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Learning and Wellbeing Trajectories Among Older Adults in England

Andrew Jenkins¹ and Tarek Mostafa²

Abstract

In an ageing society such as the UK, there is much interest in factors which can contribute to the wellbeing of older adults. It is not implausible to suppose that participation in learning could have beneficial effects, yet research on the wider benefits of learning has tended to focus on young people or those in mid-life and there is currently little evidence on the impact of learning on the wellbeing of older adults. Insofar as evidence does exist, most of it is qualitative, and while of much value and interest, it is based on very small, and possibly not very representative, samples of the older population. This research aimed to provide new, quantitative evidence drawing on a large, nationally representative sample, on the effects of participation in learning on the wellbeing of older adults.

Our study used data from the English Longitudinal Study of Ageing (ELSA), a continuing, longitudinal survey of older adults which is representative of people aged 50 years and above living in private households in England. To measure wellbeing we used the CASP-19 instrument, a subjective wellbeing measure which was designed specifically for older adults and is available at all waves of the ELSA survey. ELSA respondents were asked about four types of learning activity: obtaining qualifications; attendance at formal education/training courses; membership of education, music or arts groups or evening classes; membership of sports clubs, gym and exercise classes. A range of regression techniques were used to analyse the relationship between learning and wellbeing. Multiple regression models were applied to data from ELSA wave 4. To take account of unobservable factors which might influence wellbeing we applied multiple regression to the change score between two waves of the survey and fitted fixed effects panel regressions to four waves of ELSA data. Learning was associated with higher wellbeing after controlling for a range of other factors. We found strong evidence that more informal types of learning were associated with higher wellbeing. There was also some evidence that obtaining qualifications was linked to higher wellbeing but no evidence that formal education/training courses were associated with higher wellbeing.

JEL classification: I21, J14, J24

Keywords: Older adults, lifelong learning, wellbeing, benefits of learning, ELSA.

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1. INTRODUCTION

This report sets out findings from quantitative analysis of the relationship between participation in learning and wellbeing outcomes among older adults in England. There is substantial evidence of the benefits of adult learning, but the outcomes of learning for older adults have been relatively little researched. This project utilised data from the English Longitudinal Study of Ageing (ELSA) a large-scale, on-going survey of older adults. A range of different types of learning were investigated, including obtaining qualifications, vocational courses, informal learning/evening classes, and gym/exercise classes.

1.1. Research Questions

The research addressed the following questions:-

What are the factors which explain participation by older adults in various types of learning activity?

How do the extent of learning participation and the types of learning activities engaged in change as people get older?

What are the major determinants of wellbeing? In particular, how does wellbeing vary by gender, age, education (highest qualification held), health, and work status?

Does participation in learning have an impact on the wellbeing of older adults?

Do certain types of learning have more of an impact on the wellbeing of older adults than other types of learning?

Does the impact of learning on the wellbeing of older adults vary between different sub-groups (such as by gender, age group, work status)?

How does wellbeing change as adults grow older and how can such changes be explained?

2. LITERATURE

A full review of the literature on the wellbeing of older adults is beyond the scope of this report. But it is worth highlighting some previous studies on the impact of learning in later life in order to set our findings in context. A pioneering study of the relationships between learning and wellbeing for older adults was undertaken by Dench and Regan (2000). They re-interviewed a sample of 336 older adults (aged 50 to 71) from the 1997 National Adult Learning Survey (NALS). The re-interviews were conducted in 1999 and aimed to update information on participation in learning. Questions were also asked about motivations to learn, reasons for not learning, and the respondents' own perceptions of the impact that participation in learning had had in their lives. During the two years 1997 to 1999, some 70 per cent of respondents had done some learning, on the broad definition of learning adopted in the Dench/Regan study. It was found that 48 per cent had done some taught and 56 per cent some non-taught learning. The survey data on the impact of learning revealed benefits for wellbeing and for social participation. Eighty per cent of learners reported a positive impact of learning on at least one of: their enjoyment of life, their self-confidence, their self-perception, their satisfaction with other aspects of their life, their ability to cope. Some groups were more likely to report benefits of learning than others. In particular, women were more likely to report positive benefits of learning; those in poor health or with a disability were also more likely to benefit from learning.

Withnall (2010) reports on a research project into the role of learning in the lives of older adults in Britain, conducted between 2000 and 2004. The project gathered qualitative data initially via 10 focus groups involving 98 older adults, and subsequently via questionnaires returned by 77 adults and follow-up in-depth interviews with 35 of them. All the older adults were retired. They were divided roughly evenly between participants and non-participants in learning. Some of the learning occurred in formal courses but there was also a good deal of informal learning activity. The benefits which these older adults perceived that they derived from learning included keeping the mind active and acquiring new knowledge. Social contact – meeting new people and making friends – was valued by many. Smaller numbers mentioned specific health benefits such as relaxation.

Narushima (2008) undertook research concerning a seniors' education programme in Canada. These were daytime courses specifically for people aged over 60 in subject areas such as

calligraphy, sewing, Chinese poetry, folkdance, and fitness and exercise. Most of the 15 students who were interviewed had chronic health problems and the research focussed on the health benefits of engaging in learning. The interviewees stated that the courses helped to 'keep them going'. They looked forward to the weekly classes, and the topics were of great interest to them. The importance of keeping the mind active was mentioned often. In addition, the classroom was a lively and welcoming space for many and they had built up friendships through attending the classes.

Jamieson (2007, 2012) reports findings from questionnaire data and interviews with retired people enrolled on courses at a British university. Interviewees discussed several ways in which participation in formal learning could contribute to their wellbeing. Prominent was that it was a component of their social lives, and that it could bolster or boost their self-esteem. Once more, the mental stimulation of learning new things was an important benefit for many of the interviewees. Jamieson also discusses a theme which emerged in her research of respondents wishing to make best use of their free time, and that learning was considered 'time well spent'. Similarly, Russell (2008), in her study of 19 older adults in Australia who were learning computer skills, emphasised that these retirees had more time and freedom than in the past when lives were often filled with family or work commitments, and that they wanted to use this free, or unobligated, time in a meaningful way including by undertaking challenging learning activities.

It is noticeable that research on the contribution which participation in learning can make to the wellbeing of older adults has been based on small samples and mainly qualitative in nature. While the results of such studies are of much value and interest, even some qualitative researchers have acknowledged this limitation of the evidence base and called for more quantitative, especially longitudinal, studies (Anderson, 2008; Narushima, 2008). One of the principal advantages of the analysis of large-scale datasets is representativeness. By drawing on a large sample in quantitative studies we can be more confident that the findings are representative of the population of older adults. Furthermore, quantitative analysis can yield precise estimates of the size of an effect. As Jamieson (2007, p20) notes, reflecting on her qualitative interviews with older learners, 'the benefits highlighted by our respondents suggest that studying improved their quality of life, but they do not in themselves indicate much about the magnitude of the impact'. The fitting of models in quantitative analyses can also control for other factors which affect wellbeing. The effect of learning after allowing for

many other influences on wellbeing can then be measured. It can be very difficult to disentangle the respective roles of many factors in a purely qualitative study.

Since the late 1990s large-scale quantitative analyses, often drawing on longitudinal data, have made a substantial contribution to the evidence base on learning benefits (Feinstein et al, 2008). In a recent overview of research Field (2011) also acknowledges the important contribution that such work has made. However, most of these studies have considered mainly people in their 30s and younger. In research which was originally commissioned as part of the 2008/09 NIACE Inquiry into the Future for Lifelong Learning, Jenkins (2011) sought to apply similar methods to the study of the wellbeing of older adults. He used data from early waves of the English Longitudinal Study of Ageing (ELSA), a large-scale, nationally representative survey of those aged 50 and above. The objective of the research was to identify the effects of participation in learning on the wellbeing of older adults. The CASP-19 quality of life indicator was used as a measure of subjective wellbeing of older adults. Three types of learning were analysed: formal education and training courses, education/music/arts groups or evening classes and gym/exercise classes. Multiple regression analyses were used to investigate the change in wellbeing outcomes between two survey waves. The key finding was that participation in education/music/arts groups and evening classes was significantly associated with changes in subjective wellbeing. Formal education/training courses and gym/exercise classes were not significantly associated with well-being, after controlling for other factors. The results were robust to the wellbeing measure used: very similar results were obtained when conducting the analyses using other measures, such as life satisfaction and GHQ-12 (a health oriented measure of wellbeing). The research in this report uses the latest available data from the ELSA survey and aims to update and extend these earlier findings.

3. DATA AND METHOD

3.1. The dataset: ELSA

This study uses data from the English Longitudinal Study of Ageing (ELSA). This is a continuing, longitudinal survey of adults who were aged 50 and above in 2002 and includes a broad range of information about their mental and physical health, well-being, quality of life and economic and social circumstances. The original sample for ELSA was drawn from three waves – 1998, 1999 and 2001 – of the Health Survey of England (HSE) and included

12,100 participants. The survey is representative of people aged 50 years and above living in private households in England. Respondents were followed up in 2004/05 (Wave 2), in 2007 (Wave 3) and in 2009 (Wave4). The survey was 'refreshed' at Waves 3 and 4, bringing in additional respondents from later waves of HSE in order to boost the ELSA sample.

Throughout our research cases which were not part of the core sample (such as younger partners of ELSA core sample members), any other cases where the recorded age was less than 50 and those who were interviewed by proxy were dropped from the dataset prior to analysis.

3.2.Measurement of Learning and Wellbeing in ELSA

There are various approaches to measuring wellbeing. In the ELSA survey there is a quality of life measure designed specifically for older adults known as CASP-19 (Wiggins et al, 2008) and this is the wellbeing measure used here. In developing this measure, old age was conceived as a distinct phase of the lifecourse, and one in which there was scope for reflection and pleasure – i.e. the measure tries to move beyond traditional notions of old age being regarded as a time solely of poverty, misery and ill-health. Quality of life was theorised as the satisfaction of needs in four areas: control (C), the need to be able to act freely in one's environment; autonomy (A), the need to be free from undue interference by others; the need for self-realisation (S); and pleasure (P), the need for enjoyment in life. There are 19 items in total across these four sub-domains of quality of life. See Appendix 1 for further details of the items. Responses from the 19 questions were summed to yield a quality of life variable with a maximum value of 57.

