

7. Physical and cognitive function

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The results presented in this chapter show that:

- There is considerable variation in the level of physical impairment between age groups. The prevalence of reported physical functional limitation is surprisingly high at the youngest end of the sample, with 43% of respondents in their 50s reporting difficulty with mobility and 13% reporting difficulty with a basic activity of daily life (self-care). At the same time, most (58%) of the respondents in their 80s and older report no difficulties with basic activities of daily life and 17% report no difficulty with mobility functions.
- The variation in the level of impairment by occupational class is also considerable. Respondents with routine and manual occupations report up to twice as many difficulties with physical function as those with managerial or professional occupations. This occupational class disability gap is equivalent to the disability gap between age groups 10–15 years or more apart.
- Walking speed slows dramatically with age. Only around one in forty people aged between 60 and 64 walk more slowly than 0.4 metres/second, compared with one in five at age 80 and over. This deterioration in walking speed is more marked in women than in men.
- Chronological age is the strongest determinant of scores on the objective cognitive tests, whereas scores on the subjective measure (self-reported memory) are more strongly influenced by education and occupational class than by age.
- There was a very high level of forgetfulness in the sample, particularly in the older groups. Over two-thirds of the oldest group forgot to carry out actions that they had earlier been instructed to perform. Assuming that the measures of forgetfulness used in ELSA are indicative of forgetfulness in daily life, these findings raise concerns about activities such as remembering to take medication, pay bills or take safety precautions such as turning off the cooker.
- Although older respondents in general perform less well than younger respondents on the cognitive tests, older respondents (aged 75 and over) who have a degree or higher education often performed as well as, and

sometimes better than, younger respondents with no educational qualifications. This trend was particularly strong in the case of numerical ability, where the youngest group with no qualifications gave fewer correct responses than older groups with intermediate education or a degree or higher education.

- There is an interesting pattern of gender differences on the various cognitive measures. Women performed better than men on most of the memory tests, while men performed better than women on most of the executive function tests. The gender difference on memory is in line with many published studies (Huppert and Whittington, 1993; Portin et al., 1995; Maitland et al., 2000), but the gender difference on executive function measures has received relatively little attention to date.

This chapter provides a cross-sectional description of physical and cognitive function among people aged 50 and over in England. Disability or impairment of function is a key marker of population health at all ages. In older people, disability and impairment measures are especially useful, as older people often have more than one illness, and disability measures are a good way of quantifying the overall impact of several coexisting conditions on a person's ability to function. Physical and cognitive function are covered together in this chapter, because both profoundly influence independence in older people, and it is likely that they have many of the same underlying causes. This chapter complements the detailed information about symptoms, diagnosed illness and health-related behaviours reported in Chapter 6.

England is experiencing a prolonged period of increasing life expectancy and population ageing, in common with most countries around the world. There is considerable uncertainty and debate about the likely effects of this population ageing, in particular about how many added years of life will be spent with a disability and about which groups within the population will suffer most from poor health, disability and impaired function. Disability has powerful effects on individual well-being, on the need for informal help and health care and on long-term care needs and costs (Gill et al., 2001). Good information on disability and all levels of function is vital for understanding and informing policy responses to population ageing.

This chapter describes the measures of physical and cognitive function used in ELSA wave 1, and then gives the main findings. The prevalence of physical and cognitive impairment by age, sex and occupational class, as well as the prevalence of different types of disability, is shown. For occupational class, the National Statistics socio-economic classification (NS-SEC) is used. A full breakdown of the findings is shown in the tables in the Annex to this chapter. The chapter updates the data for England from previous surveys of disability (Box 7.1). The results presented here are the first results from a national survey in England to use such a broad range of measures of both physical and cognitive function.

The population studied in the first wave of ELSA is limited to people living in the community and does not cover institutions. The Health Survey for England 2000 found that 4% of the total population aged 65 and over were resident in

care homes, with a progressive increase in the proportion of the total population resident in care homes, up to those aged 90 and over, where three in ten people were resident in care homes. The true population burden of impairment and disability is therefore likely to be greater than that found in ELSA, especially at the top end of the age distribution. ELSA also has limited information from proxies.

Box 7.1. Previous British surveys of disability

Previous major national surveys of the disabled population in England include those undertaken in 1969, 1985 and 1996 (Martin, Meltzer and Elliott, 1988; Grundy et al., 1999). The 1985 survey of disabled adults in private households was one of four linked surveys of disabled adults and children living in private households and communal establishments, conducted by the Office of Population Censuses and Surveys between 1985 and 1988. Both the 1985 and the 1996 survey screened a nationally representative sample population to identify those with a disability, but the screening questions were different.

Several other surveys have included questions on disability. The Health Survey for England (HSE) included questions on disability in 1995, 2000 and 2001 (Bajekal, Primatesa and Prior, 2003; Hirani and Malbut, 2002; Prescott-Clarke and Primatesa, 1997). The same questions were asked in HSE 1995 and 2000, and covered incontinence and limitations in functional activities (seeing, hearing, communication, walking and using stairs) and in activities of daily living (ADLs) – getting in and out of bed or a chair, bathing, washing, eating and toileting. The General Household Survey in 1998 had questions on disability in those aged 65 or over (Office for National Statistics, 2000). The Medical Research Council Cognitive Function and Ageing Study estimated the prevalence of limiting disability in people aged over 65 in England and Wales (Parker, Morgan and Dewey, 1997). The Allied Dunbar National Fitness Survey asked questions about current and past activity in adults, and included a physical appraisal (Skelton et al., 1996).

7.1 Defining and measuring physical function

Physical function is a person's ability to perform normal physical activities of daily living. Disability occurs when a person has problems with physical function, and is commonly defined as a restriction in a person's ability to perform normal activities of daily living (Verbrugge and Jette, 1994). The World Health Organisation (WHO) in 1980 distinguished this concept of disability from impairment and handicap (World Health Organisation, 1980). Impairments are concerned with the abnormalities of body structure and appearance and with organ or system function; disabilities reflect the consequences of impairment in terms of functional performance or inability to undertake activities considered normal; and handicap refers to the disadvantage experienced by an individual as a result of impairments or disabilities. WHO replaced the 1980 International Classification of Impairments, Disabilities and Handicaps (ICIDH) classification in 2001 by the International Classification of Functioning, Disability and Health (ICF) (World Health Organisation, 2001), and ICF retains the widely accepted concept of disability as a reduction in a person's functional performance.

