0.06
		2037	2117	2488	2811	3519	3037	1920	2625	3102	3127	2315	2323	2568	3176
Negative attitudes 50%	No controls	0	0	0.01	0	0	0	0	0	0	0	0	0	0.01	0
		1797	1850	2157	2534	3195	2815	1773	2410	2840	2837	2097	2072	2316	2880
	Full controls	0.08	0.08	0.09	0.08	0.15	0.12	0.06	0.1	0.11	0.06	0.08	0.05	0.07	0.07
		1791	1844	2152	2527	3185	2813	1754	2309	2834	2813	2078	2071	2311	2871
No Os and engaged at 16	No controls	**0**	**0**	**0.01**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		1028	1091	1199	1404	1787	1556	1026	1356	1557	1616	1289	1204	1294	1570
	Full controls	**0.09**	**0.11**	**0.15**	**0.1**	**0.18**	**0.14**	**0.16**	**0.19**	**0.13**	**0.07**	**0.13**	**0.11**	**0.08**	**0.1**
		1021	1085	1188	1401	1781	1537	1014	1348	1534	1600	1277	1203	1294	1540
No Os and not engaged at 16	No controls	**0**	**0**	**0**	**0**	**0**	**0**	**0.01**	**0.01**	**0**	**0**	**0.02**	**0**	**0.01**	**0**
		573	648	669	826	1057	961	582	880	962	997	546	628	747	990
	Full controls	**0.15**	**0.13**	**0.15**	**0.14**	**0.18**	**0.2**	**0.23**	**0.24**	**0.22**	**0.14**	**0.33**	**0.15**	**0.15**	**0.14**
		566	643	655	825	1034	941	536	827	945	968	535	621	732	952

Note: Pseudo R-squares are above the number of observations, which are in bold font. The pseudo R-squares and numbers of observations are taken from separate logistic regressions for each health and well-being outcome and for each group. Details of the controls are given in Appendix 2.

Appendix table A4.6: Pseudo R-squares and number of observations for the logit regressions used to estimate the odds ratios for adult learners compared to non-learners in relation to transformed well-being and health between 33 and 42

GROUP	MODEL	LS	OPT	EFF	SRH	DEP	SMK	ALC	EXE	OBS
All	No controls	**0** / 3916	**0** / 3837	**0** / 2480	**0.01** / 2349	**0** / 600	**0.01** / 3102	**0** / 1769	**0** / 2991	**0** / 992
	Full controls	**0.05** / 3901	**0.05** / 3835	**0.09** / 2479	**0.09** / 2348	**0.13** / 598	**0.06** / 3095	**0.04** / 1767	**0.03** / 2990	**0.08** / 987
No Os	No controls	0 / 1679	0.001 / 1456	0.003 / 1258	0.012 / 1143	0.004 / 338	0.003 / 1665	0.001 / 709	0.003 / 1362	0 / 1679
	Full controls	0.073 / 1673	0.08 / 1456	0.095 / 1258	0.153 / 1143	0.18 / 331	0.077 / 1656	0.081 / 702	0.053 / 1356	0.073 / 1673
Self-reported truants	No controls	0 / 1575	0.004 / 1482	0.002 / 1042	0.007 / 971	0.004 / 283	0.001 / 1451	0 / 763	0.002 / 1209	0 / 1575
	Full controls	0.084 / 1572	0.082 / 1477	0.141 / 1039	0.129 / 970	0.287 / 279	0.075 / 1445	0.095 / 757	0.082 / 1207	0.084 / 1572
Negative attitudes 50%	No controls	0.001 / 1465	0.004 / 1399	0.003 / 1026	0.007 / 889	0.006 / 247	0.001 / 1337	0 / 728	0.003 / 1103	0 / 371
	Full controls	0.048 / 1465	0.08 / 1398	0.064 / 1025	0.062 / 889	0.201 / 247	0.067 / 1336	0.079 / 724	0.055 / 1103	0.186 / 365
No Os and engaged at 16	No controls	**0** / 755	**0** / 686	**0** / 549	**0.01** / 487	**0.02** / 111	**0** / 607	**0** / 310	**0** / 597	**0** / 215
	Full controls	**0.1** / 753	**0.11** / 674	**0.17** / 544	**0.22** / 485	**1** / 108	**0.14** / 602	**0.21** / 308	**0.11** / 592	**0.39** / 201
No Os and not engaged at 16	No controls	**0** / 544	**0.01** / 463	**0.01** / 424	**0.02** / 374	**0** / 143	**0.01** / 654	**0** / 258	**0** / 446	**0** / 147
	Full controls	**0.18** / 534	**0.21** / 454	**0.21** / 413	**0.23** / 369	**1** / 137	**0.22** / 649	**0.27** / 249	**0.22** / 444	**1** / 138

