



National Research and Development Centre
for adult literacy and numeracy

Research report

Measuring basic skills for longitudinal study

The design and development of instruments for
use with cohort members in the age 34 follow-up
in the 1970 British Cohort Study (BCS70)

Samantha Parsons and John Bynner,
with Vanessa Foudouli

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Emily Brewer
Marketing and Publications Officer
Institute of Education
University of London
Tel: 020 7947 9501
Email: e.brewer@ioe.ac.uk

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Publications
NRDC
Institute of Education
20 Bedford Way
London WC1H 0AL.

Telephone: +44 (0)20 7612 6476
Fax: +44 (0)20 7612 6671
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Measuring basic skills for longitudinal study

Samantha Parsons and John Bynner

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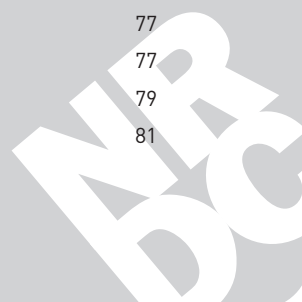
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Peer review

This report was peer reviewed by Professor Steve Reder, Portland State University and Professor Greg Brooks, University of Sheffield.

Summary

The work here took place against the background of a major new initiative in Britain, both to understand and to tackle the problem of poor basic skills in a substantial minority of the population. Concerns were driven by the growing body of international evidence that basic skills difficulties were a major impediment to successful functioning in modern society, not least in the UK. This culminated in the work of the Moser Committee, (Moser report (1999), *A fresh start. Improving literacy and numeracy*. DfEE), and the government strategy that flowed from it, *Skills for Life*.

The 1958 and 1970 British birth cohort studies, longitudinal studies that follow up all babies born in a single week throughout their lifetime, were an important source of evidence for the Moser Committee's enquiry into adult basic skills (literacy and numeracy) that needed expanding and updating because of the relatively small sub-samples from which the original basic skills data were collected. The *Skills for Life* strategy, and the research programme NRDC set up to support it, offered the opportunity to extend measurement of literacy and numeracy skills to the whole of one of the birth cohorts – the 1970 cohort at the age of 34, for which funding was already available for a follow-up in 2004.

The 2004 survey has two main parts: the Core Interview, which every cohort member who agreed to take part completed, and the Parent and Child Interview, that only selected cohort members with resident natural or adopted children completed. The Core Interview also included:

- the assessment of all BCS70 cohort members' grasp of literacy and numeracy.
- a number of exercises to assess the presence of symptoms associated with dyslexia.
- a standard Computer Assisted Personal Interview (CAPI) and Computer Assisted Self Interview (CASI) to update the record of cohort members' lives and to observe their current situation in respect of education, housing, health, work and family life.

The Parent and Child Interview contained:

- an additional CAPI section in the personal interview where cohort members answered questions about the health, care and education experiences of each of their resident natural or adopted children aged 16 years, 11 months or less.
- a paper-based self-completion questionnaire, which required cohort members to answer questions covering parenting styles and the development of each eligible child.
- the assessment of the cognitive skills of their children between age 3 and 16 years, 11 months.
- resident natural or adopted children aged between 10 years and 16 years, 11 months inclusive also completed an additional questionnaire about their activities at home and school, their attitudes, self-esteem and educational aspirations.

The following chapters set out in detail the steps taken in the design of the NRDC-funded components of the 34-year-old BCS70 follow-up survey. The account includes the different piloting stages, the analysis of the data collected and the conclusions leading to final design decisions. Chapter 1 outlines the standard design protocol for a cohort study follow-up survey that was employed. Chapter 2 sets out the main design features of the 1970 cohort study and the different components of the 34-year-old follow-up. Chapter 3 describes the design of the

adult literacy and numeracy assessments, for which two modes of questioning were used: multiple-choice and open response (interview) mode. The account of the dyslexia assessments follows in chapter 4. Chapter 5 describes the child assessments and parent data. Chapter 6 provides an overview and some conclusions.

Each chapter aims to be informative about the work undertaken as an aid to interpretation of results, particularly for research and policy users of the data, and to supply the key information needed for others to devise their own instruments for the assessment of basic skills. In this sense, the report's major function is as a source book for future users of this new round of cohort studies basic skills data.

Despite the tight timetable and administrative constraints on the wide range of assessments to be used in the survey, the goals set for them have been achieved. We now have a battery of reliable instruments that we know can be effectively administered in people's homes by appropriately trained interviewers. The assessments have validity in tapping the core dimensions of literacy and numeracy at the requisite levels with which the survey is concerned. We can also assess the presence of dyslexia as a factor in poor reading and on adult functioning more generally. Reliable children's assessments of basic skills and broader cognitive measures spanning a wide age-range are available. Well developed questionnaires to tap family functioning and child development can be employed to unpack further the family factors involved in children's cognitive development and basic skills acquisition.

The prime purposes of the report are to demonstrate 'fitness for purpose' of the instruments to be used in the research undertaken to support the *Skills for Life* strategy and to supply the details of design that will be of help in interpreting the research results. The report also serves in the nature of a source book enabling others to replicate the approach to assessment design on new samples of adults or children¹. Overall, the development work represents a substantial contribution to the knowledge base on which the success of *Skills for Life* ultimately depends.

1. Permission must be sought from nferNelson to use any of the scales from the BAS II detailed.

1 Background to the assessment

1.1 *Skills for Life*

The British 1958 and 1970 birth cohort studies are longitudinal studies of the British population followed up from birth through adult life. The National Child Development Study (NCDS) started with all the 17,000+ births in a single week in 1958 and the 1970 British Cohort Study (BCS70) started with all 17,000+ births in a single week in 1970. Evidence from the studies on the extent of, and correlates of, basic skills difficulties in the population reinforced television-based literacy campaigns of the 1980s² (continuing on from the very influential *On the Move* series which began in 1975), and was a major source of evidence underpinning the work of the Basic Skills Agency through the 1990s. The Moser Committee, in their report *A Fresh Start*, similarly relied heavily on cohort studies evidence in making the case for major new government initiatives on adult basic skills³. The picture painted of a population with significant numbers lacking basic functional literacy – up to 20 per cent – and perhaps twice this proportion unable to function effectively with numeracy, signalled a national problem that became a top government priority to solve. Impetus was added by international comparison of basic skills performance through the Organisation for Economic Cooperation and Development (OECD)'s International Adult Literacy Survey (IALS), suggesting that Britain was near the bottom of the functional literacy and numeracy league table – 22 per cent poor literacy compared with 7 per cent in Sweden⁴. This implied that one in five British adults had the literacy and numeracy skills that were not much above those expected of an 11-year-old.

The consequence of the literacy and numeracy gap had also been spelt out in the cohort studies work. Those with functional literacy and numeracy problems were much more likely to be unemployed or characterised by various kinds of disengagement and poor well-being. Moreover, their problems typically reflected a stunted educational career related to poor family circumstances and lack of parental interest in and support for educational progress. The education system had clearly failed such children who had entered adult life without the basic competencies and qualifications demanded for effective functioning in a modern industrialised society. The general conclusions drawn from the cohort studies evidence were:

- Britain's economic competitiveness was damaged in comparison with other countries through its high level of basic skills difficulties;
- basic skills difficulties were a major factor in adult social exclusion – another key government concern; and
- major efforts across the education system were required to ensure that subsequent generations left education with full basic skills competence.

The Moser Committee prescriptions for improvement concerned the first two of these challenges. The committee set targets for curtailing the problem among adults, with reductions by 2010 to half the numbers in the poor literacy and poor numeracy categories, so

2. On the BBC: 'Switch onto English', 1984–5, 'Write Now', 1985–6, 'Spelling it Out', 1987–8, 'Stepping Up' and 'Step Up to WordPower and NumberPower', 1989. For Granada/ITV: World in Action documentary 'Starting at the Bottom', 1987.

3. Moser Report (1999). **A Fresh Start: Improving Literacy and Numeracy**. DfEE publication, ref CMBS1.

4. For the report on the survey of adults aged 16–65 in Great Britain, carried out as part of the International Adult Literacy Survey (IALS) see: Carey, S, Low, S and Hansbro, J (1997). **Adult Literacy in Britain**. London: The Stationery Office.

that by this date over 90 per cent of the population would be competent in both.

Taking up the challenge, the Department for Education and Skills (DfES) commissioned research on the savings to the taxpayer of reducing Britain's basic skills deficit. Again, using cohort study data, the Institute of Fiscal Studies in collaboration with the Centre for Economic Performance at the London School of Economics and the Wider Benefits of Learning research centre at the Institute of Education, University of London estimated that the gain to the taxpayer would be as much as £2.54 billion if the Moser numeracy target was achieved and £0.44 billion for the achievement of the literacy target⁵. This analysis provided a major plank of the evidence base in support of the Department's submission to the consolidated spending review at the time. The outcome was the release of the funding that led to the launch of the top priority government programme, *Skills for Life*⁶.

1.2 The case for new assessments

Despite the extensive use made of the cohort study evidence to support new policies, it had to be acknowledged that the collection of basics skills performance data in the cohort studies, at age 21 in the case of BCS70 (1991) and at age 37 in NCDS (1995), was limited to 10 per cent samples – reflecting the funding available at the time. This limited the scope of analysis quite significantly with respect to:

- charting the career pathways of particular groups with basic skills difficulties;
- investigating the functioning of people with poor skills in different kinds of occupational and social contexts; and
- mapping geographical variation.

Apart from analysis limitations, each of the two basic skills assessments had been to a certain extent ad hoc in conception and use with different test instruments devised respectively by Cambridge Training and Development Ltd (BCS70 – age 21) and the National Foundation for Educational Research (NCDS – age 37). Each attempted to map test scores onto the City and Guilds 'Wordpower' and 'Numberpower' standards in use at the time (see chapter 3), but this had only been partially successful. There was therefore a case for the development of a new test that would make good these deficiencies; i.e. could be 'benchmarked' against new national standards and would reflect more faithfully the new core curriculum for adult basic skills. It should also maintain a degree of comparability with the earlier sub-sample basic skills assessments.

Accordingly, when the National Research and Development Centre for Adult Literacy and Numeracy (NRDC) was established in the Institute of Education, University of London (as part of *Skills for Life*), a top priority was to use the funding available to carry out a comprehensive assessment of cohort members' basic skills in at least one of the cohorts. The availability of NRDC funding coincided with funding made available by the Economic and Social Research Council (ESRC) for the planned interview follow-up at age 34 in BCS70 and a telephone interview survey at age 46 in NCDS. Accordingly, through this it was possible to build in a basic skills assessment for the whole BCS70 cohort at only a marginal cost to NRDC.

5. Bynner, J, McIntosh, S, Vignoles, A, Derden, L, Reed, H, Van Reenen, J (2001). **Improving Adult Basic Skills: benefits to the individual and society**. DfEE Research Report RR251. London: HMSO.

6. DfEE (2001). **Skills for Life: The national strategy for improving adult literacy and numeracy skills**. Report ref: SFLLN.

The BCS70 follow-up survey also offered other data collection opportunities of major relevance to the *Skills for Life* strategy:

- subjective appraisal of difficulties;
- writing assessment;
- dyslexia assessment; and
- assessment of cohort members' children.

Until the adoption of objective assessment through specially designed tests in the BCS70 age-21 survey, previous data on basic skills difficulties had been collected by asking cohort members directly about them. This was the method used in the 1981 NCDS survey at age 23, analysis of which was influential in the 1987 World in Action documentary *Starting at the Bottom*⁷. The method was subsequently repeated in the NCDS age-33 and age-42 surveys and used alongside the objective assessment in the age-37 survey. Subjective assessments were also included in the BCS70 age-21 and age-30 surveys. Such assessments, which correlate only weakly with objective measures, are particularly useful in gauging motivation to sign up for remedial courses. Accordingly, it was also decided to use subjective appraisals in an improved form for the new BCS70 follow-up.

Samples of cohort members' writing were collected in the BCS70 age-21 and NCDS age-37 surveys. These required extensive coding and have not been used much in subsequent research. The new opportunities the NRDC funding offered led to the decision to include a similar collection of writing samples in the new survey.

Throughout their childhoods, BCS70 cohort members had received regular assessments of their cognitive skills development, including reading and mathematics. At age 10, they had also taken a number of sub-tests from the Bangor Dyslexia Test⁸, specially designed to measure the reading disorder dyslexia in children (see chapter 4). It was decided to capitalise on this earlier experience by investigating continuities in dyslexia symptoms and their consequences from childhood to adulthood by including an assessment of adult dyslexia in the follow-up survey.

Finally in the follow-up at age 33 in NCDS, one third of cohort members and all their eligible children took part in a sub-study that included assessments of the children's cognitive development using an English adaptation of American tests⁹. Through funding that became available to NRDC by a grant from the European Social Fund (ESF), it was possible to include a similar, though trimmed down, assessment of cohort members' children in the BCS70 follow-up. This would have the advantage of enabling intergenerational continuities and discontinuities in basic skills acquisition from parents to children to be investigated. It also offered opportunities for cross-cohort comparison at comparable ages to identify any changes in the processes of literacy and numeracy acquisition across the 12 years separating the births of the two cohorts. For the new surveys, however, it was necessary to increase the

7. Mary Hamilton discussed findings reported in Hamilton, M (1987) **Literacy, Numeracy and Adults**. London: ALBSU (Adult Literacy and Basic Skills Unit, now The Basic Skills Agency).

8. Miles, TR, (1982/1997) **The Bangor Dyslexia Test**. Wisbech, Cambs: Learning Development Aids.

9. Funded through a special grant by the US National Institute for Child Health and Development. Some examples of research using this data: Verropoulou, G, Joshi, H and Wiggins, R D (2002) 'Migration, Family Structure and Children's Well-being: a Multilevel Analysis of the Second Generation of the 1958 Birth Cohort Study', **Children and Society**, vol 16, pp 219–231. McCulloch, A and Joshi, H (2002). 'Child Development and Family Resources: an exploration of evidence from the second generation of the 1958 Birth Cohort', **Journal of Population Economics**, vol 15, pp 283–304. McCulloch, A and Joshi, H (2001). 'Neighbourhood and family influences on the cognitive ability of children in the British National Child Development Study', **Social Science and Medicine**, 53,5, pp 579–591.

sample of cohort members from one third to one half, reflecting the delayed parenting, and consequently smaller number of children eligible for assessment, in the more recent 1970 cohort¹⁰.

1.3 Instrument design

The standard design protocol for a cohort study follow-up survey comprises piloting some or all parts of the instrumentation on general population samples. The piloting is followed by a comprehensive 'dress rehearsal' pilot survey for testing the whole data collection package on a representative sample of cohort members before putting the main survey into the field. Because of the need to develop a new adult literacy and numeracy assessment and assess the feasibility of the dyslexia assessment, in this case the piloting included a more substantial developmental stage. A large-scale pilot survey was used, encompassing 177 respondents to generate enough data for item analysis. The results supplied the basis for finalising the test design within the context of the preferred survey method, Computer Assisted Personal Interview (CAPI).

For the child assessments, following an extensive review of alternative standard instruments for use with children ranging from age 3 through (potentially) to 16, piloting was used (on a smaller sample) principally to test timings and feasibility in the different field settings in which the assessment was to be administered. (As in the previous BCS70 adult follow-up at age 30, all data collection was to take place in cohort members' homes.) Apart from the assessment, the cohort member parent (including the cohort member father whenever possible) supplied much information about each individual child and family life more generally. The mode of data collection included, written (supplied on paper), and computer-administered self-completion questionnaires. Children of 10 years and over also completed a paper self-completion questionnaire about their lives.

The dress rehearsal survey brought all of the different assessment components together with the cohort member interview. The interview was used to update the picture of the cohort members' current situation in relation to employment, family, education, health, social participation and attitudes and to fill the gap in job and other histories between the present and the previous follow-up at age 30. It also supplied the opportunity to collect cohort members' own assessments of their basic skills difficulties and, at the end of the interview, to collect samples of their writing.

1.4 Structure of the report

The following chapters set out in detail the steps taken in the design of the NRDC-funded components of the 34-year-old BCS70 follow-up survey. The account includes the different piloting stages, the analysis of the data collected and the conclusions leading to final design decisions. This work was carried out in close collaboration with our colleagues in the National Centre for Social Research¹¹ who were contracted to undertake the surveys and whose

10. The age at first birth for women in the UK rose from 25.7 in 1991 to 27.1 in 2000. For further details, see Smallwood, S (2002). 'New estimates of trends in births by birth order in England and Wales' **Population Trends**, 108, pp 32–48.

11. NatCen is the largest independent social research institute in Britain. They have designed, carried out and analysed research studies in the fields of social and public policy for more than 30 years. For further details, refer to www.natcen.ac.uk NatCen have carried out a number of the previous surveys of NCDS, BCS70 and MCS [see chapter 2].

professionalism and experience was absolutely vital to the success of the design process. Interviewer feedback on the difficulties they faced in delivering such complex survey instruments in the field was also critically important.

Chapter 2 sets out in more detail the main design features of the 1970 cohort study and the components of the 34 year-old follow-up. Chapter 3 describes the design of the adult literacy and numeracy assessments, for which two modes of questioning were used: multiple-choice and open response (interview) mode. The account of the dyslexia assessments follows in chapter 4. Chapter 5 describes the child assessments and parent data.

Each chapter attempts to be both informative about the work undertaken as an aid to interpretation, particularly for research and policy users of the data, and to supply the key information needed for others to devise their own instruments for the assessment of basic skills. In this sense, the report's major function is as a source book for future users of this new round of cohort studies basic skills data.

2 Cohort studies design overview

2.1 Introduction

Britain's nationwide birth cohort studies follow the same group of people from birth into and through adulthood giving a picture of whole generations. By following up people from birth, it is possible to find out how present situations relate to past circumstances and predict future functioning. Cohort studies are one of the richest resources for the study of human development, covering all aspects of life and are widely used by government and in academic research, nationally and internationally.

There are four such surveys in Britain:

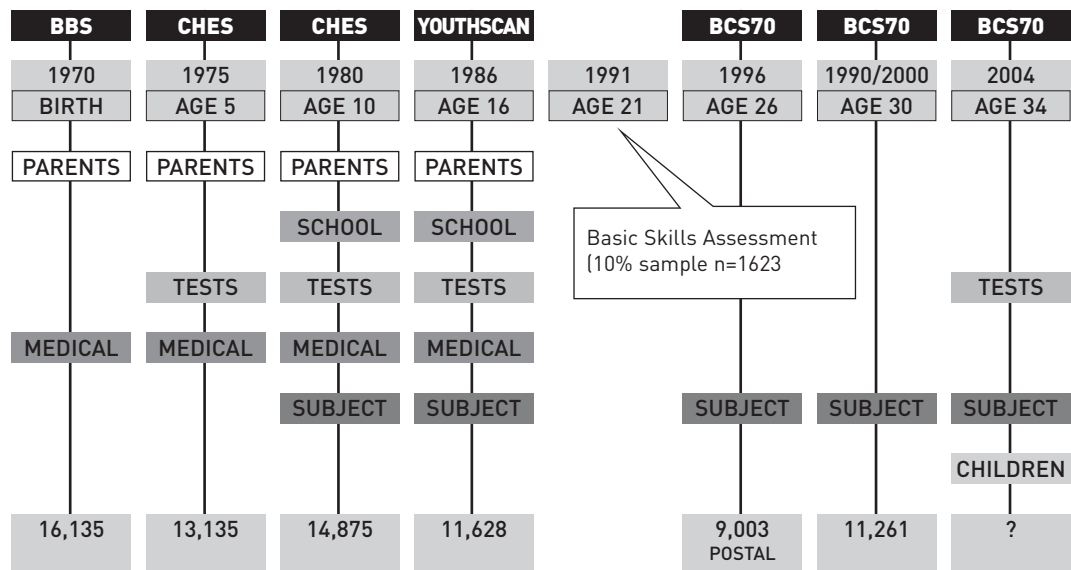
- National Survey of Health and Development (NSHD) which began in 1946.
- National Child Development Study (NCDS) which began in 1958.
- 1970 British Cohort Study (BCS70) which began in 1970.
- Millennium Cohort Study (MCS) which began in 2000.

The first three of those studies are based on all births in Great Britain in one week in 1946, 1958 and 1970, whereas the MCS is based on births over 12 months in selected areas within the United Kingdom. NCDS, BCS70 and MCS are all managed by the Centre for Longitudinal Studies (CLS) at the Institute of Education, University of London. NSHD is based in the Department of Epidemiology and Community Health at University College, London.

2.2 BCS70 in detail

BCS70 began when data were collected about all the babies born in England, Scotland and Wales¹² in one week of April 1970. As shown in figure 2.1, cohort members have since been followed up five times, at ages 5, 10, 16, 26 and 30, to collect data about their health, educational, social and economic circumstances. (A representative 10 per cent sample were also interviewed at age 21). The most recent (sixth) follow up was carried out in 2004 when cohort members were aged 33 or 34. It is estimated that the final sample will be close to 10,000.