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Information regarding physical function was collected via self-report in this wave of ELSA, with the exception of walking speed, which was directly observed. Additional performance tests will be conducted during the nurse visit in wave 2 of ELSA in 2004.

The core questions about physical function in ELSA fall into one of three domains: activities of daily living (ADLs) or self-care activities; instrumental activities of daily living (IADLs) or activities necessary for independent living in a community; and mobility (or lower-limb function), here reported jointly with upper-limb function (Pearson, 2000). In addition, participants were asked about problems with eyesight, hearing and incontinence. Participants aged 60 years and older were asked about falls, both with and without medical treatment, and were timed over two 8-foot-long walks. The questions are designed to be comparable where possible with those asked in the Health and Retirement Survey (HRS) in the USA, a sister survey to ELSA (Wallace and Herzog, 1995).

Mobility measures, activities of daily living (ADLs) and instrumental activities of daily living (IADLs)

These were assessed using show cards. Yes/no response codes were used, in order to be consistent with recent waves of HRS, where a yes/no response was used for the telephone interviews (Health and Retirement Survey, 2003).

Mobility (leg) and arm function

To assess mobility and arm function, respondents were shown a card and the following text was read to them: ‘We need to understand difficulties people may have with various activities because of a health or physical problem. Please tell me whether you have any difficulty doing each of the everyday activities on this card. Exclude any difficulties that you expect to last less than three months. Because of a health problem, do you have difficulty doing any of the activities on this card?’ (Box 7.2).

Box 7.2. Show card for mobility, arm function and fine motor function

- 1 Walking 100 yards
- 2 Sitting for about two hours
- 3 Getting up from a chair after sitting for long periods
- 4 Climbing several flights of stairs without resting
- 5 Climbing one flight of stairs without resting
- 6 Stooping, kneeling, or crouching
- 7 Reaching or extending your arms above shoulder level
- 8 Pulling or pushing large objects like a living room chair
- 9 Lifting or carrying weights over 10 pounds, like a heavy bag of groceries
- 10 Picking up a 5p coin from a table
- 96 None of these

Respondents were also timed over an 8-foot-long walk (twice) and asked the following mobility question, drawn from the US Third National Health and Nutrition Examination Survey (NHANES III): ‘By yourself and without using any special equipment, how much difficulty do you have walking for a quarter of a mile?’ (Lan et al., 2002; US Third National Health and Nutrition Examination Survey, 2003).

Activities of daily living (ADLs) and instrumental activities of daily living (IADLs)

To assess ADLs and IADLs, respondents were shown a card and the following text was read to them: ‘Here are a few more everyday activities. Please tell me if you have any difficulty with these because of a physical, mental, emotional or memory problem. Again exclude any difficulties you expect to last less than three months. Because of a health or memory problem, do you have any difficulty doing any of the activities on this card?’ (Box 7.3).

Box 7.3. Show card for ADLs (items 1–6) and IADLs (items 7–13)

- | | |
|----|---|
| 1 | Dressing, including putting on shoes and socks |
| 2 | Walk across a room |
| 3 | Bathing or showering |
| 4 | Eating, such as cutting up food |
| 5 | Getting in or out of bed |
| 6 | Using the toilet, including getting up or down |
| 7 | Using a map to figure out how to get around in a strange place |
| 8 | Preparing a hot meal |
| 9 | Shopping for groceries |
| 10 | Making telephone calls |
| 11 | Taking medications |
| 12 | Doing work around the house or garden |
| 13 | Managing money such as paying bills and keeping track of expenses |
| 96 | None of these |

Further measures for those reporting difficulties with ADLs or IADLs or mobility

Those reporting difficulty with one or more ADL, IADL or mobility function were asked further questions. They were asked if anyone ever helped with the activities they had problems with. If they replied that somebody helped them, they were shown a card and asked, ‘Who helps you with these activities?’ (Box 7.4).

Those reporting difficulty with one or more ADL, IADL or mobility function were also asked if they used any of the following items, from a list read aloud:

1. a cane or walking stick?
2. a Zimmer frame or walker?

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3. a manual wheelchair?
4. an electric wheelchair?
5. a buggy or scooter?
6. special eating utensils?
7. a personal alarm?
8. none of these [exclusive code]?

The interviewer was instructed to code all items that applied.

Box 7.4. Show card for who helps with activities

- | | |
|----|---------------------------------|
| 1 | Husband or wife or partner |
| 2 | Mother or father |
| 3 | Son |
| 4 | Son-in-law |
| 5 | Daughter |
| 6 | Daughter-in-law |
| 7 | Sister |
| 8 | Brother |
| 9 | Grandson |
| 10 | Granddaughter |
| 11 | Other relative |
| 12 | Unpaid volunteer |
| 13 | Privately paid employee |
| 14 | Social or health service worker |
| 15 | Friend or neighbour |
| 95 | Other person |

Other physical function measures

Respondents were asked whether they had fallen down in the last two years (for any reason) and, if so, how many times they had fallen down in the past two years and whether in any of the falls they had injured themselves seriously enough to need medical treatment.

Respondents were asked to rate their eyesight (using glasses or corrective lenses as usual) and hearing (using a hearing aid as usual) respectively using the following five response categories: excellent, very good, good, fair or poor.

Respondents were asked about incontinence as follows: 'During the last 12 months, have you lost any amount of urine beyond your control?'

Again, all these questions were designed to be comparable with HRS.

7.2 Defining and measuring cognitive function

There is known to be a broad spectrum of cognitive capability among middle-aged and, especially, older people, with dementia at one extreme and maintained function at the other. If we consider the full spectrum, the overall human and economic costs associated with cognitive impairment and cognitive decline are very high. While the prevalence of dementia is low before the age of 70 (around 1.4% for ages 65–69, rising to 4.1% for ages 70–74 (Hofman et al., 1991)), the presence of mild cognitive impairment may nevertheless interfere with work performance, the management of finances and social activities. Indeed, independence in later life is as much determined by mental ability as by physical ability.