ELSA respondents were asked about four types of learning activity. In the self-completion module of the survey, which addressed leisure activities and social participation, they were asked whether they were members of any education, arts or music groups or evening classes, and they were asked about membership of sports clubs, gym and exercise classes. In the work and pensions module of the survey they were asked whether they had obtained any qualifications since the previous wave of the survey and whether they had taken a formal education or training course in the previous twelve months.

So, the four basic categories of learning which can be defined in the ELSA data are:-

1. Obtaining qualifications
2. Attendance at formal education/training courses
3. Membership of education, music or arts groups or evening classes
4. Membership of sports clubs, gym and exercise classes

The basic categories can also be combined to yield:-

5. Formal learning (either of 1 and 2 above)
6. Informal learning (either of 3 and 4 above)
7. Any learning (any of 1 to 4 above).

These seven types of learning will be used in the analyses in this report.

3.3.Methods

Our interest is in the relationships between various types of learning activity on the one hand and a measure of wellbeing on the other. The ELSA dataset, which includes information on both of these things was used for all of the analyses. ELSA has a number of advantages. It is a large, nationally representative sample of older adults. It contains much information on many aspects of the background and lives of older adults so that there is scope to control for other factors which influence wellbeing. And it is longitudinal which means that change over time can be considered. The various methods which we use in this report aim to ensure that these features of the ELSA data are fully exploited.

Initially, cross-tabulations and graphs were used to explore the extent of learning by older adults, and associations between this and wellbeing. Such exploratory analysis can provide useful insights and was an important first step. Nonetheless, it was clearly important to allow for other factors, apart from learning, which may have an influence on the outcome of interest, wellbeing. Perhaps more educated people or wealthier people are more likely to have high quality of life. There may be differences by gender. Or older adults in our sample might have lower of quality of life, on average, than the relatively young members of the sample. It would then be important to allow for education level, gender and age when testing for relationships between learning and the wellbeing outcome. To address this issue the research used multiple regression analysis. This is a standard way of examining how a set of

explanatory variables are related to a quantitative response variable, such as the CASP-19 measure of wellbeing. The main reason for using multiple regression is that it enables the researcher to control for a range of variables when examining the key relationship of interest. After controlling for lots of other factors which might influence wellbeing, is there a statistically significant relationship with participation in learning? A range of control variables were included in the multiple regression model to allow for other variables which may influence wellbeing. The set of explanatory variables used in this study included gender, age, highest qualification, marital status, work status, household wealth and income, and health status. These analyses were applied to the most recently available wave of ELSA data, wave 4, collected in 2009.

Such cross-sectional multiple regression models control for the effects of *observable* variables on wellbeing. However, there may be *unobserved* characteristics which could influence both the likelihood of participation in learning and wellbeing. For example, suppose that some well-motivated people are more likely to undertake courses and also happen to have high scores on wellbeing. Motivation as such was not measured in the dataset, and so could not be included in the analyses and might potentially bias the estimates of the effects of adult learning. The correlation between wellbeing and learning would be spurious – it has arisen solely because of the unobserved factor, motivation. A way of addressing this issue is to focus on the change in, rather than the level of, wellbeing.

As wellbeing and learning are measured repeatedly in ELSA, it was possible to analyse the change in wellbeing between two waves of data, and whether there was any association with participation in learning. So long as motivation is a fixed attribute then examining the change in wellbeing, will eliminate the fixed effect and an unbiased estimate of the effects of adult learning can then be obtained. Multiple regression models were used to analyse the change in the wellbeing outcome – CASP-19 quality of life – between two waves of the ELSA survey i.e. the difference between the CASP-19 score at wave 3 and the CASP-19 score at wave 4. These models are reported in Section 5.3. The rationale for focussing on the change, rather than the level, of the CASP-19 variable is that it better enables the researcher to overcome the bias which may arise from unobservable variables. It was important that the model included changes in other observable factors which may influence the change in wellbeing. For example, a transition from employed to retired status might have an impact on wellbeing and would need to be incorporated into the model when analysing change.

In this kind of analysis of change scores regression to the mean between the two measurement occasions is not uncommon. Our approach to addressing this was to include the initial level of the outcome also among the explanatory variables, that is including the level of CASP-19 at Wave 3 as an explanatory variable when modelling the change in CASP-19 between Wave 3 and Wave 4.

Since four waves of ELSA data are available, we can extend the basic change score approach to utilise a method for all four waves of data simultaneously, rather than just the change between two waves. This is known as fixed effects panel regression modelling. The rationale is essentially the same – of differencing out the effect of both observed and unobserved time-invariant predictors. The fixed effects method can handle two or more waves of data. It focuses on the deviation at each wave from the overall mean on each variable (Allison, 2009). Results for these models will be presented in Section 6.3.

So a range of different types of regression model were applied in the analyses of the relationship between wellbeing and learning. But always the underlying purpose of the analysis was much the same: to test whether there were statistically significant relationships with learning and whether they persisted after controlling for the other relevant factors which influence wellbeing.

Our research questions also included modelling whether older adults participate in learning. Here the outcome is inherently binary – participating versus not participating, or obtaining a qualification versus not obtaining a qualification – and so we used a form of regression analysis appropriate for such binary outcomes. In this situation, the probability of the binary outcome occurring was modelled as a function of a set of explanatory variables using the technique of logistic regression. A convenient property of logistic regression is that results can be presented in the form of odds ratios. Suppose that we are modelling a binary outcome such as participation versus non-participation in learning. Gender is an explanatory variable, with female as the reference category. Now an odds ratio of one implies that the odds of a ‘success’ (here, learning participation) are unaffected by the explanatory variable. In other words, we infer that there is no difference in the odds of learning participation between males and females. An odds ratio larger than one, on the other hand, would mean that the odds of learning participation are greater for males relative to the reference group, females.

3.4. Limitations of the Study

Some limitations of the study should be noted. A common problem with longitudinal surveys is that people tend to drop out over time (non-response), so that the survey may become unrepresentative. The ELSA surveys are supplied with weights to ensure representativeness by adjusting for patterns of non-response. These weights were used throughout our analyses. All the estimates shown can be assumed to be weighted for non-response, unless explicitly stated otherwise.

Secondly, self-reported health may be an important explanatory variable for wellbeing. However, the measure of self-reported health in ELSA is not consistent across all waves of the survey. In Wave 1 there were two self-report health variables: hegenh (also used in the Health Survey for England) and hehelp (also used in the Health and Retirement Survey, USA). In Wave 2 hehelp was used alone and in wave 3 hegenh. In Wave 4 it reverted to hehelp. So it is not possible to obtain a measure of self-reported health which is consistent across all waves of ELSA. This only limits our analyses when we are looking at more than one wave of the dataset. Where feasible we report analyses both with and without self-reported health to check whether this variable was having any crucial impact on the nature of the results. Note that this was not feasible for the analyses of panel data.

Some background data are not available for some respondents. This applies to those individuals who joined the survey at Wave 3 or Wave 4. Wave 0 data (basic characteristics such as social class and highest qualification) is not currently available for those who joined at Wave 3 and Wave 4. Discussions with staff at NatCen suggest that this data is likely to be available from Autumn 2012. So it is not currently possible to derive variables such as highest qualification for these cases and they drop out, for example, of regression analyses where highest qualification is among the explanatory variables. Hence sample sizes in some of the analyses are smaller than we expected when we began working on the project. Nonetheless, all regressions still contain several thousand cases and, as noted above, we make use of weights to ensure that the representativeness of the sample is not compromised.

Finally, there was an error in the coding of the questionnaire at Wave 3 of ELSA such that people were not asked in that wave about whether or not they had obtained a qualification

since the previous wave. To overcome this we conducted an imputation exercise using regression modelling to predict whether someone obtained a qualification at Wave 3 or not. This affects results in Section 6, where we are analysing all four waves of ELSA data, which consequently need to be considered with some degree of caution, particularly when thinking about the impact of obtaining a qualification on wellbeing.

4. OLDER ADULTS: PARTICIPATION IN LEARNING

The ELSA survey contains much useful information about the extent of participation in various types of learning. It also includes information about other characteristics of respondents which can be used to construct models of their probability of engaging in learning. Section 4.1 outlines the extent of learning participation in the most recent wave of ELSA, Wave 4, and tabulates how participation varies by the characteristics of respondents. In Section 4.2 logistic regression analysis is used to model the determinants of participation in learning at Wave 4.

4.1. Patterns of participation in learning at Wave 4 of ELSA

Table 1: Percentage of individuals aged 50 to 69 undertaking learning activities.

Learning	Frequencies	Percentage
Formal learning	1134	18.93
Informal learning	1638	30.63
Any learning	2337	43.90

Source: ELSA wave 4

Table 1 presents the number and percentage of individuals undertaking learning activities. As previously discussed, formal learning combines two types of activity: learning leading to a qualification and formal education/training courses, while informal learning combines education, music, arts, and evening classes, and sports club, gym and exercise classes. Overall, almost 44 per cent of older adults were engaged in some form of learning on this definition. Over 30 per cent participated in informal learning at this stage of their lives, and 19 per cent were undertaking formal learning.

Table 2: Formal and Informal learning broken down into 4 types of learning activities.

Learning	Frequencies	Percentage
Obtained a qualification	487	8.19
Formal education/training course	972	15.55
Education, music or arts group or evening classes	569	10.65
Sports clubs, gym or exercise classes	1322	24.73

Source: ELSA wave 4

In Table 2, the categories are broken down into more detailed types of learning activities. At Wave 4 of ELSA almost a quarter of this sample of older adults were participating in sports, gym/exercise classes, and over 15 per cent had participated in formal education/training courses; over 10 per cent were participating in education, music or arts groups or evening classes, while about eight per cent had obtained a qualification since the previous wave of the survey.

Table 3: Learning activities by gender.

Gender	Formal Learning	Informal Learning	Any learning
Female	19.44	33.40	45.58
Male	18.38	27.69	42.11

Source: ELSA wave 4

In Table 3, we present the percentages of individuals undertaking learning activities by gender. Females were more likely to participate in learning activities than males. The difference was more noticeable for informal learning, while levels of participation in formal learning were similar for males and females.

Table 4: Learning activities by level of initial qualification.