12. Data were collected about children born in Northern Ireland, but these children were not subsequently followed up.

Figure 2.1. BCS70 follow-up studies from 1970–2004

2.3 Development of the 2004 survey

Development work to establish robust survey instruments, with special emphasis on the new literacy and numeracy assessments, began in 2002. The first design of the adult assessments was piloted on 177 members of the general public in their 30s in July 2003 (The Basic Skills Pilot). The child assessments were similarly piloted in September-October 2003 on 127 children from 60 households (The Child Assessment Pilot). After revisions to the design of some assessments, all survey instruments were piloted in a 'dress rehearsal' of the final survey design on 64 BCS70 cohort members and 40 of their children in November 2003 (The dress rehearsal). The main fieldwork for the 2004 survey began in February 2004. All possible interviews were completed by June 2005.

2.3.1 The Basic Skills Pilot

The sample was recruited from the general population, with interviewers aiming to interview equal numbers of men and women aged between 29 and 39, as BCS70 cohort members would be 34 when interviewed. No formal socio-economic criteria were given, but interviewers were initially instructed to recruit from a diverse range of housing types. 16 interviewers were briefed by the research team on either 22 or 23 July 2003. The fieldwork took place from 24 July 2003 – 6 August 2003. The interviewer de-briefing was on 7 or 8 August 2003.

Interviewers approached potential respondents on the doorstep, or by 'snowballing' from respondents and other contacts, i.e. asking those who had taken part in the study if they knew of anyone else who might be willing to participate. Those who agreed to take part were given a letter explaining the study. In most cases, an appointment was made for a later time, although in some cases respondents were interviewed immediately contact was made. Everyone who completed the interview was given a £10 gift voucher as a token of appreciation.

The sample was originally to be boosted by up to 20 respondents recruited from students attending adult basic skills courses at colleges within London. This was to ensure that there

would be sufficient respondents with poor literacy skills to effectively pilot the easier part of the literacy multiple-choice assessment (a group estimated to make up between 5 per cent and 10 per cent of the target population). Numerous efforts were made to recruit adult learners¹³ – however, the scheduling of the pilot during the summer holidays meant that such a group could not be contacted and recruited in time.

Instead, the interviewers were asked to target respondents who might be more likely than average to have poor basic skills. Since this could not be done explicitly without the risk of causing offence, the following tactics were recommended:

- Concentrating recruitment in low income areas, where individuals with low basic skills might be expected to be more likely to be found;
- Encouraging respondents whose reluctance to take part seemed to be linked to the content of the interview; and
- Using 'snowballing' techniques – respondents who had qualified for the easier literacy questions and had seemed to enjoy the interview were asked to suggest friends who might be interested in taking part.

In total, 14 interviewers achieved 177 interviews across England and Scotland¹⁴. The sample was:

- 58 per cent women (102), 42 per cent men (75);
- 94 per cent White British;
- aged between 25 and 45, with 89 per cent falling within the desired 29 to 39 age range; and
- 66 per cent of men and 57 per cent of women had first left full-time education at 16.

2.3.2 The Parent and Child Pilot

The sample was once again recruited from the general population, with some interviewers returning to households who had participated in the Basic Skills Pilot. For 'new' respondents, the same procedures were followed as detailed above. Every adult who took part in the interview was again given a £10 gift voucher as a token of appreciation; every child was given a 'goody bag'. Interviewers were briefed by the research team on 22 September 2003. The fieldwork took place from 27 September 2003–12 October 2003. The interviewer de-briefing was on 20 October.

Once the interviewer had collected the basic demographics of all household members in the CAPI, for each eligible child the parent (figure) was asked a number of questions about their health and education on the CAPI and filled out a self-completion paper questionnaire for each eligible child. Each child in the household between age 3 and 16 years, 11 months who agreed to take part completed a number of assessments. In total, information was collected on 127 children from 60 households. 99 children completed at least one of the three assessments. There were two versions of the assessments: the BAS II Early Years assessments for children aged 3–5 years, 11 months, the BAS II School Age assessments for children between ages 6 and 16 years, 11 months¹⁵.

13. Organisations contacted for that purpose include the Tower Hamlets College (Judith Hinman) and the University of London, Institute of Education (Irene Schwab).

14. Two interviewers were briefed but did not return complete interviews. No interviews took place in Wales.

15. Elliot, C D, (1983, 1996). **British Ability Scales II: Core Scale 2**. Berkshire: The NFER-NELSON Publishing Company Ltd.

- 32 per cent (n=32) of children completed the Early Years assessment.
- 68 per cent (n=67) of children completed the School Age assessment.

2.3.3 The dress rehearsal

Briefings were held on 20, 21 and 24 November. Ten interviewers completed interviews from 25 November–7 December 2003. The de-briefing of interviewers took place on 10–11 December.

A representative sample of 140 BCS70 cohort members was issued to NatCen. Of these:

- 81 per cent had been interviewed in 1999/2000.
- 19 per cent had been interviewed in 1986.

Overall, interviews with 64 cohort members and 40 of their children were completed. Of these children:

- 35 per cent (n=14) completed the BAS II Early Years assessments.
- 65 per cent (n=26) completed the BAS II School Age assessments.

2.3.4 Main fieldwork

The issued sample for the main fieldwork from the CLS database to NatCen was 13,197 cohort members. All of these cohort members met the following criteria:

- living in Great Britain and outlying islands;
- interviewed in 1986 or later (i.e. since they were 16); and
- contact details confirmed since 1996.

In total, 85 per cent of the sample had been interviewed by NatCen interviewers in 1999/2000. Of the remaining 15 per cent, 9 per cent had participated in the 1996 postal survey and 6 per cent were last interviewed in 1986. Cohort members who have withdrawn permanently from the study were excluded, as were a very few who were difficult or unpleasant when last interviewed.

2.4 Coverage

The 2004 survey has two main parts, the Core Interview, which every cohort member who agreed to take part completed, and the Parent and Child Interview that only selected cohort members with resident natural or adopted children completed.

The Core Interview involved a personal interview and an adult assessment:

- **Personal Interview:** a standard Computer Assisted Personal Interview (CAPI) and Computer Assisted Self Interview (CASI) were used to update the cohort members' lives and to observe their current situation in respect to education, housing, health, work and family life. The estimated average time for completion of the CAPI and CASI was 50 minutes.
- **Adult Assessments:** these assessment tools measured a cohort member's literacy and numeracy skills and the presence of some symptoms associated with dyslexia (the term 'dyslexia', however, was not used with cohort members). The estimated average time for completion of this section was 40 minutes. Special instruments were designed for this

assessment, comprising:

- test items from the National Survey of Adult Basic Skills Needs¹⁶, carried out to assess the general public's basic skills problems;
- test items used in the previous 1991 BCS70 basic skills survey¹⁷; and
- test items adapted from the Dyslexia Adult Screening Test¹⁸.

The Parent and Child Interview contained an additional CAPI section in the personal interview, paper based self-completion questionnaires and the assessment of their children's cognitive skills¹⁹.

- CAPI interview module: cohort members answered questions about the health, care and education experiences of each of their resident natural or adopted children, who lived in the same household, aged 16 years, 11 months or less. The estimated average time for completion of this section was 10 minutes per child, though time would vary according to the age of a child.
- Parent self-completion paper questionnaire: cohort members answered questions covering parenting styles and the development of children aged 0–16, 11 months. There was a questionnaire to complete for each of their resident natural or adopted children. The estimated average time for completion of a questionnaire was 10 minutes.
- Child self-completion paper questionnaire: resident natural or adopted children aged between 10 years and 16 years, 11 months inclusive completed a questionnaire about their activities at home and school, their attitudes, self-esteem and educational aspirations. The estimated average time for completion was 15 minutes.
- Child assessments: resident natural or adopted children aged between 3 and 16 years, 11 months had their cognitive skills assessed. The assessments were selected from the battery of assessment tools that make up the British Ability Scales, or BAS II²⁰. The estimated average time for completion was 20 minutes.

A technical report containing a more detailed description of the content of each questionnaire included in the 2004 survey will be published after the main fieldwork has been completed.

16. Williams, J, Clemens, S, Oleinikova, K and Tarvin, K (2003). **The Skills for Life survey: A national needs and impact survey of literacy, numeracy and ICT skills**. DfES Research Report 490. Department for Education and Skills. Crown copyright.

17. These items concerning the use of functional literacy and numeracy were developed by the Cambridge Training and Development Agency. For full details of all assessment items, see Ekinsmyth, C and Bynner, J (1994). **The Basic Skills of Young Adults**. London: The Basic Skills Agency.

18. Fawcett, A. J and Nicolson, R. I. (1998). **The Dyslexia Adult Screening Test (DAST)**. London: The Psychological Corporation.

19. All cohort members and eligible children participated in the assessments unless they were prevented from doing so by learning difficulties or communication difficulties to do with their sight, hearing or speech. The assessments were not carried out if the cohort member or their child refused, or it was stopped if they became distressed. There were stopping rules specific to most of the assessments, but interviewers were instructed to stop the exercise if the cohort member or child showed any signs of becoming distressed.

20. Elliot, C D (1983, 1996). **British Ability Scales II: Core Scale 2**. Berkshire: The NFER-NELSON Publishing Company Ltd.

3 Basic skills

3.1 Measurement of basic skills in the 2004 survey

Three ways of measuring basic skills were adopted in the 2004 survey. Cohort members answered questions on self-reported difficulties in the Core Interview before attempting multiple-choice and open-response literacy and numeracy assessment items.

These three separate measures of basic skills and results from the pilot studies carried out during the development of the final survey instruments are discussed in the order presented to BCS70 cohort members in the main interview: self reported difficulties, multiple-choice literacy and numeracy assessment items, and open-response literacy and numeracy assessment items.

3.2 Self-reported difficulties

Self-reported difficulties with basic skills have a long history in cohort data, first being asked about in 1981 when NCDS cohort members were age 23. NCDS cohort members have subsequently answered questions on difficulties they had with reading, writing and basic number work at ages 33, 37 and 42, BCS70 cohort members when aged 21 and 30. These questions provided one of the first real insights into the literacy and numeracy difficulties experienced by adults in Britain (ALBSU, 1987)²¹. As noted in the previous chapter, such questions also have particular value in identifying likely response to new provision offered under the *Skills for Life* programme. If people do not perceive a difficulty, then clearly the incentive to join classes to improve their skills is missing.

The questions expanded between ages 23 and 33 in NCDS, with this wider coverage being similarly adopted at age 21 in BCS70 and at age 37 in NCDS, although there was a slight alteration to the writing/spelling question (see table 3.2b). In the last round of data collection in 2000, when NCDS cohort members were age 42 and BCS70 age 30, the initial general questions that asked if a cohort member had a skills difficulty were withdrawn. Cohort members were asked a more specific question about the nature of the problems they had with reading, writing or basic maths/numbers/arithmetic, not if they had difficulties per se.

Table 3.1 shows just how remarkably consistent the percentage of cohort members reporting reading, writing/spelling or basic number and arithmetic problems has been over time: 3–4 per cent reading, 3–5 per cent numbers and between 4–12 per cent for writing and/or spelling. The variation for writing/spelling is primarily dependent on whether spelling difficulties were reported separately from writing difficulties²². Tables 3.2a, 3.2b and 3.2c indicate which questions were asked at which sweep of data collection. ‘★’ indicates the question was asked of all respondents, ‘◆’ indicates the question was filtered i.e. only asked if the response was ‘yes’ to the first question.

21. Hamilton, M (1987). **Literacy, Numeracy and Adults**. London: ALBSU (Adult Literacy and Basic Skills Unit, now The Basic Skills Agency).

22. ALBSU, 1987; Ekinsmyth and Bynner, 1994; Bynner and Parsons, 1997.

Table 3.1. Per cent self-reported difficulties in NCDS and BCS70 at different ages

AGE OF COHORT MEMBER	NCDS				BCS70	
	23	33	37	42	21	30
Reading difficulties	4%	4%	3%	3%	3%	3%
Writing difficulties			4%	6%		4%
Writing and/or Spelling difficulties	9%	9%	12%		9%	
Number-work difficulties	5%	3%	4%		4%	
Change calculation and/or problems with days/dates/calendars				5%		5%
(Change calculation problems)				(2%)		(2%)
(Days/dates/calendars problems)				(3%)		(3%)
Any difficulty (inc. spelling)	13%	11%	15%		12%	
Any difficulty			8%	10%		9%
N(100%) =	12537	11407	1714	11419	1623	11261

3.2.1 Selecting the questions to pilot

When preparations for the 2004 pilot study began, the value of repeating the same self-reported questions for the benefit of longitudinal consistency, or dropping the filter question in an attempt to capture more specific difficulties cohort members might be experiencing, were weighed up, along with interviewee burden. For example, in the 2000 survey, if a cohort member had reported they have no difficulties to the question, 'When you buy things in shops with a five or ten pound note, can you usually tell if you are given the right change?', they would not be asked any further questions. By dropping the filter on this question, cohort members would now be asked if they experienced difficulties with other types of number or maths calculations. After much consideration, the filter was dropped for the pilot study, and all but one of the basic skills questions included in 1999/2000 were asked in 2004. In total, this amounted to three questions on reading difficulties, four questions on writing difficulties and six on number and maths difficulties²³. The questions selected are indicated with a '●' in tables 3.2a, 3.2b and 3.2c.

23. The question 'If you need to, can you usually work out what dates go with days on a calendar?' was not included. Questions selected concentrated on money, numbers and mathematical calculations.

Table 3.2a. Reading questions

AGE	NCDS				BCS70		2003/4	
	23	33	37	42	21	30	Pilot 29-39	DR* 33
GENERAL INTRODUCTION. As you probably know, thousands of adults have difficulties with reading or writing at one time or another. It would help us if you could answer some questions about your experience of reading and writing.	★	★	★		★			
Since leaving school have you had any problems with reading?	★	★	★		★			
If respondent answered 'yes' they were asked if their difficulties were due to sight problems or difficulties with reading. If 'difficulties with reading', additional questions were asked.								
a) Can you read and understand what is written in a magazine or newspaper? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆	★	◆	★	●	●
b) Can you usually read and understand what is written in a letter sent to you? [IF YES] Can you read this easily, or is it with difficulty? OR		◆			◆			
b) Can you usually read and understand what is written in an official typed letter sent to you? [IF YES] Can you read this easily, or is it with difficulty?			◆					
c) If you have to, can you usually read and understand any paperwork or forms you would have to deal with in a job? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆	◆	◆	◆	●	●
d) If you have to, can you read aloud to a child from a children's storybook? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆	◆	◆	◆	●	●

*DR = Dress rehearsal.

key: ★ = ask all; ◆ = filtered; ● = ask all in 2004

Table 3.2b. Writing questions

	NCDS				BCS70		2003/4	
	23	33	37	42	21	30	Pilot 29-39	DR* 33
AGE								
Since leaving school have you had any problems with writing or spelling? OR	★	★			★			
Since leaving school have you had any problems with writing or spelling? [IF YES] Is this just with writing, just with spelling, or do you have problems with both?			★					
If respondent answered 'yes', they were asked if their difficulties were due to sight problems, problem holding pen/pencil, using keyboard, both, difficulties with writing generally. If 'difficulties with writing generally', additional questions were asked.		◆	◆		◆			
a) If you need to, can you write a letter to a friend to thank them for a gift or invite them to visit? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆	★	◆	★	●	●
b) Could you write to an employer to apply for a job? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆		◆			
c) Could you fill in a form, from the council for example, or for a hospital appointment? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆		◆			
d) Could you write a letter of complaint about something if you wanted to? [IF YES] Can you read this easily, or is it with difficulty?			◆		◆			
e) When you try to write something, what is it you find difficult? Do you find it difficult to ...								
spell words correctly [yes / no]		◆	◆	◆	◆	◆	●	●
make your handwriting easy to read [yes / no]		◆	◆	◆	◆	◆	●	●
put down in words what you want to say (never try to write anything) [yes / no]		◆	◆	◆	◆	◆	●	●

*DR = Dress rehearsal.

key: ★ = ask all; ◆ = filtered; ● = ask all in 2004

Table 3.2c. Maths, numbers and arithmetic questions

AGE	NCDS				BCS70		2003/4	
	23	33	37	42	21	30	Pilot 29-39	DR* 33
Since leaving school have you had any problems with number work or basic maths? OR	★							
Since leaving school have you had any problems with numbers or simple arithmetic?		★	★		★			
If respondent answered 'yes', additional questions were asked.								
a) When you buy things in shops with a five or ten pound note, can you usually tell if you are given the right change? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆	★	◆	★	●	●
b) If you need to, can you keep household accounts of what you have spent or saved or what to put by for bills when they come? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆		◆			
c) What is it you find difficult with numbers and simple arithmetic? Do you find it difficult to..... recognise and understand numbers when you see them		◆	◆	◆	◆	◆	●	●
add up		◆	◆	◆	◆	◆	●	●
take away		◆	◆	◆	◆	◆	●	●
multiply		◆	◆	◆	◆	◆	●	●
divide		◆	◆	◆	◆	◆	●	●
d) If you need to, can you usually work out what dates go with which day on a calendar? [IF YES] Can you read this easily, or is it with difficulty?		◆	◆	★	◆	★		

*DR = Dress rehearsal.

key: ★ = ask all; ◆ = filtered; ● = ask all in 2004

3.2.2 Feedback from the Basic Skills Pilot

All questions that asked about skills difficulties in the pilot study were of a simple 'yes' or 'no' format. However, the feedback from interviewers involved in the pilot study indicated that respondents often wanted an additional intermediate response option, such as 'sometimes' or 'it depends'. Taking this on board, additional response options were introduced to some questions for the dress rehearsal.

3.2.3 Results from the Basic Skills Pilot and dress rehearsal

The results from the pilot study and dress rehearsal are shown in tables 3.3a, 3.3b and 3.3c below compared, where possible, with the results for the same questions in the most recent NCDS and BCS70 surveys.

Table 3.3a. Per cent reporting difficulties to the individual reading questions

READING	2004			
	NCDS age 42	BCS70 age 30	Pilot	DR
Can you usually read and understand what is written in a magazine or newspaper? [in DR: with difficulty, no]	3%	3%	18%	5% 3%/2%
Can you read aloud to a child from a children's storybook? [in DR: with difficulty, no]			8%	0% 0%/0%
Can you usually read and understand any paperwork or forms you would have to deal with in a job? [in DR: with difficulty, no]			14%	5% 2%/3%
n(100%)	11,419	11,261	177	64

DR = Dress rehearsal.

Table 3.3b. Per cent reporting difficulties to the individual writing questions

WRITING	2004			
	NCDS age 42	BCS70 age 30	Pilot	DR
Can you write a letter to a friend to thank them for a gift or to invite them to visit? [in DR: with difficulty, no]	6%	4%	7%	2% 2%/0%
When you try to write something do you find it difficult to spell some words correctly?			37%	14%
Do you find it difficult to make your handwriting easy to read?			24%	19%
Do you find it difficult to put down in words what you want to say?			33%	13%
n(100%)	11,419	11,261	177	64

DR = Dress rehearsal.

Table 3.3c. Per cent reporting difficulties to the individual number questions

MATHS, NUMBERS AND ARITHMATIC	2004			
	NCDS age 42	BCS70 age 30	Pilot	DR
When you buy things in shops with a five or ten pound note, can you usually tell if you have the right change? [in DR: with difficulty, no]	2%	2%	6%	4% 2%/2%
When you have to do things with numbers do you find it difficult to recognise numbers when you see them?			10%	3%
Do you ever have difficulty adding up? [in DR: always, sometimes]			14%	23% 3%/20%
Do you ever have difficulty with subtraction – that is taking one number away from another? [in DR: always, sometimes]			17%	22% 3%/19%
Do you ever have difficulty with multiplication? [in DR: always, sometimes]			19%	25% 3%/22%
Do you ever have difficulty with division? [in DR: always, sometimes]			24%	30% 3%/27%
n(100%)	11,419	11,261	177	64

DR = Dress rehearsal.

For the three questions previously asked to cohort members, we can see that the percentages who reported difficulties in previous sweeps were very similar to the percentages who reported difficulties in the dress rehearsal. Interestingly, the percentages from responses given by the general population sample used in the Basic Skills Pilot were higher. This might suggest that:

- levels of self-reported or indeed assessed difficulties in the adult population of Britain are in fact higher than the estimates provided by cohort data over the years²⁴;
- the location of the Basic Skills Pilot in areas with socio-economic characteristics associated with cohort members with poor basic skills was a well chosen strategy as a higher than the expected percentage of people reported difficulties with one or more of the basic skills; and/or
- the 'snowballing' technique employed by interviewers to try and reach people who had poor basic skills was productive.