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 about retirement, health and housing in later life are complex and may be compromised by impairments in decision-making ability or other aspects of memory and executive function, including planning, organisation and mental flexibility. Numerical skills, such as quantitative reasoning, appear to decline markedly as individuals age. A classical longitudinal study showed that older individuals declined more on number skills than on any other primary mental ability over a seven-year period (Schaie and Strother, 1968). In addition to marked longitudinal decline within an age cohort, this study and others also found substantial cohort differences, and these will be addressed in future waves of ELSA.

Surprisingly little is yet known about the biological, social and environmental factors that determine cognitive impairment or the rate of cognitive decline in individuals. There is some evidence that cardiovascular disease is moderately associated with cognitive impairment in the general population (Breteler et al., 1994), but less is known about the association of cognitive performance and risk factors such as hypertension, where results have been inconsistent (e.g. Posner et al., 2002). Some studies have shown a relationship between cognitive performance and self-reported health and level of physical activity (Christensen et al., 1996; Hultsch, Hammer and Small, 1993), but the size of these associations is very modest.

Environmental or contextual factors appear to play a role in self-reported cognitive capability in that the functional consequences of cognitive impairment, like physical impairment, depend on environmental demands. For example, it has been reported that memory complaints are more common among individuals in demanding occupations than among those in clerical and manual occupations, even though memory test performance is better in the former group (Rabbitt and Abson, 1990). A full understanding of how individuals make the economic, social and lifestyle decisions associated with retirement requires an assessment of key aspects of cognitive function, along with information about their health and social environment.

The cognitive measures selected for ELSA cover a diversity of cognitive domains and were chosen on the basis of four primary considerations: (a) assessing cognitive processes that are relevant to the everyday function of older people; (b) using tasks that are known to be sensitive to age-related decline; (c) avoiding floor effects (too many people failing) and ceiling effects (too many obtaining maximum scores); and (d) employing measures used in other studies to facilitate comparisons. The cognitive processes that were assessed include learning and memory, word-finding ability, executive function, speed of processing and numerical ability. Given the primacy of memory in age-related cognitive impairment, memory assessment is further subdivided into retrospective memory (recalling information that was learned previously) and 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, set-shifting or mental flexibility, organisation, abstraction, planning and problem-solving. The non-memory tasks used in ELSA tap into a number of these processes (see below).

The specific cognitive measures used in ELSA wave 1 are as follows:

Memory measures

1. Self-rated memory – this measure provides an indication of whether the respondent is worried about their memory. They are asked to rate whether their memory at the present time is excellent, very good, good, fair or poor. The item comes from the HRS.
2. Orientation in time – knowing the day and date is a simple but effective test of memory. Time orientation was assessed by standard questions about the date (day, month, year) and the day of the week. This item is included in the HRS and 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 10 common words are presented aurally and the participant is asked to remember them. Word recall is tested both immediately and after a short delay that 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. The first member of the household to be tested is assigned a list at random by the computer, and where there is more than one member of the household in the ELSA sample, the remaining lists are also selected at random. To ensure standardisation, the lists are presented by the computer, using a taped voice.
4. Prospective memory – sometimes referred to as ‘remembering to remember’, prospective memory concerns memory for future actions. Early in the cognitive assessment section, respondents are informed about two actions that they will be asked to carry out at the appropriate time, later in the session. They are told that they will need to carry out these actions without being reminded. The first task is to remember to write their initials in the top left-hand corner of a page that is attached to a clipboard, when they are later handed the clipboard. The second task is to remember

to remind the interviewer to record the time when the interviewer announces that the cognitive section is finished. When the appropriate point is reached for the respondent to carry out the actions, the interviewer waits for five seconds to see if the respondent performs the correct action without a prompt. If they fail to carry out the action spontaneously, the interviewer reminds them that they were going to do something and records what the respondent then did. A correct response requires the person to carry out the correct action without being reminded. The first task is based on a similar task used in the Medical Research Council Cognitive Function and Ageing Study (MRC CFA Study, 1998), and the second task is based on a similar task used in the Rivermead Behavioural Memory Test (Wilson, Cockburn and Baddeley, 1985).

Executive function / other cognitive items

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 set-shifting (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 the time is up, 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 by the respondent provides a measure of accuracy. This test was developed for the 1946 birth cohort study (Richards et al., 2001) and has also been used in the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).
3. Numerical ability – this aims to establish the participant's level of numeracy by asking them to solve 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 correct answers on the first five questions, and 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. These items were developed for ELSA and have also been used in HRS in an experimental module.

Summary cognitive measures

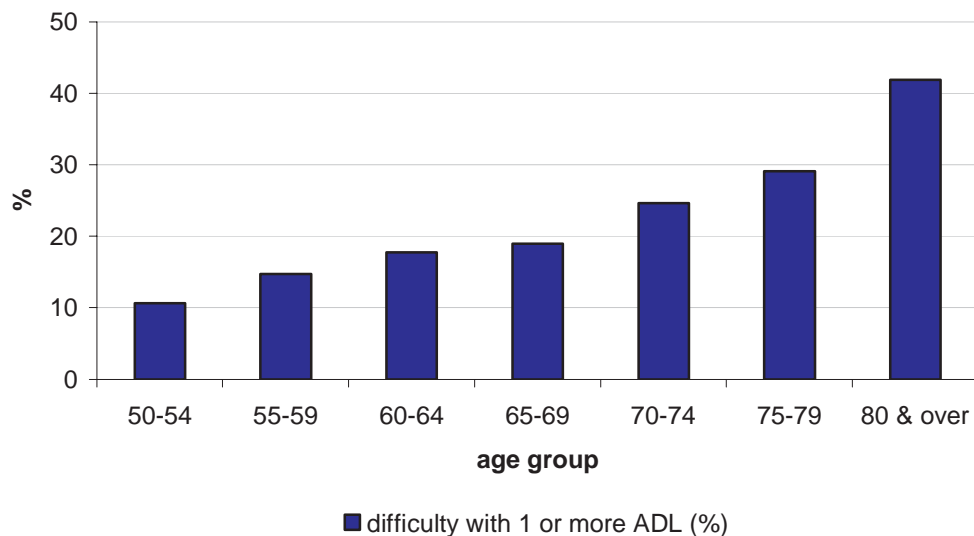
For some purposes, it is useful to derive summary cognitive performance measures. Accordingly, we have derived a memory index, an executive function index and a global cognitive index which combines the two in the derivation of these summary measures. Some test scores have been recoded. The memory index combines all the scores on the objective memory tests and has a range of possible scores from 0 to 30. The executive function index combines all the scores on the other cognitive tests and also has a range of possible scores from 0 to 30. The global cognitive index combines these two to produce a score ranging from 0 to 60.