Qualification level	Formal Learning	Informal Learning	Any learning
Higher qualification	26.81	47.07	61.15
Some qualification (below HE)	11.92	27.72	37.08
No qualifications	7.46	15.45	23.00

Source: ELSA wave 4

Table 4 clearly shows that more educated individuals had much higher levels of engagement in learning activities than their low educated counterparts. This is an indication that initial

education might have a positive non-market benefit for the older adult population as it increases their interest in learning at a later stage of their lives.

Table 5: Learning activities by age groups.

Age groups	Formal Learning	Informal Learning	Any learning
Aged 50 - 54	26.17	32.25	51.28
Aged 55 - 59	24.02	30.30	47.22
Aged 60 - 64	14.80	30.09	40.13
Aged 65 - 69	8.04	30.32	35.61

Source: ELSA wave 4

Our sample consists of adults aged 50 to 69. We can break the sample down into four sub-groups by age, as in Table 5. The percentage of individuals undertaking formal learning fell considerably with age. In contrast, the percentage of individuals engaged in informal learning remained almost the same. This is at least partly because formal learning is associated with work and fewer adults in the older age groups were in work.

Most of the sample were either retired or employed. There was a large gap between these two groups in the proportion who participated in formal learning, with the participation rate much higher for those in work, but the gap for informal learning was much narrower (Table 6) and conversely participation there was slightly higher among retired people than the employed.

Table 6: Learning activities by work status.

Work status	Formal Learning	Informal Learning	Any learning
Retired	9.42	33.20	38.32
Employed	26.79	31.85	51.16
Unemployed	21.47	19.12	36.43
Perm Sick/Disabled	6.22	8.17	14.40
Looking after home/family	10.93	29.76	35.80
Other incl. Semi-retired	25.55	54.84	71.45

Source: ELSA wave 4

4.2. Regression Models of Participation in Learning

In this sub-section we undertake a number of regressions to assess the determinants of participation in learning activities. We start by setting out the variables to be included in the analyses.

Learning variables: as previously defined. Some regressions distinguish between formal and informal learning; some regressions use the more detailed breakdown into four types of learning activity.

Controls:

Male (0 for females, 1 for males), age (treated as a continuous variable), marital status (1 single, 2 married/partnered, 3 divorced, 4 widowed), work status (1 retired, 2 employed or self employed, 3 unemployed, 4 permanently sick or disabled, 5 looking after home or family, 6 other incl. semi retired), self reported health (1 poor, 2 fair, 3, good, 4 very good, 5 excellent), highest qualification (1 high qualifications, 2 middle qualifications, 3 no qualifications), wealth quintiles. Note that for all dichotomous variables the first category was used as the reference group.

In the following two tables we analyse the determinants of learning activities. Note that the dependent variables are binary; therefore, we are using logistic regressions. There is no generally agreed approach to determining overall goodness of fit for logistic regression but we report pseudo- R^2 statistics which give some information about this. For example, in Table 8 the pseudo- R^2 is higher for education/training courses and music/arts/evening classes than it is for obtaining qualifications, suggesting that the models account for more of the variation in the first two types of learning than for learning which led to qualifications.

Nevertheless, we regard model fit as adequate and focus most of our attention here on the significance of specific explanatory variables. The results for the explanatory variables are presented in the form of odds ratios. From Table 7 it can be seen that males were less likely to engage in both formal and informal learning activities than females (this is inferred from the fact that the odds ratios for males in both the formal and informal learning regression models are less than one – hence reduced odds for males relative to the reference category, females).

The likelihood of undertaking formal learning clearly declined with age. However, the odds ratio for age in the informal learning regression model is very close to one and actually not

statistically significant and so there was no effect of age on the probability of participating in informal learning. In other words, other things equal, in a large sample of adults aged 50 to 69 older adults were just as likely as the relatively younger ones to participate in informal learning. Marital status appeared to have no significant effects on participation in either formal or informal learning.

Table 7: The determinants of engagement in learning

	Formal Learning	Informal Learning	Any Learning
Male	0.694 (0.002)**	0.570 (0.000)***	0.617 (0.000)***
Age	0.931 (0.000)***	0.991 (0.525)	0.962 (0.003)**
Partnership status (reference category, single)			
Married/partnered	1.235 (0.445)	0.791 (0.268)	0.891 (0.589)
Divorced	1.254 (0.467)	0.743 (0.240)	0.902 (0.674)
Widowed	1.284 (0.478)	0.734 (0.263)	0.856 (0.567)
Work status (reference category, retired)			
Employed	2.303 (0.000)***	0.708 (0.003)**	1.123 (0.281)
Unemployed	2.011 (0.122)	0.683 (0.435)	0.902 (0.798)
Perm sick/disabled	0.734 (0.387)	0.547 (0.067)	0.587 (0.055)
Looking after home/family	0.902 (0.701)	0.799 (0.246)	0.765 (0.156)
Other (incl. semi-retired)	2.851 (0.050)*	3.100 (0.073)	5.017 (0.002)**
Health status (reference category, poor)			
Fair health	0.872 (0.681)	1.588 (0.165)	1.107 (0.722)
Good health	1.156 (0.643)	2.509 (0.004)**	1.696 (0.052)
Very good health	0.960 (0.898)	3.453 (0.000)***	1.969 (0.014)*
Excellent health	1.134 (0.708)	5.216 (0.000)***	3.142 (0.000)***

Highest qualification level (reference category, HE)			
Some qualifications (not HE)	0.360 (0.000)***	0.457 (0.000)***	0.399 (0.000)***
No qualifications	0.267 (0.000)***	0.284 (0.000)***	0.270 (0.000)***
Wealth quintile (reference category, lowest)			
Wealth 2	0.620 (0.031)*	1.154 (0.485)	0.887 (0.498)
Wealth 3	0.775 (0.231)	1.497 (0.038)*	1.187 (0.312)
Wealth 4	0.850 (0.443)	1.856 (0.001)**	1.439 (0.032)*
Wealth 5 (highest)	0.986 (0.946)	2.485 (0.000)***	1.885 (0.000)***
<i>N</i>	3228	2938	2886
<i>Pseudo R squared</i>	0.11	0.12	0.12

Notes: Results presented in the form of odds ratios.
p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The effect of work status varied according to the type of learning. The employed were more likely to engage in formal learning activities than retired individuals, but being in work reduced the likelihood of engagement in informal learning. As for the level of prior qualifications, this was found to have a significant impact on both formal and informal learning participation. Those with more education were more likely to participate. Good health was strongly related to participation in informal learning but was not a significant determinant of participation in formal learning (after controlling for other factors). The probability of undertaking informal learning also significantly increased with the level of wealth.

These results suggest, then, that the determinants of participation in learning were different according to whether the learning was formal or informal. Holding other things constant, being in an older age group and being retired reduced the probability of formal learning; but being older had no impact on informal learning, while being retired was positively associated with informal learning.

Table 8: The determinants of engagement in learning (detailed).

	Obtained qualification	Formal educ/train course	Music, arts, evening class	Gym, exercise class
Male	0.999 (0.994)	0.659 (0.001)**	0.347 (0.000)***	0.675 (0.000)***
Age	0.921 (0.003)**	0.924 (0.000)***	1.017 (0.374)	0.986 (0.346)
Partnership status (reference category, single)				
Married/partnered	1.477 (0.400)	1.058 (0.842)	0.707 (0.226)	0.898 (0.627)
Divorced	1.780 (0.242)	1.143 (0.675)	0.973 (0.935)	0.737 (0.257)
Widowed	1.408 (0.546)	1.003 (0.994)	0.728 (0.383)	0.904 (0.728)
Work status (reference category, retired)				
Employed	1.765 (0.017)*	2.401 (0.000)***	0.695 (0.021)*	0.692 (0.002)**
Unemployed	1.923 (0.242)	1.836 (0.218)	0.452 (0.319)	0.677 (0.460)
Perm. Sick/Disabled	0.398 (0.128)	0.736 (0.438)	0.831 (0.690)	0.434 (0.040)*
Looking after home/family	1.110 (0.791)	0.923 (0.787)	0.861 (0.562)	0.743 (0.155)
Other (incl. Semi- retired)	1.130 (0.905)	3.099 (0.031)*	0.595 (0.562)	2.764 (0.086)
Health status (reference category, poor)				
Fair health	0.745 (0.499)	0.859 (0.670)	1.399 (0.480)	1.678 (0.214)
Good health	0.821 (0.628)	1.205 (0.581)	1.962 (0.133)	2.918 (0.007)**
Very good health	0.710 (0.420)	0.974 (0.940)	1.991 (0.129)	4.560 (0.000)***
Excellent health	0.662 (0.360)	1.255 (0.527)	2.600 (0.043)	6.308 (0.000)***
Highest qualification (reference category, HE)				
Some quals (not HE)	0.526 (0.001)**	0.342 (0.000)***	0.291 (0.000)***	0.582 (0.000)***
No qualifications	0.419	0.219	0.136	0.406

	(0.002)**	(0.000)***	(0.000)***	(0.000)***
Wealth quintile (reference category, lowest)				
Wealth 2	0.783 (0.407)	0.537 (0.009)**	0.803 (0.486)	1.481 (0.095)
Wealth 3	0.723 (0.280)	0.661 (0.063)	1.043 (0.887)	1.843 (0.006)**
Wealth 4	0.796 (0.435)	0.790 (0.286)	1.547 (0.122)	2.140 (0.001)**
Wealth 5 (highest)	0.529 (0.044)*	0.944 (0.795)	2.206 (0.004)**	2.594 (0.000)***
<i>N</i>	3212	3406	2938	2938
<i>Pseudo R squared</i>	0.055	0.13	0.15	0.10

Notes: Results presented in the form of odds ratios.
p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 8 the regressions are repeated after formal and informal learning were broken down into their constituent elements. Males had a lower likelihood of participating in learning activities except for learning that led to a formal qualification. Age reduced the likelihood of both types of formal learning but its impact on both types of informal learning was insignificant. Marital status had no significant effects on any of the four types of learning activities. Employed individuals were more likely to obtain qualifications and to participate in formal education/training courses. As noted earlier, there would be both more incentive and more opportunities to undertake these types of learning if in work. On the other hand, and controlling for other factors (including health status and age) retired people were more likely to participate in both music, arts and evening classes and gym/exercise classes. Clearly retired people would have more time for informal learning. All four types of learning were strongly and positively associated with the level of prior education, as measured by highest qualification level.

