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Participation in Learning and Depressive Symptoms

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This paper reports the findings of research on relationships between depression and participation in learning using data from a large sample of older adults. The objective was to establish whether learning can reduce the risk of depression. Data were obtained from the English Longitudinal Study of Ageing, a nationally-representative sample of adults aged 50 and above. The eight-item Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure depressive symptoms. Participation in learning covered the acquisition of qualifications; taking formal training courses, learning at arts, music or evening classes; and participation in gym/exercise classes. Multiple regression analyses were conducted with the change in the measure of depressive symptoms between two waves of the longitudinal survey as the response variable. There was limited evidence that participation in learning reduced the risk of depression in later life. Only learning leading to qualifications was significantly associated with the outcome after controlling other factors. But learning leading to qualifications was undertaken only by a small minority of the sample, mainly the youngest and most highly educated. Other types of learning were not significantly associated with depression. It appears that learning has, at best, a small role to play in addressing the risk of depression in later life.

In recent years there has been a growing interest in analyzing the benefits of adult learning across a wide range of domains. Apart from its impact on an individual's success in the labor market, learning in adulthood may also have the potential for improving some noneconomic outcomes including self-confidence, social participation, civic engagement, health maintenance, and happiness and wellbeing (Feinstein, Hammond, Woods, Preston, & Bynner, 2003; Schuller, Bynner, Brasett-Grundy, Hammond, & Preston, 2004; Field, 2009; Schuller & Watson, 2009). But a full understanding of when and why learning has beneficial effects is still some distance away and requires the accumulation of more evidence. Much of the research to date has tended to focus on adults in midlife or younger, and there is less work on older adults. This paper reports the findings of new research on the impact of engaging in learning by older adults on symptoms of depression.

Depression is a very common form of mental ill-health, and the cost of treating it has been estimated, in Europe, at 118 billion euros annually and in the United States at \$170 billion (Sobocki, Jonsson, Angst, & Rehnberg, 2006; Ladin, Daniels, & Kawachi, 2010). The prevalence of depressive symptoms tends to decline from young adulthood through to midlife but then to rise consistently after the age of 60 (Ladin et al., 2010). Older adults may be at risk of

depression for a number of reasons. Retirement is a major lifecourse transition that may well bring depression for some. In addition, depressive symptoms may emerge in later life as a response to poor physical health (Chou, 2007) and also because of psychosocial factors such as loss of family members and close friends. It is important, then, to understand whether participation in learning can play a role either in reducing the probability of older adults becoming depressed or helping those already suffering from depression to emerge from the condition.

Much of the literature on learning outcomes focuses on the economic (employment and earnings) benefits of learning, and there is less research on the health benefits of learning, including its impact on depression. Some United States studies, including Miech and Shanahan (2000) and Mirowsky and Ross (2002), have found that those with more education are less likely to experience depression in adult life. Similarly, in the case of the United Kingdom, Hammond, and Feinstein (2006) report much lower odds of depression for adults in their 30s among those who had obtained qualifications at school compared to those who left school without qualifications. But these studies are concerned with the effects of initial education rather than learning in adulthood.

Among the health outcomes analyzed in Feinstein et al. (2003) was depression as measured by a malaise score. The researchers considered both the onset of depression by age 42 for those who were not depressed at age 33 and exit from depression by age 42 for those who did report depression at age 33. Adult learning was found to have beneficial effects on several health outcomes after controlling for other factors, but the research did not find any positive effects of adult learning on depression. Feinstein and his coauthors also discuss the contrast between these quantitative findings and the in-depth qualitative interviews in Schuller, Brassett-Grundy, Green, Hammond, and Preston (2002). They conclude that while adult learning may be of benefit to certain individuals at risk of depression, there was no evidence that it had beneficial effects across statistically representative samples of the population. Hammond and Feinstein (2005) examined links between self-efficacy and adult learning. They found associations between taking courses and improvements in self-efficacy, especially those who had left school with no qualifications. This work is relevant here because self-efficacy may help to protect against the onset of depression. To summarize, some qualitative research suggests a possible link between participation in learning and reduced risk of depression, but the quantitative evidence does not show any compelling evidence of effects of learning undertaken in adulthood on depression. Moreover, the research was concerned with younger and midlife adults rather than older adults.

Research with older adults has suggested that participation in learning could have benefits for various mental health outcomes, but it has not investigated depression specifically. Studies of participation in lifelong learning show that older adults can obtain a range of benefits including mental stimulation, social engagement, and increased self-esteem (Lamb & Brady, 2005; Withnall, 2009). In a small sample of older adults in the United States, Dorin (2007) found that life satisfaction was higher for older adults who participated in online educational classes relative to those who did not, but this result was not statistically significant. There is some evidence from qualitative and small-sample studies that engagement in learning may be associated with improvements in self-efficacy among adults with early-stage dementia (Richeson, Boyne, & Brady, 2007).