7.3 Findings on physical function

Activities of daily living (ADLs)

The prevalence of reported difficulty with ADLs increases with age, with 10.6% of respondents aged 50–54 reporting difficulty, compared with 41.9% of those aged 80 and over. This comparatively high rate of disability in younger respondents, while many older respondents report no difficulty with ADLs, demonstrates that disability and age are not synonymous, and is consistent with previous studies (Manton, 1989). (Table 7A.1, Figure 7.1)

Figure 7.1. Difficulty with activities of daily living (ADLs), by age

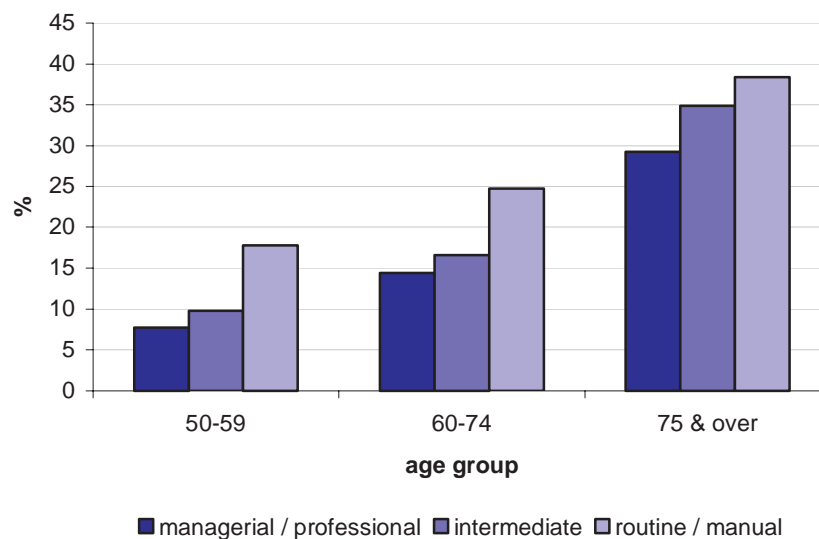


There is very little difference between the sexes for reported difficulty with ADLs, although disability is slightly higher in men than in women up to age 64, and in women than in men over age 64 (44.1% for women and 38.1% for men over 80 years old) (Table 7A.1). Particularly high rates of difficulty were reported for dressing and bathing (13.4% and 12.5% respectively) (Table 7A.2).

There is considerable difference between occupational classes for reported difficulty with ADLs. Overall, the rates of difficulty with ADLs are 14.0% for

those with managerial and professional occupations and 25.5% for those with routine and manual occupations. The excess disability in routine and manual occupational classes, compared with managerial and professional occupational classes, is present in all age groups. The rates of difficulty with ADLs reported by respondents in routine and manual occupational classes are 17.8% for ages 50–59 and 38.4% for ages 75 and over. For those in managerial and professional occupational classes, the rates are 7.7% for ages 50–59 and 29.2% for ages 75 and over. The relative difference between occupational classes thus decreases with age, whilst the absolute difference remains similar (17.8 is more than twice as high as 7.7, but 38.4 is less than a third as high again as 29.2, whilst the absolute differences are 10.1 and 9.2). (Table 7A.3, Figure 7.2)

Figure 7.2. Difficulty with one or more activity of daily living (ADL), by age and occupational class



Instrumental activities of daily living (IADLs)

Again, the prevalence of reported difficulty with IADLs increases with age, with 12.2% of respondents aged 50–54 reporting difficulty, compared with 48.8% of those aged 80 and over. These percentages are only very slightly higher than the percentages for ADLs. There is a big increase (from 28.6% to 48.8%) in the number reporting difficulty with IADLs between the 75–79 age band and the 80-and-over band. Overall, women report more difficulty with IADLs than men do at all ages (25.1% and 17.5% respectively). (Table 7A.4)

Particularly high rates of difficulty were reported for doing work around the house and garden (16.2%) and shopping for groceries (9.7%). The over-75s reported problems more than twice as often as those aged 60–74 in both sexes for nearly all IADLs, suggesting that there is a threshold around age 75. (Table 7A.5)

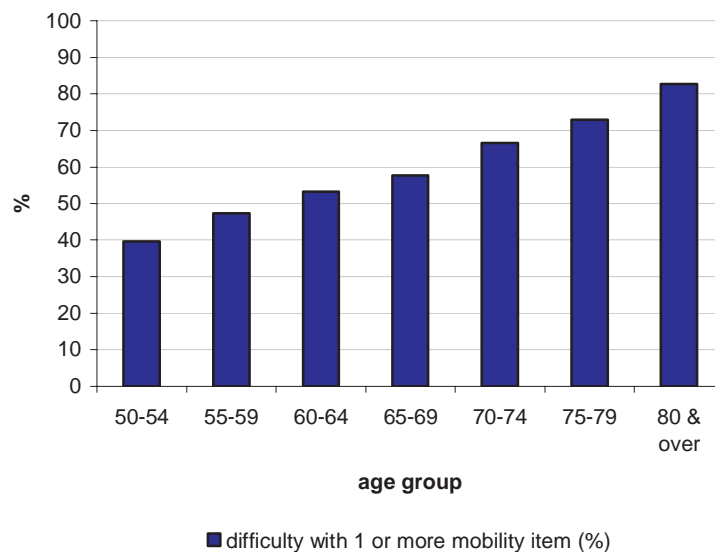
The difference between the occupational classes for IADLs follows a similar pattern to that described above for ADLs. Overall, the rates of difficulty with IADLs were 14.1% for those with managerial and professional occupations

and 26.2% for those with routine and manual occupations. The excess disability in routine and manual occupational classes, compared with managerial and professional occupational classes, is present in all age groups. The rates of difficulty with IADLs reported by respondents in routine and manual occupational classes are 18.3% for ages 50–59 and 42.4% for ages 75 and over. For those in managerial and professional occupational classes, the rates are 8.4% for ages 50–59 and 33.1% for ages 75 and over. The relative difference between occupational classes thus decreases with age, whilst the absolute difference remains similar (18.3 is more than twice as high as 8.4, but 42.4 is less than a third as high again as 33.1, whilst the absolute differences are 9.9 and 9.3). For IADLs, the difference between occupational classes is as big as the difference between age groups. 18.3% of the youngest respondents (aged 50–59) with a routine or manual occupation report a difficulty with an IADL, compared with only 11.8% of older respondents aged 60–74 with a managerial or professional occupation. (Table 7A.6)