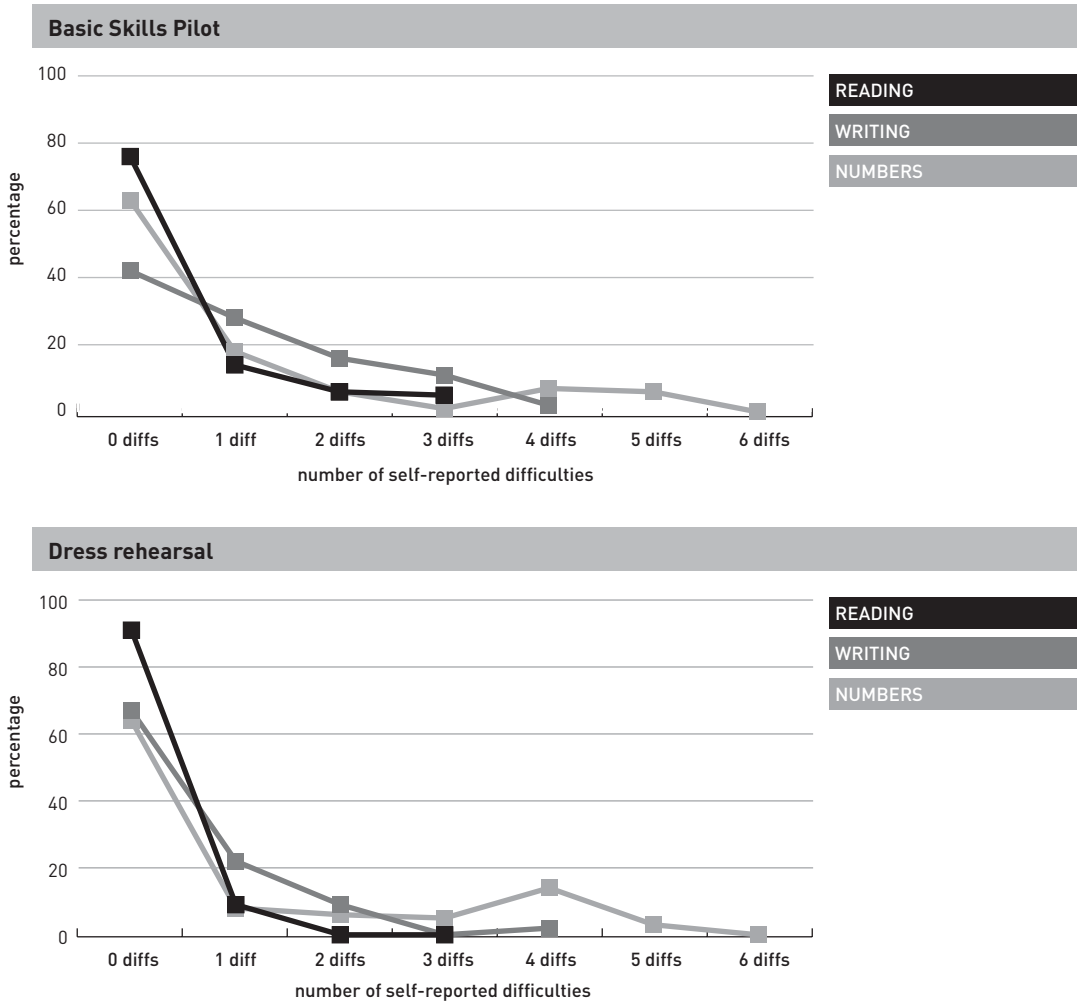
For the questions not previously asked to all cohort members in previous sweeps, many of the Basic Skills Pilot and dress rehearsal population samples reported difficulties with at least one aspect of reading, writing or numberwork. This was highest at 37 per cent for spelling (pilot sample), and 30 per cent for division (dress rehearsal). Interestingly, a higher percentage of the general population sample used in the Basic Skills Pilot consistently reported specific reading and writing difficulties, but a higher percentage of cohort members in the dress rehearsal pilot reported difficulties with the mathematical calculations of addition, subtraction, multiplication and division. Figure 2.1 shows the percentages reporting the specific number of reading, writing or numberwork difficulties. It can be seen that broadly

24. Although both the NCDS and BCS70 cohort members have remained remarkably representative of the original 17,000 plus cohort members, attrition has occurred and it is most notable among those with fewer qualifications and at the lower end of the socio-economic strata. For further details, see Shepherd, P (1993). 'Analysis of Response Bias' in Ferri, E (ed.) **Life at 33; the fifth Follow-up of the National Child Development Study**. London: National Children's Bureau and City University, and Shepherd, P (1997). 'Survey and Response' in Bynner, J, Ferri, E and Shepherd, P (eds.) **Twenty-something in the 1990s: getting on, getting by, getting nowhere**. Aldershot: Ashgate Publishing Ltd.

the same pattern emerged in both pilot surveys with difficulties with numbers showing up most frequently, followed by difficulties with writing and then reading.

This will make for interesting analysis opportunities when the data are made available in early 2005. The complete list of questions asked on basic skills difficulties is included in tables A3.1a, A3.1b, A3.1c in the basic skills appendix.

Figure 3.1: number of reading, writing or number work difficulties reported in the Basic Skills Pilot and dress rehearsal



3.3 Literacy and numeracy assessment items

A review of available assessment instruments that had been used to assess adult reading, writing and numeracy in English in a UK setting was carried out by Greg Brooks and colleagues²⁵ for NRDC. The principal aims of this review were to identify the best instrument for different research purposes:

- progress in response to teaching; and
- investigation of the origins and consequences of basic skills difficulties.

The latter helped in the choice of assessment instruments for use in the 2004 cohort survey. The two best candidate instruments that emerged were:

- tests previously used in the 1958 and 1970 cohort studies;
- the *Skills for Life Survey* (also known as the National Survey of Adult Basic Skills Needs and as the Adult Basic Skills Baseline Survey)²⁶.

The baseline survey was devised by the Centre for the Development and Evaluation of Lifelong Learning (CDELL) at the University of Nottingham, for the Department for Education and Skills (DfES). Following much consultation with colleagues at CDELL²⁷ and in the Institute of Education, a new assessment tool for piloting was designed from these two sources. By retaining some tasks that cohort members completed in the earlier surveys, and importing new tasks from the baseline survey, the new assessment tool would aim to:

- enhance longitudinal analysis by measuring individual improvement and deterioration over time;
- extend the scope of the assessment by being comparable with the current national *Skills for Life Survey*; and
- maintain continuity with the earlier basic skills surveys.

3.3.1 Previous assessment of basic skills in BCS70 and NCDS

These previous assessments were administered as part of larger paper-based surveys, and as such took no more than 30 minutes of total interview time. In both BCS70 and NCDS surveys, each of the functional literacy and numeracy assessment tasks consisted of giving cohort members a visual stimulus and then asking a number of questions about it. Questions were set at levels of difficulty in accordance with the City and Guilds WordPower and NumberPower standards at the time: foundation level, level 1, level 2 and level 3 (literacy only) and were 'open response' in format.

3.3.2 The *Skills for Life Survey* literacy and numeracy assessments

The Baseline Survey was carried out by BMRB Social Research²⁸ on behalf of the DfES in 2002. The aim of the survey was to produce a national profile of adult literacy and numeracy competence using computer-based multiple-choice items. The numeracy items are based on

25. Brooks, G, Heath, K and Pollard, A (2005). **Assessing adult literacy and numeracy: a review of Research Instruments**. London: NRDC.

26. Williams, J, Clemens, S, Oleinikova, K and Tarvin, K (2003). **The Skills for Life survey: A national needs and impact survey of literacy, numeracy and ICT skills**. DfES Research Report 490.

27. Special thanks to Peter Burke, John Gillespie and Bob Rainbow, consultants at CDELL.

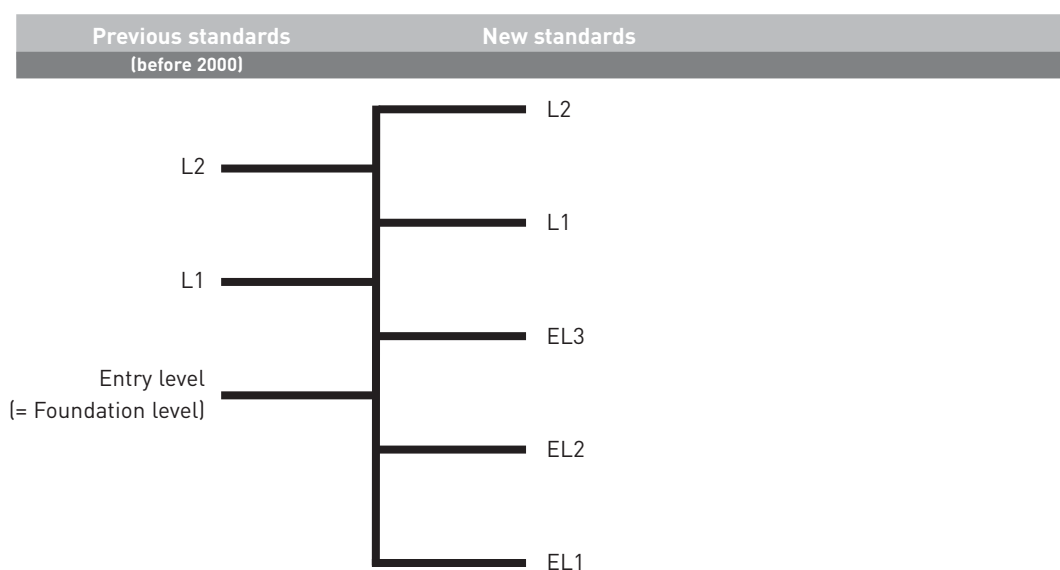
the Adult Numeracy Core Curriculum for England, the literacy items on the National Adult Literacy Standards²⁹.

The items are set at five levels of difficulty: entry level 1, entry level 2, entry level 3, level 1 and level 2, the most difficult. Figure 3.2 gives a comparison of the old and new standards.

The assessment was carried out in the style of adaptive testing. With this approach, algorithms route the individual respondent to items at an appropriate level for that person, based on their previous response(s). Each respondent who completed the literacy assessment answered between 17 and 20 items from a total of 70 items. Similarly, each respondent who completed the numeracy assessment answered 19 from a total of 48 numeracy items. Each of the literacy and numeracy tests was designed to take 20 to 25 minutes (on average) to complete.

The assessment items were presented to respondents on a laptop computer. The interviewer typically sat alongside the respondent so both could see the screen. After going through some introduction screens with the interviewer on how to do the assessment, the respondent would read the question and corresponding information on the screen for each question, then select from (in most cases) four alternative answers. The interviewer would input this choice into the laptop: the next question was then selected automatically according to the algorithm and displayed.

Figure 3.2. Comparison of previous and new standards



Source: The Adult Literacy Core Curriculum Trainers' Pack (2001). Module 1, Unit 2, OHT8, page 36. Department for Education and Skills / The Basic Skills Agency.

L = Level EL = Entry level

28. Key players: Joel Williams, Sam Clemens, Karin Oleinikova and Karen Tarvin.

29. At the time when the survey was designed, the Adult Basic Skills Core Skills Literacy Curriculum was not available and the CDELL team had therefore to select and adapt the QCA Key Skills criteria and 'Standards for Adult Literacy' when creating the survey.

3.3.3 Research and design considerations

The two assessment tools identified as the most appropriate for use in the 2004 survey presented many research questions and design challenges before preparations for piloting could begin. The main issues were as follows.

- Multiple-choice or open-response question format:
 - One method of question or a combination of both?
 - Would changing the question format from multiple-choice or open-response alter the task difficulty, making it easier, more difficult?
- Adaptive testing or answer all approach:
 - Assessing the need for overall percentage pass/fail rates against adaptive testing and ‘spiky profiling’ (detailed below).
- Paper based or computer assisted:
 - The Blaise computer programme used by NatCen has different strengths and weaknesses compared to the programme used by BMRB. Some of the images and questions used in the Baseline survey would need to be altered before they could be Blaise compatible.
 - Would changing the presentation of a question alter the task difficulty?
 - Computer-aided testing sets limits on questions being asked and has ‘corrections’ to answers supplied by respondents built in to the computer programme. Although similar rules can be adopted for paper-based versions, the much greater degree of control the interviewer (and respondent) has over the testing situation with the paper-based test, means that there is less assurance that the rules are being strictly applied.

A combined approach was decided upon. This ensured that the proven strengths of the two chosen assessments were retained. All questions used would be presented in their original format and medium, i.e. questions from the Baseline Survey would be multiple-choice in format and presented on the computer; questions from the previous cohort assessment would be open-response and paper-based. A simple method of adaptive testing that involved two tiers would be adopted for the pilot study. Essentially, all respondents answered an initial set of questions. Depending on the number of correct answers a respondent gave to these initial questions, they either progressed to:

- a set of harder questions – the ‘upper tier’; or
- a set of easier questions – the ‘lower tier’.

It was hoped that this approach would permit an overall score based on all respondents to be calculated, along with allowing a ‘spiky profile’ to be built for those with the poorest grasp of the basic skills (those on the lower tier). Such profiles reflect a respondent’s ability through practice to show a high level of competence in one domain of the skill, while performing very badly in other domains. For example, individual experiences mean most people develop particularly competent numeracy skills in some application areas, while needing help in others. By giving respondents who struggled with the initial set of questions an additional set of easier questions, we have an opportunity to really see just what the men and women assessed with the poorest skills are capable of, rather than just knowing what they cannot do. We also needed to provide a distribution of cohort members across test score ‘levels’, in line with the Baseline Survey.

3.3.4 The Basic Skills Pilot: assessment design

The multiple-choice questions and images were presented on a computer screen; the open-ended questions were presented in paper format (showcards). To ensure the respondent was

familiar with the multiple-choice procedure, the interviewer went through the rules of the assessment and a practice question before the start of the literacy and the numeracy assessment. The order of the assessment was:

- one practice multiple-choice literacy question;
- multiple-choice literacy questions;
- open-response literacy questions;
- one practice multiple-choice numeracy question;
- multiple-choice numeracy questions; and
- open-response numeracy questions.

3.3.5 Aims of the Basic Skills Pilot

The main objective of the basic skills pilot was to gain the information required to design an assessment tool based on the best combination of multiple-choice questions that, in conjunction with the open-response questions, would take an average of 30 minutes to administer. Timing was crucial. While considerations for the selection of specific multiple-choice and open-response questions will be discussed in detail later on in this report, the development of the assessment following 'time taken' information from the basic skills pilot is now described.

The CAPI programme included a number of 'time stamps' that recorded when particular questions were reached during the interview. The overall mean and median times taken to complete the literacy and numeracy assessments are given in table 3.4³⁰. As we can see, respondents took on average between 32 minutes, 30 seconds – 44 minutes, 42 seconds to complete both the literacy and numeracy assessments, dependent upon if progress was along the 'lower' or 'upper' tiers. To reduce the average time to the allocated 30 minutes of survey time, a minimum of 2 minutes, 30 seconds – 14 minutes, 42 seconds needed to be saved. More questions were piloted than we would hope to include in the final assessment, so 'time taken' was recorded for every multiple-choice question. This way, time taken, question difficulty and curriculum coverage could all help inform question selection. As the open-response questions were far fewer and integral to the aims of the overall assessment, the time saving revisions to the assessment for the dress rehearsal were made within the multiple-choice section of the assessment.

Feedback from interviewers indicated that respondents who felt they should have been able to answer a question – generally those with more education – tended to persist until they achieved a satisfactory answer, no matter how long that took. Less able – or less confident – respondents clearly guessed responses to questions that they felt they had no likelihood of answering correctly. This may have been one, though not the only, reason why items in the upper tier in the numeracy assessment took longer on average than those in the lower tier. If the level of difficulty was pitched too high, response time would be more likely to have been polarised in this way.

Given the restrictions, which do not permit details of the original baseline questions to be published, the value of a detailed description of which questions were the most difficult or

30. Because these tend to record 'real time', they take no account of anomalies – for example breaks in the interview – and so outliers have been excluded in calculating these. All time calculations were helpfully provided by the NatCen research team.

took the longest, etc.) has obvious limitations³¹. However, the longer time taken for the fewer numeracy questions indicates that, not unexpectedly, the sample as a whole found the numeracy multiple-choice questions harder than those assessing literacy skills.

After the rigorous selection criteria had been applied to all multiple-choice questions included in the Basic Skills Pilot, the estimated average time for completion of the 20 selected literacy multiple-choice questions based on results from the Basic Skills Pilot was 9:31 minutes (upper tier); 8:52 minutes (lower tier). The estimated average time for completion of the 17 selected numeracy multiple-choice questions, again based on results from the Basic Skill Pilot, was 13:06 minutes³². As shown in table 3.4, these estimates were very accurate and the average time taken to complete all parts of the literacy and numeracy assessments in the dress rehearsal was 29 minutes, 22 seconds. No further amendments were necessary. The design of the assessment used in the dress rehearsal was taken forward to the main fieldwork.

Table 3.4. Average time taken for literacy and numeracy assessments

	Basic Skills Pilot		Dress rehearsal
	minutes : seconds		minutes : seconds
Literacy multiple-choice*	13:18		9:28
Literacy open-response	3:47		4:21
Combined literacy time	17:05		13:49
	upper tier	lower tier	
Numeracy multiple-choice	17:50	9:47	11:57
Numeracy open-response	4:38	4:38	3:36
Combined numeracy time	27:37	15:25	15:33
Combined total time (literacy + numeracy)	44:42	32:30	29:22

* As so few respondents progressed along the lower tier in the literacy assessment in both the Basic Skills Pilot (n=10) and the dress rehearsal (n=6), separate timings were not calculated.

3.4 Multiple-choice literacy and numeracy assessment items

Once the design issues detailed above had been resolved, attention turned to the selection of questions to be included in the assessment. The literacy and numeracy assessments, multiple-choice and open-response questions, could take no more than 30 minutes of survey time in total. More questions were piloted than we would use in the final assessment to facilitate selection of the questions that would provide as comprehensive coverage as possible of the Adult Literacy and Numeracy Core Curricula for England within the time constraints. They would also supply, for comparison, assessment of basic skills levels in Scotland and Wales. A lot of time was spent on the selection of the questions for this initial 'cut'. 44 literacy and 26 numeracy questions were selected.

Detailed information was available to aid selection of the 'open-response' questions (as

31. A table showing percentage of respondents incorrectly answering each multiple-choice item in the literacy and numeracy assessment, together with the average time taken by respondents to complete each question is provided in table A3.2a and 3.2b in the basic skills appendix.

32. The 'upper' and 'lower' tier of the numeracy assessment was dropped after the pilot. Full details are included later in the report.

discussed in section 3.5), but for the multiple-choice questions, only pass/fail rates for the overall sample ($n=2,849$)³³ were available. However, due to the nature of adaptive testing, the reported pass/fail rate for an individual question only related to the number of respondents who had attempted that question, i.e. item response rates were calculated for particular levels rather than for the test as a whole. For our purposes, however, overall failure rates were needed. Two simple rules, based on assumptions with obvious limitations, were applied:

- if a respondent had not attempted a question because they had been routed to a more difficult question, it was assumed they would have passed the question; and
- if a respondent had not attempted a question because they had been routed to an easier question, it was assumed they would have failed the question.

By applying these rules, radically different pass/fail rates were sometimes calculated for a question. The literacy assessment is used for illustration purposes. From the sample data provided by BMRB:

- 7 per cent (199) respondents entered the assessment at entry level 2 or entry level 3; and
- 37 per cent (1,051) respondents entered at level 1;
- 56 per cent (1,599) respondents entered at level 2.

The assumptions of adaptive testing imply that the respondents who entered the assessment at level 1 or level 2 would answer the entry level 2 and entry level 3 questions correctly. Failure rates for entry level 2 and entry level 3 questions based on the whole sample of 2849 would be much lower than failure rates based on the 199 respondents who entered the assessment at entry level 2 and entry level 3. For example:

- if 94 of 199 respondents answered incorrectly, the failure rate is 47 per cent; and
- if 94 of 2,849 respondents answered incorrectly, the failure rate is 4 per cent.

Similar rules were applied, depending on the 'layer' or 'step' of the literacy and numeracy algorithm. After recalculating failure rates for all individual questions in this crude way, we were able to eliminate questions that were 'too easy' or 'too difficult'. As for questions previously used in the cohort studies assessment, questions failed by less than 1 per cent and more than 50 per cent were the first to be omitted.

As indicated, some of the selected questions needed to be adapted to run successfully on the computer programme Blaise. The original questions were designed to be read and answered by the respondent with no intervention by the interviewer, except that the latter entered the chosen response using a mouse. The images, layout and format of the original screens were preserved as far as possible. In most cases, the two programs resembled each other closely, while in some, particularly questions presented in 'drag-and-drop' format and/or with 'multiple answers', the Blaise version differed from the original. Figure 3.3 provides more details.

33. When the data from the Baseline Survey was first examined (November 2002), data was available for 2,849 respondents. The final sample size was 8,730 respondents, but the literacy test was taken by 7,874 of them and the numeracy test was taken by 8,040.

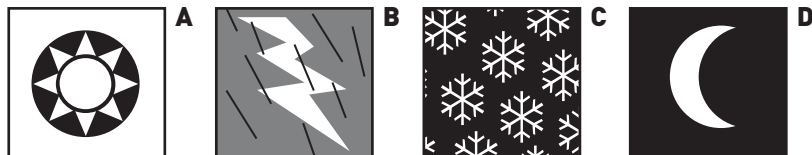
Figure 3.3. Example of a drag-and-drop multiple-choice question**Drag-and-drop format**

In the original format, the respondent had to tell the interviewer the letter that matches his/her answer (A, B, C or D) and the interviewer had to drag and drop the appropriate image in the empty space at the top left hand side of the text using the mouse. In the BCS70 assessment, the cohort member had to key in 'A', 'B', 'C' or 'D'.

