8. Cognitive function

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The key findings in this chapter include:

- One-third of the sample reported that their memory had worsened over the past two years. Compared with wave 1, 38% fewer regarded their memory as excellent and 20% more regarded their memory as poor.
- Participants' own ratings of their memory, however, are an unreliable guide to their actual memory performance, and their ratings of the change in their memory are an equally unreliable guide to the observed change in their memory performance.
- Older groups have a double disadvantage in relation to their memory performance; on tests of word recall, not only do they remember fewer words when tested immediately, but after a brief delay they forget more of what they could recall initially. To counteract this age-related loss, it is recommended that important information be provided to older people in written form.
- Older groups have a striking impairment in prospective memory – that is, remembering to carry out an action without being reminded. Around two-thirds of participants aged 75 and older forgot to perform an action that they had earlier been instructed to carry out. If the findings are indicative of forgetfulness in daily life, then they raise concerns about the health and safety of older people, in relation to such activities as remembering to take medication, pay bills and lock doors.
- Speed of information processing was the most sensitive measure of cognitive decline over the two-year period. The older the group, the greater the degree of decline.
- Literacy was assessed for the first time in a UK population sample of people aged 65 years or more. The literacy measure assessed how well respondents understood written instructions about taking an Aspirin tablet. Some degree of literacy impairment was surprisingly widespread, being found in one-third of the sample. Literacy was strongly age-related: one-half of the oldest group (80+) made at least one error on the task, compared with one-quarter of the under 60s. Only some of the age differences in literacy can be explained by differences in education, since the trend for literacy impairment to increase with age is evident even when controlling for level of education.

- The higher the level of wealth, the better the cognitive performance on all measures except speed of processing. Compared to those in the highest wealth quintile, almost eight times as many respondents in the lowest quintile were impaired in both literacy and numeracy.

8.1 Defining and measuring cognitive function

There is known to be a broad spectrum of cognitive capability among middle-aged and older people, with dementia at one extreme and maintained function at the other. If we consider the full spectrum, the overall human, social and economic costs associated with cognitive impairment and cognitive decline are very high. While the prevalence of dementia is low in Western Europe before the age of 70 (around 1.5% for ages 65–69), prevalence rises to nearly 4% for ages 70–74, 12% for ages 80–84 and 25% for those aged 85+ (Ferri et al., 2005). Even in those without dementia (i.e. the vast majority of the older population), the presence of mild cognitive impairment may nevertheless interfere with work performance, family life, the management of finances, and with social activities. Indeed, independence in later life is as much determined by mental ability as by physical ability (Huppert, 2003).

Progressive age-associated decline in memory, name-finding, complex decision-making and speed of information processing is common throughout late middle-age and later life, and may lead to social withdrawal and depression. Many of the decisions that individuals make in later life about retirement, health, housing and finances are complex and may be compromised by impairments in memory and decision-making ability or other aspects of executive function, including planning, organisation and mental flexibility. Basic abilities such as literacy and numeracy are also very important for dealing with the complexities of daily life.

A full understanding of how individuals make the economic, social and lifestyle decisions associated with retirement and later life requires an assessment of key aspects of cognitive function, along with information about the factors that influence the maintenance or decline of it, and those aspects that influence our perceptions of cognitive ability such as self-reported memory.

The cognitive measures selected for ELSA cover a diversity of cognitive domains and were chosen on the basis of four primary considerations:

- assessing cognitive processes that are relevant to the everyday functioning of older people;
- using mainly tasks that are known to be sensitive to age-related decline;
- avoiding floor effects (too many people failing) and ceiling effects (too many obtaining maximum scores);
- employing measures used in other studies to facilitate comparisons.