Mobility (leg) and arm function

As expected, the prevalence of reported difficulty with mobility and arm function increases with age, with 39.7% of respondents aged 50–54 reporting difficulty, compared with 82.7% of those aged 80 and over. Higher rates of difficulty were reported with mobility than with IADLs or ADLs. Women report more difficulty with mobility and arm function than men do at all ages (64.0% and 49.2% respectively). (Table 7A.7, Figure 7.3)

Figure 7.3. Difficulty with mobility items, by age



High rates of difficulty were reported by both sexes with climbing several flights of stairs (men up to 48.4%, women up to 59.7%), stooping, kneeling or crouching (men up to 47.3%, women up to 58.2%), lifting or carrying heavy weights (men up to 28.6%, women up to 55.3%) and getting up from a chair after sitting for long periods (men up to 33.3%, women up to 41.6%). There is a big increase in the proportion of both sexes reporting problems with all

items, except sitting, between the 60–74 age group and the over-75 age group. (Table 7A.8)

The difference between the occupational classes for mobility is similar but slightly smaller than that described above for IADLs and ADLs. Overall, the rates of difficulty with mobility are 47.1% for those with managerial and professional occupations and 63.2% for those with routine and manual occupations. The excess disability in routine and manual occupational classes, compared with managerial and professional occupational classes, is present in all age groups. The rate of difficulty with mobility and arm function reported by respondents in routine and manual occupational classes is 50.3% for ages 50–59, and 80.6% for ages 75 and over. For those in managerial and professional occupational classes, the rates are 35.1% for ages 50–59 and 72.5% for ages 75 and over. Both the relative and absolute differences between occupational classes thus decrease with age (50.3 is 43% more than 35.1, but 80.6 is only 11% more than 72.5, whilst the absolute differences are 15.2 and 8.1). Some of this decreased gap between occupational classes may be due to a ceiling effect, due to the high rates of older respondents reporting difficulty with the mobility measures. (Table 7A.9)

Walking speed

Walking speed was measured only in those aged 60 and over, and only those who successfully completed both walks were entered into the analysis here. The proportion of respondents walking at 0.4 metres/second (m/s) or slower increases with age, from 2.7% at age 60–64 to 19.4% at age 80 or over. The median speed in m/s decreases with age, from 0.94 at age 60–64 to 0.61 at age 80 or over. The proportion of women walking slower than 0.4 m/s is higher than the proportion of men after age 65, and the gap widens with increasing age, to 22.8% of women and 13.7% of men at age 80 and over. (Table 7A.10)

Falls

Questions on falls were asked only of those aged 60 and over. Of those asked, 32.0% had fallen down in the last two years. The prevalence increased with age, from 25.6% of those aged 60–64 to 47.3% of those aged 80 and over. More women than men had fallen in the last two years (37.2% and 25.7% respectively). Of those who had fallen, 38.2% had needed medical treatment as a result of the fall. (Table 7A.11)

In men (but not women), the percentage of falls resulting in medical treatment stayed fairly constant, at around 30%, even though the percentage of men who fell increased with age from 20.8% to 43.1%. In women, the percentage of falls resulting in medical treatment increased as the percentage of women who fell increased, from around 30% to around 50%.

Problems with eyesight, hearing and incontinence of urine

The percentage reporting fair or poor eyesight increases with age after about age 70, from 12.6% for ages 65–69 to 32.7% at age 80 and over. The percentage reporting fair or poor hearing increases with age after about age 60,

from 15.6% at ages 55–59 to 39.2% at age 80 and over. For eyesight, there is little difference between the sexes, but for hearing, 1.5 to 2 times as many men as women report difficulties at all ages except 80 and over. (Table 7A.12)

The percentage reporting being incontinent also increases with age, and was much higher for females than for males in all age groups. The size of the difference between men and women reporting being incontinent narrows with increasing age. In the 50–54 age group, 3.1% of men and 17.9% of women report being incontinent, whereas in the over-80 age group, the figures are 18.8% for men and 25.5% for women. (Table 7A.13)

Receipt of help for those reporting difficulty

Out of all those reporting difficulty with one or more ADL, IADL or mobility and arm function, 40.6% received help. The percentage receiving help increased with age, from 33.0% at age 50–59 to 53.9% at age 75 and over. At all ages, women received more help than men (for example, 39.6% and 32.2% respectively receiving help at age 60–74).

The commonest sources of help overall (percentage of all who reported difficulty with an ADL, IADL or mobility function) were spouse or partner (21.4%), daughter (11.2%), son (7.5%), other unpaid individual (7.3%) and paid individual (6.7%). Unpaid individuals included other relatives, voluntary workers, and friends and neighbours. Very low percentages received help from parents, and this decreased further with increasing age, to 0.1% at age 75 and over, as expected. Little help was received from siblings (1.6%) or grandchildren (2.3%), although grandchildren provided some support for their grandparents aged over 75 years (4.6%).

Nearly all sources of help increased with increasing age, except for help from a spouse, which remained roughly constant for men (21.0% at age 50–59 and 23.7% at age 75 or over) and decreased markedly for women aged 75 and over (from 26.0% at age 50–59 to 12.0% at age 75 or over). Paid help for women aged 75 and over increased markedly to 19.8%, from 3.8% at age 60–74. In men, paid help increased from 2.7% at age 60–74 to 10.5% at age 75 or over. (Table 7A.14)

Use of aids for those reporting difficulty

Out of all those reporting difficulty with one or more ADL, IADL or mobility and arm function, 30.4% used an aid. The percentage using an aid increased with age, from 15.4% at age 50–59 to 52.7% at age 75 or over. By far the most common aid used (percentage of all who reported difficulty with an ADL, IADL or mobility function) was a cane or walking stick (26.8%). 4.8% used a personal alarm, 4.2% a manual wheelchair and 3.5% a Zimmer frame or walker. The use of personal alarms and Zimmer frames increased markedly in the 75-and-over age group. Personal alarms were used by 2.4% of respondents aged 60–74 and 12.0% aged 75 and over. Zimmer frames were used by 1.7% of respondents aged 60–74 and 8.9% aged 75 and over. (Table 7A.15)