5. LEARNING AND WELLBEING

In this section the relationship between learning and wellbeing is analysed. The objective is to consider this relationship using the most recently available ELSA data. In Section 5.1 we conduct some preliminary exploration of factors which may influence or co-vary with wellbeing, including gender, age, education (highest qualification held), health, and work status. Section 5.2 presents cross-sectional multiple linear regression models of wellbeing,

investigating whether, in Wave 4 of ELSA, participation in learning was associated with wellbeing after controlling for a range of other factors. Then in Section 5.3 the regression models use the change in wellbeing between waves 3 and 4 as the outcome variable.

5.1. Some Descriptives on Wellbeing

At Wave 4 of ELSA the mean CASP-19 wellbeing score was 41.3.

Table 9: Average CASP-19 outcomes by gender.

Gender	Mean
Female	41.60
Male	40.90

Table 9 shows that females had a slightly higher average of CASP-19 than males, even though the difference is very small in magnitude.

Table 10: Average CASP-19 outcomes by age groups.

Age groups	Mean
Aged 50 to 54	40.50
Aged 55 to 59	41.10
Aged 60 to 64	41.70
Aged 65 to 69	41.80

When the average is computed by age groups (Table 10), it can be seen that CASP-19 outcomes were slightly higher in older age groups.

Table 11: Average CASP-19 outcomes by highest qualification.

Highest qualification	Mean
Higher qualification	43.80
Some qualifications (not HE)	41.90
No qualifications	39.60

In Table 11 and as might be expected, individuals with the highest level of qualification attain the highest levels of CASP-19 outcomes. This indicates that CASP-19 might be positively correlated with the level of initial education.

Table 12: Average CASP-19 outcomes by work status.

Work status	Mean
Retired	42.20
Employed	42.30
Unemployed	38.30
Perm Sick/Disabled	29.90
Looking after home/family	39.40
Other incl. Semi-retired	44.30

In Table 12 we compute the average of CASP-19 outcomes by work status. The lowest levels of wellbeing were unsurprisingly amongst the long-term sick and disabled. On average, at least, those in work and those in retirement had very similar levels of wellbeing. The unemployed and the other/semi-retired groups were very small in number and so average wellbeing for them must be interpreted cautiously, but the figures suggest low levels of wellbeing among the unemployed and high levels amongst the other/semi-retired group.

5.2. Regression Models of Relationship between Learning and Level of Wellbeing

In the following two tables we present the results from the multiple linear regression models of CASP-19 wellbeing outcomes on learning activities and other controls. These models relate the level of wellbeing at ELSA Wave4 to learning activities reported in Wave4 (the most recent wave of data currently available) in the presence of controls. In this section we report and discuss only the coefficients on the learning participation variables – see Appendix 2 for the results in full.

As reported in Table 13, formal learning was found to have an insignificant effect on wellbeing outcomes while informal learning was statistically significant and associated with higher levels of wellbeing. More precisely, those who undertook informal learning had increased wellbeing of 0.72 points everything else held equal.

Table 13: Regression of CASP-19 wellbeing outcomes on formal and informal learning.

	CASP-19	CASP-19
Formal learning	-0.360 (0.388)	
Informal learning	0.723 (0.024)*	
Any learning		0.414 (0.180)
R squared	0.32	0.32

Note: the models control for age, gender, highest qualification, work status, marital status, self-reported health, and wealth quintile. See Appendix 2 for full details.
p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This may reflect that informal learning activities such as music, sports or gym classes may be more enjoyable for the older adult population. As for the combined category of any type of learning, the effect was insignificant, and this result was driven by the insignificance of the effect of formal learning on CASP-19 wellbeing outcomes. The R-squared statistic gives an indication of goodness-of-fit. Here the models accounted for about one-third (32 per cent) of the variation in wellbeing.

Table 14: regression of CASP-19 wellbeing outcomes on the four learning activities.

	CASP-19
Obtained qualification	-0.152 (0.815)
Education/training course	-0.273 (0.582)
Music, arts, evening class	0.114 (0.778)
Gym/exercise class	0.905 (0.006)**
R squared	0.32

Note: the model controls for age, gender, highest qualification, work status, marital status, self-reported health, and wealth quintile. See Appendix 2 for full details.
p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When learning was divided into more detailed categories (Table 14) it was found that, while both gym/exercise classes and music/arts/evening classes were positively associated with wellbeing (in the presence of all controls), only the gym/exercise classes were statistically significant. Undertaking such classes was predicted to increase wellbeing by 0.9 points, on average. Neither type of formal learning – qualifications, or education/training courses – was significantly related to wellbeing.

5.3. Models of Learning and the Change in Wellbeing between ELSA waves 3 and 4

In the following tables we present the findings of multiple linear regression analyses of the difference in the CASP-19 wellbeing measure between wave 3 and wave 4 on the learning activities and the rest of the controls.

Table 15: Regressions of changes in CASP-19 outcomes between wave 3 and 4.

	CASP19 Wave4 – wave3 Model A	CASP19 Wave4 – wave3 Model B	CASP19 Wave4 – wave3 Model C	CASP19 Wave4 – wave3 Model D
Obtained qualification	0.507 (0.295)	0.326 (0.478)	0.047 (0.939)	0.049 (0.935)
Formal education or training course	0.128 (0.702)	0.295 (0.354)	0.185 (0.642)	0.178 (0.649)
Music/arts/ Evening class	0.419 (0.179)	0.664 (0.021)*	0.414 (0.224)	0.358 (0.287)
Gym/exercise class	0.181 (0.439)	0.901 (0.000)***	0.540 (0.034)*	0.431 (0.092)
<i>N</i>	3144	3144	2426	2426
<i>R squared</i>	0.002	0.105	0.137	0.145

Notes: Model A has no control variables; Model B just controls for CASP-19 at Wave 3; Model C controls for CASP-19 at Wave 3 and gender, age, partnership status, employment status, highest qualification, wealth; Model D includes all the controls in Model C, and adds self-reported health.
p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 15 we present the results of the regressions of changes in CASP-19 outcomes between wave 3 and wave 4. The dependent variable is the difference in CASP-19 between the two waves (wave 4 – wave 3). In Model A here we estimate the effects of the four learning variables on this CASP-19 change score without any controls. In Model B we add

the level of CASP-19 wellbeing at wave 3 as a control. This is to allow for the possibility of regression to the mean effects. In Model C, we added a further set of control variables: gender, age, partnership status, employment status, highest qualification, wealth. Note that in this regression we are adding the controls as measured at Wave 3. In other words, we are considering whether the initial level of these variables has an impact on the change over time in wellbeing – for example that men have a different wellbeing trajectory compared to women. Model D adds the level of self-reported health as a further factor which might potentially influence the change in wellbeing.

In Model A, no learning activities had any significant impact on the change in wellbeing. When the level of CASP-19 at wave 3 was added as a control, both music/arts/evening classes and gym/exercise classes had a significant and positive effect on the change in wellbeing. When the rest of the controls were added (Model C), significance dropped and the only learning activity to have a positive and significant effect was gym/exercise classes. The statistical significance of gym/exercise classes fell further (so as to be just significant at the 10 per cent level) and all other forms of learning remained non-significant if self-reported health was also included as a control.

Table 16: Regressions of changes in CASP-19 outcomes between wave 3 and 4 on changes in explanatory variables.

	CASP19 Wave4 – wave3 Model A	CASP19 Wave4 – wave3 Model B
Obtained qualification	0.368 (0.448)	0.337 (0.478)
Formal education/training course	0.098 (0.765)	0.049 (0.880)
Music/arts or evening class	0.779 (0.008)**	0.704 (0.014)*
Gym/exercise class	0.959 (0.000)***	0.800 (0.000)***
<i>N</i>	2967	2967
<i>R squared</i>	0.114	0.123

Notes: Both reported models here control for changes in partnership status, whether moved into or out of work, changes in wealth; Model B also includes the change in self-reported health.

p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

However, while the results in Table 15 are of some interest, it is not clear that the change in wellbeing should be explained by a set of control variables measured at Wave 3 i.e. the level of these control variables. Moreover, the models do not allow for things which do vary over time. We attempted to address these problems in our next set of models.

So, in Table 16 we regress the difference between wave 4 and wave 3 in CASP19 outcomes on the changes in ‘inputs’ over the same period. Clearly variables which do not change over time, either inherently or by assumption, such as gender, highest qualification and age will be dropped from the model here. Actually, age was dropped because the change in age is identical for all respondents. This model also included the initial level of CASP19 at wave 3 as an explanatory variable, because of concerns that the wellbeing measure displayed regression to the mean. According to the R^2 statistic, the model accounts for about 11 per cent of the outcome variable, change in wellbeing, and this increased marginally, to just over 12 per cent, when we included also self-reported health, as in model B. In this table it can be seen that both types of informal learning had a positive and significant impact on CASP-19 wellbeing outcomes. Those who undertook music/arts and evening classes were likely to have 0.70 to 0.78 additional units on their CASP-19 score, while individuals undertaking gym/exercise classes are likely to have up to almost one additional unit (0.80 to 0.96 units) on their CASP-19 score.

To summarise: in this Section we have tried several approaches to modelling the change in wellbeing between Waves 3 and 4 of the ELSA survey. In our preferred models (Table 16), which control only for regression to the mean and for changes in other factors between Waves 3 and 4 there was strong evidence that informal learning had an impact on wellbeing, while formal types of learning did not.

6. TRACKING CHANGES BETWEEN 2002 AND 2009

Almost all the previous research literature on older learners has been cross-sectional in nature or, at best, has followed people over very short periods of time such as before and after a course. The availability of four waves of ELSA data, tracking a large sample of individuals over a seven year period between 2002 and 2009, provides a unique opportunity to

investigate changes in learning participation and wellbeing as people get older. Some of the key questions which researchers on the learning of older adults would like to answer include whether, and if so, to what extent participation in learning declines as people get older. Also, whether adults move from formal types of learning to informal learning as they become older. Previous research drawing only on cross-sectional data has tended to address these questions by comparing the learning participation of respondents of different ages in their sample. But this is much less satisfactory than following the same group of people over time and actually observing the changes in their patterns of learning.