The cognitive processes that were assessed include learning and memory, word-finding ability, executive function and speed of processing, along with the basic skills of literacy and numeracy. Given the primacy of memory in age-related cognitive impairment, memory assessment comprises measures of both self-reported memory and memory test for performance, including retrospective memory (recalling information learned previously) as well as prospective memory (remembering to carry out an intended action). The term ‘executive function’ refers to a number of cognitive control processes which include attention, initiation, mental flexibility, organisation, abstract thinking, planning and problem-solving. The non-memory tasks used in ELSA tap into a number of these processes (discussed below). While most of the cognitive measures used in ELSA are known to show large age differences (cross-sectionally), and to decline with advancing age (longitudinally), the literacy measure might be expected to show cross-sectional age differences, but it is less clear that it would show appreciable longitudinal decline. As far as we can ascertain, wave 2 of ELSA is the first time that literacy has been assessed in a UK population sample aged over 65, so future waves of ELSA will provide a unique opportunity to examine the progression of literacy over time.

The specific cognitive measures used in ELSA wave 2 are essentially a repeat of those used in wave 1. The only differences are (1) a question about self-reported change in memory over the two-year interval has been added; (2) one of the prospective memory tasks was dropped because of time constraints (and since it correlated very highly with the task that was retained), and (3) a literacy test was administered in place of the wave 1 numeracy test.

Memory measures

1. Self-reported memory – this measure provides an indication of whether the respondent is worried about their memory. They were asked to rate their memory at the present time as excellent, very good, good, fair or poor. The item wording comes from the US Health and Retirement Study (HRS, 2002). Respondents were also asked to say whether compared with two years ago their memory is now better, the same, or worse.

2. Orientation in time – knowing the day and date is a simple but effective test of memory. Time orientation is assessed by standard questions about the date (day, month, year) and the day of the week. This item is included in the HRS and also forms part of the Mini-Mental State Examination (MMSE), which is used in numerous studies of ageing.

3. Word list learning – this is a test of verbal learning and recall, in which ten common words are presented aurally and the participant is asked to remember them. Word recall is tested both immediately and after a short delay, which is filled with other cognitive tests. ELSA uses the word lists developed for HRS, which comprise four different versions, so that different lists can be given to different members of the same household, and for different waves. For wave 1, the first member of the household to be tested was assigned a list at random by the computer and where there was more than one member of the household in the ELSA sample, the remaining lists were also selected at random. For wave 2, the lists were selected in the same way, but it excluded the list that the respondent had heard in wave 1. To ensure standardisation, the lists were presented by the

computer, using a taped voice, and preceded by a volume check to ensure that the respondent could hear the list.

4. Prospective memory – sometimes referred to as 'remembering to remember', prospective memory concerns memory for future actions. Early in the cognitive assessment session, respondents were informed about an action that they would be asked to carry out at the appropriate time, later in the session. They were told that they would need to carry out the action without being reminded. The task was to remember to write their initials in the top left-hand corner of the page attached to the clipboard, when later handed the clipboard. When the appropriate point in the session was reached for the respondent to carry out the action, the interviewer waited for five seconds to see if the respondent performed the correct action without a prompt. If they failed to carry out the action spontaneously, the interviewer reminded them that they were going to do something, and recorded what the respondent then did. A correct response requires the person to carry out the correct action without being reminded. This task is based on a similar task used in the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).

Executive function

1. Word-finding (verbal fluency) – this is a test of how quickly participants can think of words from a particular category, in this case, naming as many different animals as possible in one minute. Successful performance on this test requires self-initiated activity, organisation and abstraction (categorising animals into groups such as domestic, wild, birds, dogs), and mental flexibility (moving to a new category when no more animals come to mind from a previous category).

2. Letter cancellation – this is a test of attention, visual search and mental speed. The participant is handed a clipboard to which is attached a page of random letters of the alphabet set out in rows and columns, and is asked to cross out as many target letters (P and W) as possible within one minute. An example is given at the top of the page to show the respondent how to cross out the letters. The page comprises 26 rows and 30 columns and there are 65 target letters in all. Respondents are asked to work across and down the page as though they were reading, and to perform the task both as quickly and as accurately as possible. When one minute has elapsed, the respondent is asked to underline the letter they reached. The total number of letters searched provides a measure of speed of processing. The number of target letters (P and W) missed up to the letter reached, provides a measure of accuracy. We also devised a measure of search efficiency which was defined as the percentage of letters correctly crossed out divided by the number of target letters up to the point reached. The letter cancellation test was developed for the 1946 birth cohort study (Richards et al., 1999) and has also been used in the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).