7.4 Findings on cognitive function

Memory

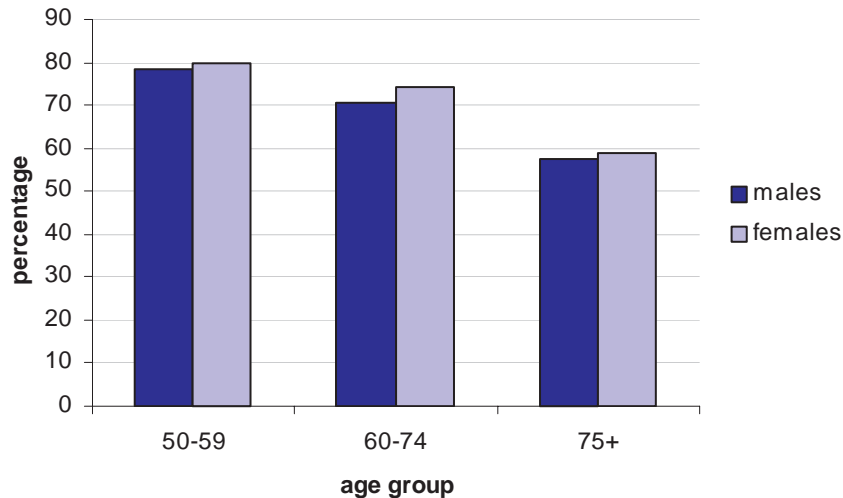
Self-reported problems with memory were present in almost a third of the total sample, with 32.3% rating their memory as fair or poor rather than excellent, very good or good (Table 7A.16). In men, the measure showed a steady increase with age, with 28.7% describing their memory as fair or poor in the youngest group rising to 40.4% in the oldest group. However, a very different pattern emerged for women. Those aged 65–69 reported the lowest percentage of problems. Indeed, the percentage reporting fair or poor memory fell steadily between ages 50–54 and ages 65–69, then began to rise. There was also an interesting pattern of gender differences. At ages 60 and over, women were less likely than men to report fair or poor memory, while at ages under 60, women were more likely than men to report fair or poor memory. Self-reported memory was also related to level of education (Table 7A.17). The higher the level of education, the smaller the percentage who reported their memory to be fair or poor. This pattern was seen for men and women in each age group. The association between self-rated memory and occupational class was similar to the association between self-rated memory and education – the higher the occupational class, the smaller the percentage reporting their memory as fair or poor (Table 7A.18). It is interesting that this finding conflicts with the earlier results of Rabbitt and Abson (1990), who used a volunteer sample. Volunteers often included the ‘worried well’, which may account for the discrepancy.

In the ELSA sample as a whole, 23.1% made at least one error on time orientation (day, month, year, day of week). The percentage making an error increased progressively with advancing age, from 15.0% in the youngest group to 36.8% in the oldest (Table 7A.19), and this trend was seen for both men and women. Of those who made an error, the great majority made only one error, which was usually giving an incorrect day of the month. Women performed better than men in every age group, and this gender difference was particularly evident for the percentage making two or more errors in the younger age groups. There was an overall effect of educational level and occupational class on this test, in the expected direction (Williams et al., 2003), with most errors in the groups without educational qualifications or in routine and manual occupations (Tables 7A.20 and 7A.21).

For the sample as a whole, the mean number of words recalled from the 10-word list was 5.4 immediately and 3.9 after a delay. As expected, the older the group, the fewer the words they recalled. The youngest group recalled an average of 6.2 words immediately and 4.9 after a delay, compared with the oldest group, who recalled 3.9 words immediately and 2.1 after a delay (Table 7A.22). Figure 7.4 shows the mean number of words retained after the delay as a percentage of the mean number recalled immediately. This shows that even after a short delay, older people recall a much smaller proportion of the information they acquired. Women outperformed men on the word-recall task in every age group, on both immediate and delayed recall. The advantage shown by women on this verbal learning task is in line with numerous other studies (Huppert and Whittington, 1993; Portin et al., 1995; Maitland et al.,

2000). Higher educational level was strongly associated with better performance on this task, as expected, and the effect was seen in every age group for both men and women and for both immediate and delayed recall (Table 7A.23). A similar pattern of results was seen for occupational class but the effect was smaller than that for education (Table 7A.24).

Figure 7.4. Mean delayed word recall as percentage of mean immediate recall



On the two tests of prospective memory, almost half of the sample forgot to carry out the specified actions without being reminded (48.8% and 49.6% for the initials and time-recording tasks respectively – Table 7A.25). As expected, performance decreased steadily with increasing age. Just over a third of respondents in the youngest age group failed to carry out the appropriate actions without a reminder, compared with over two-thirds of those in the oldest age group (69.8% on the initials task and 78.3% on the time-recording task in the oldest group). On both prospective memory tasks, men outperformed women in every age group. The direction of the gender difference on these two tasks in ELSA contrasts with the findings from the MRC Cognitive Function and Ageing Study, in which a similar test was administered in a population sample of almost 12,000 respondents aged 65 and over (Huppert et al., 2001). On this task, women were 11% more likely than men to perform correctly without a prompt. Further investigation is required to establish why women performed better than men on the MRC CFAS prospective memory task but not on the two tasks used in ELSA.

There was a strong effect of educational level on these tasks: well over half of the group without educational qualifications failed to carry out the required actions without a reminder (Table 7A.26). The effect of education was evident in every age group and particularly pronounced in the oldest group, where amongst those with no educational qualifications, around 70% failed on the initials task and over 75% failed on the time-recording task. The gender difference on these tasks reported above appears to be partly explained by gender differences in education, since when education was matched (Table 7A.26), women performed better than men in about a third (3/9 and 4/9) of the age-by-education comparisons for each task. As was the case for the word-

recall test, the effect of occupational class was very similar to the effect of education but somewhat smaller (Table 7A.27).