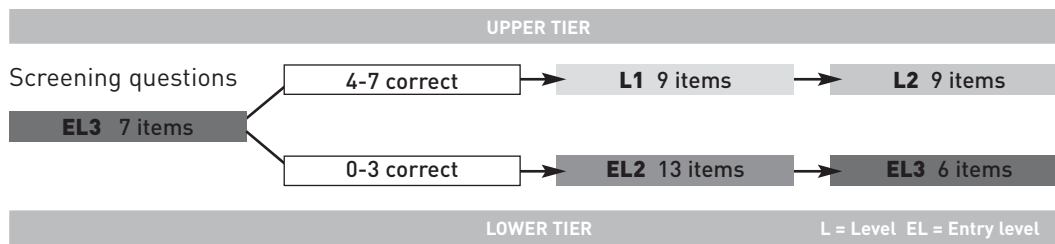
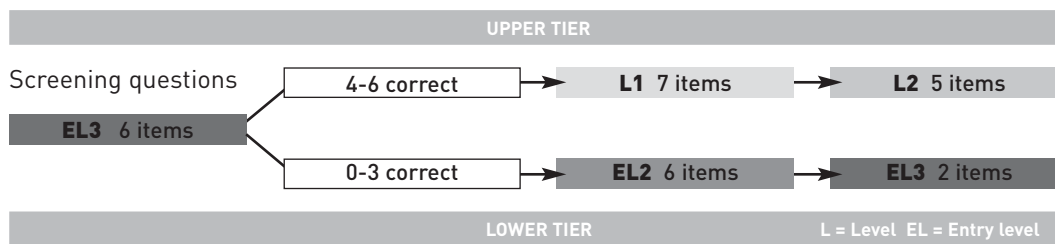
TODAY'S WEATHER

Today will be a very bright and hot sunny day

Which image would you put in the box to show what the weather will be like today?

**3.4.1 Design of the 'multiple-choice' assessment**

Figures 3.4a and 3.4b show the simple algorithm that directed respondents through the two 'tiers' or 'levels' of the multiple-choice questions in both the literacy and numeracy assessments. The number of correct responses to the initial set of screening questions (entry level 3) directed respondents along either the upper tier (level 1 and level 2 questions) or along the easier lower tier (entry level 2 and then a few more entry level 3 questions). If a respondent had four or more correct answers, they progressed along the upper tier. Between zero and three correct answers sent them along the lower tier. Overall, respondents on the upper tier had 25 literacy or 18 numeracy questions; respondents on the 'lower' tier had 26 literacy or 14 numeracy questions. Administration details are given in figure 3.5.

Figure 3.4a. Design of the (pilot) literacy multiple-choice assessment**Figure 3.4b. Design of the (pilot) numeracy multiple-choice assessment****Figure 3.5. Administration of the multiple-choice assessment**

For this part of the assessment, the interviewer and respondent sat side-by-side, so both could see the screen. Each question consisted of a visual image and some text. Once interviewers had taken the respondent through the practice question, they could not give any guidance or feedback to the respondent. The respondent read the text/question on the screen, then selected from (in most cases) four alternative answers: A, B, C and D*. The respondent then told the interviewer their choice and the interviewer input this choice into the laptop. In Blaise, response options must be entered as 1, 2, 3 and so on. Green coloured stickers were labelled and placed on the appropriate keys (A=1, B=2, C=3, D=4, E=5). Once an answer was entered, the next item appeared on the screen automatically. A respondent could not go back to a previous question and change their answer once it had been entered. Interviewers could only reiterate which response option the respondent had selected for an individual questions, and offer neutral encouragement, such as 'yes', 'okay', 'thank you' etc. after each answer.

*There were five alternative answers for one of the questions and three alternative answers for two of the questions.

3.4.2 The Basic Skills Pilot: feedback and results³⁴

Other than the time taken to complete the assessments, as discussed earlier, other objectives to achieve from the Basic Skills Pilot were:

- **two tiers:** to see if the two tiers proved effective. The aim was to be able to calculate an overall score, while at the same time gaining more detailed knowledge – a ‘spiky profile’ – of those with the poorest grasp of literacy and numeracy;
- **question format and sequence:** to see if changes made to specific questions made them difficult to understand and how the placement of ‘repeated images’ affected respondents;
- **instructions:** were respondents clear about what they had to do?; and
- **other difficulties:** to see what administrative or other difficulties arose for interviewers and respondents.

Two tiers: did the two tiers prove effective?

Of the 177 respondents in the Basic Skills Pilot, 6 per cent (n=10) progressed along the lower tier of the multiple-choice part of the literacy assessment. This figure is in line with previous studies, and suggests the screening questions were able to identify accurately the small group of adults with the most severe literacy difficulties. However, 34 per cent (n=60) of respondents progressed along the lower tier of the multiple-choice part of the numeracy assessment. Bearing in mind the relatively small sample size and consequent high sampling error, this figure is higher than expected from previous studies, where no more than 1 in 4 cohort members were identified with very limited numerical skills, and this suggests that the screening questions were either too difficult or maybe too specific, i.e. they were not broad enough to capture a range of number skills. Thus, more respondents were penalised (sent to the lower tier) for not having the skills being assessed by the specific screening questions selected, whereas many of them might have been able to do higher level tasks.

Calculation of overall total scores

In addition to providing the opportunity for a detailed examination of the adults in BCS70 with the poorest literacy and numeracy skills, the final literacy and numeracy assessments also needed to provide a total score that could be calculated for all cohort members. For analytic purposes, it is vital to be able to have a single measure that gives the distribution of the spread of literacy and numeracy scores across a truly representative adult population. As detailed earlier, in order to do this, we have to assume that respondents progressing along the lower tier would not be able to answer the multi-choice questions on the upper tier (level 1 and level 2).

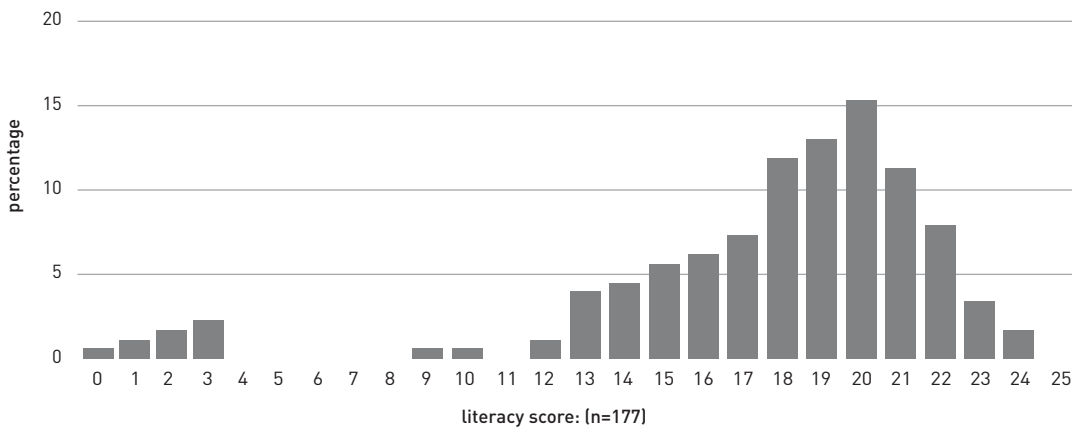
Any correct answer was given ‘1’ point, an incorrect answer ‘0’ points. For the numeracy questions with more than one correct answer, ‘1’ point was only awarded if all parts of the questions had been correctly answered. Respondents on the lower tier were awarded ‘0’ points for each of the questions on the upper tier. The maximum literacy score available was 25, the maximum numeracy score available was 18. By using this approach, respondent scores for those who progressed along the lower tier of the multiple-choice part of the assessment were highly skewed at the lower end: the maximum score they could attain was 3. Unlike with literacy, where no more than 6 per cent of respondents progressed along the lower tier, 1 in 3 of all respondents went along the lower tier of the numeracy assessment. Figures 3.6a and 3.6b give the distribution of respondents by total score attained in the

34. This section draws on the detailed report of the Basic Skills Pilot produced by the NatCen research team.

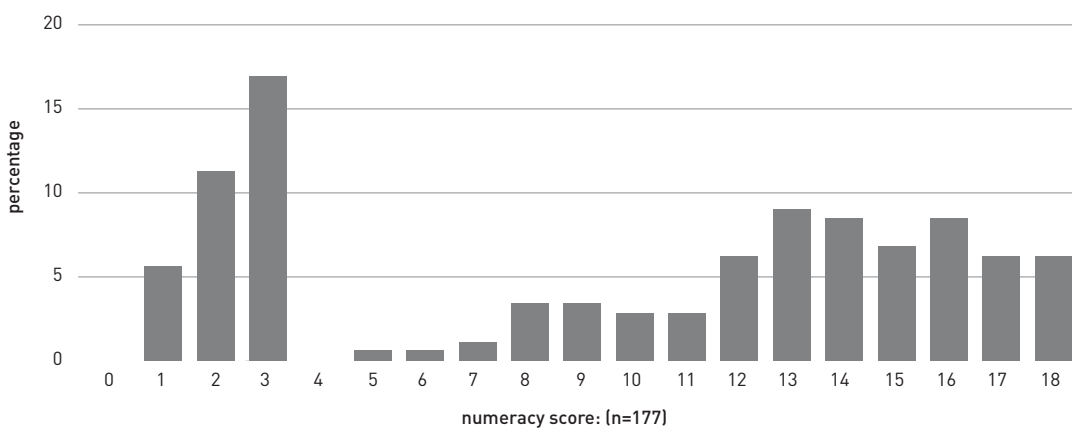
literacy and numeracy assessments. The literacy assessment clearly produced a good spread of scores with, as we might expect, a bias towards high performance. This reflects the relatively low incidence in the population of very poor reading skills.

For the numeracy assessment, the picture was rather different. The pilot results showed that an overall score could not successfully be interpreted from results of the two-tiered numeracy assessment. A third of respondents had difficulty with the initial set of questions and progressed along the easier lower tier of the assessment. As such, the scores formed more of a bimodal distribution with little or no continuity in performance from the lower to the upper tier. Even though the distribution of scores obtained from earlier studies suggested that a high number of low performers was to be expected (1 in 4), as reflected in a flatter more even distribution of respondents from low to high scores, the 'two-tier' design would still result in a distortion of true performance. This is because the true distribution of scores for the population as a whole would not be adequately reflected by the assessment because the poor performers were effectively excluded from tasks that they might have been able to do, suggesting they were a different population. As an overall score of performance measured on a continuous scale is an essential requirement of the basic skills assessment, the design strategy for the numeracy assessment needed to be revised.

**Figure 3.6a. Total literacy score from multiple-choice questions
(all respondents – if assumed lower tier get upper tier wrong)**



**Figure 3.6b. Total numeracy score from multiple-choice questions
(all respondents – if assumed lower tier get upper tier wrong)**



Question format and sequence

Each screen contained three different elements:

- an image, with a combination of text, pictures and graphic prompts, e.g. a box to indicate a missing word;
- the question being asked;
- the list of response options.

While the responses were always at the bottom of the screen, the questions were sometimes above or below the images. Interviewers reported the inconsistent screen layout meant many respondents struggled to grasp what was expected of them in this section.

Clear instructions

Example question: At the start of the literacy and numeracy multiple-choice sections, the interviewer demonstrated to the respondent what they had to do by taking them through an example question³⁵. Interviewers felt that the examples, particularly the one used at the start of the literacy assessment, were not well chosen.

'Don't know' or 'Pass' option: the Baseline Survey made the 'don't know/can't guess' option explicit, but the full interviewer instructions had not been available before the pilot briefings. The pilot protocols did not include clear instructions about how to register an inability to reach a response (not quite the same as 'don't know') and interviewers felt it was clear that many respondents simply guessed at questions they felt unable to answer, or struggled on for far longer than necessary before asking for interviewer assistance.

Other administration points

Order of the assessment: the order of the assessment components and corresponding administration changes meant a lot of shifting of position of computer, interviewer or respondent. For the introduction and multiple-choice questions, both respondent and interviewer needed to see the computer. For the open-response questions, the respondent could not see the screen as the answers were on the screen. In general, interviewers found the procedure unnecessarily clumsy, whilst in some households it proved particularly difficult to find appropriate places to sit.

CASI: all interviewers raised why this part of the interview was not self-administered through CASI, with the respondents entering the responses themselves³⁶. In the main BCS70 fieldwork, this mode of administration might seem particularly incongruous as cohort members would have just completed a standard CASI. In 1999/2000, when cohort members were last interviewed, 6 per cent asked for assistance when completing the CASI (5.6 per cent from the interviewer, 0.4 per cent from a family member).

Mistakes in original screens: the original screens contained some spelling mistakes and other errors. These were corrected in later versions of the program.

35. These questions were selected from the battery of questions in the Baseline Survey not selected for piloting. The two questions were set at entry level 3.

36. Indeed, a couple of interviewers offered this option to respondents; it made their role – expressly forbidden to do anything other than enter responses and offer non-directional encouragement – easier to comprehend. Some interviewers found their passive role hard to sustain when respondents seemed completely lost. They were frustrated by the lack of advice in the protocol on how to move forward if a respondent became stuck on a question for a long time.

3.4.3 Design of the final multiple-choice assessment

Revisions to the administration, basic design and question layout of the multiple-choice assessment were implemented following feedback from interviewers and further consultation with our colleagues at CDELL.

CASI: the first change was that the assessment would be completed as a CASI. In most households, the flow of the interview meant cohort members would complete the assessments just after they had answered a set of questions on their views, opinions and other personal matters in CASI format. As long as they understood what was being asked of them, i.e. the introduction screens were clear, there was no reason for keeping to the way the assessment had been conducted for the Baseline Survey. In the Baseline Survey, questions were answered by using the mouse, but cohort members only had to press a key to record their answer. However, if a cohort member did not want to press the keys themselves, the interviewer would enter their answers for them within the same restrictions employed for the pilot study, i.e. they could provide no help or feedback, only neutral encouragement.

Instructions: the introduction to the multiple-choice questions was changed to be the same as that used in the Baseline Survey. This consisted of three examples of questions and a number of other information screens that the interviewer read out and went through with the respondent. Apart from improving the instructions to respondents, consistency with the protocols of the Baseline Survey was maintained.

Sequence: the change in the order of the components of the overall assessment improved the flow of the assessment, cutting down on the number of times the interviewer, respondent or computer needed to shift position. The order of the assessment was now:

- introduction to multiple-choice questions as used in Baseline Survey (with minor amendments);
- multiple-choice literacy questions;
- multiple-choice numeracy questions;
- open-response literacy questions; and
- open-response numeracy questions.

Layout: the layout of each question on the screen was standardised as follows:

- the question appeared at the top of the screen;
- an image, with a combination of text, pictures and graphic prompts, e.g. a box to indicate a missing word, in the middle of the screen; and
- the list of response options at the bottom of the screen.

A 'don't know/not sure' (pass) key was introduced. This was explained to respondents during the introduction screens. As with the other keyboard keys, respondents would use (A=1, B=2, C=3, D=4, E=5), a (blue) coloured sticker was placed on the relevant key they had to press, although it was not labelled ('don't know' = 9). A big red sticker was placed on the ENTER key.

3.4.4 Selecting multiple-choice questions for the final assessment

Two of the three criteria that had been applied to the selection of the open-response questions were applied to the multiple-choice questions (see tables A3.2a and A3.2b in the basic skills appendix for full details³⁷). These were:

- 'not too easy or too difficult': if less than 1 per cent or more than 50 per cent of respondents gave an incorrect answer to an individual question, the question was excluded from the selection process; and
- 'free from gender bias': in the earlier basic skills surveys, a gender bias was evident for some items with women tending to do marginally better than men on most reading items and substantially worse on some of the numeracy items, of which calculating areas of a room and working out percentages were the most notable examples. Accordingly, a male-female bias was calculated for each question by subtracting the failure rate of men from the failure rate of women. Items with a 10 per cent or higher difference were excluded.

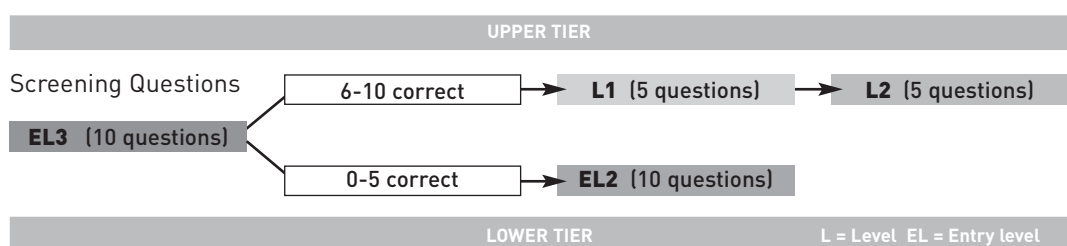
At this stage of development it was also critical to consider:

- 'the national curricula': ensure coverage of as many aspects of the national literacy and numeracy curricula as possible, taking into account the aspects already covered by the open-response questions; and
- 'time taken': the time taken to complete an individual question was also a critical factor.

3.4.5 Literacy multiple-choice assessment changes

The two-tier literacy assessment was retained, with some modifications. A total of 20 multiple-choice literacy questions made up the final assessment. Figure 3.7 shows the number of entry level 3 screening questions was increased to ten. Respondents failing to answer at least six of these questions correctly went on to answer ten entry level 2 questions on the lower tier. Respondents who answered between six and ten screening questions correctly proceeded to the upper tier, and answered five level 1 and five level 2 questions.

Figure 3.7. Final literacy multiple-choice assessment



3.4.6 Numeracy multiple-choice assessment changes

A high proportion of men and women in the general population have number difficulties³⁸. Adults with the poorest grasp of literacy (as defined by this assessment) essentially have limited reading skills, whereas the difficulties for adults with the poorest grasp of number skills are more varied. Some adults will be comfortable using numbers in a specific context or environment, very much dependent upon their individual experiences. Outside this context or environment, their number skills could flounder. For example, although a person could easily calculate the correct number of bits of wood needed to lay a floor in a room of a certain size,

37. It was not possible to apply the 'good discriminator' criterion to the pilot data, given the limited sample size.

38. Parsons, S, and Bynner, J (1999). Literacy, Leaving School and Jobs: the effect of poor basic skills on employment in different age groups. London: The Basic Skills Agency.

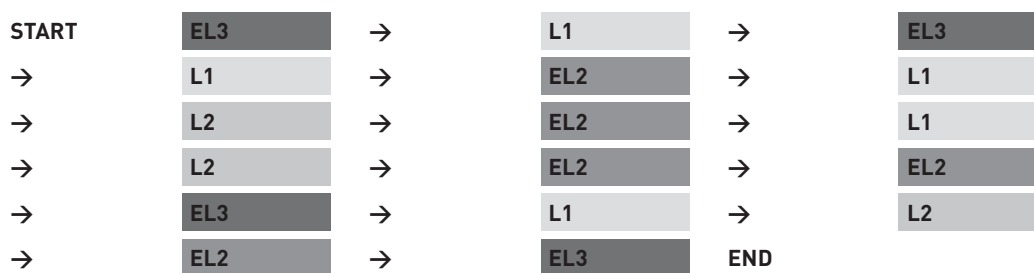
they could not work out the cost of spreading a £500 holiday over six monthly instalments. Unlike literacy, this 'context-specific use' can vary enormously. The widespread and diverse nature of difficulties associated with numeracy in the general population suggest that creating a 'spiky profile' of number skills at the population level would have equal, if not more, value than restricting this examination to the one in four or one in three with the poorest grasp of numeracy. The next stage of development for the BCS70 numeracy assessment was therefore concentrated on the design of an assessment that required all respondents to attempt all questions. The decisions were based on results of the pilot study. The aim was to include 20 questions in the final assessment, as for literacy, but time restrictions limited the final number to 17 as numeracy questions generally took longer to answer in the pilot study. Two options for how to administer the numeracy assessment were considered:

- i) Start the assessment with the easiest questions, progressively increasing question difficulty.
- ii) 'Mix up' questions by difficulty but administer them by curriculum topic, i.e. all questions set at different levels that related to 'money calculations' would follow each other, before any questions on 'whole numbers and time'.

Option 'i' is the more traditional approach, but option 'ii' was preferred for its potential of capturing more of the aspects of numeracy an individual respondent can and cannot do. As there could only be a maximum of 17 multiple-choice questions, not all aspects of the curriculum could be covered by the questions selected at each level. Respondents may have difficulty with the particular questions set at entry level 3, but because of their own particular experiences be able to answer questions set at level 1 or level 2. For example, a respondent may be very competent at questions to do with calculating money and be able to answer a question set at level 2, but not be able to answer a question on calculating proportions, even though this question was an 'easier' entry level 3 question.

There is the potential in option 'ii' for a respondent to become disheartened earlier on in the assessment as harder questions appear earlier, but it is likely that they will be encouraged to continue by the appearance of an easier question that they are confident of attempting. In addition, the revised assessment started and ended with an entry level 3 question, as detailed in figure 3.8.

Figure 3.8. Sequence of difficulty of questions in final numeracy assessment



L = Level EL = Entry level

For the numeracy assessment, as all respondents attempted all questions, the aim was to select (at least) 4 questions from each of the 4 levels of difficulty, entry level 2, entry level 3, level 1 and level 2.