Basic skills

1. Literacy – the aim was to use a measure of prose literacy that has relevance for the lives of older adults. Participants were shown a realistic, but fictitious medicine label for a product called Medco Aspirin and asked a series of questions to establish how well they understand the instructions on the label. This test has been widely used as part of the International Adult Literacy Survey (IALS) (OECD & Statistics Canada, 2000) and the Adult Literacy and Life Skills Survey (Statistics Canada & OECD, 2005). Question 1 concerns the maximum number of days for which this medication should be taken; question 2 invites respondents to list three situations in which a doctor should be consulted (out of six situations mentioned on the label); question 3 asks respondents to name one condition for which the tablets can be taken (out of six). The maximum possible score on this brief literacy test is 3.
2. Numeracy – this was not assessed in wave 2, but in this report we compare levels of literacy and numeracy for wave 2 respondents. The participants' level of numeracy was established by asking them to solve six problems requiring simple mental calculations based on real-life situations. The test begins with three moderately easy items to provide a rapid assessment of ability level. Respondents who make errors on all these items are then asked an easier question. Respondents who get any of the first three questions correct are then asked two progressively more difficult questions (and given credit for the easiest question). A score of 1 is given for a correct answer on each of the first five questions, but for the final question (calculation of compound interest), a score of 1 is given if the answer is almost correct and a score of 2 if the answer is fully correct. Scores on this test range from 0 to 7. These items were developed for ELSA and have also been used in HRS.

Summary cognitive measures

For some purposes, it is useful to derive summary cognitive performance measures. Accordingly, we have derived a memory index, which combines the scores on all the memory tests to produce a range of scores from 0 to 27. This is similar to the memory index derived in wave 1, but does not include the second prospective memory test as this was not repeated in wave 2.

8.2 Findings on cognitive function

The data presented below include descriptive data for wave 2, and data on cognitive change between waves 1 and 2. Where means and confidence intervals are presented, the significance of differences can be obtained directly from the tables, but in the case of percentages, we describe general trends and, in some cases, the results of chi-square tests. We recognise that differences between measures taken at two points in time provide only crude estimates of longitudinal trends, since they can be unduly influenced by intra-individual fluctuations. One needs data over a number of waves to see reliable trends in an individual's performance over time, and these will be available from future waves of ELSA. Nevertheless, with this proviso, it is interesting to begin to look at trends in the wave 2 data.

Memory

Table 8A.1 shows respondents' perceptions of their memory in five categories, from excellent to poor, in both wave 1 and wave 2. The first set of columns reports data for the full wave 1 sample, the second set for wave 1 respondents who were also assessed in wave 2, and the final set for wave 2 respondents who had been assessed in wave 1 (the full wave 2 sample contains an additional 36 people who did not have a full face-to-face interview in wave 1). It can be seen that for the wave 1 sample, scores are fairly normally distributed across the five response categories and that, as expected, a smaller percentage of those who went on to wave 2 reported their memory as poor (6%) than those who did not (7%). This table also provides an indication of change in self-reported memory between waves 1 and 2. It can be seen that in wave 2, 38% fewer respondents who participated in both waves describe their memory as excellent, while 20% more describe their memory as poor. For all three sets of data, women were less likely to use the extreme categories than men; that is, a higher percentage of men than women reported their memory as excellent and also a higher percentage of men reported their memory as poor. The number of women reporting their memory as excellent in wave 2 dropped by 43%, whereas the reduction for men was less at 36%, but the number of men reporting their memory as poor in wave 2 increased by 28%, while the number of women increased by only 15%.

Table 8A.2 shows self-reported memory at wave 2, broken down by age and sex. Just over one-third of the total sample rated their memory as fair or poor, rather than excellent, very good or good. For men, the percentage reporting memory problems was higher among older participants (75 years and above) than among younger participants (less than 75 years), but there was no consistent age effect in women. In every age group, the percentage of women reporting memory impairment was smaller than for men and this difference was particularly pronounced among those aged 70 years and older. Wave 2 also asked participants to compare their memory now with how it was two years earlier. Table 8A.3 shows that only just over 1% of the sample said that their memory is better now, while almost one-third said that their memory is now worse. Among the men, the percentage saying their memory is worse now increases steadily with age, but again there is no consistent pattern for women.