To the extent that these tasks provide an indication of prospective memory in everyday life, the high prevalence of age-associated forgetfulness is a cause for concern, particularly in the oldest age groups. These findings raise questions about the extent to which older individuals remember to carry out essential actions such as those concerned with health (taking medication), security (locking doors, turning off the cooker) and economic activity (collecting pensions, checking statements). 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).

Executive / other cognitive performance

The number of different animal names that ELSA respondents produced on the verbal-fluency task ranged from 0 to 52, with an overall mean of 19.1. 10% of the sample produced 10 animal names or fewer, and 6% of the sample produced 30 or more. As expected, there was a progressive decrease in the number of animal names produced with advancing age (Table 7A.28). On average, respondents aged 50–54 produced 21.9 different animal names, compared with 14.6 in respondents aged 80 and over. There was also a gender difference, with men showing an advantage over women, particularly in the older age groups. However, this gender difference partly reflects gender differences in education, since in the group with a degree or higher education, women performed slightly better than men overall, and this trend was only reversed at age 75 and over (Table 7A.29). Occupational class also exerted an effect on verbal fluency, which was the same for men and women, and smaller than the effect of education (Table 7A.30).

The letter-cancellation task provided measures of both speed and accuracy of performance. The speed measure was the number of letters that were searched during the one-minute interval, and ranged from 16 to 780, with a mean of 305. The mean number of letters searched decreased, as expected, with advancing age, from 328 in the youngest group down to 257 in the oldest (Table 7A.31). Women performed better than men on this measure and the gender difference was seen in every age group. The effect of education on speed of processing was in the expected direction and was evident for both sexes and each age group (Table 7A.32). The effect of occupational class was in the expected direction for men, but for women, there was no discernible difference between those in intermediate occupations and those in routine and manual occupations (Table 7A.33). Accuracy of performance was measured in terms of the number of target letters missed, i.e. the number of letters P and W that were not crossed out up to the point the respondent reached. This value ranged from 0 to 52 out of a maximum of 65 targets. The average number missed was 5.5, this number increasing with age up to age 70–74 and remaining stable thereafter (Table 7A.31). Women missed more targets than men – an average of 5.7 versus 5.3 for men. There was an interesting effect of

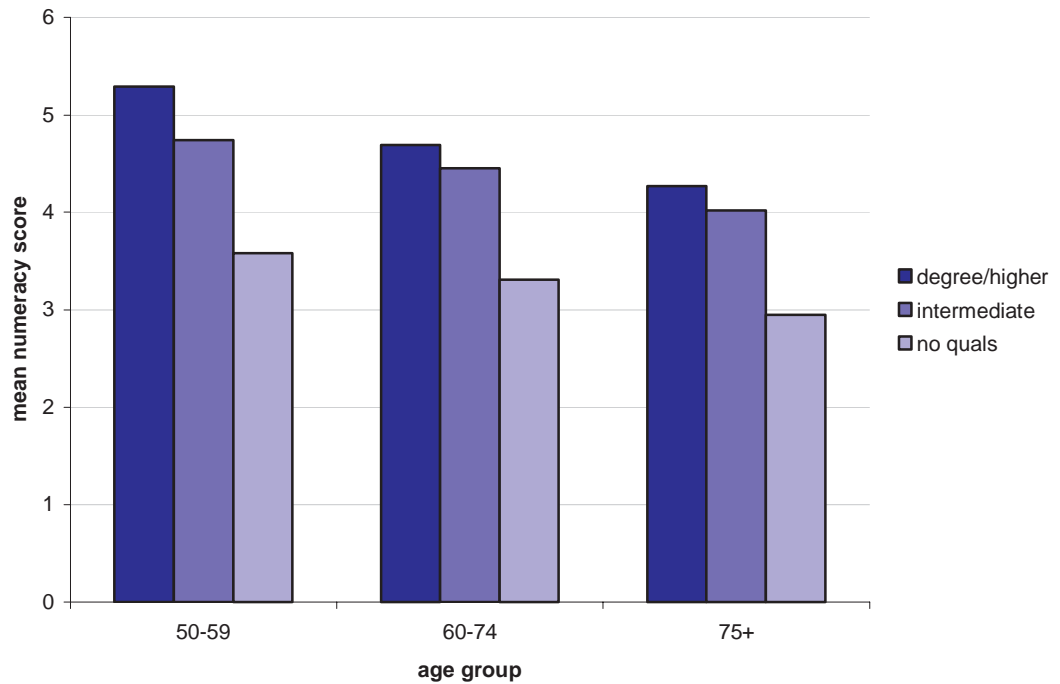
education and occupational class on the accuracy measure (Tables 7A.32 and 7A.33). For both men and women, respondents with an intermediate level of education showed the highest level of accuracy overall (i.e. the lowest number of targets missed). Likewise, women in intermediate occupations showed the highest level of accuracy overall, although this was not the case for men.

It is useful to consider the results of the letter-cancellation task in terms of the well-known trade-off between speed and accuracy. In general, an individual can maximise either their speed of performance or their accuracy of performance but not both. A similar pattern can often be seen in group data. The gender differences reported above are consistent with the notion of a speed–accuracy trade-off, since women were both faster and less accurate than men. A similar pattern was observed for education, where respondents with a degree or higher education were faster and less accurate than those with an intermediate level of education (Table 7A.32). Likewise, women in professional or managerial occupations were faster and less accurate than women in intermediate occupations, although this effect was not observed for men (Table 7A.33). There was also some degree of speed–accuracy trade-off with respect to age: while search speed decreased progressively with age, respondents in the oldest age groups (70–74, 75–79, 80+) maintained their level of accuracy (Table 7A.31). On the other hand, respondents in the youngest age group were both faster and more accurate than older respondents, while respondents who had no educational qualifications or were employed in routine or manual jobs were both slower and less accurate than other groups (Tables 7A.32 and 7A.33).