Moreover, the repeated sampling of the same individuals over time (panel data in the jargon) provides the researcher with data which can be utilised to make more robust inferences about the impact of learning on wellbeing than can be accomplished with cross-sectional data. This is essentially because, with repeated sampling, we can exploit variation within respondents to take account of unobservable characteristics which might otherwise bias the results. We have utilised this approach to tackling unobservables to some extent already above by looking at change between two waves of ELSA, but we can now draw on all four waves of the survey yielding a longer period to study the respondents and a larger sample of observations in total.

So in this section we utilise all four waves of the ELSA survey which are currently available. Trajectories of learning participation as people get older are investigated in Section 6.1; changes in wellbeing over time are explored in Section 6.2; and we exploit the panel nature of the data to estimate robustly the impact of learning on wellbeing in Section 6.3. In Section 6.4 we apply similar regression models separately to sub-groups so as to infer whether the effects of learning vary by age group, gender and prior educational level.

6.1. Changes in Participation in Learning as the Sample Aged between 2002 and 2009

How does participation in learning change as people get older? Almost all previous research which has addressed this question has done so by comparing different age groups in a cross-section. But, with the ELSA data, we can instead study the same group of individuals as they get older. Here we track the group of just over 3,000 people with data at all four ELSA waves and consider learning participation as they get older, from ages 50 to 69 at Wave 1

through to 57 to 76 at Wave 4. Note, as elsewhere in this report, estimates were weighted to ensure representativeness.

The proportion engaged in some learning was 49 per cent at Wave 1, declining to just under 40 per cent at Wave 4.

Table 17: Percentage reporting some learning

WAVE:	Any learning
	%
Wave 1	49.1
Wave 2	46.5
Wave 3	41.8
Wave 4	39.7

N = 3,096

As the sample aged by approximately seven years between Wave 1 and Wave 4, learning participation declined. This decline was much steeper for formal learning, than for informal learning (Figure 1 and Table 18). The proportion participating in formal learning fell from about 27 per cent at Wave 1 to just 14 per cent at Wave 4, while the proportion of informal learners also fell as the group aged, but the decline was much gentler, from 36 per cent at Wave 1 to around 32 per cent at Waves 3 and 4.

Table 18: Percentages reporting formal and informal learning

WAVE:	Formal	Informal
	%	%
Wave 1	26.9	36.4
Wave 2	24.3	34.4
Wave 3	19.0	32.2
Wave 4	14.1	32.3

N = 3,096

The proportion engaged in each type of learning is shown in Table 19. In the first wave over a quarter participated in sports clubs/exercise classes and this proportion fell only slightly over time; almost a quarter participated in formal education and training courses at Wave 1 but with a major decline to only 12 per cent by Wave 4. The proportion doing education, music, arts groups or evening classes was nearly 17 per cent at Wave 1, falling to about 13 per cent by Wave 4. Few obtained qualifications, especially in later waves.

Figure 1: Participation in Formal and Informal learning: ELSA Waves 1 to 4

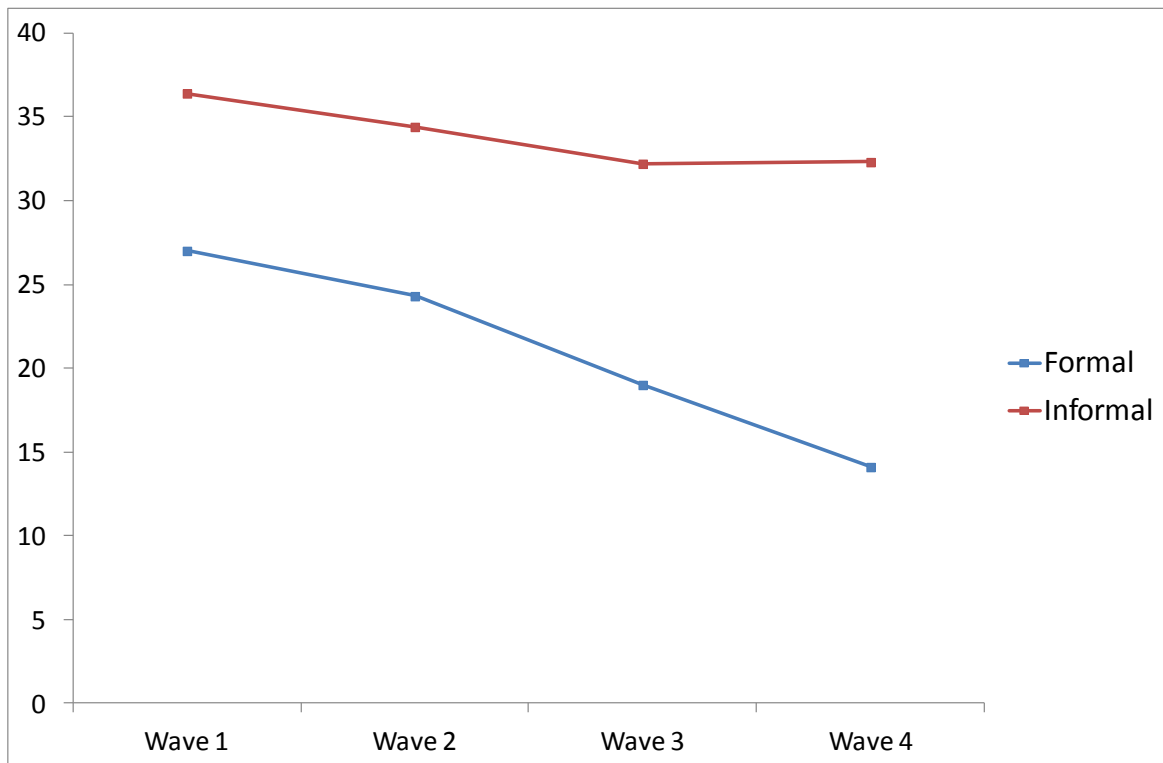


Figure 2: Participation in Any Learning, by Gender : ELSA Waves 1 to 4

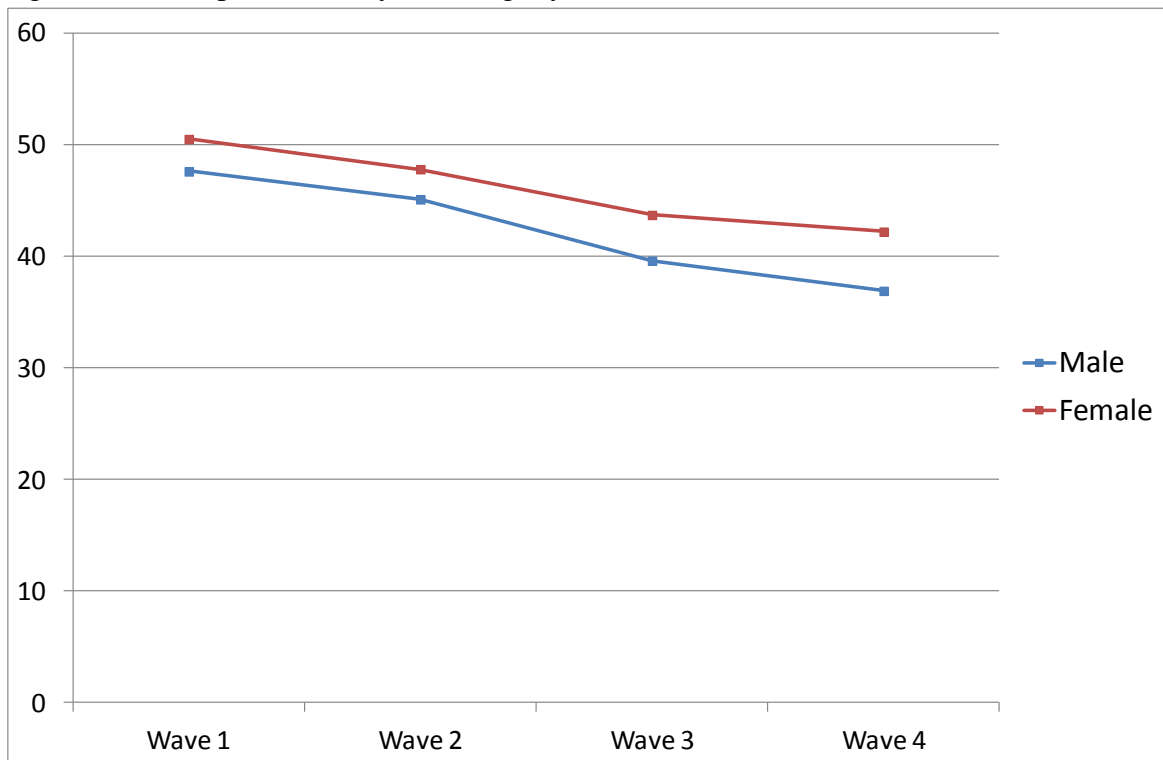


Table 19: Percentage reporting each type of learning

	Obtaining qualifications	Formal education and training	Music, arts, evening classes	Gym/exercise classes
	%	%	%	%
Wave 1	11.7	23.5	16.6	26.5
Wave 2	10.1	22.0	15.0	25.3
Wave 3	9.0	18.9	13.1	24.9
Wave 4	5.6	12.2	12.8	25.1

N = 3,096

Participation in learning was somewhat higher for females at each wave than for males (Figure 2). As shown in Table 20, the proportion acquiring qualifications was 11 per cent for males and 12 per cent for females at Wave 1, falling to 6 per cent for males and 5 per cent for females by Wave 4. Participation in formal education/training courses was 23.5 per cent for both males and females at Wave 1, dropping to 11.8 per cent among males and 12.6 for females at Wave 4. Table 20 also shows that the major difference by gender was in participation in education/music/arts groups and evening classes where the participation rate was about twice as high for women as for men. Participation in sports clubs and gym exercise classes was also marginally higher amongst women.