A question which often arises in surveys is the extent to which we can take self-reporting measures at face value. The question we can ask in the present context is, how well does self-assessed memory compare with actual performance in memory tests? And likewise, how well does self-assessed change in memory compare with observed change in performance in memory tests? As noted above, age differences in self-reported memory are surprisingly small, particularly among women, but this is in stark contrast to the very large age differences observed on all the objective tests of memory. Tables 8A.4 and 8A.5 show substantial age differences on the three memory tests used in ELSA: time orientation, prospective memory and word list memory. Age differences are particularly marked on the prospective memory test, which assesses the respondent's ability to remember to carry out an instruction given earlier in the session without being reminded. In the oldest group (80+), the failure rate for this task was twice as high as in the under-60s group (64% versus 31%). If this test is a valid indicator of prospective memory in daily life, then these findings are alarming, since a very high percentage of old people live alone, and this finding may indicate that they are at increased risk of forgetting to carry out important actions such as taking medication, locking doors or paying bills. There may be less of a problem remembering appointments, social commitments or family events, since there is evidence from experimental research that older people are more likely than younger people to record appointments and important dates in diaries or calendars, whereas young adults tend to rely on their memory (Moscovitch, 1982).

Table 8A.5 shows marked age-related impairment of memory for the ten-word list in wave 2. The older the group, the fewer words they recalled when tested immediately after the list was presented. All groups recalled fewer words after a short delay, but is there a specific effect of age on the percentage of words retained? To answer this question, we calculated delayed recall as a percentage of immediate recall for each respondent. Table 8A.5 confirms that after a short interval (around five minutes), older people recall a much smaller percentage of the words they had originally recalled; the percentage retained was only 54% in the oldest group compared with 86% in the youngest. While the overall effect of gender on this test is small, women recalled more words than men in every age group except the oldest, for which the mean scores were identical. After the delay, women also retained a slightly higher percentage of the words they had originally recalled, and this was observed in every age group.

The scores on the three separate tests of memory were combined into a single memory index with a range from 0 to 27. The extent to which memory performance changed over the two-year interval between wave 1 and wave 2 was examined using this combined score, and categorised into improvement, no change (wave 2 score equals wave 1 score ± 1) and decline (Table 8A.6). For the sample as a whole, three-in-ten obtained a score within one point of their wave 1 score and were hence classified as showing no change; a further three-in-ten showed a decrease of two or more points and were therefore classified as having declined, and nearly four-in-ten showed an increase of two or more points and were classified as having improved. That is, a higher percentage of the sample showed an improvement in their memory performance over two years than showed a decline. This result is not unexpected, since previous studies have demonstrated practice effects on memory tasks lasting around two years (Rabbitt et al., 2001). Practice effects may be either specific (participant recalls the test materials used two years previously), or non-specific, e.g. as a result of the participant becoming familiar with the testing procedure in general. Since a different word list was presented to each participant in waves 1 and 2, and since most of the points on the memory index comes from recall of the word list (20 out of 27 points) it is likely that the improvement resulted from a non-specific practice effect. A few participants may have recalled in advance of the cognitive assessment that they would be asked about the date or would have to remember to carry out an action, but it is likely that this would have occurred in only a very small number of cases. In spite of the improvement in memory performance for the sample as a whole, there is a tendency for older groups to show less improvement and more decline than younger groups. For example, nearly three-in-ten people in the 80+ group are likely to show an improvement, compared with four-in-ten of those under 60, while those percentages are reversed for the likelihood of decline.