Attention was given to the feedback from the pilot study, thus repeated images were avoided to stop the confusion felt by respondents who thought they had already answered an individual question. This was a problem particular to the numeracy assessment as images were not grouped together as they had been for the literacy assessment. Images that had been dramatically changed from the original baseline image (particularly those which had been in drag-and-drop format) were also avoided, to retain as much homogeneity with the original assessment as possible.

To obtain as balanced a set of questions as possible in relation to curriculum coverage, difficulty levels and no repeat images, the final assessment is made up of five questions set at entry level 2, four questions at entry level 3, five questions at level 1 and three questions at level 2.

3.4.7 Results from the dress rehearsal

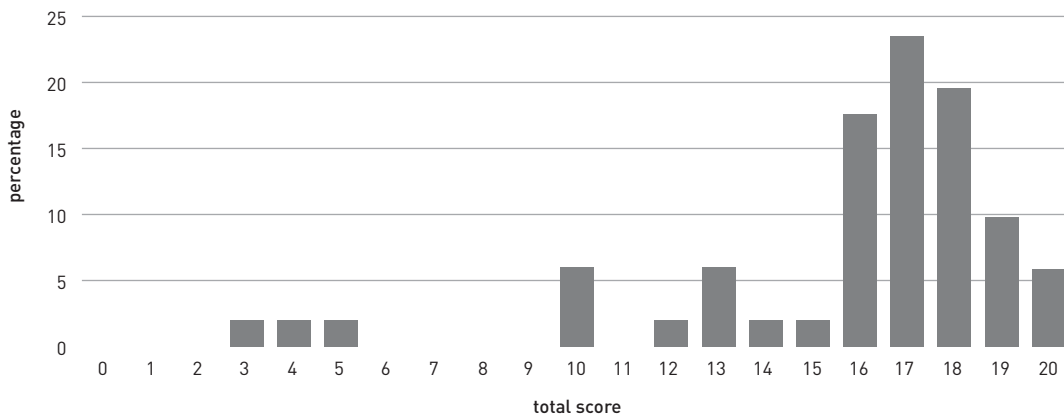
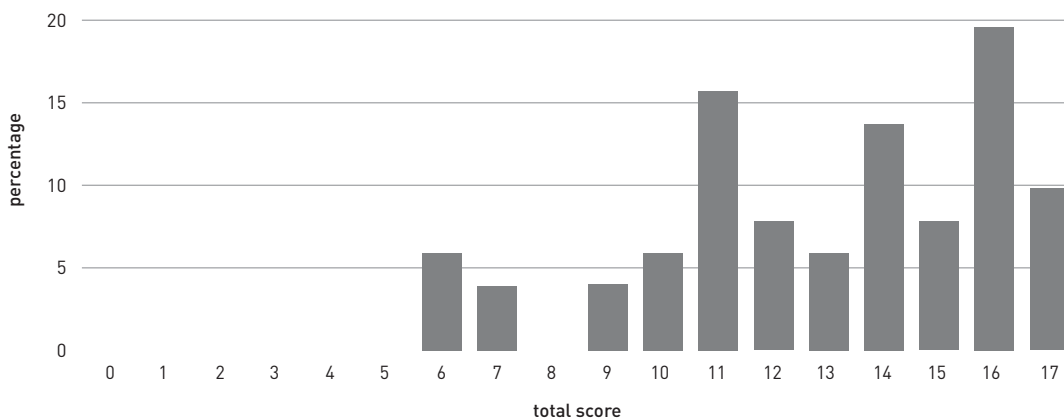
Literacy

A random sample of 64 cohort members took part in the dress rehearsal: 95 per cent progressed along the upper tier of the literacy assessment, 5 per cent progressed along the lower tier of the multiple-choice part of the assessment. This is only slightly lower than the 6 per cent from the pilot study and previous analysis of cohort members. This result does suggest, therefore, that the screening questions were able to accurately identify a group of adults with the most severe literacy difficulties. The small number of lower tier respondents in the pilot or dress rehearsal study restricts any analysis of this crucial group. However, if a similar 5–6 per cent of the BCS70 cohort dropped down to the lower tier, we would have the rare opportunity to examine the specific circumstances and difficulties of some 500–600 adults with the poorest grasp of literacy.

The assessments also needed to generate a total score calculated for all respondents. To do this, we again assumed that the cohort members who progressed along the lower tier of the multiple-choice assessment (those who answered more than five of the initial ten entry level 3 questions incorrectly) would have answered the more difficult level 1 and level 2 questions incorrectly. Any correct answer was given '1' point, a wrong answer '0' point. Respondents on the lower tier were awarded '0' points for each of the questions on the upper tier. The maximum literacy score available from the multiple-choice questions is therefore 20. The distribution of respondents by total score attained is given in figure 3.9a. As before, the distribution is skewed towards high performance in much the same way as in the pilot.

Numeracy

For numeracy, between four and seven cohort members did not even hazard a guess at at least one of six of the 17 multiple-choice questions and made use of the 'don't know' option. As all cohort members attempted identical questions, a total score was calculated without assumptions made about a cohort member's likely performance on un-attempted test items. Any correct answer was given '1' point, a wrong answer '0' point (including 'don't know'). One question required a 'multiple answer'. In this instance, a score of '1' was only awarded if both of the two correct answer options were selected. The maximum total score available for the numeracy assessment was 17. The distribution of respondents by total score attained is given in figure 3.9b. Again, bearing in mind the even smaller sample this time and large sampling error, although a small group still showed an exceptionally poor performance on the assessment, there was no evidence of the kind of bimodal distribution we saw earlier. In other words, by removing the 'screen' that placed relatively high numbers of respondents on a lower tier, the main aim of the test construction – that of achieving continuity in the measurement of performance in the population from one level to the next – was achieved.

Figure 3.9a. Total literacy score from multiple-choice questions**Figure 3.9b. Total numeracy score from multiple-choice questions**

3.5 Open-response literacy and numeracy assessment items

In 1991, when age 21, a representative 10 per cent sample of BCS70 had their functional literacy and numeracy assessed. These assessments were administered as part of a much larger paper-based survey, and as such could take no more than 30 minutes of a 90-minute interview. Each of the functional literacy and numeracy assessment tasks consisted of giving cohort members a visual stimulus and then asking a number of questions about it. Questions were set at levels of difficulty in accordance with City and Guilds WordPower/NumberPower standards at the time: foundation level, level 1, level 2 and level 3 (literacy only) and were 'open-response' in format. Inclusion of some of these questions in the new 2004 basic skills assessment tool enhances longitudinal analysis and measures change, improvement and deterioration over time.

The findings from this and a similar NCDS study carried out in 1995 have been highly influential³⁹. The information has helped establish that one in five adults in Britain have difficulties with at least one of these basic skills. That is, 'they cannot read fluently, write easily or perform basic maths calculations at the level expected of an 11 year-old'⁴⁰. In fact,

39. Ekinsmyth and Bynner, 1994; Bynner and Parsons, 1997.

40. *Skills for Life*, 2001.

problems with numbers are experienced by as many as one in two adults⁴¹, the figure adopted by the Moser Committee.

3.5.1 Selecting the open-response questions

Using the assessment data supplied by the 1,621 cohort members who completed the assessments in the 1991 survey, three criteria were applied to the questions for selection into the final assessment⁴².

Not too easy or too difficult: if less than 1 per cent or more than 50 per cent of cohort members gave an incorrect answer to an individual question, the question was excluded from the selection process.

Free from 'gender bias': a male-female bias was calculated for each question. The failure rate of women was subtracted from the failure rate of men. Items with more than 10 per cent difference were excluded. The reasoning behind this selection was that because of the few items involved we needed to focus this component of the assessment on discriminating between levels uncontaminated by such factors as gender. Such a restriction did not apply in the case of the multiple-choice items.

A 'good discriminator': assessment scores were previously grouped into four skills groups: very poor, poor, average, good. A simple discrimination index was calculated for each question. The failure rates of cohort members with 'good' assessment scores were subtracted from failure rates of cohort members who achieved 'very poor' assessment scores. The bigger the difference, the better the item was at discriminating. As far as possible, we wanted items with a minimum 20 per cent discrimination score, but this would not always be possible for the easier items, which were failed by relatively few cohort members.

For each question, tables 3.5a and 3.5b give the original level of difficulty, the actual percentage of cohort members who incorrectly answered the question together with the re-graded level of difficulty based on this percentage⁴³, and the associated gender bias and discrimination score. As the overall assessment needed to cover as many aspects of the national curriculum as possible, the aspect of the curriculum that each question covered was also a very important factor. The questions selected needed to complement the selection of the multiple-choice questions. After much consideration, seven literacy and seven numeracy open-response questions were selected from the previous cohort assessments. These are highlighted in bold in the tables.

41. See Bynner and Parsons, 1997.

42. A similar exercise was carried out on the data supplied by the 1,714 cohort members who took part in the 1995 NCDS survey. When the skills assessment is repeated in a later NCDS survey, much of the groundwork on the selection of the open-response questions will have been done. The seven literacy and six numeracy questions selected from the 1991 BCS70 survey just need to be replaced with the selected questions from the 1995 NCDS survey.

43. Questions were re-graded in line with the percentage of cohort members who had failed the individual questions at the different levels of difficulty in the 1991 survey. For literacy, questions were graded as foundation level questions with 0–5 per cent failure rate; level 1 with 6–20 per cent failure rate; level 2 with 21–40 per cent failure rate; level 3 with 41–50 per cent failure rate. For numeracy, questions were graded as foundation level questions with 0–16 per cent failure rate; level 1 with 17–35 per cent failure rate; level 2 with 36–50 per cent failure rate. Questions with more than 50 per cent failure rate were immediately excluded. This is indicated by 'X' in the tables.

Table 3.5a BCS70 literacy questions: per cent giving incorrect response by literacy level

	New level	All	Men	Women	Very poor	Poor	Average	Good	Disc Index	Men-Women
		%	%	%	%	%	%	%	%	%
FOUNDATION LEVEL										
1. A newspaper advert for a Concert: a) Where is the concert being held?	1	5	5	5	19	11	5	1	18	0
b) Who will be playing at the concert?	F	1	1	1	8	2	1	0	8	0
2. Reading a map: a) Which is the quickest route from Oban to Dundee?	F	5	3	7	33	6	3	1	32	-4
b) Is Edinburgh east or west of Glasgow?	1	7	6	8	25	13	6	2	23	-2
LEVEL 1										
1. Consulting Yellow Pages: a) Could you give me the address of Casper's restaurant?	F	5	5	5	28	12	2	0	28	0
b) What is the phone number of Bobby Brown's restaurant?	F	2	2	2	11	2	2	0	11	0
2. Reading an advertisement: a) What is the age limit for applying, if you are NOT a qualified engineer?	1	9	10	8	23	14	12	3	20	2
b) If you want more information, what do you have to do if you make a phone call?	2	17	20	16	65	36	17	2	63	4
3. Reading graphs:										
a) What % of the poll did Labour get 3 weeks before the by-election?	1	10	9	12	43	21	8	2	41	-3
b) Why do the graphs look so different even though they show the same results?	2	24	22	26	79	51	22	6	73	-4
c) Why would the Labour party prefer to use graph B?	2	21	18	23	72	40	21	5	67	-5
LEVEL 2										
1. Reading a manual: a) What do the initials RF stand for?	2	24	21	27	79	52	26	4	75	-6
b) What is the factory setting for the RF channel?	2	22	18	25	77	50	20	3	74	-7
c) Where would you look to find out about the STILL V-LOCK adjustment screw?	X	53	47	57	89	81	69	26	63	-10
2. Reading a passage: What are the main points of the argument in favour of hunting? CM needed to make 4 main points to get a correct answer.*	X	77	74	80	98	92	82	65	33	-6
3. Reading a First Aid book: a) What are the things you could do if you found someone who was suffering from hypothermia? CM needed to make 5 main points to get a correct answer.*	X	48	48	49	84	69	53	31	53	-1
b) Someone lost body heat and became hypothermic: what is the best way to re-warm them?	3	37	38	37	80	67	50	11	69	1
LEVEL 3										
1. Reading a passage: What was the greatest cause of Jonathan's discomfort?	X	77	77	78	92	87	83	67	25	-1
n =		1,621	746	875	132	264	483	744		

* For the purposes of question selection, a cohort member needed to have given all main points to be awarded a 'correct' answer.

Disc Index = Discriminations Index

Table 3.5b BCS70 numeracy questions: per cent giving incorrect response by numeracy level

	New level	All	Men	Women	Very poor	Poor	Average	Good	Disc Index	Men-Women	
											%
FOUNDATION LEVEL											
1. Calculation of change: You buy two items at a shop and the total comes to £17.89. What is the change from £20?	F	15	14	16	34	15	7	4	30	-2	
2. Programming a video recorder:											
a) In 24 hour clock time, what time do you program the video to start recording?	F	13	10	16	35	11	5	2	33	-5	
b) In 24 hour clock time, what time do you program the video to finish recording ?	F	16	11	20	39	13	7	4	35	-9	
c) Will a 4 hour tape be enough?	F	12	9	15	25	12	9	4	21	-6	
LEVEL 1											
1. Calculation of coins: how many coins would you give altogether?	2	40	39	41	64	46	37	16	48	-2	
2. Calculation of an area of a shape: what is the area of this shape?	X	67	59	74	97	87	63	27	70	-15	
3. Reading a table: how many subjects had more entrants with mathematics A level in 1979 than in 1973?	2	42	40	45	83	50	30	9	74	-5	
4. Buying a car: a) What is the deposit?	1	23	19	27	62	22	7	1	61	-8	
LEVEL 2											
1. Buying a car: b) If you pay monthly instalments, how much do you have to pay each month?	X	75	73	76	98	91	79	38	60	-3	
2. Arranging holidays: a) When could you go?											
b) What would be the total return cost for both to go in your car?	1	26	21	31	62	31	9	2	60	-10	
	2	50	44	54	88	61	36	17	71	-10	
3. Calculating prices: a) What is the difference in price between the two jackets after the reductions?	X	89	86	92	100	99	96	66	34	-6	
b. Which is cheaper?	2	42	36	46	76	46	36	10	66	-11	
4. Reading a table: What % of the total number of students did engineering and technology in 1973?	2	48	36	58	90	68	30	7	83	-22	
n =		1,621	746	875	435	347	389	452			

Disc Index = Discriminations Index

3.5.2 Amendments to questions for the Basic Skills Pilot

Although, in essence, the questions remained the same, amendments were made to six literacy and two numeracy questions before piloting. (See basic skills appendix for the showcards and corresponding questions used in the 2004 survey.)

- L1a and L1b: a new page from yellow pages was selected. The page used in 1991 was taken from the 1990/01 Yellow Pages for the Coventry area. Since that time, the area telephone dialling code had changed and much of the information was out of date. A similar page from the 2003/04 Yellow Pages for the Coventry area was again selected.
- L2a and L2b: a new map was selected. In 1991, the map was of a part of Scotland, primarily selected as the survey was only carried out in England and Wales⁴⁴. To not favour those living in Scotland, a map of part of Ireland was selected.
- L3b and L3c: additional alternatives to what constituted a correct answer were included. The correct answer to these questions required the interviewer to understand some fairly complex bar charts.
- N2a and N3a: new images and prices for the items on the two showcards were selected. The previous images were very old fashioned and the prices unrealistic.

3.5.3 Results from the Basic Skills Pilot

The open-response questions were to be attempted by all respondents taking part in the pilot study (n=177). The open-response literacy questions followed the multiple-choice literacy questions, similarly for the open-response numeracy questions. The open-response literacy questions took an average time of 3:47 minutes to complete; the open-response numeracy questions 4:38 minutes.

Interviewers and respondents found the transition to the open-response questions from the multiple-choice questions was managed without any complication. However, the change from multiple-choice to open-response to multiple-choice to open-response required quite a lot of re-positioning by the interviewer, the respondent, and/or the position of the computer screen. Additional feedback from interviewers on specific questions is detailed in table A3.3 in the basic skills appendix.

3.5.4 Amendments to questions for the dress rehearsal

In response to the interviewer feedback, additional amendments to the map and alternatives to what constituted a correct answer for the two 'bar chart' questions took place in time for the dress rehearsal. Some minor revisions to the wording used for other questions also took place, but suggestions that were felt to fundamentally alter the difficulty of a question were not put in place.

The order of the questions in the basic skills assessment was altered. The open-response literacy and numeracy questions now came after all the multiple-choice literacy and numeracy questions had been completed. This would reduce the time spent shifting seats and position of the computer and any associated awkwardness.

Question N1c was dropped. This was to provide the best set of questions for covering the national curriculum within the overall time constraints of the survey.

44. The survey was funded by the Basic Skills Agency, whose remit only includes England and Wales.

3.5.5 Results from the dress rehearsal

As for the pilot study, all open-response questions were attempted by all cohort members taking part in the dress rehearsal (n=64). The open-response literacy questions took a mean time of 4:21 minutes to complete; the open-response numeracy questions 3:36 minutes. This was a longer time on the literacy questions than in the pilot study, but a shorter time on numeracy questions. Sample size will have an impact on time, but there was also one less numeracy open-response question to answer. As the numeracy open-response questions now followed the literacy open-response questions, cohort members may well have got into their stride by the time of the numeracy questions.

Because of the small sample size involved, it was not possible to re-apply the criteria used to select 1991 BCS70 questions for the first pilot. However, bearing in mind the large sampling error involved, comparisons of the overall percentage with incorrect answers from the original representative 10 per cent BCS70 survey, the pilot study and the dress rehearsal are striking (table 3.6 and figure 3.10).

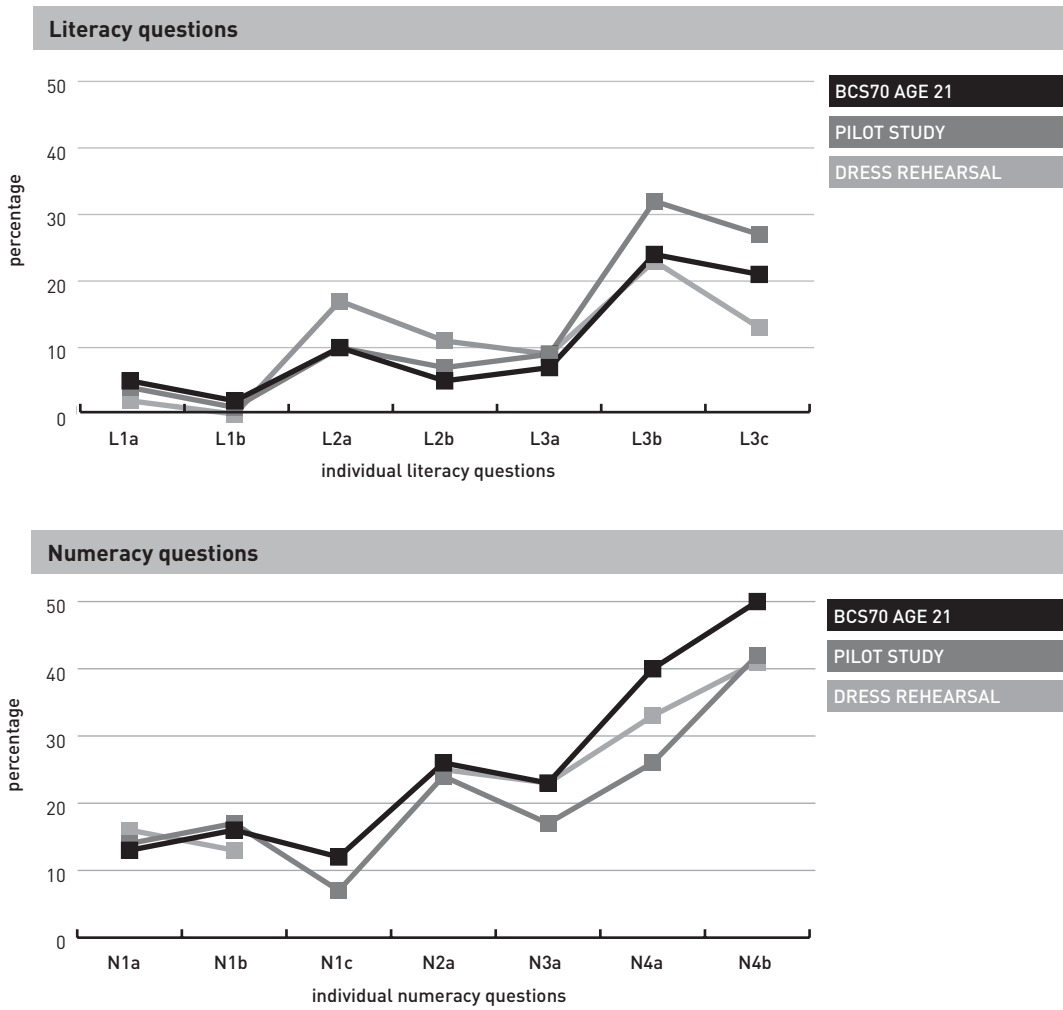
The first thing to observe is the high level of consistency across the three sets of results. The same patterns of difficulty are replicated by the three different sets of data. The hardest literacy question was L3b, the easiest L1b. The hardest numeracy question was consistently N4b, but a slight discrepancy arose for the easiest question. For the respondents taking part in the pilot study and the original BCS70 age-21 survey, the easiest question was N1a, whereas it was N1b in the dress rehearsal. Figure 3.11 amplifies the picture, showing the total scores achieved across all seven literacy and six numeracy questions. The percentage of respondents scoring between 0-7 (literacy) and 0-6 (numeracy), is extremely similar for the three sets of respondents, with generally lower numbers gaining high scores for numeracy than for literacy.