Table 20: Percentage reporting each type of learning, by gender

	Obtaining qualifications	Formal education and training	Music, arts, evening classes	Gym/exercise classes
MALES				
	%	%	%	%
Wave 1	11.3	23.5	11.5	24.9
Wave 2	10.2	21.2	11.2	24.5
Wave 3	9.3	18.1	9.2	23.4
Wave 4	6.0	11.8	8.1	23.5
FEMALES				
	%	%	%	%
Wave 1	12.1	23.5	21.1	27.9
Wave 2	9.6	22.7	18.5	26.0
Wave 3	8.8	19.6	16.6	26.2
Wave 4	5.3	12.6	17.1	26.5

N = 3,096

The sample was split into those aged 50 to 59 at Wave 1 (and therefore aged about 57 to 66 by Wave 4) and those aged 60 to 69 at Wave 1 (and therefore aged about 67 to 76 by Wave 4). The older age group had lower participation rates overall, as can be seen in Figure 3. However, comparing formal and informal learning (Figure 4) it was apparent that participation rates for informal learning were very similar for the two groups, while formal learning participation showed a substantial gap between them. Formal learning participation declined very sharply for the younger of the two age groups, most probably because many of them were moving from work into retirement over the observation period from 2002 to 2009.

Table 21: Percentage reporting any learning, by highest qualification held

	Higher education	Some qualifications (below HE)	No qualifications
	%	%	%
Wave 1	68.8	51.3	24.9
Wave 2	66.3	45.5	26.8
Wave 3	61.2	39.3	24.5
Wave 4	59.0	37.9	21.6

N = 3,096

As for prior education, the sample was split into three groups: those with higher education qualifications, those with qualifications below HE, and those with no qualifications. Both informal and formal types of learning were lowest amongst those with no qualifications and greatest amongst those with higher education qualifications (Tables 21 and 22).

Table 22: Participation in formal and informal learning, by highest qualification held

	Formal			Informal		
	HE	Below HE	None	HE	Below HE	None
	%	%	%	%	%	%
Wave 1	42.1	29.4	7.1	53.7	34.8	20.3
Wave 2	38.2	23.6	10.4	50.2	33.2	19.4
Wave 3	30.9	17.8	8.0	48.9	29.3	18.6
Wave 4	25.2	11.6	5.9	48.4	30.8	17.7

N = 3,096

Figure 3: Participation in Any Learning, by Age Group : ELSA Waves 1 to 4

Note: Age at Wave 1

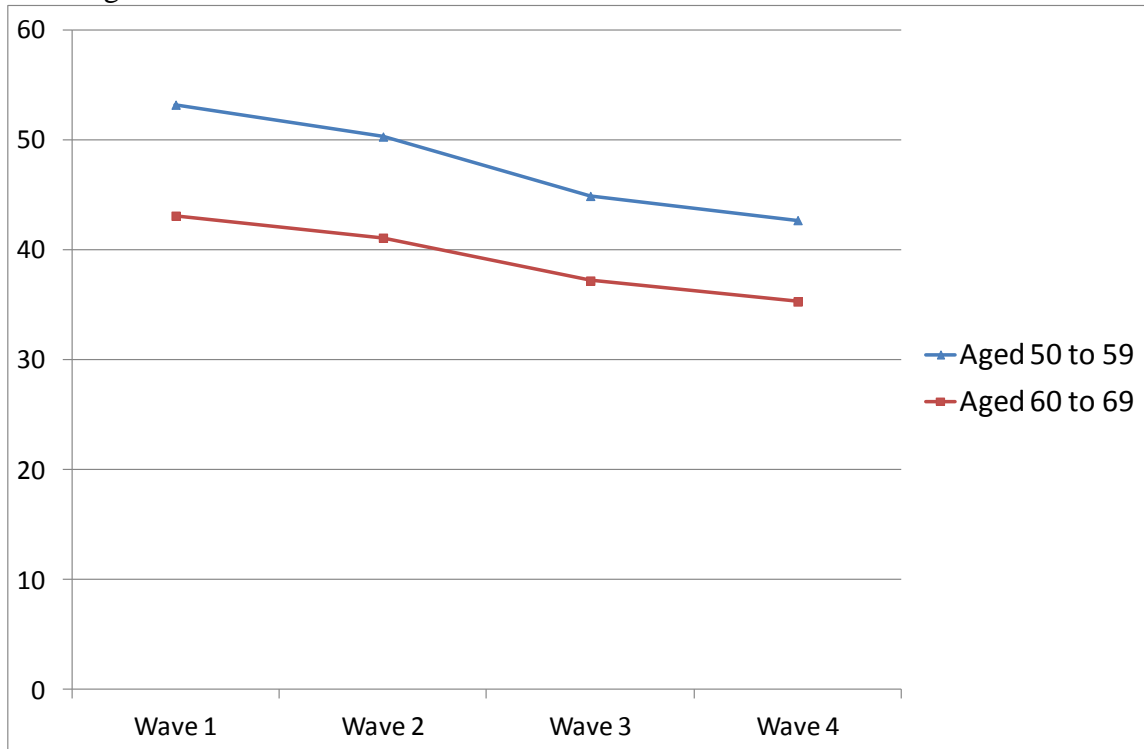
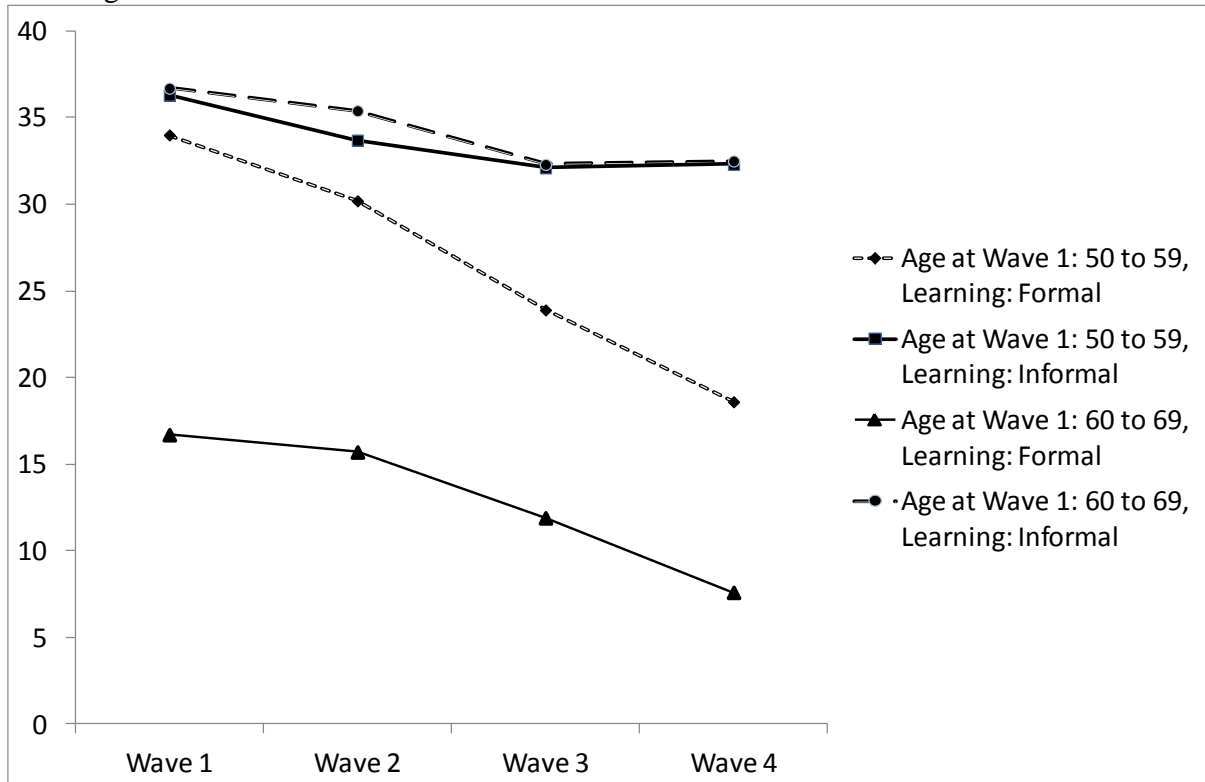


Figure 4: Participation in Formal and Informal Learning, by Age Group :

ELSA Waves 1 to 4

Note: Age at Wave 1



The extent to which respondents participated in learning activities across the four waves of ELSA data is outlined in Table 23. We can distinguish between persistent learners, who participated in some form of learning at three or four waves; occasional learners who participated at one or two waves, and non-learners, who did not participated in any learning activity at any wave.

Table 23: Patterns of learning participation
Based on four waves of ELSA survey

Type of learner:	Definition	
		%
Non-learner	No learning at any wave	31.2
Occasional	Learning at one or two waves	33.3
Persistent	Learning at three or four waves	35.6
ALL		100.0

Exactly a third of the sample were occasional learners, just over a third persistent learners, and just under a third were non-learners. The summary statistics in Table 24 suggest that being a persistent learner was associated with being in work, being female, belonging to a younger age group, and especially with prior education level (as measured by highest qualification).

Table 24: Characteristics of those with different patterns of learning participation
Based on four waves of ELSA survey
Column percentages

Type of learner:	Gender		Age group	
	Male	Female	Aged 50 to 59	Aged 60 to 69
	%	%	%	%
Non-learner	32.9	29.7	25.8	39.0
Occasional	33.5	33.1	35.9	29.5
Persistent	33.6	37.3	38.3	31.5

Type of learner:	Work status		Highest qualification level		
	In work	Retired	HE	Some	None
	%	%	%	%	%
Non-learner	20.0	35.5	13.5	28.3	54.5
Occasional	38.3	30.4	30.3	38.5	28.7
Persistent	41.7	34.2	56.2	33.2	16.9

6.2. Changes in wellbeing between 2002 and 2009

Before proceeding to the regression analysis of wellbeing, we briefly summarise the changes over time in the wellbeing measure. The mean CASP-19 wellbeing score fell gradually over time by, on average, about half a point between each wave, from 43.7 at Wave 1 to 42.0 by Wave 4 (Table 25).