The next question we addressed was the extent to which observed change in memory is related to self-reported change in memory. This is presented in Table 8A.7, which focuses on the 31% of the sample whose memory test performance was shown to have declined by two points or more. If self-reporting of memory change were a reliable guide to actual decline in memory, then we would expect to see a higher percentage showing actual decline among those who reported that their memory had become worse than among those who reported that their memory had stayed the same or improved. However, this prediction is not borne out by the findings reported in Table 8A.7. The percentages showing an actual decline in memory bear no relationship to whether the participant reported that their memory had got worse or not. This finding was replicated with a more stringent cut-point (a drop of three or more points from the wave 1 value – data not shown). So we can conclude that self-reported change in memory is not a reliable indicator of observed change.

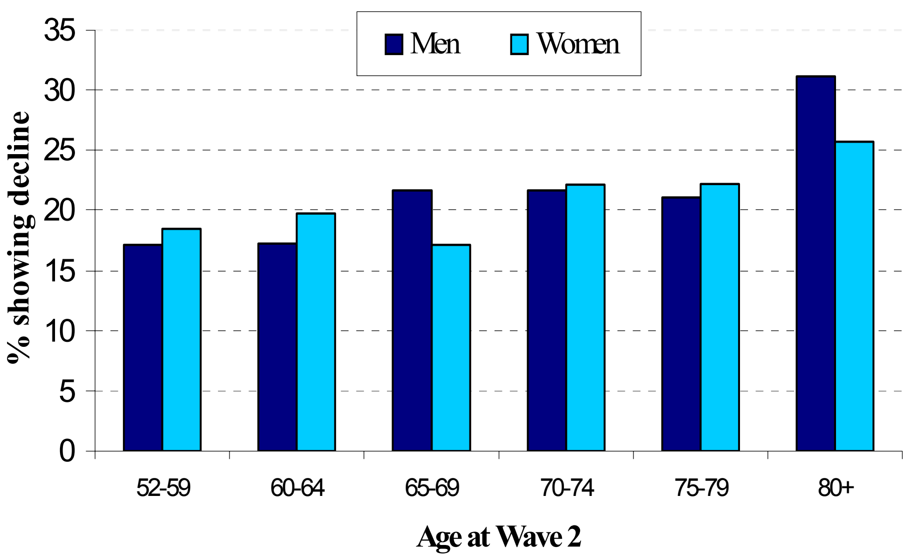
Executive function

Verbal fluency tasks provide measures of a number of executive processes, including self-initiated activity, categorisation and mental flexibility. The number of different animal names produced by ELSA respondents on the verbal fluency task in wave 2 ranged from 0 to 63, with an overall mean of 20. As expected, there was a large effect of age on fluency scores (Table 8A.8). Respondents aged under 60 produced an average of 22 different animal names, compared with less than 15 in respondents aged 80 and over. The mean number of animal names decreased steadily with chronological age in both men and women. Men performed significantly better than women overall (19% versus 17%; chi-square=6.87, 1 df, $p<0.01$). The lower half of the table shows the percentage of those in each group who declined by five or more points, the closest approximation in the data to the largest quintile of change scores. Overall, nearly one-in-five of the sample showed this degree of decline, and it can be seen that a higher percentage of men declined than women. In contrast to performance on the memory tests, where a higher percentage overall showed an improvement rather than a decline, on this test, a higher percentage showed decline rather than improvement, regardless of the choice of cut-point (provided the same figure was used above and below 0 – data not shown). Interestingly, there was no systematic effect of age on the percentage of respondents showing a substantial decline on this test, although men and women aged 80+ were more likely than those in any other age group to show this level of decline.

The letter cancellation task provided a measure of speed of information processing. The speed measure was the number of letters searched during the one-minute interval, and it ranged from 11 to 780 with a mean of 295 (data not shown). The mean number of letters searched in wave 2 decreased as expected, with chronological age, from 310 in respondents aged under 60, to 251 in those aged 80 and above (Table 8A.9). On this speed measure, women performed substantially better than men in every age group; overall, women searched an average of 30 letters more than men (308 compared with 278), which represents a full additional row of letters on the page on which they were working.