Table 3.6. Comparing per cent incorrect in BCS70 age 21 with 2004 pilot study and dress rehearsal

LITERACY	Level of difficulty	BCS70 age 21	Pilot data	Dress rehearsal
L1a: Yellow Pages – address	FL	5%	4%	2%
L1b: Yellow Pages – phone no	FL	2%	1%	0%
L2a: Map – quickest route	L1	7%	10%	17%
L2b: Map – East or West	L1	5%	7%	11%
L3a: Bar Chart – approx	L1	10%	9%	9%
L3b: Bar Chart – Y-axis	L2	24%	32%	23%
L3c: Bar Chart – prefer	L2	21%	27%	13%
NUMERACY				
N1a: Video Timer – start	FL	13%	14%	16%
N1b: Video Timer – finish	FL	16%	17%	13%
N1c: Video Timer – tape	FL	12%	7%	not used
N2a: In a shop - £ coins	L1	40%	24%	25%
N3a: Deposit on a Car	L1	23%	17%	23%
N4a: Ferry – when go	L2	26%	26%	33%
N4b: Ferry – return cost	L2	50%	42%	41%

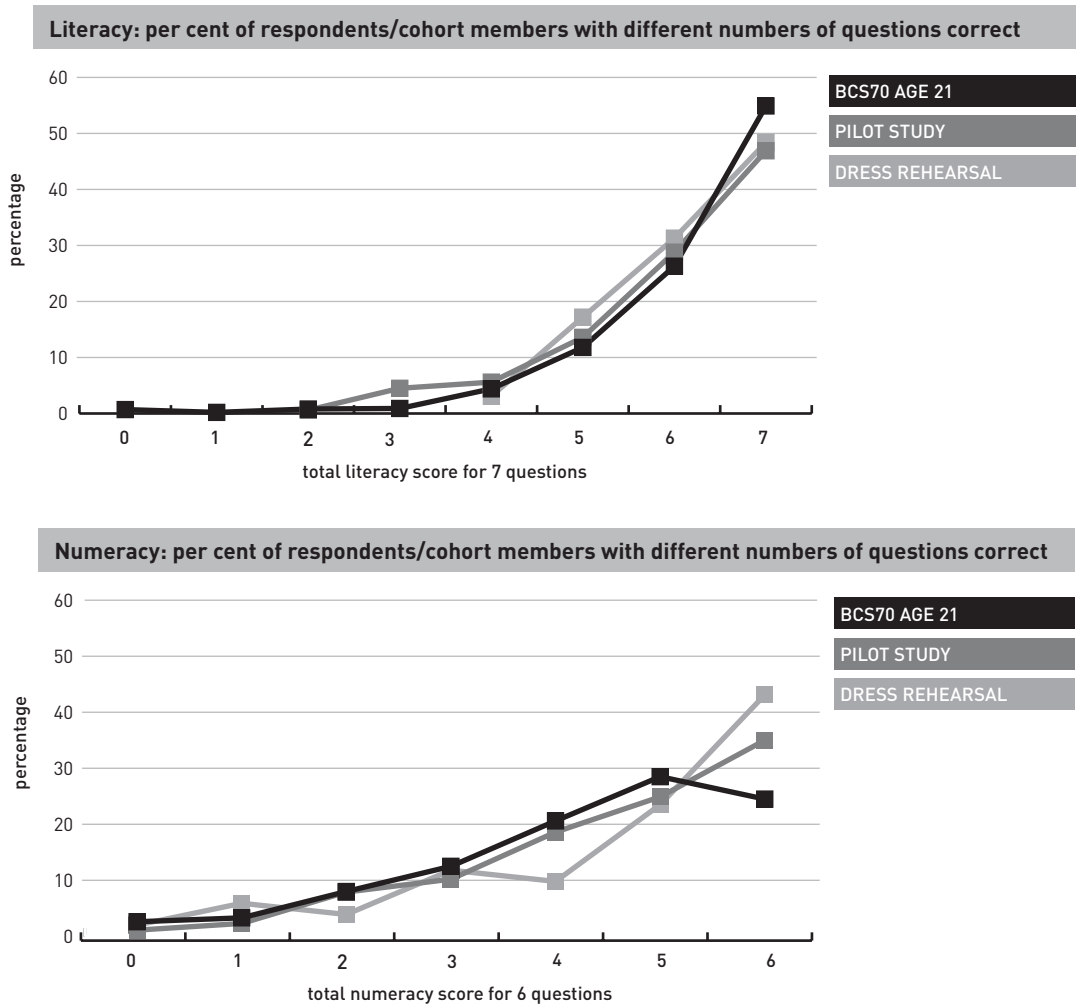
Key: FL = foundation level; L1 = level 1; L2 = level 2

Figure 3.10: comparing per cent incorrect in BCS70 age 21 with per cent incorrect in 2004 Basic Skills Pilot and dress rehearsal



Note: numeracy question N1c was not included in the dress rehearsal

Figure 3.11: comparing total scores by cohort members for questions in BCS70 age 21 with 2004 Basic Skills Pilot and dress rehearsal



3.6 Converting overall performance in literacy and numeracy assessments into levels

It is anticipated that most analysts using the new BCS70 assessment data will wish to work with total scores reflecting cohort members' performance relative to that of the whole population across the whole performance range. This assumes a reasonably high level of reliability of the scores, to ensure that differences are not brought about by high levels of measurement error. The reliability estimates for both literacy and numeracy surpassed the levels generally considered acceptable for survey analysis purposes, exceeding 0.8 (alpha coefficient) in both cases.⁴⁵

However, an important element of the survey was also to be able to compare the BCS70 performances with those obtained in the National Baseline Survey in terms of the nationally agreed levels. We cannot guarantee the same standards of reliability for this comparison because of the relatively small number of items available to assess performance at each level and the complexity, in scaling terms, of the adaptive testing approach. As we discuss below, there were also problems in mapping precisely determination of levels from one survey to the other. Hence, only a limited comparison could be undertaken and caution is needed in interpreting the results.

By converting performance – the number of correct answers in both the multiple-choice and open-response parts of the assessment – into levels, we were able to classify respondents by their achieved level. There are many ways of doing this, and a number were tried out. Much attention was given to the levels of the open-response questions. As discussed previously, in figure 3.2, the levels of the open-response assessment items do not directly correspond with the levels of the multiple-choice questions. To re-cap:

- open-response foundation level questions fall across multiple-choice entry level 2 and entry level 3.
- open-response level 1 questions across multiple-choice entry level 3 and level 1.
- open-response level 2 questions across multiple-choice level 1 and level 2.

Were the levels of the open-response items therefore to be downgraded or upgraded? The dress rehearsal results suggest the open-response assessment items worked better if they were downgraded. However, the number of cohort members taking part in the dress rehearsal was small (n=64), so this decision will need to be looked at again following analysis of results from all BCS70 cohort members in early 2005. Given these considerations, the distribution of cohort members by levels, as shown in figure 3.12a and 3.12b, was restricted to performance in the multiple-choice part of the assessment; it is based on the principle that to pass a level at least half of the questions at a given level needed to be answered correctly (see below).

3.6.1 For literacy

- Below entry level 2: between 0 – 5 entry level 2 questions correctly.
- Entry level 2: between 6 – 10 entry level 2 and 0 – 5 entry level 3 questions correctly.
- Entry level 3: between 6 – 10 entry level 3 and 0 – 2 level 1 questions correctly.
- Level 1: between 3 – 5 level 1 and 0 – 2 level 2 questions correctly.
- Level 2: between 3 – 5 level 1 and 3 level 2 questions correctly.

45. Full details are reported in 'Measuring Basic Skills in Longitudinal Study' (in preparation for the journal Literacy and Numeracy Studies).

3.6.2 For numeracy

- Below entry level 2: between 0 – 3 entry level 2 questions correctly.
- Entry level 2: between 4 – 5 entry level 2 and 0 – 2 entry level 3 questions correctly.
- Entry level 3: between 3 – 4 entry level 3 and 0 – 3 level 1 questions correctly.
- Level 1: between 4 – 5 level 1 and 0 – 2 level 2 questions correctly.
- Level 2: 3 level 2 questions correctly.

As shown in figures 3.12a and 3.12b, comparisons with the results of the National Baseline Survey are remarkably consistent, despite such differences in sample size⁴⁶. The distribution of respondents by numeracy levels is particularly striking. For literacy, an identical percentage was placed at entry level 3 or lower (13 per cent), although the spread of cohort members in the dress rehearsal placed more of them at the ‘bottom’ (entry level 2 and below) or ‘top’ (level 2 and above) end of the levels classification.

Figure 3.12a. ‘Profiles of competence’ based on national standards for adult literacy: comparison of BCS70 dress rehearsal with National Baseline Survey results

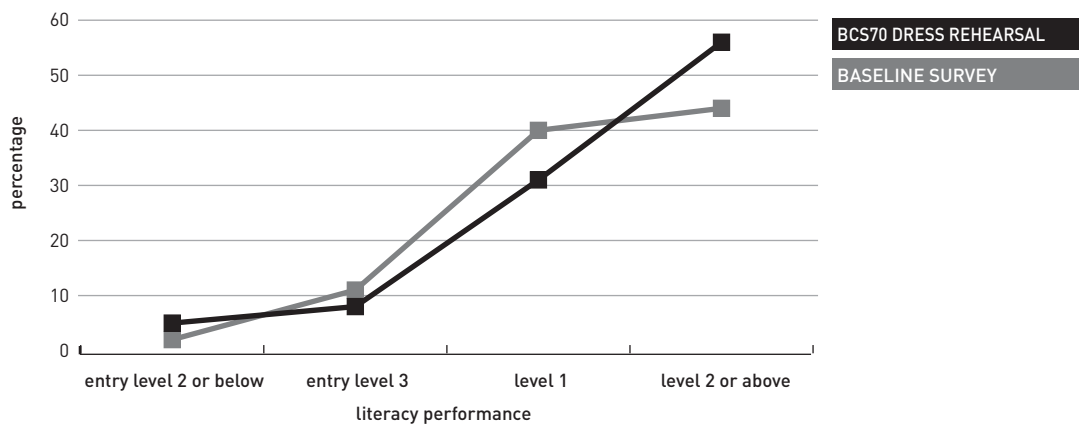
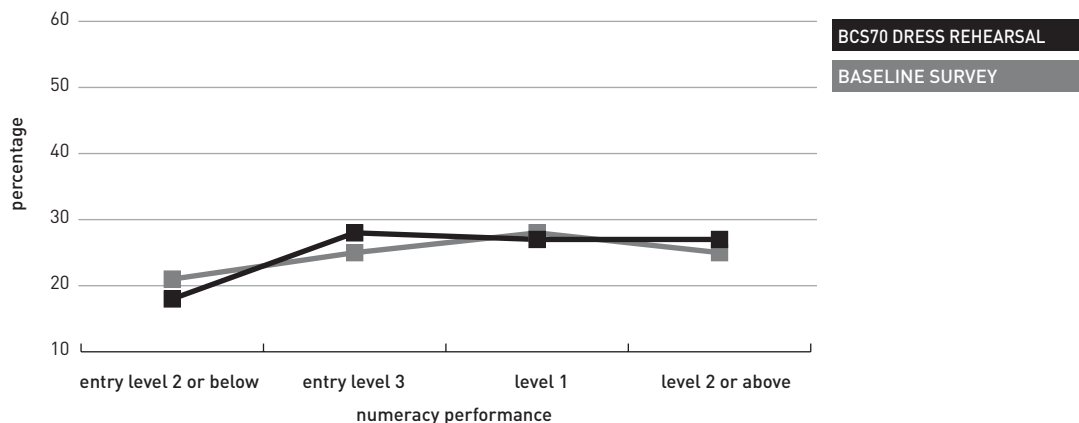


Figure 3.12b. ‘Profiles of competence’ based on national standards for adult numeracy: comparison of BCS70 dress rehearsal with National Baseline Survey results



46. The *Skills for Life* survey report: **A national needs and impact survey of literacy, numeracy and ICT skills**, DfES Research Brief RB490. N=7,874 respondents completed the literacy assessment; N=8040 respondents completed the numeracy assessment.

3.7 Coverage of the National Curriculum

3.7.1 Literacy

The adult literacy core curriculum covers 'Speaking and Listening', 'Reading' and 'Writing'. The items in the Baseline Survey cover aspects of reading and writing only⁴⁷. There are three main aspects of reading and writing covered by the adult literacy core curriculum. These are:

Reading

- Reading Comprehension (RC).
- Grammar and Punctuation (GP-R).
- Vocabulary, Word Recognition, Phonics (VWRP).

Writing

- Writing Composition (WC).
- Grammar and Punctuation (GP-W).
- Spelling and Handwriting (SH).

The aspect of the curriculum each item covers is taken from the detailed description provided for the items in the Baseline Survey. As with this survey, item selection heavily concentrated on the many aspects of 'Reading Comprehension'. However, 'Writing Composition', 'Grammar and Punctuation' and 'Spelling and Handwriting' are also covered by items on both the lower and upper tiers (see table A3.2a in the basic skills appendix). A sample of handwriting, obtained from each cohort member at the end of the interview, provides a more complete picture of their literacy.

3.7.2 Numeracy

Seven aspects of number skill from the numeracy curriculum were assessed by the items in the original Baseline Survey. These were:

- Basic Money (BM).
- Whole Numbers and Time (NT).
- Measures and Proportion (MP).
- Weights and Scales (WS)..
- Length and Scaling (LS).
- Charts and Data (CD).
- Money Calculations (MC).

Other than 'Basic Money', at least one question at each level of difficulty was available for selection for each aspect of number skill assessed. Questions on 'Basic Money' ranged in difficulty from entry level 1 up to entry level 3. Although the Baseline Survey included questions set at entry level 1, very few adults had difficulty with these questions. Within the design constraints of the cohort assessment, questions set at this level of difficulty were not included.

47. The work undertaken by colleagues at CDELL for the Baseline Survey pre-dated the National Adult Literacy Core Curriculum document. **The National Standards for Adult Literacy** (QCA 2000) were used instead. Each question was designed to meet a specific criterion or criteria for reading and/or writing. Level 1 and level 2 questions were based on multiple-choice items used in the national key skills tests. However, some questions needed re-formatting for computer-based use.

Figure 3.13 shows that, with the inclusion of the six open-response questions, the seven different aspects of the curriculum are covered by at least three questions. If this was not always possible, the easier alternative was selected. ie, if the level 1 question was not suitable for selection, the entry level 3 rather than level 2 question was selected.

Figure 3.13. Aspects of the curriculum covered by the numeracy multiple-choice questions

	Multiple-choice				Open response	
	EL3	L1				
Whole Numbers and Time (NT)		EL3	L1		FL	
Measures and Proportion (MP)		EL3	L1			L2
Weights and Scales (WS)	EL2		L1	L2		
Length and Scaling (LS)	EL2		L1	L2		
Charts and Data (CD)	EL2				L1	L2
Money Calculations (MC)	EL2	EL3	L1	L2		L2
Basic Money (BM)	EL2	EL3			L1	

FL = foundation level L = level EL = Entry level

Handwriting

Collecting samples of handwriting has a long history in cohort study research. Back in 1969, when NCDS cohort members were aged 11, they were given 30 minutes to write a short essay on 'Imagine that you are now 25 years old. Write about the life you are leading, your interests, your home life and your work at the age of 25'. In 1980, when BCS70 cohort members were aged 10, they each copied out the sentence 'The quick brown fox jumps over the lazy dog'. As adults, a sample of handwriting was collected from the 10 per cent of cohort members who took part in the basic skills assessments. In 1991, when aged 21, BCS70 cohort members were asked to write down how they had found the skills assessment. In 1995, when aged 37, NCDS cohort members were asked to complete a job application form as part of the literacy assessment.

As all BCS70 cohort members taking part in 2004 attempted the multiple-choice and open-response literacy assessment questions, it was essential to collect a sample of handwriting to complete the picture of their literacy. Cohort members in the main fieldwork were asked to write a couple of sentences on what they have liked or disliked about being a part of BCS70 over the last 34 years⁴⁸. A sample of handwriting was obtained, revealing competence in spelling, grammar and punctuation together with skills in layout and presentation of writing. Methods of coding such writing data in terms of such dimensions have been developed in the previous surveys and will be applied to the new data. This will supply data for comparison not only from childhood to adulthood, but in the case of the sub-sample studies, within adulthood as well.

Importantly, the writing task will also enable us to gain from cohort members insights into what it has been like to be part of national longitudinal survey from the day they were born, including any thoughts they have about the assessment elements of it. Analysis of cohort members' positive and negative experiences of being part of BCS70 is also an important source of information for the development of the cohorts studies programme in its own right.

48. This exercise was not piloted, but was adopted once the writing/copying task from the DAST battery of exercises was dropped. See chapter 4.

4 Dyslexia

4.1 Measuring symptoms of dyslexia

The final part of the adult assessment was to measure the prevalence of some of the symptoms associated with dyslexia. The word 'dyslexia' is Greek in origin and means 'difficulty with words'. Though the precise origins and meaning of the syndrome has attracted controversy⁴⁹, it is generally believed that dyslexia usually arises from a difference in the brain area that processes language-based information and affects the underlying skills that are needed for learning to read, write and spell. Environmental factors also impact upon dyslexia, with symptoms found in people from all socio-economic and education groups, from those who cannot read to those with higher education awards⁵⁰. It is estimated that around 4 per cent of the population is severely dyslexic, with a further 6 per cent having mild to moderate problems⁵¹.

BCS70 cohort members had symptoms of dyslexia assessed when they were 10 years old, when three short individual measures from The Bangor Dyslexia Test⁵² were administered, in conjunction with other cognitive assessments, on more than 12,000 cohort members. Analysis of the data has estimated between 2–4 per cent of the cohort members were dyslexic to some degree⁵³. By re-assessing the cohort members at age 34, we will have a unique opportunity to:

- obtain a true estimate of the spread of dyslexic symptoms in a representative adult population;
- see what, if any, symptoms are lost or acquired over time;
- see which symptoms are most persistent;
- look at the relationship between dyslexia, literacy and numeracy scores; and
- compare past experiences and adult outcomes for 'dyslexic' adults with their non-dyslexic peers.

4.2 The Dyslexia Adult Screening Test (DAST)

After much advice and consultation, the Dyslexia Adult Screening Test (DAST)⁵⁴ was the preferred instrument for use in the 2004 survey. Although the DAST does not measure precisely the same symptoms associated with dyslexia as were measured by The Bangor Dyslexia Test at age 10, its use was supported by Professor Tim Miles, who devised the

49. Rice, M and Brooks, G (2004). **Developmental Dyslexia in Adults: a Research Review**. London: NRDC.

50. This information is extracted from the websites detailed. For further information, refer to the British Dyslexia Association (www.bda-dyslexia.org.uk), the Bangor Dyslexia Unit (www.dyslexia.bangor.ac.uk) and the Dyslexia Institute (www.dyslexia-inst.org.uk).

51. These estimates are primarily obtained from school populations, but as dyslexia has neurological origins, the occurrence in adults will essentially be the same.

52. The Bangor Dyslexia Test contains ten items. The three selected measures were: The Left-Right Test (involving naming body parts), and the Months Forward and Months Reversed tests (sequential recall of months of the year). See Miles, T R (1982/1997). **The Bangor Dyslexia Test**. Wisbech, Cambs: Learning Development Aids.

53. Miles, T R and Haslum, M N (1986). 'Dyslexia: Anomaly or normal variation?' **Annals of Dyslexia**, 36, pp 103–117. Miles, T R, Wheeler, T J and Haslum, M N (2003). 'The Existence of Dyslexia without Severe Literacy Problems'. **Annals of Dyslexia**, vol 53, pp 340–349.

54. Fawcett, A. J. and Nicolson, R. I. (1998). **The Dyslexia Adult Screening Test (DAST)**. London: The Psychological Corporation.

Bangor test, as offering good continuity with the earlier assessment⁵⁵. The DAST is based on the Dyslexia Screening Test (DST), a battery of 11 tests used to identify children 'at risk' of dyslexia⁵⁶. These tests were modified to support adult screening and led to the publication of DAST in 1998. DAST comprises a battery of 11 tests, of which three are educational attainment measures and eight are diagnostic measures directed at identifying dyslexia symptoms. These are listed in figure 4.1. See the DAST manual for full details. There are some similarities between some of these measures and those used in the 1992 US National Adult Literacy Survey (NAAL), which offers another basis for comparison.⁵⁷

Figure 4.1. DAST attainment and diagnostic measures

The three attainment measures:

One-Minute Reading: reading aloud as many as possible of 120 words in the time limit

Two-Minute Spelling: a written spelling exercise – a maximum of 40 words

One-Minute Writing: transcription of a short passage.