Notes: Pseudo R squares are above the number of observations, which are in bold font. The pseudo R-squares and numbers of observations are taken from separate logistic regressions for each health and well-being outcome and for each group. Details of the controls are given in Appendix 2.

Appendix 5: Gender differences in the associations between adult learning and health and well-being

Appendix table A5.1: Odds ratios for sustained health contingent on participation in adult learning for men over women (interaction terms) – all controls included

GROUP	LSOFA	OPT	EFFIC	SRH	DEPR	MIGR	BPAIN	HAY	ASTHM	SKIN	SMKG	ALC	EXER	OBES
All	**1.16**	**1.18**	**.91**	**1.07**	**.9**	**1.01**	**1.31**	**1.31**	**1.13**	**.91**	**.92**	**.95**	**.87**	**1.1**
	.236	.166	.501	.581	.469	.928	.14	.199	.489	.531	.693	.756	.215	.558
No Os	0.77	0.93	0.77	1.04	0.79	1.31	1.11	1.93	1.6	0.85	0.74	0.86	0.74	1.05
	0.197	0.707	0.233	0.849	0.273	0.292	0.712	0.042	0.09	0.458	0.371	0.565	0.104	0.86
Self-reported truants	0.96	1.37	0.81	0.92	0.85	1.16	1.55	1.53	1.27	1.01	0.84	0.99	0.88	1.37
	0.852	0.108	0.355	0.677	0.496	0.57	0.147	0.221	0.403	0.981	0.621	0.956	0.475	0.229
Negative attitudes	0.83	1.26	0.71	0.77	0.72	0.87	1.49	1.6	0.86	0.82	0.45	0.75	0.83	1.69
	0.41	0.267	0.145	0.232	0.176	0.637	0.203	0.195	0.63	0.414	0.023	0.272	0.357	0.064
No Os and engaged	**.7**	**.91**	**.81**	**1.53**	**1.26**	**1**	**1.65**	**1.55**	**1.5**	**.76**	**1.5**	**.77**	**.86**	**1.71**
	243	736	539	151	494	991	29	388	36	406	419	503	581	153
No Os and disengaged	**.9**	**.96**	**.35**	**.97**	**.55**	**1.3**	**.49**	**1.56**	**1.26**	**.74**	**.04**	**.59**	**.48**	**.66**
	796	902	019	93	131	606	248	494	667	483	001	289	042	383

Notes: The results are taken from separate regressions for each group and for each sustained health outcome. Each odds ratio is derived from the coefficients on the interaction terms for adult learning by gender. P-values are given in smaller bold font underneath the odds ratios. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix table A5.2: Odds ratios for transformed health contingent on participation in adult learning for men over women (interaction terms) – all controls included