We also created a measure of search efficiency for each individual, which is the number of target letters correctly cancelled as a percentage of the total letters searched. An age-related decline in search efficiency is shown in the lower half of Table 8A.9, falling from 83% in the under-60s to 73% in those aged 80+. There was no significant effect of gender on search efficiency, although women searched at a considerably faster rate than men. To establish the extent of decline on the letter cancellation test over the two-year interval between wave 1 and wave 2, we calculated a difference score for search speed for each individual. To define a substantial level of decline on this score, we calculated a cut-point which corresponds approximately to the largest quintile of change. Slightly more than one-in-five of the sample showed this degree of slowing. Table 8A.10 shows that the percentage with this substantial slowing on the speed measure tends to increase with age, from 18% of those aged under 60 to 28% of those aged 80 or more (see Figure 8.1). There was no significant gender difference on this measure of change.

Figure 8.1. Speed of visual search: percentage showing substantial slowing between wave 1 and wave 2

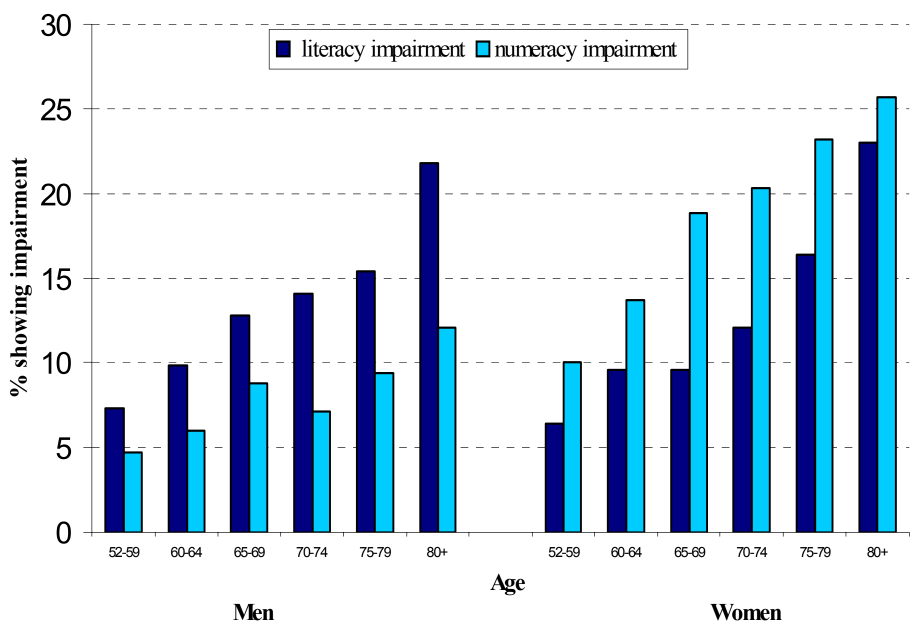


Basic skills

The brief literacy test involved reading and being asked questions about the instructions on a typical medicine label. The maximum possible score on this brief literacy test was 3, and overall, two-thirds of the sample obtained the maximum score, while slightly more than one tenth scored either 0 or 1 (Table 8A.11). The percentage of the sample obtaining the maximum score decreases with advancing age, from three-quarters of the youngest group to half of the oldest. There was no consistent effect of gender on this test. The fact that one-third of the total sample showed some impairment on this measure is rather alarming, since the task assessed comprehension of a relatively simple set of instructions on how to take Aspirin tablets. Furthermore, the fact that half of the oldest group made at least one error on this task is of particular concern, since the oldest members of the population are most likely to be taking medication and a high percentage take a large number of different tablets, requiring them to follow a variety of different instructions.

One would expect that level of literacy is strongly related to level of education, and this is amply confirmed by Table 8A.12. Regardless of where we placed the cut-point for literacy impairment (literacy score <3 or <2), those with no educational qualifications have one-and-a-half to two times the rate of impairment of those with intermediate qualifications, who in turn have one-and-a-half to two times the rate of impairment of those with a degree or higher qualification. While there are clearly educational differences between the older and younger groups, these differences do not explain the age differences in literacy, since the age effect can be seen within each level of education and for both genders.