The eight diagnostic measures:

Rapid Naming: time taken to name a page full of outline drawings

Postural Stability: ability to balance after a push in the back

Phonemic Segmentation (including Spoonerisms): ability to split words into their constituent sounds

Backwards Digit Span: ability to use working memory

Nonsense Passage Reading: ability to read 'made up' or 'nonsense' words that the reader has never seen before

Nonverbal Reasoning: a rough measure of fluid intelligence

Verbal and Semantic Fluency: indication of strengths accompanying weaknesses. i.e. good semantic fluency may go with poor verbal fluency.

4.3 Selecting the DAST exercises

After lengthy consultation with a leading expert on the use of/design of the DAST, Angela Fawcett⁵⁸, six of the DAST exercises were piloted. Time restrictions would limit the final assessment to four DAST exercises but, as each exercise had specific rules and administration points, it was important to pilot more than we would ultimately use. We wanted the best set of exercises to capture the different and diverse experiences of dyslexia in our population, but also the exercises that could best be reliably administered by interviewers in cohort members' own homes. In summary, the first three exercises measure the fluency of literacy skills (attainment), and the second three exercises the underlying phonological skills (diagnostic). These aspects are known to be impaired in adults with dyslexic symptoms, and fluency can show up problems in even high-achieving dyslexics⁵⁹.

55. At the 6th BDA International Conference, Allyson G Harrison and Eva Nichols presented A Validation Of The Dyslexia Adult Screening Test (DAST) In A Post Secondary Population in Canada. The DAST was administered to 116 students with Specific Learning Disabilities (SLD) and 122 volunteer control subjects. The DAST correctly identified 74 per cent of the students with a SLD at-risk for dyslexia. However, the DAST misidentified 26 per cent of SLD students as not being at risk for dyslexia, and 16 per cent of the control group as being at risk for dyslexia, even though almost all control group students reported no history of any learning or reading problems. Despite this, the DAST does have a higher than acceptable false positive rate. Suggestions were offered for recalculation of the data and a clustering of the subtests to maximize differentiation between subject groups.

56. For further details, see Fawcett, A J, Nicolson, R I and Dean, P (1996). 'Impaired performance of children with dyslexia on a range of cerebellar tasks'. *Annals of Dyslexia*, 46, pp 259–283.

57. See <http://nces.ed.gov/naal>

58. Dr. Angela Fawcett, Department of Psychology, University of Sheffield, Sheffield S10 2TP.

59. Miles, T R and Miles, E (1999). *Dyslexia: A Hundred Years On*. 2nd edition. Buckingham: Open University Press.

The six DAST exercises selected for piloting were:

- One-Minute Reading: demanded a speedy as well as accurate performance. Respondents read aloud as many words as they could in one minute. There was a maximum of 120 words. The words started easy and increased in difficulty;
- Two-Minute Spelling: assessed speed as well as accuracy of spelling, also involves speed of writing. There was a maximum of 32 words (40 if early errors were made). Again, the words started easy and increased in difficulty;
- One-Minute Writing: assessed the speed and accuracy of transcription of a short passage;
- Phonemic Segmentation: assessed ability to split words into their constituent sounds;
- Spoonerisms: a more complex measure of segmentation ability, which involved a higher memory load; and
- Nonsense Passage Reading: ability to read 'made up' or 'nonsense' words that the reader has never seen before. Thought to be the task most sensitive to dyslexia.

DAST provided a complete change of direction for respondents and interviewers alike. Once interviewers had practised administering the DAST exercises to both familiarise themselves with the words and the specific requirements of each exercise, for example the fast pace respondents needed to read the words in the One-Minute Reading exercise, or the best way to sit to observe the One-Minute Spelling exercise, the feedback from interviewers after the pilot study was, overall, very positive. The majority reported that respondents really enjoyed these exercises, and the interview ended on a high note. Some interviewers remarked that it gave all respondents a chance to do well at something, and that it finished the interview on a positive note, away from possible anxieties raised by the literacy and numeracy assessments.

After much consideration and consultation with Angela Fawcett and examination of the pilot results, the One-Minute Writing and the Phonemic Segmentation exercises were dropped and the Two-Minute Spelling exercise was reduced to one minute⁶⁰. The four exercises selected were felt to be the best combination of exercises, given time restrictions. Reading and Spelling were particularly strong candidates for selection, given their obvious relationship with basic literacy skills. Spoonerisms were preferred to the Phonemic Segmentation exercise as they captured a more complex skill, were quick to administer and were found great fun by the vast majority of respondents. Although the most demanding of the exercises for both respondents and interviewers alike, the Nonsense Passage Reading exercise was included as it seemed particularly good at identifying difficulties among adults who had performed well on the other DAST exercises.

In addition to the DAST exercises, the Adult Dyslexia Checklist, or the Vinegrad Checklist⁶¹ was included as part of the short interview included in the pilot study. This short questionnaire can be used to screen relatively large adult populations, for example a group of students involved in the first year of further or higher education. Figure 4.2 details the 20 simple 'yes-no' questions that make up the Vinegrad Checklist. Based on total scores from completion of the Vinegrad Checklist, two groups of adults 'non-dyslexics' (0–7) and 'dyslexics' (8 plus) can be defined. A score of 8 or more 'yes' responses' is expected in around 11 per cent of a given sample/population. As an additional tool for selecting the 'best'

60. Alternate words (as they appeared in the list) were chosen. Cohort members had to spell a total of 16 words, with four additional 'easier' words.

61. Although this originated in the Dyslexia Institute, it was later revised by Michael Vinegrad and since became known as the Vinegrad Checklist. Vinegrad, M (1994) "A Revised Adult Dyslexia Checklist". *Educare*, 48, pp 21–23.

exercises from DAST, respondents' scores in the DAST exercises included in the pilot study were compared against their score on the Vinegrad Checklist.

Figure 4.2. Vinegrad Checklist

1. Do you find difficulty telling left from right?
2. Is map-reading or finding your way to a strange place confusing?
3. Do you dislike reading aloud?
4. Do you take longer than you should to read a page of a book?
5. Do you find it difficult to remember the sense of what you have read?
6. Do you dislike reading long books?
7. Is your spelling poor?
8. Is your writing difficult to read?
9. Do you get confused if you have to speak in public?
10. Do you find it difficult to take messages on the telephone and pass them on correctly?
11. When you say a long word, do you sometimes find it difficult to get all the sounds in the right order?
12. Do you find it difficult to do sums in your head without using your fingers or paper?
13. When using the telephone, do you tend to get the numbers mixed up when you dial?
14. Do you find it difficult to say the months of the year forwards in a fluent manner?
15. Do you find it difficult to say the months of the year backwards?
16. Do you mix up dates and times and miss appointments?
17. When writing cheques, do you frequently find yourself making mistakes?
18. Do you find forms difficult and confusing?
19. Do you mix up bus numbers like 95 and 59?
20. Did you find it hard to learn your multiplication tables at school?

4.4 Adapting the DAST materials and interviewer instructions

A lot of work went into the design of the DAST materials at each stage of development.

Protocols: the exact protocols and instructions as they appeared in the DAST manual were used for each of the DAST exercises. Interviewers read these verbatim to respondents at the start of each exercise.

Paper and computer use: the DAST exercises are a paper-based instrument, but interviewers used the computer to administer various parts of the exercises, particularly in the Basic Skills Pilot Study, when it was essential that interviewers recorded how long each exercise took to complete. The instructions the interviewers read out to the respondents were also on the CAPI screen in the pilot. Interviewer feedback following the pilot clearly indicated the DAST should be entirely administered on paper. This was mainly due to the additional demands placed on the interviewer during these exercises. For example, interviewers had to maintain rapport with the respondent while evaluating their performance, operate an electronic timer and enter information into the computer. With this in mind, only brief instructions for the interviewer remained in CAPI for the dress rehearsal, and for the main fieldwork interviewers only had to press the ENTER key at the start and end of the DAST exercises. This was to record the time taken to complete the whole DAST section. All interviewer instructions for carrying out each of the DAST exercises were now included in the booklet. More details of the difficulties met by interviewers are provided in table A4.1 in the dyslexia appendix.

Recording respondent scores: as only six of the original 11 DAST exercises were used, the original DAST score sheet used for recording respondents' scores and times needed much revision. The amount of specific scoring that interviewers had to do in a respondent's home was also reduced to minimise interviewer burden and risk a respondent feeling uncomfortable and the interviewer being viewed as an assessor or teacher. These feelings were particularly likely to occur if the respondent felt they had performed poorly.

Two interviewer DAST booklets and one respondent DAST booklet were designed for the basic skills pilot. The two interviewer booklets were needed to pilot different ways of laying out how interviewers recorded the scores for the One-Minute Reading and the Nonsense Passage Reading exercises⁶². After some experimentation, the following symbols were agreed:

Version A – '/' for correct, '0' for an error, '—' for pass (and 's' for *semi-correct* for the Nonsense Passage Reading).

Version B – 'C', 'E' and 'P' were printed by each word, so that the interviewer need only circle or strike through the appropriate mark. Examples of alternative DAST interviewer grids are given in figure 4.3.

Figure 4.3. The two examples of marking the DAST One-Minute Reading test (also used for the Nonsense Passage Reading exercise)

Correct = /		Error = 0		Pass = —	
Version A					
pat	<input type="checkbox"/>	bridge	<input type="checkbox"/>	concert	<input type="checkbox"/>
fog	<input type="checkbox"/>	freight	<input type="checkbox"/>	village	<input type="checkbox"/>
king	<input type="checkbox"/>	evil	<input type="checkbox"/>	payment	<input type="checkbox"/>
oil	<input type="checkbox"/>	poet	<input type="checkbox"/>	express	<input type="checkbox"/>
				magnitude	<input type="checkbox"/>
				formation	<input type="checkbox"/>
				Insurance	<input type="checkbox"/>
				Principal	<input type="checkbox"/>
Version B					
Correct = C		Error = E		Pass = P	
pat	C	E	P	bridge	C E P
fog	C	E	P	freight	C E P
king	C	E	P	evil	C E P
oil	C	E	P	poet	C E P

Interviewers expressed an overwhelming preference for version B of the interviewer booklet at the basic skills pilot de-briefs, however neither design was convenient for left-handers⁶³. The four DAST exercises selected after the pilot study resulted in no further need for a separate DAST booklet for cohort members. In the dress rehearsal, cohort members were

62. The original protocols used a simple grid and suggested the scorer write 'C' for correct, 'E' for error and 'P' for pass by each word or item. 'C' and 'E' were rejected as being too similar, with the potential for coding mistakes to occur when responses were counted and/or entered, particularly if the codes were counted after the interview or by a different person. Obvious symbols, such as 'ü' for correct were considered unacceptable, as was the option of only marking errors and passes, which might let respondents infer how well or badly they were doing.

63. A revised booklet was provided for left-handed interviewers in the dress rehearsal, but those involved did not feel it benefited them and was thus not included in the materials for the main fieldwork. However, some left-handed interviewers struggled in the early stages of fieldwork and an updated version for left-handers was subsequently designed.

given a sheet of paper to complete the One-Minute Spelling exercise. Interviewers would attach this to the interviewer DAST booklet for easy identification. For the main fieldwork, with the inclusion of the free writing exercise, additional pages were included in the DAST booklet for cohort members to write their thoughts and complete the One-Minute Spelling exercise.

One-Minute Reading exercise: interviewers reported that some respondents took the speed element very seriously and several read out the words extremely fast, which caused problems for the interviewers. In order to keep pace, most interviewers stopped recording correct readings and noted errors and passes only. (Correct responses were then marked post-interview.) They felt that they managed to do this without the respondents being aware, not least because the latter were focused on reading the list. In light of this, instructions to interviewers were adapted successfully for the dress rehearsal and kept for the main fieldwork.

Nonsense Passage Reading exercise: to calculate an accurate score for the Nonsense Passage Reading exercise, time taken had to be considered. In the basic skills pilot study, interviewers had been asked to record this time in seconds. A relatively high number of errors were recorded for this, most likely as a result of the timer displaying time in minutes and seconds, thus the interviewers had a small calculation to perform. In response to the difficulties encountered, interviewers in the dress rehearsal and main fieldwork were not required to convert remaining minute(s) and seconds at the end of the exercise to seconds. They just had to record what was on the timer, for example, 1 minute 25 seconds not 85 seconds.

Interviewers were asked to code semi-correct readings of nonsense words, and it was unclear after the pilot study whether this required too subjective a judgment or whether interviewers were able to apply standardised rules. After a lot of consideration, interviewers were asked to code semi-correct readings of nonsense words in the dress rehearsal and main fieldwork. If data quality is in doubt, 'semi-correct' and 'incorrect' response categories can be collapsed together.

Timing the exercises: three of the exercises were timed and interviewers were supplied with simple electronic timers that counted down. When (if) the interviewer stopped the timer early, i.e. if the respondent completed the task early, the interviewer just had to write the seconds left on the timer down in the booklet.

Stopping rules: discontinuation instructions were given for most exercises. These referred to respondent distress, or consecutive errors or passes. In practice, interviewers felt that each exercise should be discontinued only if the respondent showed distress or refused to go on. To stop respondents who remained happy to continue with the exercise despite making errors created more problems than it solved.

Interviewer difficulties: two of the 16 interviewers participating in the pilot study found that their own dyslexic symptoms made administering the DAST exercises difficult. Each of them found ways of coping but, in the main stage of fieldwork, the research team offered all interviewers the opportunity of talking over any concerns they had felt after they had been briefed to do the survey and if necessary withdrawing from working on it.

Briefings: a lot of time was spent improving the briefing and written instructions given to

interviewers involved in the main fieldwork on how to carry out the DAST exercises. As in the pilot and dress rehearsal briefings, a combination of training and practical exercises was used. In the pilot and dress rehearsal briefings, members of the research team performed the One-Minute Reading and Nonsense Passage Reading exercises 'live', but as the members of the research team knew the exercises very well by the time of the pilot and dress rehearsal briefings, the performances were somewhat 'staged'. In the main fieldwork briefings, interviewers listened to recordings of the exercises being read and gained practice at marking the responses in the DAST booklet. The recordings used were examples of the exercises being read by some of our colleagues for the first time thus the mistakes and hesitations were 'real'⁶⁴. This ensured that all interviewers received the same practices and the 'realness' of the exercises remained as fresh for the last briefing as it had been for the first. Although the sound quality varied across briefing venues, the research team gained a much clearer view of an interviewer's grasp of the required task and their initial performance. This was particularly important for the few relatively inexperienced interviewers involved with the survey.

Early feedback received during main fieldwork briefings from interviewers who had been involved in the basic skills pilot and/or dress rehearsal has been very positive. The briefings have been very engaging and the interviewers have felt very prepared by the end of a long, complex but fun briefing. All interviewers were asked to practise administering the DAST exercises on friends and family before their first interview, but the majority view has been that 'different' and potentially difficult tasks for interviewers to carry out have been presented very clearly.

4.5 DAST exercises and results from the Basic Skills Pilot and dress rehearsal

4.5.1 Time taken to administer the DAST exercises

In the basic skills pilot study, the 'time' for each DAST exercise was recorded by interviewers in their booklets. This 'time' included time taken to explain the exercise, the exercise itself, and the time taken by interviewers to answer relevant questions for each exercise in the interviewer booklet. Time was recorded in exact minutes only. In addition to this, interviewers had to press the 'enter' key on the computer at the end of each exercise to produce a 'time' in CAPI. However, the range of time was very wide, as some interviewers forgot to press the enter key, thus the information was considerably less precise than 'real' CAPI time stamps. In the dress rehearsal, the timings of the individual dyslexia exercises were not recorded, thus only overall time taken to administer the four exercises could be calculated.

Table 4.1 shows the mean (average) time for all six DAST exercises was 17:42 minutes, nearly eight minutes too long. Using the pilot data as a guide, the average time it would take a cohort member to complete the four selected DAST exercises would be 11:36 minutes. This was still too long. After further consultation with Angela Fawcett, the Spelling exercise was reduced by half, which suggested that the four DAST exercises would take approximately 9:39 minutes. Other administrative changes introduced would ease the demands placed on the interviewers and hopefully reduce the average time further. The actual mean time was 10:06 minutes⁶⁵. As this was just six seconds above the allocated amount of survey time, no further 'cuts' were necessary.

64. Many thanks to colleagues in NRDC and the Centre for Longitudinal Studies (CLS), custodians of the cohort studies, for their time and willingness for their attempts to be used as part of the briefing process.

Table 4.1. Average time taken to complete the DAST exercises

Pilot study		Dress rehearsal		
	Average time		Average time	
			Estimated	Actual
One-Minute Reading	3 : 36 mins	One-Minute Reading	3 : 36 mins	
Two-Minute Spelling	3 : 54 mins	One-Minute Spelling	1 : 57 mins	
One-Minute Copying	2 : 54 mins			
Phonemic Segmentation	3 : 12 mins			
Spoonerisms	1 : 48 mins	Spoonerisms	1 : 48 mins	
Nonsense Passage	2 : 18 mins	Nonsense Passage	2 : 18 mins	
Total Time	17 : 42 mins		9 : 39 mins	10:06 mins

4.5.2 One-Minute Reading exercise

An adult experiencing some of the symptoms associated with dyslexia, who may be regarded as successful, can still have greater problems when reading under time constraints. The exercise comprised a list of 120 words, graded in difficulty, which the respondent had to read aloud as fast and as accurately as they could in one minute.

A practice list of six words is used in DAST, but this was not felt to be necessary to use on cohort members⁶⁶. Cohort members are trained respondents, and as such are very used to following interviewer instructions and being assessed.

There were two lists of 120 words – form A or B. Form B was only to be used if there was a disruption during the reading aloud of words on form A. Form B was not used in the pilot study and was dropped for the dress rehearsal and main stage. If the exercise was interrupted, a second attempt was not permitted. This brought the One-Minute Reading exercise in line with the other three selected DAST exercises.

Each of the 120 words could be read ‘correctly’, ‘incorrectly’ or ‘passed’ (either the respondent did not attempt to read the word and said ‘pass’, or they inadvertently missed it out). One point was awarded for each word read correctly. If all the words were read aloud in less than one minute (even if a respondent had passed on one or two words), an additional point was awarded for each second left on the timer. For example, if a respondent finished in 57 seconds, three points would be awarded.

Results

Table 4.2 shows the average number of words read correctly in one minute was 90 in the pilot study, 98 in the dress rehearsal. The 19 per cent of respondents in the pilot study with a score of 8 plus on the Vinegrad Checklist (dyslexics) read fewer words than their counterparts with a score between 0–7 (non-dyslexics)⁶⁷. Figure 4.4 shows the range of the scores achieved by participants in both development studies. Although the average score achieved by BCS70 cohort members in the dress rehearsal was higher, the distribution of the scores was markedly similar across the two sets of data. It is also notable that the mean score was

65. In the dress rehearsal, the overall time to administer all four DAST exercises was calculated from the end of the previous (numeracy open-ended) section of the CAPI questionnaire to the end time of the last (nonsense reading) DAST exercise. Time calculations were provided by the NatCen research team.

66. As the practice words would not be used on cohort members, it was important to pilot the way we would actually administer the exercise on the general public sample used in the pilot study.

67. 164 respondents completed the Vinegrad Checklist.

higher for the non-dyslexic group (94) compared with the dyslexic group (73), as identified by the Vinegrad Checklist. This may be taken as evidence to support the test's validity. Further details of the results are provided in table A4.2 in the dyslexia appendix.

Table 4.2. Results of the One-Minute Reading exercise

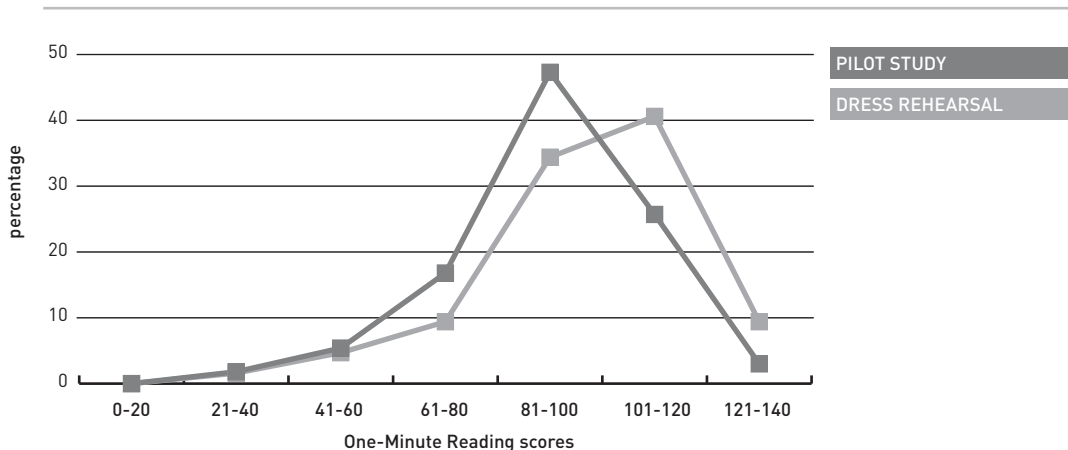
	N	Score range	Mean	Median	sd
Pilot Study: All	167	21–126	90	92	19.4
Non-dyslexics*	125	46–124	94	94	15.0
Dyslexics†	30	21–112	73	70	23.3
Dress rehearsal: All	64	39–130	98	100	20.3

sd = standard deviation

*Non-dyslexics = a score of 0–7 on the Vinegrad Checklist,

†Dyslexics = a score of 8–20 on the Vinegrad Checklist.