GROUP	LSOFA	OPT	EFFIC	SRH	DEPR	SMKG	ALC	EXER	OBES
All	**1.04**	**1.06**	**1.02**	**1.1**	**.33**	**.83**	**.91**	**1.11**	**.46**
	.81	.717	.928	.618	.012	.31	.694	.5	.017
No Os	1.05	0.95	0.84	0.91	0.27	0.94	0.95	1.12	1
	0.809	0.833	0.492	0.728	0.048	0.827	0.893	0.632	0.997
Self-reported truants	1.46	1.14	1.01	1.01	0.32	0.63	0.75	1	0.22
	0.108	0.601	0.972	0.98	0.169	0.105	0.448	0.986	0.016
Negative attitudes	1.49	1.06	1.07	0.91	0.11	0.78	1.52	1.22	0.37
	0.104	0.836	0.805	0.759	0.036	0.403	0.283	0.459	0.122
No Os and engaged	**1.15**	**1.05**	**.66**	**.73**		**1.03**	**1.12**	**1.36**	**4.88**
	.679	.908	.326	.528		.947	.881	.426	.208
No Os and disengaged	**1.16**	**1.79**	**1.13**	**1.07**		**.59**	**.3**	**1.82**	
	.742	.272	.825	.91		.333	.181	.241	

Notes: The results are taken from separate regressions for each group and for each transformed health outcome. Each odds ratio is derived from the coefficients on the interaction terms for adult learning by gender. P-values are given in smaller bold font underneath the odds ratios. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix table A5.3: Odds ratios for sustained health outcomes for those who did adult learning over those who did not, men and women separately, all controls included (1)

GROUP	SATISFACTION WITH LIFE SO FAR		OPTIMISM		EFFICACY		SELF-RATED HEALTH		DEPRESSION		MIGRAINES		BACK PAIN	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
All	**.83**	**1.01**	**1.01**	**1.16**	**1.09**	**1.08**	**.88**	**.9**	**1.04**	**.96**	**.95**	**.95**	**.9**	**1.12**
	.048	.956	.942	.091	.425	.452	.162	.265	.738	.76	.659	.702	.416	.458
No Os	1.14	0.89	1.27	1.21	1.21	1.12	0.98	0.97	1.02	0.83	1.07	1.31	1.07	1.15
	0.416	0.452	0.083	0.185	0.277	0.483	0.875	0.838	0.912	0.257	0.713	0.227	0.748	0.555
Self-reported truants	0.94	0.91	1.08	1.52	1.27	1.02	0.92	0.93	1	0.87	0.88	1.06	0.87	1.27
	0.673	0.56	0.601	0.006	0.178	0.923	0.584	0.637	0.979	0.471	0.451	0.801	0.533	0.338
Negative attitudes	1.11	0.86	1.17	1.38	1.49	1.16	1.13	0.94	1.13	0.92	1.02	0.99	1.09	1.3
	0.568	0.359	0.333	0.048	0.032	0.408	0.471	0.695	0.503	0.634	0.899	0.968	0.7	0.302
No Os and engaged	**.94**	**.63**	**1.11**	**1.14**	**1.54**	**1.63**	**.89**	**1.18**	**.94**	**1.32**	**.99**	**1.15**	**.62**	**.9**
	.799	.058	.627	.552	.118	.082	.636	.477	.807	.353	.983	.729	.191	.837
No Os and disengaged	**1.57**	**1.25**	**1.3**	**1.47**	**.91**	**.34**	**.67**	**.76**	**1.06**	**.49**	**1.3**	**1.22**	**4.24**	**.57**
	.262	.523	.383	.241	.835	.008	.217	.374	.873	.023	.539	.686	.057	.398

Notes: These are taken from separate regressions for each health outcome and for each proxy measure for failure to flourish at school for men and women separately. P-values are given in smaller bold font underneath the odds ratios. F is females and M, which is shaded, is males. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix table A5.4: Odds ratios for sustained health outcomes for those who did adult learning over those who did not, men and women separately, all controls included (2)