It is noticeable that much of the research on the health benefits of learning for older adults has been qualitative in nature (Narushima, 2008). There is a lack of research evidence from the analysis of large-scale datasets on the effects of learning among adults in their 50s and beyond.

This paper contributes to the filling of that gap with quantitative findings on older adults, learning, and the likelihood of depressive symptoms.

DATA AND MEASUREMENT

The data used in the quantitative analyses were from the English Longitudinal Study of Ageing (ELSA). This is a continuing survey of adults who were aged 50 and above in 2002, and it includes a broad range of information about their mental and physical health, well-being, quality of life, and economic and social circumstances. The sample is representative of people aged 50 years and above living in private households in England. ELSA respondents have now been surveyed several times, meaning that changes over time in their health, attitudes, and other outcomes can be analyzed. The analyses here draw on data from the first two waves of ELSA data: the initial survey conducted in 2002 (Wave 1), and the follow-up of 2004/2005 (Wave 2). The sample for analysis was confined to those in the core ELSA sample, i.e., not their younger partners. Those aged less than 50 and cases interviewed by proxy were omitted.

The Center for Epidemiological Studies Depression Scale (CES-D) is included in ELSA and was used to assess depressive symptoms. It consists of eight items, such as whether the respondent "felt depressed," "felt sad," or "been feeling happy" in the past week. The eight-item CES-D has been widely used and has been shown to have excellent validity and reliability (Gallo et al., 2006; Steffick, 2000). The eight items were summed to give an overall score of depressive symptoms, and this had a mean of 1.53 (*SD* 1.95) at Wave 1 and increasing slightly to 1.59 (*SD* 1.95) at Wave 2. A score of three or more on the CES-D scale is often utilized as a measure of depression, and so a binary variable was created with the value one if the respondent scored three or more on the scale and otherwise taking the value zero. On this basis, nearly a quarter (23.3%) of the sample could be regarded as experiencing depression at Wave 1, rising to 23.7% at Wave 2. These binary variables were used to examine the characteristics of those who entered or exited depression between the two waves of the survey. Some 8,427 ELSA respondents had depression score data at Wave 1 and Wave 2, and these were the cases used in the analysis.

ELSA respondents were asked about several types of learning activity. 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. The respondents were also asked whether they had taken a formal education or training course in the previous 12 months. In the self-completion module of the survey, which addressed leisure activities and social participation, respondents were asked whether they were members of any education, arts or music groups, or evening classes; and they were asked about membership in sports clubs, gym, and exercise classes. Participation in these four types of learning activity at each wave of the survey is summarized in Table 1. Participation was found to be highest overall for gym, sports club, or exercise classes. These were followed by formal courses and music, arts, and evening classes, with the proportions obtaining qualifications much lower than the other types of learning activity. This is consistent with previous literature that has found older adults not to be motivated by the acquisition of qualifications (Withnall, 2009, Principi & Lamura, 2009). Women were much more likely than men to attend music, arts, or evening classes (14.7% compared to 8.9%); differences by gender were much less for the other forms of learning. The proportions attending formal education and training courses also fell steeply by age, but this was less true for music, arts, and evening classes and for attending

TABLE 1
Participation in Learning in the ELSA survey

	<i>All</i> (%)	<i>Male</i> (%)	<i>Female</i> (%)
Obtaining a qualification	6.0	5.8	6.1
Formal course	13.9	13.2	14.4
Music, arts, or evening class	12.1	8.9	14.7
Gym/exercise class	18.1	18.1	18.0

Note. Learning activity at Wave 2.

gym, sports club, or exercise classes. For example, the percentage of those in their 70s attending music, arts, and evening classes (10.5%) was only a little lower than those in their 50s attending such classes (11.8%). Those with higher qualifications were more likely to be participants in learning activities than those with lower-level qualifications and those with no qualifications. This is also consistent with previous research, including among older adults (Chou, Chi, & Leung, 2003).

METHOD

The aim of the research was to identify the effects of adult learning on depressive symptoms. A key methodological challenge was selection bias. There may be unobserved characteristics that could influence both the likelihood of participation in learning and the depression score: perhaps certain well-motivated people were more likely to undertake courses and tended also to have lower scores on the measure of depressive symptoms, for example. As motivation was not measured in the dataset, this could potentially have biased the estimates of the effects of adult learning. To overcome this, the change in the outcome variable, rather than the level of it at a single point in time, was used. So long as motivation is a fixed attribute, then examining the change in the outcome will eliminate the fixed effect, and an unbiased estimate of the effects of adult learning can be obtained.