The average score on the tests of numerical ability was 4.4 out of a possible total of 7.3% of the sample got none of the answers correct, and 11.4% got all the answers correct. Performance on these tests showed substantial age and gender differences (Table 7A.34). The youngest group obtained an average score of 5.0, compared with the oldest group, whose average was 3.5. The average score for women was 4.0 compared with 4.8 for men, and the gender difference was apparent in every age group. Performance was related to level of education and occupational class and the effects of these two variables were the same for both genders and all ages (Tables 7A.35 and 7A.36). It is noteworthy that on the numeracy task, the oldest group with a degree or higher education performed better than the youngest group with no educational qualifications. This can be seen for women in Figure 7.5. The relatively low numeracy of certain groups – notably the poorly educated, women and the elderly – provides cause for concern if we assume that the measures of numeracy used in ELSA are indicative of numerical ability in daily life. In our computerised age, there is unprecedented access to numerical information and we are increasingly deluged with data. Indeed, a seminal publication entitled *Mathematics and Democracy* argues that individuals who lack the ability to think numerically cannot participate fully in civic life (Steen, 2001). Certainly, individuals whose numerical ability is limited will be hampered when faced with many important decisions about finances, lifestyle and health. Making sensible decisions about savings and pensions, and understanding the risks involved in health-related behaviours or medical treatments, depend in part on numerical ability and quantitative reasoning. Future waves of ELSA will

examine the comparative effects of ageing and cohort differences on numeracy and its impact on behaviour.

Figure 7.5. Numerical ability, by age and education: women

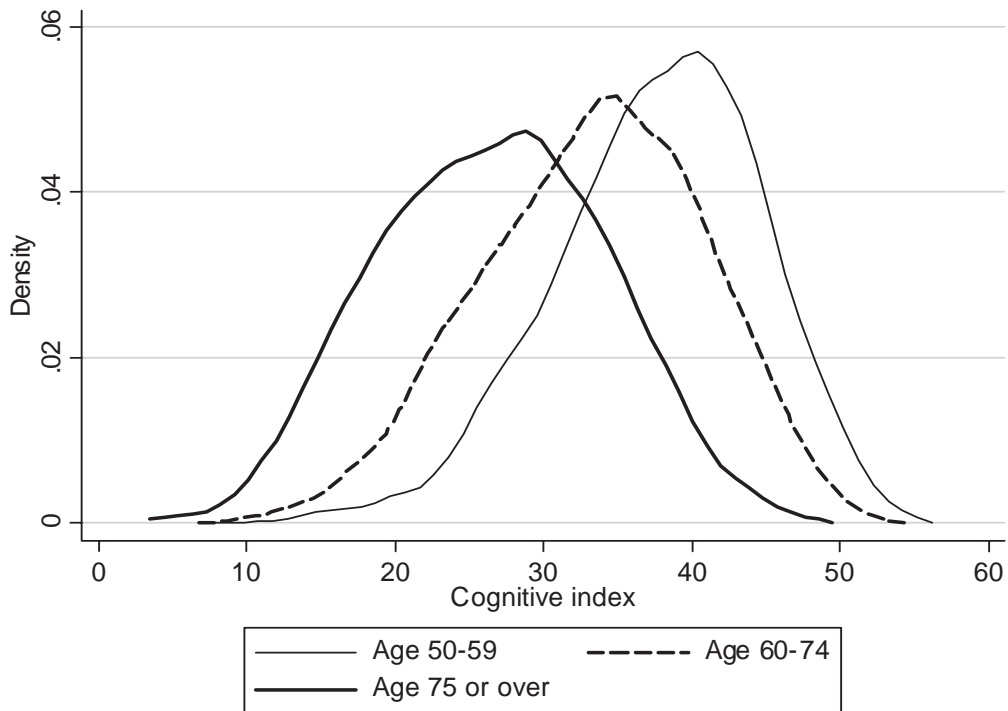


Summary cognitive measures

A memory index has been derived from all the objective memory tests used in ELSA, and scores on the memory index spanned the full range of possible values from 0 to 30. An executive function index has also been derived from all the non-memory items, and scores on the executive index ranged from 4 to 29. Finally, we derived a global cognitive index combining scores on all the objective cognitive tests, and scores on the global cognitive index ranged from 5 to 55 (out of a maximum of 60). For the ELSA sample as a whole, all three of these measures form a near-normal distribution, with no evidence of floor or ceiling effects. This distribution of scores makes these summary measures very suitable for detecting change in the longitudinal component of ELSA. Mean scores on the global cognitive index are shown in Table 7A.37, by age, gender and education. Figure 7.6 shows the distribution of the global cognitive index by age group. It can be seen that the distribution of scores becomes broader with advancing age, indicating increasing heterogeneity among the older groups. The graph also shows the large area of overlap in cognitive capability between different age groups.

Cognitive capability is likely to be related to measures of physical function, particularly the ability to perform instrumental activities of daily living (IADLs), which make demands on both physical and cognitive function. This association is seen in Table 7A.38. Within each age group, the mean score on the global cognitive index decreases as the number of IADL problems

Figure 7.6. Distribution of global cognitive index, by broad age band



increases. The mean cognitive index score was 34.7 for those reporting no difficulties with IADLs, 30.1 for those reporting 1–2 difficulties and 26.1 for those reporting 3 or more difficulties with IADLs. The association between physical and cognitive function may be due to a common underlying cause, such as age-related physiological changes, or to other factors associated with both physical and cognitive impairment, such as occupational class.

7.5 Conclusions

Disability or impairment of function is a key marker of population health and independence at all ages. This chapter has described the variation in physical and cognitive function between age groups, and the effects of occupational class and education, for people aged 50 and over in England. The levels of physical and cognitive impairment are surprisingly high in the younger age groups, especially in those with no educational qualifications and in routine and manual occupations. In contrast, many older respondents reported and showed no difficulties with physical and cognitive function. In general, physical and cognitive function is associated with education and occupational class, with respondents from managerial and professional occupations and/or with higher levels of education performing better and reporting fewer difficulties with function.

The results presented are all from the cross-sectional data in wave 1 of ELSA and provide important information about disability and impairment of function. The differences in function at different ages shown by the cross-

sectional data presented in this chapter are due to differences between cohorts as well as to the effects of ageing. Data from future waves of the study will provide information on trajectories of health, disability and impairment of function. Until the longitudinal data become available, it is not possible to separate the relative contribution of age and cohort effects. The most useful information for policy-makers will come from the comparison of this cross-sectional data with data from the same respondents to be collected in wave 2 and future waves of ELSA. The longitudinal design of ELSA allows for repeated collection over time of the data presented here, as well as future collection of detailed data on objective physical performance measures and on the quality of health care received. This will inform policy debates about the manner in which health, health care and social and economic circumstances interact over time, and the extent to which they each affect disability and functional decline.

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