GROUP	HAY FEVER AND ALLERGIC RHINITIS		ASTHMA AND BRONCHITIS		SKIN PROBLEMS		SMOKING		HEAVY DRINKING		EXERCISE		OBESITY	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
All	**.75**	**1.05**	**.85**	**.94**	**.86**	**.79**	**.9**	**.87**	**1.01**	**.96**	**1.29**	**1.15**	**.98**	**1.04**
	.047	.754	.176	.65	.134	.034	.522	.37	.921	.744	.002	.114	.883	.742
No Os	0.52	1.22	0.81	1.2	0.92	0.83	1.02	0.69	0.93	0.82	1.41	1.09	0.8	1.09
	0.009	0.446	0.272	0.422	0.605	0.265	0.953	0.137	0.705	0.287	0.014	0.527	0.291	0.644
Self-reported truants	0.85	1.26	0.86	1.06	0.87	0.94	0.7	0.67	0.88	0.92	1.22	1.14	0.69	1.01
	0.532	0.404	0.446	0.8	0.396	0.725	0.191	0.136	0.525	0.682	0.146	0.375	0.074	0.953
Negative attitudes	0.8	1.25	0.9	0.73	0.83	0.73	1.55	0.54	1.12	0.81	1.41	1.22	0.74	1.38
	0.456	0.427	0.638	0.207	0.297	0.087	0.125	0.03	0.585	0.306	0.023	0.18	0.206	0.117
No Os and engaged	**.61**	**2.23**	**.84**	**.86**	**.88**	**.77**	**.79**	**1.63**	**1.06**	**.95**	**1.31**	**1.02**	**.66**	**1.41**
	.238	.109	.589	.709	.609	.324	.599	.261	.854	.879	.23	.912	.213	.221
No Os and disengaged	**.35**	**.68**	**.7**	**.72**	**1.23**	**.85**			**1.08**	**.68**	**2.28**	**1.16**	**.47**	**1.01**
	.15	.614	.449	.545	.585	.668			.887	.365	.007	.64	.161	.973

Notes: These are taken from separate regressions for each health outcome and for each proxy measure for failure to flourish at school for men and women separately. P-values are given in smaller bold font underneath the odds ratios. F is females and M, which is shaded, is males. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix table A5.5: Odds ratios for transformed health outcomes for those who did adult learning over those who did not, men and women separately, all controls included (1)

GROUP	SATISFACTION WITH LIFE SO FAR		OPTIMISM		EFFICACY		SELF-RATED HEALTH		DEPRESSION	
	F	M	F	M	F	M	F	M	F	M
All	1.06	1.05	1.22	1.29	1.41	1.28	1.16	1.52	1.68	0.3
	0.585	0.651	0.084	0.031	0.012	0.055	0.244	0.008	0.057	0.074
No Os	1.03	1.03	1.32	1.21	1.78	1.24	1.77	2.14	2.72	
	0.884	0.862	0.162	0.325	0.006	0.252	0.008	0.003	0.04	
Self-reported truants	0.99	1.18	1.47	1.7	1.34	1.29	1.4	1.87	1.56	
	0.962	0.35	0.051	0.01	0.195	0.285	0.123	0.029	0.455	
Negative attitudes	1.04	1.36	1.72	1.84	1.46	1.11	1.43	2.11		
	0.849	0.091	0.011	0.004	0.119	0.64	0.148	0.009		
No Os and engaged	0.78	1.04	1.66	1.43	2.8	0.93	1.56	1.44		
	0.398	0.901	0.149	0.251	0.012	0.838	0.319	0.605		
No Os and disengaged	1.02	1.56	1.02	3.73	3.79	3.79	2.01	18.09		
	0.97	0.252	0.974	0.02	0.059	0.016	0.192	0.011		

Notes: These are taken from separate regressions for each health outcome and for each proxy measure for failure to flourish at school for men and women separately. P-values are given in smaller bold font underneath the odds ratios. F is females and M, which is shaded, is males. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix table A5.6: Odds ratios for transformed health outcomes for those who did adult learning over those who did not, men and women separately, all controls included (2)