A range of factors that may influence the risk of depression—and which were available in the ELSA Wave 1 survey—were included in the analyses to address the possibility of confounding bias. These were gender, age, highest qualification, marital status, work status, home ownership, household income decile and whether expected to experience financial difficulties in future, various aspects of physical health (whether a current smoker, poor eyesight, suffered physical pain at present, whether had experienced heart disease, bone disease, stroke, lung disease, cancer, or diabetes), mobility difficulties and disabilities (Activities of Daily Living [ADL] and Instrumental Activities of Daily Living [IADL]), and the extent of support from family and friends. The choice of these variables was based on factors found to be important in previous studies of depression (Lagana & Sosa, 2004), including some such as Chou (2007) that have used data from the ELSA survey. A further set of explanatory variables to measure change in circumstances between Wave 1 and Wave 2 of the ELSA survey were also included in the multiple regression models. These were gaining or losing a partner, moving in or out of work, change in income decile, whether expectations of future financial position became better or worse, whether began or stopped

experiencing physical pain, whether mobility, ADL, and IADL each became better or worse. The lagged response variable, i.e., the level of CES-D at Wave 1, was also included as this may reduce measurement error and aid interpretation. The effect estimates can then be interpreted as the impact of adult learning on the change in the outcome, given the initial level of the outcome. From this very long list of variables, parsimonious specifications were arrived at by dropping nonsignificant variables from the model in stages. Attrition from the survey was addressed by using nonresponse weights in the regression analyses. Essentially, those who remained in the survey but had characteristics associated with being likely to drop out were accorded a higher weight. For instance, if it turned out that retired males were especially likely to drop out, it would be appropriate to give higher weight to retired males in the modeling. In practice, the weights used in the analyses were the standard nonresponse weights for each wave, which are available as part of the ELSA survey datasets (Scholes, Taylor, Cheshire, Cox, & Lessof, 2008).

RESULTS

Multiple regression analysis was applied with the change in the CES-D score between ELSA Waves 1 and 2 as response variable. Explanatory variables were included to allow for other factors that may influence the outcome. The regression models were weighted to take account of attrition from the survey. The results of this exercise are summarized in Table 2. The table reports the main findings on the relationships between adult learning and the response when all relevant controls were included in the models. Two models are shown. One includes a dummy variable for participation in any form of adult learning. The second model has separate dummy variables for each type of adult learning: obtaining qualifications, participation in formal education/training courses, music/arts/evening classes, and gym/exercise classes. The response variable was the depression score at Wave 2 minus the depression score at Wave 1; so a negative regression coefficient indicates that it contributed to reducing the depression score.

For the first specification, after controlling for other factors, only a very weak association, statistically significant at the 10% level, was found between adult learning and the change in

TABLE 2
Regression analyses of change in depression score between ELSA Wave 1 and Wave 2 (Dependent variable: change in 8-item CES-D score)

	<i>Model (1)</i>	<i>Model (2)</i>
Any learning	-0.080 (1.93)*	
Obtained qualification		-0.226 (2.95)***
Formal education/training course		-0.023 (0.37)
Music, arts, or evening class		0.016 (0.24)
Gym or exercise class (Wave 2)		-0.027 (0.59)
Observations	7,198	7,198
<i>R</i> -squared	0.307	0.308

Notes. Absolute values of *t* statistics in parentheses.

*significant at 10%; **significant at 5%; ***significant at 1%.

Both models contain a full set of controls, including depression score at Wave 1, confounding factors at Wave 1, and measures of change in circumstances between Wave 1 and Wave 2. All models weighted for nonresponse.

the depression score. When the type of learning was distinguished, obtaining a qualification was very strongly associated with the change in the depression score; but there were no statistically significant associations for other forms of learning. In this model those who obtained a qualification were predicted, on average, to reduce their depression score by approximately 0.23 units, which was equivalent to 11.6% of a standard deviation of the Wave 1 score.

So who were the people obtaining qualifications? They tended to be the younger members of the sample. Nearly 11% of those in their 50s obtained a qualification in the recent past, compared to 4% of those in their 60s and less than 2% of those aged 70 and above. Likewise, approximately 11% of those who already held higher education qualifications reported obtaining a qualification. This is compared to 8% of those with prior qualifications below higher education level and a mere 1.5% of the considerable number of ELSA respondents—some 43% of the sample—with no prior qualifications. Another cross-tabulation showed over 1 in 10 of those in employment had obtained a qualification, but just 3% of those in retirement. These findings confirm that the benefits of learning, in terms of reduced depression scores, were likely to be confined to a very small subgroup of relatively young, employed, and highly qualified individuals.