Figure 8.2. Age and gender differences in literacy and numeracy impairment



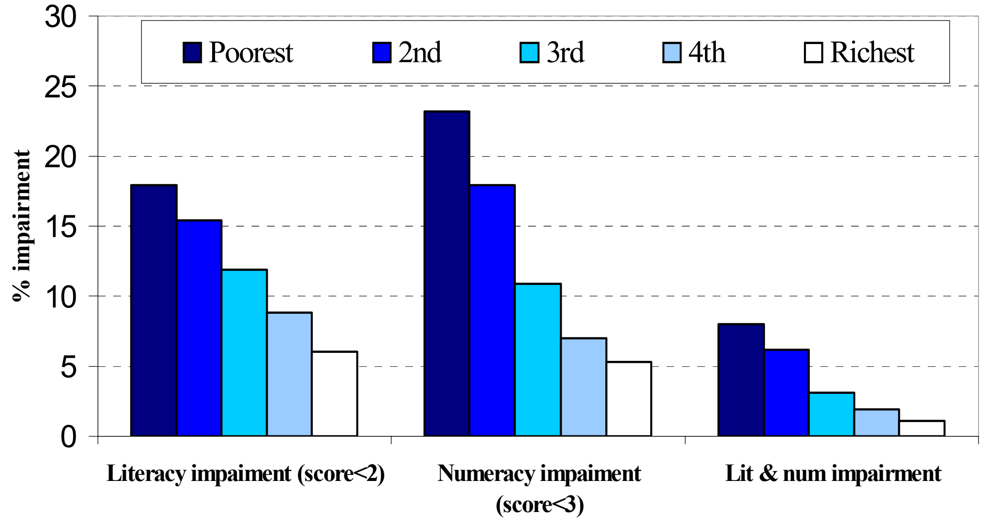
Basic skills comprise both literacy and numeracy. Although numeracy was not assessed in wave 2, it was assessed in wave 1, and there is no reason to expect a decline in basic skills over two years for the majority of the sample. Table 8A.13 reports data for wave 2 respondents who completed both the literacy and numeracy tests. It presents the percentages who were impaired in literacy only, numeracy only, or both. Direct comparisons between literacy and numeracy impairment are problematic. Our approach was to define impairment as the bottom 10% of scores (approximately) on each measure. Accordingly, literacy impairment was defined as a score of 1 or less on the literacy test (maximum = 3) and numeracy impairment was defined as a score of 2 or less on the numerical reasoning test (maximum = 7). Overall, slightly less than 12% of the sample were impaired in literacy, slightly more than 12% were impaired in numeracy, and nearly 4% of the total sample were impaired in both. The percentage impaired in both literacy and numeracy showed a five-fold increase with age, and women were more likely than men to be impaired in both (5% of women compared with 3% of men). There is also a striking pattern of gender differences (see Figure 8.2), with men being more likely to show literacy impairment than numeracy impairment (12% and 7% respectively), while women are more likely to show numeracy impairment than literacy impairment (17% compared with 12%). It should be noted that these figures are an under-estimate of population levels of impairment on these tasks, since wave 2 is a survivor sample, and therefore those with lower levels of numeracy at wave 1 were less likely to have taken part in wave 2. The median (IQR) numeracy score for those who continued into wave 2 was 5 (3–6) compared with 4 (2–5) who were only in wave 1.

These findings on literacy and numeracy are of great interest, since there appear to have been no previous studies undertaken of those aged over 65. The most recent UK study, The Skills for Life survey (DfES, 2003) was restricted to respondents aged 16–65. The survey reports age effects by broad age bands, the most comparable to ELSA being the age group 55–65. Comparison with ELSA is difficult because literacy and numeracy levels are divided into five categories: Entry Level 1 or below, Entry Level 2, Entry Level 3, Level 1 and Level 2 or above, which are based on more extensive measures of literacy and numeracy than were possible in ELSA. Nevertheless, if we focus on performance at the two lowest levels (Entry Level 1 or below, and Entry Level 2 or below), the results are consistent with ELSA findings on both age and gender. A greater proportion of participants in the oldest group (55–65) performed at the lowest levels compared with those aged under 45, for both literacy and numeracy (table 3.A4 – DfES, 2003). The Skills for Life survey also shows that in the age group 55–65, a smaller percentage of women than men perform at the lowest levels in literacy (5% and 9% respectively), while the gender effect is reversed for numeracy, with a smaller percentage of men than women performing at the lowest levels (20% and 34%).