Table 25: Mean CASP-19 score at each wave of ELSA

WAVE:	Mean CASP-19 score
Wave 1	43.7
Wave 2	43.5
Wave 3	42.1
Wave 4	42.0
N = 2,908	

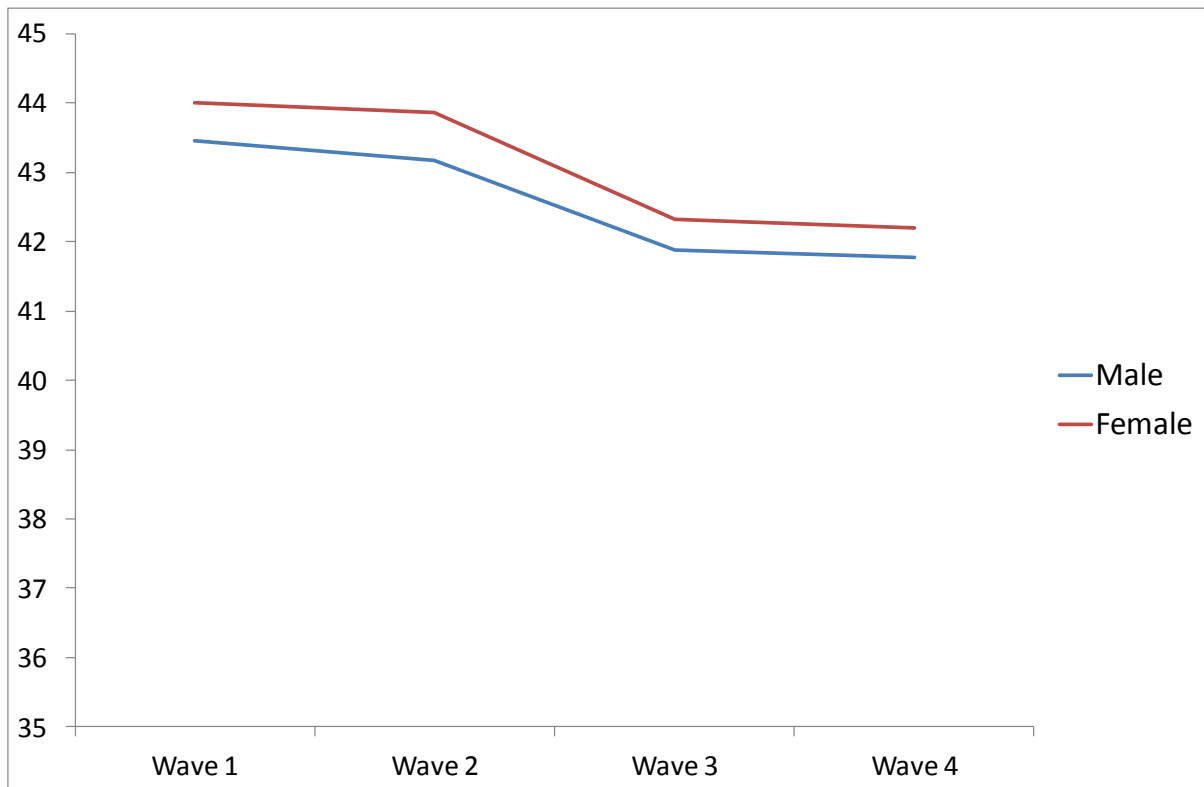
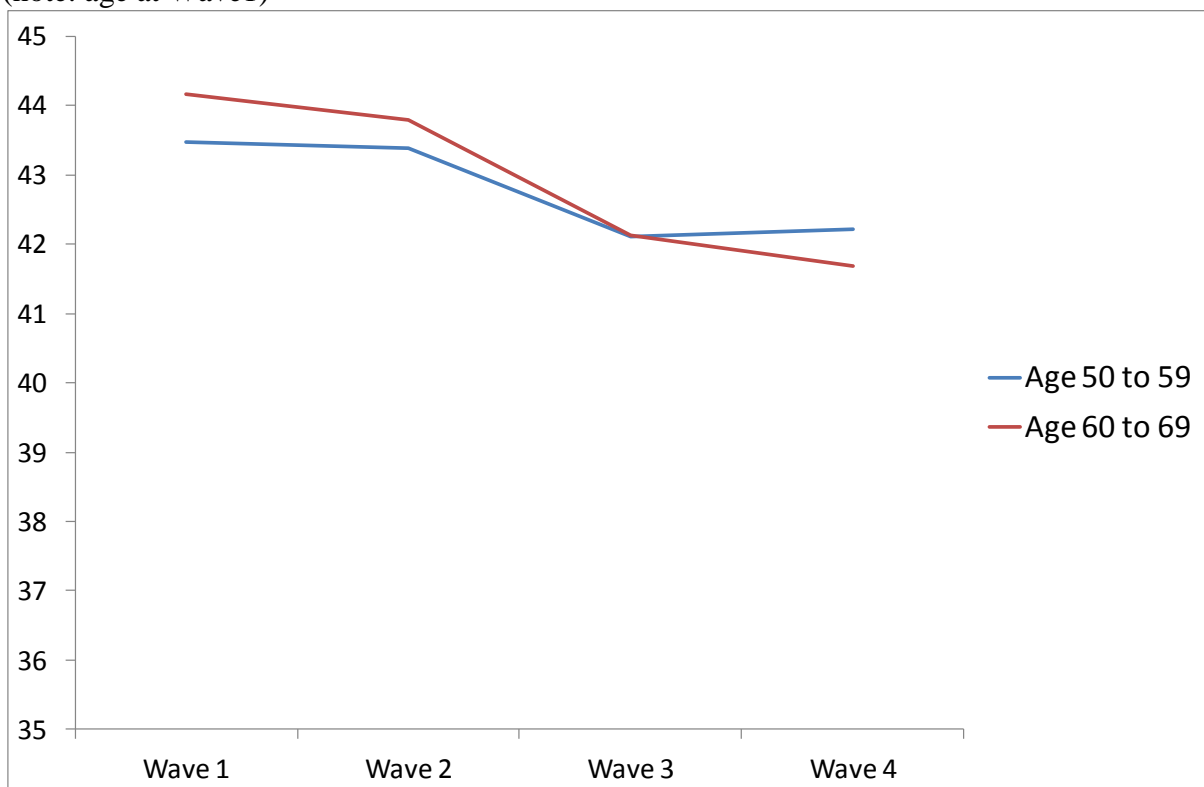
This gradual decline occurred for both males and females (Figure 5); older adults reported somewhat steeper declines in wellbeing on average than younger adults (Figure 6). People with higher levels of education tended to have higher levels of wellbeing, but the rate of decline in the wellbeing score over time was broadly similar for each of the three educational groups, as may be inferred from Table 26.

Table 26: Mean CASP-19 score at each wave of ELSA, by highest qualification

WAVE:	Mean CASP-19 score		
	HE	Below HE	None
Wave 1	45.4	43.9	41.8
Wave 2	45.1	43.7	41.7
Wave 3	44.0	42.1	40.3
Wave 4	43.9	42.0	40.1

N = 2,908

Figure 5: CASP-19, ELSA Waves 1 to 4, by gender

Figure 6: CASP-19, ELSA Waves 1 to 4, by age group
(note: age at Wave1)

6.3. Panel Regression Models of Learning and Wellbeing

In this section we present results estimated across all four waves of the ELSA dataset. This has the advantage of a large sample of observations. Moreover, as described in the Method section earlier we used fixed effects panel regression models – the main advantage of this approach is to take into account unobservable factors which might otherwise bias the results. Note that, although we are now utilising pooled data across all four waves of ELSA, the models still relate learning observed at wave t to wellbeing outcomes at wave t . In other words there are no long lags between learning participation and learning outcomes.

In Table 27 are the results of fixed effects panel regressions of wellbeing outcomes on learning, with formal and informal learning considered separately. The first column presents the results without controls while the second takes into account marital and work status as controls. Both regression models include dummy variables for each wave to take account of any differences over time. Note that in fixed effects models, it is not possible to include time constant variables and variables that change by the same amount for all respondents such as age. Also, we do not have an overall measure of goodness-of-fit analogous to the R-squared statistic in multiple linear regression, so we report an F-test to confirm that the fitted models are a significant improvement on the null model containing no explanatory variables. It can be seen that formal learning had an insignificant impact on wellbeing outcomes. However, informal learning had a positive and significant impact on CASP-19 wellbeing outcomes and those undertaking this type of learning were estimated to gain 0.48 additional points on their wellbeing outcomes.

Table 27: the effect of formal and informal learning on wellbeing outcomes.

	CASP 19	CASP 19
	Model A	Model B
Formal learning	0.130070 (0.338)	0.124467 (0.355)
Informal learning	0.525459 (0.000)***	0.483687 (0.000)***
No of observations	14532	14520
No of individuals	4229	4226
F test and (P value)	79.69 (0.00)	35.81 (0.00)

Notes: Both models include time i.e. wave dummies; Model B also controls for partnership and work status

p -values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 28 we regressed CASP-19 wellbeing outcomes on the four different types of learning. The findings show strong evidence that both types of informal learning (music/arts groups or evening classes and gym/exercise classes) had a positive and significant impact on wellbeing. There was also some evidence here (statistically significant at the five per cent level) that obtaining a qualification had a positive impact on wellbeing. The estimated magnitudes of the effects of each of these three types of learning were similar at around 0.4 to 0.5 units of the CASP-19 score. Formal education/training courses did not have any significant effect on the wellbeing outcome.

Table 28: the effect of the four types of learning on wellbeing outcomes.

	CASP19 Model A	CASP19 Model B
Obtained qualification	0.434 (0.027)*	0.420 (0.031)*
Formal education / training course	-0.057 (0.702)	-0.061 (0.681)
Evening/music/arts class	0.491 (0.004)**	0.454 (0.008)**
Gym/exercise class	0.430 (0.004)**	0.406 (0.007)**
No of observations	14524	14512
No of individuals	4229	4226
F test and (P value)	57.51 (0.00)	31.27 (0.00)

Notes: Both models include time i.e. wave dummies; Model B also controls for partnership and work status

p -values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.4. Regression models applied to sub-groups

It was also of interest to consider whether any benefits of learning for wellbeing applied universally across the dataset, or whether the effects were in fact stronger for some sub-groups than for others. So differences by gender, age group, highest qualification, health status and work status were investigated. For the first three categories we used the panel

data, that is estimated results drawing on all four waves of ELSA. Because health status and work status change over time it was not possible to conduct sub-group analyses on the panel and we used the Wave 4 cross-sectional data only. For brevity we just summarise the results here but do not present any tables. Appendix 3 provides tables of findings for the learning variables.