GROUP	SMOKING		HEAVY DRINKING		EXERCISE		OBESITY	
	F	**M**	**F**	**M**	**F**	**M**	**F**	**M**
All	1.36	1.15	1.46	1.14	1.12	1.26	1.52	0.54
	0.028	0.297	0.114	0.287	0.306	0.05	0.108	0.025
No Os	1.24	1.26	1835.1	1.09	1.05	1.59	1.41	1.27
	0.325	0.27	0.034	0.676	0.786	0.013	0.5	0.64
Self-reported truants	1.19	0.82	4.23	0.92	1.17	1.19	22.06	0.09
	0.431	0.399	0.021	0.677	0.433	0.401	0.008	0.014
Negative attitudes	1.2	0.78	1.28	1.31	1.01	1.39	2.38	0.65
	0.465	0.294	0.79	0.186	0.951	0.111	0.472	0.591
No Os and engaged	0.75	0.89	3.91E+20	1.24	0.82	1.92	722583.4	2E+15
	0.53	0.809	0	0.582	0.534	0.071	0.999	0.996
No Os and disengaged	3.12	1.45	4.93	0.32	0.57	2.23	0	0
	0.025	0.519	0	0.038	0.359	0.078	0	0

Notes: These are taken from separate regressions for men and women and for each health outcome and for each proxy measure for failure to flourish at school. The odds ratios are for the interaction terms between failure to flourish at school and gender. P-values are given in smaller bold font underneath the odds ratios. F is females and M, which is shaded, is males. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix 6: Differences in the associations between adult learning and health and well-being between groups who did and did not flourish at school

Appendix table A6.1: Odds ratios for sustained health contingent on participation in adult learning for those who did and did not flourish at secondary school over those who did (all controls included)

	LSOFA	OPT	EFFIC	SRH	DEPR	MIGR	BPAIN	HAY	ASTHMA	SKIN	SMOKG	XSDR	EXER	OBESITY
No Os	1.23	1.12	1.03	1.43	.87	1.18	1.49	.64	1.04	1.12	.81	.89	1.06	.78
	.141	**.360**	**.866**	**.012**	**.388**	**.337**	**.053**	**.05**	**.831**	**.477**	**.357**	**.491**	**.651**	**.167**
	4691	4730	5732	6421	7945	6872	4545	5761	6947	7009	5796	5466	5846	7126
Self-reported truants	1.04	1.31	.97	1.08	.89	1	.99	1.42	1.18	1.22	.45	.87	1	.76
	.802	**.043**	**.861**	**.583**	**.509**	**.982**	**.972**	**.142**	**.418**	**.217**	**.001**	**.436**	**.991**	**.150**
	4196	4157	5160	5724	7073	6081	4005	5095	6163	6220	5179	4839	5227	6362
Negative attitudes	1.32	1.16	1.01	1.04	1.16	1.47	1.69	.83	1.01	.94	.57	.85	1.11	.49
	.171	**.408**	**.975**	**.826**	**.483**	**.109**	**.059**	**.567**	**.982**	**.771**	**.064**	**.49**	**.547**	**.004**
	4053	4005	4988	5538	6829	5874	3873	4903	5953	5996	5018	4669	5054	6137
No Os and engaged	.95	.89	1.2	1.28	1	.94	1.07	.75	1.03	.99	1.3	.93	.87	1.05
	.778	**.461**	**.340**	**.141**	**.984**	**.781**	**.77**	**.28**	**.903**	**.974**	**.346**	**.714**	**.348**	**.815**
	3822	3798	4668	5227	6424	5541	3643	4629	5607	5647	4706	4401	4752	5753
No Os and disengaged	1.45	1.23	.74	1.07	.7	1.34	1.61	.58	.99	1.29	.46	.81	1.3	.7
	.071	**.272**	**.164**	**.708**	**.091**	**.235**	**.092**	**.078**	**.957**	**.23**	**.017**	**.383**	**.145**	**.149**
	3822	3798	4668	5227	6424	5541	3643	4629	5607	5647	4706	4401	4752	5753

Notes: The results are taken from separate regressions for each group and for each sustained health outcome. The regressions use the whole cohort but include a dummy variable for membership of the group and an interaction term for adult learning by membership of the group. Each odds ratio is derived from the coefficient on this interaction term. P-values are given in smaller bold font underneath the odds ratios and numbers of observations are given below these. Details of controls are given in Section 2.5.5 and Appendix 2.