Cognitive function, wealth and employment status

Many and varied factors are associated with performance on cognitive function tests. These include physical and mental health, health behaviours (e.g. alcohol consumption), socio-economic status and social engagement, as well as subjective aspects of well-being (e.g. sense of control, optimism, selfesteem). In this report, we focus briefly on just two aspects of socio-economic position: wealth and employment status. It is to be expected that wealth would be positively associated with cognitive capability, and that this occurs for various reasons. For example, higher levels of wealth in family of origin are likely to be associated with better access to education and better career prospects. Alternatively, having a high level of cognitive ability (independent of family and education) may lead to the pursuit of financially rewarding activities. The relationship between selected measures of cognitive performance and age-specific wealth quintiles is shown in Table 8A.14. With the exception of speed of visual search, the measures show a clear trend in the direction of increasing performance with increasing wealth. Nowhere is this association more striking than in relation to the basic skills of literacy and numeracy. Figure 8.3 shows a strong inverse relationship between impairment and quintile of wealth. Comparing the lowest wealth quintile with the highest, three times as many in the lowest quintile are impaired in literacy; more than four times as many are impaired in numeracy, and almost eight times as many are impaired in both literacy and numeracy. The relationship between cognitive function and wealth is partially accounted for by differences in education, although respondents with an intermediate degree of education can be found in all quintiles of wealth.

Figure 8.3. Impairment in literacy and numeracy, by age-specific wealth quintiles



Cognitive function also plays an important role in a person’s employment prospects. The relationship between cognitive function and employment status is shown in Table 8A.15. Not surprisingly, those who are currently employed or self-employed perform best on almost every measure of cognitive function, while the permanently sick or disabled perform poorly on most measures. Interestingly, those in the unemployed group perform at a comparable level to the employed group on some measures (self-reported memory, verbal fluency and search efficiency), although they show a substantial impairment in memory test performance, search speed, literacy and numeracy. The people who are looking after family at home (almost entirely women) show fairly good performance on most measures, apart from a relatively high level of literacy and numeracy impairment. Some caution is needed when interpreting this table, since employment groups differ in their mean age, as shown in the table; unlike the previous table where wealth quintiles have been age-adjusted, employment status is not age-adjusted. Future analyses of the data will need to address the many complex associations within the data using a variety of multi-variate analyses and modelling techniques.

8.3 Conclusion

Cognitive capability or impairment of function is a key marker of population health and independence at all ages. This chapter has described the variation in cognitive function between age groups and between men and women, and the effects of education, wealth and employment status for people aged 52 and over in England.

The results presented are from the cross-sectional data in wave 2 of ELSA as well as various measures of change. Although the two-year period that has elapsed between ELSA waves 1 and 2 is rather too short to yield reliable estimates of cognitive decline, nevertheless substantial decline was observed on some measures, most notably speed of information processing. However, memory scores improved on average over the two-year period, although the improvement was more evident in younger than in older groups. This slight improvement in memory performance probably reflects a non-specific practice effect resulting from the participants' familiarity with the test procedures. There was a mismatch between observed change in memory test performance and self-reported change in memory, confirming that self-reporting of decline in memory is an untrustworthy indicator of actual memory decline.

This chapter provides the first national data on literacy and numeracy in people aged 65 and older. Our findings show surprisingly high literacy and numeracy impairment, particularly among older people. This is only partially explained by age differences in education, since age differences persist within each level of education. We also found a striking pattern of gender difference, with men showing greater impairment in literacy than in numeracy and women showing greater impairment in numeracy than in literacy.

Data from future waves of the study will provide more reliable information on trajectories of cognitive impairment. The longitudinal design of ELSA allows for repeated collection over time of most of the measures presented here. This will inform policy debates about the manner in which cognitive function interacts with health, well-being, lifestyle, and social and economic circumstances.

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