The results by gender suggested that the impact of music, arts and evening classes on wellbeing was larger for males than for females. There was weak evidence, at the ten per cent level, that this difference was statistically significant. Conversely, the estimated effect of gym/exercise classes was larger for females than for males, although this difference was not found to be statistically significant. Separate analyses were conducted for two age groups - those between 50 and 59 at ELSA wave 1 and those between 60 and 69 at that time. It was found that the music, arts and evening classes had a larger effect for the younger age group while gym/exercise classes had a larger effect for the older age group. However, differences were not significant. As for prior education, music, arts and evening classes had a positive and significant effect only for those with higher or other qualifications, while the effect was insignificant for those with no qualifications. For gym classes, the effect was largest for those with no qualifications. There was then some evidence, albeit not entirely conclusive, that while informal learning generally had an impact on wellbeing, there was variation by the type of informal learning. Music, arts and evening classes tended to have larger effects for those who were younger, more highly educated and male, while the effects of gym/exercise classes tended to be larger for those with no qualifications, relatively older and female. Finally, the cross-sectional analyses by work status and health status did not reveal any significant differences by sub-group but sample sizes were quite small.

7. CONCLUSION

This report has described research results on two topics. Firstly, the extent of participation in learning by people aged in their 50s and 60s and how such participation changes as people grew older and their circumstances, including whether they were in work, changed. Secondly, whether participation in learning by older adults had any impact on their wellbeing. Here we discuss briefly the key findings on each of these topics.

Our results from regression models suggested that the determinants of participation in learning were different according to whether the learning was formal or informal. Holding other things constant, being in an older age group and being retired reduced the probability of formal learning; but being older had no impact on informal learning, while being retired was positively associated with informal learning. As for other factors, the level of prior qualifications was found to have a significant impact on both formal and informal learning participation. Those with more education were more likely to participate. Good health was strongly related to participation in informal learning but was not a significant determinant of participation in formal learning (after controlling for other factors). Males were less likely to engage in both formal and informal learning activities than females.

As for the impact of learning on wellbeing we utilised several different types of regression model to analyse the relationship between these two variables. Multiple regression models were applied to data from ELSA wave 4. To take account of unobservable factors which might influence wellbeing we applied multiple regression to the change score between two waves of the survey and fitted fixed effects panel regressions to all four waves of ELSA. A consistent finding was that informal types of learning (music, arts, evening classes; gym, exercise classes) had an impact on wellbeing. Quantitative results of the kind reported here cannot provide reasons why participation in music, arts groups and evening classes would tend to enhance wellbeing. We might speculate that participation in informal learning would occur because of the intrinsic enjoyment of the subject and also sometimes because it provided opportunities for getting out and socialising. Indeed these messages are what emerge from the qualitative literature described earlier. It suggests that intrinsic interest in learning and/or in a specific subject, and meeting people are important reasons for learning at older ages. Older adults often appreciated learning because it helped them to be receptive to new ideas, to improve understanding and maintain a positive outlook.

Our quantitative findings provide estimates of the size of the effects of informal learning on wellbeing. The estimated effects of learning were quite small in magnitude. Participation in informal learning was estimated to raise wellbeing by between 4 per cent and 11 per cent of a standard deviation. However, research has consistently found that many variables only have small effects on measured wellbeing, suggesting that learning participation may therefore have a useful role to play as a contributor to the wellbeing of older adults. As for differences by sub-groups within the population of older adults, music, arts and evening classes tended to have larger effects for those who were younger, more highly educated and male, while the effects of gym/exercise classes tended to be larger for those with no qualifications, relatively older and female.

There was also evidence that obtaining qualifications had an impact on wellbeing; there was never any evidence that participation in formal education and training courses was related to wellbeing. Why did such education/training courses not increase wellbeing? These formal education/training courses would often have been undertaken principally for work-related reasons. Perhaps they would only boost wellbeing in the longer term if and when they led on to more satisfying work or promotion. Our analyses focus on changes in wellbeing over quite short periods of time, with waves of the ELSA survey usually about two years apart. Note also that participation in education/training courses was more widespread than the acquisition of qualifications. Hence when these two types of learning were combined into a formal learning variable, formal learning did not show any significant relationship with wellbeing. The more disaggregated results reveal that several, but not all, types of learning activity had an impact on wellbeing in later life.

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APPENDIX 1: LIST OF CASP-19 QUESTIONNAIRE ITEMS**CONTROL**

My age prevents me from doing the things I would like to do*

I feel that what happens to me is out of my control *

I feel free to plan for the future

I feel left out of things *

AUTONOMY

I can do the things I want to do

Family responsibilities prevent me from doing the things I want to do*

I feel that I can please myself what I do

My health stops me from doing things I want to do*

Shortage of money stops me doing things I want to do *

SELF-REALISATION

I feel full of energy these days

I choose to do things that I have never done before

I feel satisfied with the way my life has turned out

I feel that life is full of opportunities

I feel that the future looks good for me

PLEASURE

I look forward to each day

I feel that my life has meaning

I enjoy the things that I do

I enjoy being in the company of others

On balance, I look back on my life with a sense of happiness

*Item reverse coded for scoring

APPENDIX 2: REGRESSION MODELS OF CASP-19 WELLBEING OUTCOMES

These models relate the level of wellbeing at ELSA wave4 to learning activities reported in Wave4 in the presence of controls.

	CASP 19	CASP 19
Formal learning	-0.359810 (0.388)	
Informal learning	0.723151 (0.024)	
Male	-0.865199 (0.006)	-0.860486 (0.005)
Age	0.0193892 (0.667)	0.0248106 (0.580)
In a couple	0.328473 (0.677)	0.277149 (0.723)
Divorced	-0.830344 (0.356)	-0.843735 (0.344)
Widowed	-0.737090 (0.428)	-0.751633 (0.413)
Employed	-0.212714 (0.578)	-0.300931 (0.422)
Unemployed	-0.528060 (0.670)	-0.832436 (0.497)
Disabled	-4.228402 (0.000)	-4.231341 (0.000)
Domestic work	-2.343767 (0.001)	-2.286287 (0.001)
Semi-retired	1.422442 (0.256)	0.865569 (0.487)
Fair health	4.355554 (0.000)	4.359630 (0.000)

Good health	8.605857 (0.000)	8.637261 (0.000)
Very good health	11.60454 (0.000)	11.64230 (0.000)
Excellent health	13.83565 (0.000)	13.99124 (0.000)
Middle qualifications	-0.0487148 (0.886)	-0.0171213 (0.959)
No qualifications	-0.439656 (0.327)	-0.459006 (0.299)
Wealth 2	2.228982 (0.000)	2.336667 (0.000)
Wealth 3	2.768021 (0.000)	2.854606 (0.000)
Wealth 4	2.779503 (0.000)	2.915599 (0.000)
Wealth 5	4.609520 (0.000)	4.684643 (0.000)
Any learning		0.414256 (0.180)
Constant	29.53222 (0.000)	29.15410 (0.000)
<i>N</i>	2726	2769
<i>R squared</i>	0.32	0.32

	CASP 19
Obtained qualification	-0.151713 (0.815)
Formal course	-0.272513 (0.582)
Evening class	0.113663 (0.778)
Gym class	0.904716 (0.006)
Male	-0.887804 (0.005)
Age	0.0200346 (0.657)
In a couple	0.306674 (0.698)
Divorced	-0.820132 (0.364)
Widowed	-0.642495 (0.489)
Employed	-0.189318 (0.621)
Unemployed	-0.484479 (0.696)
Disabled	-4.197064 (0.000)
Domestic work	-2.320451 (0.001)
Semi-retired	1.425140 (0.254)

Fair health	4.319425 (0.000)
Good health	8.599093 (0.000)
Very good health	11.56068 (0.000)
Excellent health	13.81693 (0.000)
Middle qualifications	-0.0503724 (0.883)
No qualifications	-0.435534 (0.335)
Wealth 2	2.219145 (0.000)
Wealth 3	2.716914 (0.000)
Wealth 4	2.760392 (0.000)
Wealth 5	4.639301 (0.000)
Constant	29.51106 (0.000)
<hr/> <i>N</i>	2714
<i>R squared</i>	0.32
	<hr/>

APPENDIX 3: PANEL REGRESSION ANALYSES OF WELLBEING FOR SUB-GROUPS

Note: all models controlled for partnership status and work status, and included wave dummies to control for changes through time. Here we just report the results for the learning variables.

Table A3.1: Effects of the four types of learning on wellbeing outcomes by gender.

	Male CASP19	Female CASP19
Obtained qualification	0.401 (0.194)	0.438 (0.073)
Formal education/training course	-0.174 (0.436)	0.036 (0.856)
Evening/music/arts class	0.850 (0.004)**	0.216 (0.295)
Gym/exercise class	0.307 (0.203)	0.472 (0.014)*
<i>Number of obs</i>	6575	7937
<i>Number of individuals</i>	1891	2335
<i>R squared</i>	0.33	0.33

p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3.2: Effects of the four types of learning on wellbeing outcomes by age groups.

	Aged 50 to 59 CASP19	Aged 60 to 69 CASP19
Obtained qualification	0.409 (0.071)	0.625 (0.099)
Formal education/training course	-0.163 (0.382)	0.220 (0.342)
Evening/music/arts class	0.511 (0.025)*	0.284 (0.261)
Gym/exercise class	0.259 (0.184)	0.647 (0.006)**
<i>Number of obs</i>	8264	6248
<i>Number of individuals</i>	2379	1847
<i>R squared</i>	0.34	0.32

p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3.3: Effects of the four types of learning on wellbeing outcomes by education level

	Higher qualifications CASP19	Qualifications Below HE CASP19	No qualifications CASP19
Obtained qualification	0.351 (0.182)	0.418 (0.170)	0.549 (0.358)
Formal education/training course	-0.117 (0.567)	0.212 (0.345)	-0.496 (0.267)
Evening/music/arts class	0.692 (0.003)**	0.586 (0.028)*	-0.425 (0.383)
Gym/exercise class	0.269 (0.235)	0.359 (0.132)	0.662 (0.058)
<i>Number of obs</i>	4498	5927	4084
<i>Number of individuals</i>	1251	1691	1283
<i>R squared</i>	0.27	0.35	0.30

p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$