Appendix table A6.2: Odds ratios for transformed health and well-being contingent on participation in adult learning for those who did not flourish at secondary school over those who did (all controls included)

	LSOFA	OPT	EFFIC	SRH	DEPR	SMOKG	XSDR	EXER	OBESITY
No Os	1.03	1.05	1.01	1.46	.46	.96	.96	1.17	1.4
	.83	**.758**	**.958**	**.066**	**.113**	**.86**	**.837**	**.361**	**.356**
	3354	3283	2129	2007	503	2648	1518	2585	845
Self-reported truants	1.02	1.36	.99	1.23	.59	.68	.8	.82	.92
	.926	**.079**	**.976**	**.337**	**.305**	**.075**	**.345**	**.268**	**.833**
	2948	2965	1850	1743	435	2284	1360	2247	737
Negative attitudes	1.16	1.56	1.15	1.79	.91	.84	.74	.77	.5
	.475	**.054**	**.577**	**.03**	**.864**	**.487**	**.302**	**.254**	**.16**
	2845	2871	1778	1668	415	2182	1323	2156	706
No Os and engaged	1	.93	.99	1.11	1.54	.64	1.18	1.09	1.2
	.986	**.737**	**.949**	**.658**	**.458**	**.08**	**.568**	**.672**	**.683**
	2672	2673	1685	1573	391	2073	1240	2033	664
No Os and disengaged	1.09	1.27	1.22	1.56	.39	1.37	.87	.97	1.43
	.69	**.326**	**.44**	**.101**	**.095**	**.231**	**.641**	**.893**	**.476**
	2672	2673	1685	1573	391	2073	1240	2033	664

Notes: The results are taken from separate regressions for each group and for each sustained health outcome. The regressions use the whole cohort but include a dummy variable for membership of the group and an interaction term for adult learning by membership of the group. Each odds ratio is derived from the coefficient on this interaction term. P-values are given in smaller bold font underneath the odds ratios and numbers of observations are given below these. Details of controls are given in Section 2.5.5 and Appendix 2.

Are those who flourished at school healthier adults? What role for adult education?

This report concerns a two-part project about the importance for adult health and well-being of (1) broadly defined school success and (2) participation in adult learning.

In the first part of the project we examine which aspects of schooling are markers for health and well-being in adulthood, using not only measures of attainment such as qualifications, but also measures of engagement. Our interest is in testing the strength of broad-ranging childhood indicators for adult health in order to help practitioners target appropriate resources.

In the second part we consider the potential role for adult learning in improving health and well-being amongst adults generally, and in offsetting the disadvantage associated with not flourishing at school, thereby reducing health inequalities. We use longitudinal data to examine relationships between participation in adult learning and trajectories in health and well-being for adults who did and did not flourish at school.

The differences in adult health and well-being between those who flourished at secondary school and those who did not are substantial and pervasive and go beyond the effect of qualifications attained, indicating the importance of engagement at school as well as academic attainment.

We also find that patterns established in early life have a more profound effect than those adopted in later life, and the difference in scale and pervasiveness of the results for school and for adult education tend to support this.

Our findings underline the importance of understanding why flourishing at secondary school is such an important signal for adult health and well-being. However, it does not negate the value of adult education, which seems to provide real opportunities for transformation of poor health and well-being amongst adults, whether or not they flourished at school.

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