As well as the change in the depression score, it was also possible to investigate whether people moved into, or out of, depression between the two waves of the survey. These binary response variables were analyzed using logistic regression, weighted for nonresponse, and the results are in Table 3. Confining the sample to those who entered depression at Wave 2, not having been depressed at Wave 1 (i.e., scored less than 3 at Wave 1 on the eight-item CES-D and 3 or more at Wave 2), the findings for this group are in columns labelled (1) and (2) in Table 3. There was no evidence of an association with learning activity when this was measured as a simple dummy variable for participation in any form of learning. Differentiating between types of learning, it was found that obtaining a qualification was associated with a reduction in the odds of becoming depressed; but there were not statistically significant associations with the probability of becoming depressed for other forms of learning. These results were similar to those reported earlier on the full sample for the change in the depression score.

TABLE 3
Entry to, and Exit from, Depression in the ELSA survey Logistic regression models
(Results reported as odds ratios)

	<i>Models for entry</i>		<i>Models for exit</i>	
	(1)	(2)	(3)	(4)
Any form of learning	0.856 (1.60)		1.501 (2.85)**	
Obtained qualification		0.384 (3.77)**		1.102 (0.33)
Formal education training course		1.001 (0.01)		1.285 (1.11)
Music/arts, evening class		1.249 (1.58)		1.302 (1.18)
Gym/exercise class		0.853 (1.32)		1.134 (0.66)
Observations	5,621	5,621	1,578	1,578
Sample:	Those not depressed at Wave 1		Those who were depressed at Wave 1	

Notes. *t* statistics in parentheses.

*significant at 10%; **significant at 5%; ***significant at 1%.

All models contain a full set of controls, including depression score at Wave 1, confounding factors at Wave 1, and measures of change in circumstances between Wave 1 and Wave 2. All models weighted for nonresponse.

For the respondents who were depressed at Wave 1, the investigation of the factors associated with exit from depression by Wave 2 using logistic regression is shown in columns (3) and (4) of Table 3. With a single dummy variable representing learning of any type it was apparent that participation in learning was associated with an increase in the odds of exiting depression of some 50% even after controlling for many other factors influencing this transition. But it was not possible to determine which specific type of learning was most important, as all types were statistically insignificant when entered into the model, as shown in column (4). This was most likely a consequence of reduced sample size. There were only 1,578 cases of people who were depressed at Wave 1 to be entered into the logistic regression model. Other variables in the model that were associated with reduced odds of exiting depression were being aged in the 50s or 80-plus, relative to those in their 60s and 70s, expectations of financial difficulties in future, and experiencing physical pain. The odds of exiting depression were found to be higher for those whose relative income increased, or financial expectations for the future were improved, between two waves of the survey, and those who became free of physical pain. There was also a significant association between the probability of exit from depression and the extent of emotional support from friends and family.

DISCUSSION

This research has investigated relationships between depression and learning using data from a large sample of older adults in England. The findings offer only rather limited support for the idea that participation in learning has a role to play in reducing the risk of depression in later life. In analyzing change in the eight-item CES-D score over an approximately two-year period, only learning leading to qualifications was significantly associated with this score after controlling for other factors. Learning leading to qualifications was undertaken only by a small minority: the younger adults in the sample, i.e., those in their 50s and those who were at the higher educational levels. Other types of learning were not significantly associated with depression. These results were confirmed when the outcome variable was specified instead as a binary variable for entry into depression. There was also some evidence that the probability of exit from depression was increased for those who undertook learning, although it was not possible to determine which type of learning was effective.

The findings for older adults reported here are somewhat more positive than previous research on midlife adults. Quantitative research on midlife adults, those in their 30s and early 40s (Feinstein et al., 2003), found no beneficial effects on depression for any type of adult learning (academic and vocational qualifications, work-related training, leisure courses). For this group, the quantitative evidence suggests learning in adulthood neither reduced the probability of onset of depression nor did it aid recovery from depression. On the other hand, in-depth qualitative research across a range of age groups (Schuller et al., 2002) concluded that adult learning was of benefit to some individuals who would otherwise have been at risk of depression. Considering the adult lifecourse as a whole, it seems that, in terms of an impact on depression, learning could be helpful for some individuals or groups, but it may not be widely effective.

Some limitations of the current research need to be acknowledged. Although a range of different types of learning was considered, it was not possible to measure all forms of learning. In

particular, informal learning, which may be important for older adults, was not included in the survey. The effects of learning over a period of two years were analyzed, but it is possible that learning has longer-term effects as well. This might include learning in early life contributing to resilience in the face of adverse events in later life, for example. Such long-run effects of learning form an important agenda for further research in this field.

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