Figure 4.4. Distribution of scores in the One-Minute Reading exercise



4.5.3 Two-Minute/One-Minute Spelling exercise

Time pressures can increase spelling errors amongst us all, but this is particularly so for adults experiencing dyslexic symptoms. Dyslexic adults often have poor spelling, with their grasp of spelling usually worse than their reading skills⁶⁸. The original exercise consisted of 32 words, increasing in difficulty. If a respondent spelt two out of the first four words incorrectly, the interviewer read out eight additional easier words, making a total of 40 words. For the dress rehearsal and main stage survey, the exercise was reduced to one minute and comprised 16 words, with four additional easier words, making a total of 20 words.

Words could be spelt correctly, incorrectly or passed (the respondent does not attempt to spell the word and/or says 'pass'). One point was awarded for each correct spelling. An additional eight (basic skills pilot study) or four (dress rehearsal) points were added to the final score if the respondent had not made early errors and had not moved on to try the additional easier spellings.

The six practice words were again not used. In the DAST, the quality of handwriting was also recorded (good, average or poor), but as this very subjective measure did not contribute to a

68. Miles, T R and Miles, E (1999). *Dyslexia: A Hundred Years On*. 2nd edition. Buckingham: Open University Press.

respondent's score, interviewers were not asked to do this.

Interviewers read out one word at a time, starting to dictate the next word when the respondent had finished writing the previous word. At the end of the exercise, the interviewer recorded which hand the respondent wrote with and checked that they could read what the respondent had written down. If not, they asked the respondent how they had spelt a particular word, and wrote this down next to the word in question. This was very important. If the interviewer was not clear how a word was spelt, a coder entering the information into a dataset at a later date would probably not know either, and the information would be lost. Interviewers raised initial concerns about doing this, but once they were reminded of the old adage of never being able to read a doctor's handwriting, they were comfortable with this procedure. Importantly, they did not feedback any difficulties in doing this after the basic skills pilot study.

Results

The average number of words spelt correctly in the pilot study was 30. The identified dyslexics spelt significantly fewer words correctly than the non-dyslexics in the allocated time: 24 to 33. For easy comparison with the dress rehearsal, respondent scores from the pilot study were rescaled to have the same score range as the dress rehearsal: 0–20. As such, table 4.3 shows the average number of words spelt correctly in the rescaled pilot study was 15, in the dress rehearsal 16. Figure 4.5 shows the range of the scores achieved by participants in both development studies. The range of scores achieved by respondents in the pilot study was more spread than those achieved by BCS70 cohort members in the dress rehearsal. Further details of these results are provided in table A4.3 in the dyslexia appendix. Again, evidence in support of the validity of the measure comes from the Vinegrad classification. In the pilot study dyslexics obtained a substantially lower mean score than non-dyslexics, 22 compared with 32.

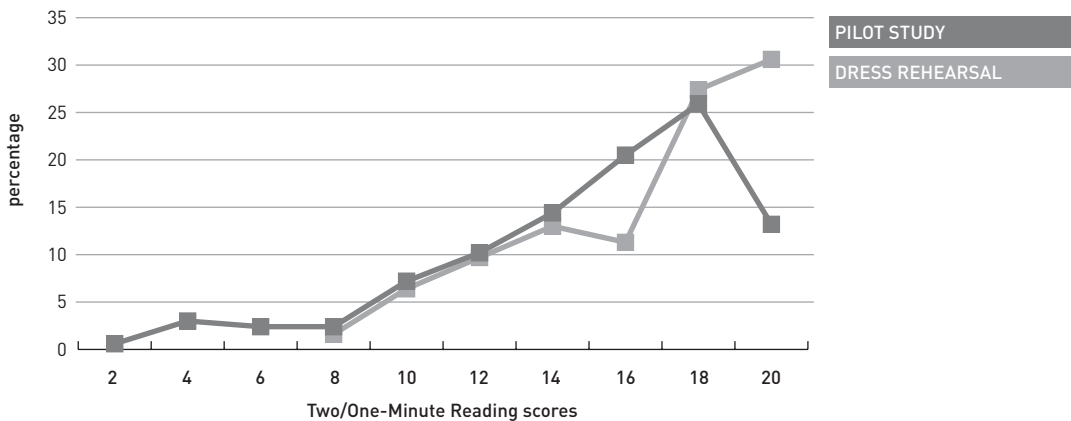
Table 4.3. Results of the Two/One-Minute Spelling exercise

	N	Score range	Mean	Median	sd
Pilot study: All	166	3–40	30	32	8.12
Non-dyslexics*	124	8–40	32	33	6.57
Dyslexics†	29	3–37	22	24	9.99
Rescaled pilot scores: All	166	1–20	15	16	4.08
Dress rehearsal: All	62	8–20	16	17	3.37

sd = standard deviation

*Non-dyslexics = a score of 0–7 on the Vinegrad Checklist,

†Dyslexics = a score of 8–20 on the Vinegrad Checklist.

Figure 4.5. Distribution of Two/One-Minute Spelling scores

4.5.4 One-Minute Writing exercise

Another difficulty for some adults experiencing symptoms of dyslexia is a slow speed of writing, together with loss of accuracy when under time pressure. This can mean that they will struggle to complete their work in an allotted time, posing particular problems in an examination situation or a specific work-related task. This aspect of dyslexia was assessed by respondents copying a short passage of 50 words in one minute.

The practice for this exercise was again dispensed with. After reading the passage, the respondent was instructed to copy all words and punctuation in the passage, to write fast but legibly and not to write in capitals. If at the end of the exercise, the writing was illegible to the interviewer (with this due to a fast writing pace), the interviewer asked the respondent to try again and to try and make their writing clearer. Only one repeat attempt was allowed.

The basic score was the number of words a respondent completed in one minute. If the passage was copied in less than a minute, one point was added for every two seconds under the minute⁶⁹. A maximum of ten points could be added for a quick time. For example, if a respondent completed the exercise in 52 seconds, four points were added to their score; if the exercise is completed in 40 seconds or less, ten points were added to the total score.

In this exercise, there were a number of ways that points were deducted. For mistakes (omitted words or words with spelling mistakes), one point was deducted for every two errors, rounding down for an 'odd' number of errors. For example, two points would be deducted for four or five errors. Up to three points could be deducted for poor handwriting, with three points being deducted for writing that was barely legible. Punctuation, including full stops, commas, spaces between words, was also assessed with two points deducted for poor punctuation.

Given the complexity and subjectivity of the scoring for this exercise, interviewers were not asked to 'score' a respondent's handwriting, only to carry out the exercise and collect a sample of their writing. Interviewers would not have the time or training to be able to carry out the scoring required in a reliable and consistent way. It was hoped to code this writing up post-fieldwork, but time restrictions for survey development did not make this practical. Therefore, no results are available.

69. If the exercise was completed in an 'odd' number of seconds ie, 51 or 53 seconds, the time was rounded down.

The exercise was relatively simple for respondents, although interviewers reported some of them seemed unhappy writing 'joined up', preferring to print. As respondents had been instructed to copy precisely, some respondents tried to keep to the line breaks of the original passage, although this was not necessary. Coding the passage would require additional expert coding and incur relatively high costs. As cohort members taking part in the main fieldwork would provide a sample of their handwriting in a 'free' writing exercise, any additional benefits of completing a timed copying exercise could not feasibly be incorporated within the time and financial restrictions of the main survey.

4.5.5 Phonemic Segmentation and Spoonerisms exercise

There is solid evidence that children with dyslexic symptoms are slow, developmentally, to detect rhymes, and that this is one of the reasons behind their struggles when learning to read. This type of phonological difficulty may persist into adulthood, and 'phonemic segmentation' ability – the ability to split words into their constituent sounds – is a sensitive index of these skills. As stated, Spoonerisms are a more complex measure of segmentation ability.

Unlike the previous three exercises, the Phonemic Segmentation, and to a certain extent, the Spoonerism exercise is not a timed exercise. However, the time taken to administer each exercise was recorded. As both exercises are not so usual or commonplace as the timed reading, spelling and writing exercises, the interviewers went through the practice examples included in the DAST instructions to help respondents fully grasp what was required of them. Once the practices were over, respondents attempted 12 Phonemic Segmentations and three Spoonerisms.

An extract from the instructions for the Phonemic Segmentation exercise is as follows:

"...Now, I want you to think about how a word is made up of different sounds. Listen to me say 'eyelid'. That's made up of two parts, 'eye' and 'lid'..... You can also break words into sounds. Can you say 'panda' without the 'da'?"

As with all the exercises, only general neutral encouragement was given, but consistency in words used ('good', 'yes', etc.) and tone of voice was vital. In this exercise, instructions and the specific word could be repeated once if the subject had clearly misunderstood the question, evident by their response to the first word/question. The Phonemic Segmentation exercise was stopped or discontinued if the respondent got the first four 'words' wrong, or otherwise, if they made three consecutive errors.

Whether respondents completed the Phonemic Segmentation exercise or stopped early, the interviewer administered the Spoonerisms exercise. They explained that it is an exercise to play around with the sounds of words. Essentially, the interviewer read out two words and the respondents had to swap round the sounds at the beginning of each word:

"..... So, if I say 'Car Park' you would say 'Par Car', and so on....."

The Spoonerisms used in the exercise were the names of three famous people.

For both the Phonemic Segmentations and Spoonerisms exercise, responses were given one point for a correct answer; 0 points for an incorrect response or a pass. A timer was used to record the time taken to complete the Spoonerisms exercise, but there was no time limit as

such. Interviewers needed to record the time taken, as one point was deducted from a respondent's score for a time of 50 seconds or more. However, this was only if one or more Spoonerisms were answered correctly. A time of 50 seconds plus indicates the respondent experienced considerable difficulty.

Results

In the DAST, scores from these two exercises can be combined, but the pilot scores were kept separate to help the selection of exercises. These are displayed in tables 4.4a and 4.4b. As with previous exercises, a high average score was achieved indicating that most respondents did not have any difficulty with the tasks. For the Phonemic Segmentation exercise, respondents had an average score of 10, but the scores between the dyslexics and non-dyslexics (as defined by the Vinegrad Checklist) were not significantly different.

For the Spoonerisms exercise, the possible range was only 0 – 3. As such, average scores do not reveal as much as for other exercises. The highest number of respondents managed all three of the Spoonerisms correctly in the pilot, but only two correctly in the dress rehearsal (indicated by the median). This was the only exercise where the respondents in the pilot study performed better than the sample of BCS70 cohort members in the dress rehearsal. The distribution of these scores is displayed in Figure 4.6. One hypothesis for the lower average score for cohort members in the dress rehearsal is that it was possibly harder to do the Spoonerisms exercise 'straight off' without having first done the Phonemic Segmentation exercise. The identified sample of dyslexics in the pilot study found the Spoonerisms harder than the non-dyslexics, another piece of validating evidence. Again, more detailed results are given in table A4.4 in the dyslexia appendix.

Table 4.4a. Results of the Phonemic Segmentation exercise

	N	Score range	Mean	Median	sd
Pilot study: all	175	3–12	10	11	2.04
Non-dyslexics*	132	3–12	10	11	1.89
Dyslexics†	30	3–12	9	9	2.53

sd = standard deviation

*Non-dyslexics = a score of 0–7 on the Vinegrad Checklist,

†Dyslexics = a score of 8–20 on the Vinegrad Checklist.

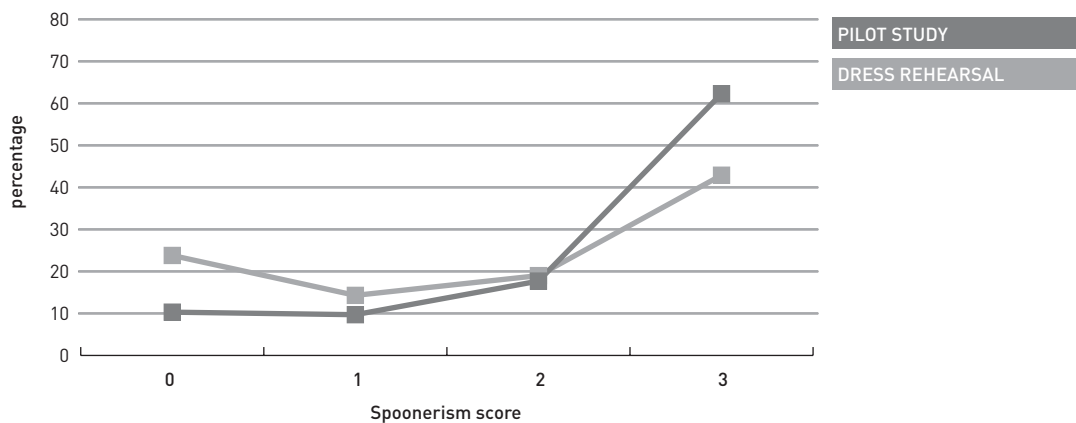
Table 4.4b. Results of the Spoonerisms exercise

	N	Score range	Mean	Median	sd
Pilot study: all	175	0–3	2	3	1.02
Non-dyslexics*	132	0–3	3	3	0.79
Dyslexics†	30	0–3	2	2	1.30
Dress rehearsal: all	63	0–3	2	2	1.23

sd = standard deviation

*Non-dyslexics = a score of 0–7 on the Vinegrad Checklist,

†Dyslexics = a score of 8–20 on the Vinegrad Checklist.

Figure 4.6. Distribution of Spoonerism scores

4.5.6 Nonsense Passage Reading exercise

Adults with symptoms of dyslexia find reading words that they have never seen before especially difficult. This can be readily explored by creating a passage of text containing 'made up' or 'nonsense' words. A well-known example of such is the poem 'Jabberwocky', from Alice through the Looking Glass.

As for the Phonemic Segmentation and Spoonerisms exercises, the short practice for this exercise was retained. Respondents were encouraged to attempt each word, but could 'pass' if they felt unable to attempt one of the words. After the practice, any mistakes were highlighted and correct answers were given. Respondents then moved to the main exercise. As for the Spoonerisms, the timer was used, being set to three minutes. Although some respondents might be awarded extra points for a quick time, it was more a strategy for bringing the exercise to a close for the respondents who were really struggling but would not admit defeat.

As in the practice, respondents could 'pass' on a word, but were discouraged from not even trying to read the nonsense words. The exercise was stopped if the respondent made five consecutive mistakes, gave up, or was still going after three minutes. Scoring was more complex than for the other exercises; the number of words read and whether or not they were nonsense words were both taken into account, together with how long the respondent took. In summary, one point was given for each of the 59 normal words read correctly; two points for a correct (plausible) reading of each of the 'nonsense' words; one point for a 'close try'. After the difficulties encountered in the pilot study, a 'close try' was quantified as a pronunciation which had one sound or syllable different, one sound or syllable omitted, or one sound or syllable added. For example:

- 'rinsomely' is correctly broken down to have three syllables – 'rin-some-ly';
- a semi-correct, close try could be 'rin**G**-some-ly' or 'r**En**-some-ly'; and
- an incorrect attempt could be 'rin**G-ER**-some-ly' or 'rin**G-ER**-some-**ER**-ly.

Results

Difficulties recording time taken to complete this task were encountered by interviewers in the Basic Skills Pilot. Following amendments made after their feedback, 'time taken' was successfully recorded in the dress rehearsal. A score that included 'time' for the nonsense reading passage results in the dress rehearsal was calculated, but to enable comparison with

pilot study figures, a total score without time penalties or bonuses was also calculated.

Table 4.5 shows a near identical high average score was attained by participants in the pilot study and dress rehearsal. Those identified in the pilot study as dyslexic read fewer words correctly than non-dyslexics. The difference in scores provides more evidence of the validity of the test. The range of scores is displayed in figure 4.7, with further details provided in table A4.5 in the dyslexia appendix.

Table 4.5. Results of the Nonsense Passage Reading exercise

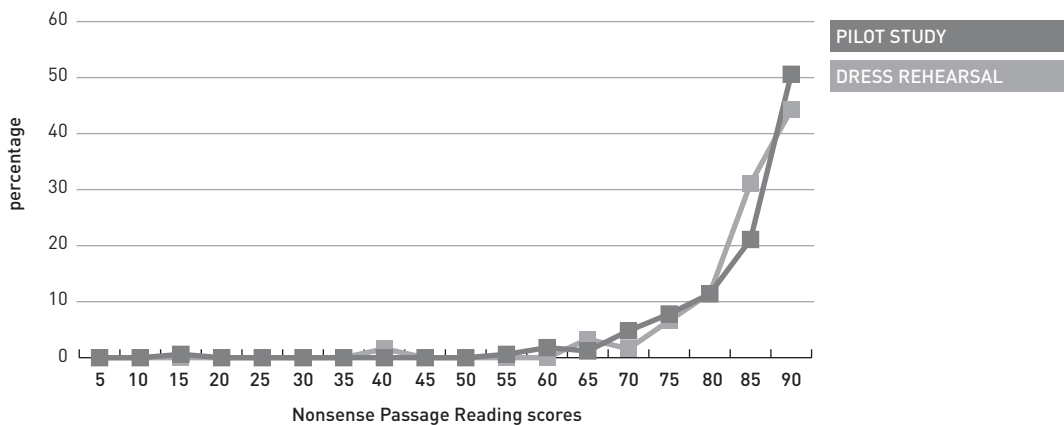
	N	Score range	Mean	Median	sd
Pilot study: all	166	14–89	82	86	9.05
Non-dyslexics*	126	14–89	83	86	8.39
Dyslexics†	29	52–89	76	76	10.10
Dress rehearsal: all (exc. Time)‡	61	36–89	82	85	8.49
Dress rehearsal: all (inc. Time)‡	61	28–99	80	81	16.68

*Non-dyslexics = a score of 0–7 on the Vinegrad Checklist,

†Dyslexics = a score of 8–20 on the Vinegrad Checklist.

‡ 'exc. time' = excluding time; 'inc. time' = including time.

Figure 4.7. Distribution of scores for the Nonsense Passage Reading exercise



5 Parent and Child Interview

An additional purpose of the 2004 survey was to gather information on a representative sample of cohort members and their resident natural or adopted children, and assess the children's cognitive skills. This part of the survey was the Parent and Child Interview and largely replicated a similar intergenerational study, the Mother and Child Survey, which was carried out in 1991 on a representative sample of the NCDS cohort, when they were aged 33. All components within the Parent and Child Interview were funded through NRDC from a grant awarded by the European Social Fund (ESF).

As described in chapter 2, the child assessments were piloted in September–October 2003 on 127 children from 60 households (the Child Assessment Pilot). After revisions to the design of some assessments, they were included in the 'dress rehearsal' for the final survey. This took place on 64 BCS70 cohort members and 40 of their children in November 2003 (the dress rehearsal).

5.1 Assessing the cognitive skills of children: which assessment?

In 1991, children between age four and 16 of one third of all NCDS cohort members completed nine age-specific child assessments adapted from US versions and administered by general survey NatCen interviewers in the cohort members' homes⁷⁰. This was an add-on to the main NCDS age 33 follow-up survey and involved a random sample of one in three of the cohort members who had agreed to take part in the main interview. Parents – almost exclusively mothers (i.e. the cohort member or their female partner) – supplied additional information about each child and about the family as a whole. Following the model adopted in the comparable US survey of mothers and children – the National Longitudinal Study of Youth (NLSY), fieldwork was preceded by a week's training, including practice interviews. The survey was successful, with over 95 per cent of the selected cohort members who had taken part in the main interview agreeing to take part.

As noted in chapter 1, the comparable age of the BCS70 cohort to that of the NCDS cohort offered the opportunity for cohort comparisons of cognitive development (with age of cohort member controlled) across the 12 years separating the two cohorts' births. This identified the first of a number of requirements for the BCS70 children assessment:

- comparable cognitive development measure to those used in the NCDS age 33 survey;
- continuity from and comparability to the assessment of cohort members' own cognitive development and educational performance when they were children and to the measures of their adult literacy and numeracy;
- applicability across the full anticipated age range expected for the cohort members' children. (This and other attributes of the children could only be effectively established by the interview when arranging the main interview.); and
- could be administered within the 20 minutes available for each child's assessment in the

70. For the complete range of assessments, see **The NCDS Sweep V User Guide** (1993), available from the Economic and Social Research Council (ESRC) Data Archive. To complete the cognitive assessments, children had to have a Peabody Picture Vocabulary Test (PPVT) age of at least 4, equivalent to 3 years 11 months and 16 days. For further details see Dunn, L. M. and Dunn, L. M. (1981). **Peabody Picture Vocabulary Test - Revised**. Circle Pines, MN: American Guidance Service.

survey. (This was partly on the grounds of survey cost and partly on the grounds of minimising 'interview burden'.)

These requirements both mapped onto and extended those applying to the NCDS child assessments – most notably the need for continuity and comparability with adult basic skills assessments. In addition, there had been some criticism of the Peabody and other US tests adopted in the earlier survey on the grounds of datedness. At a general level of comparison, e.g. based on rank ordering children, this would not matter too much but was not optimum for the detailed investigation of cognitive skills related to adult literacy and numeracy that was a prime purpose of the BCS70 survey. After much consultation, the following assessment instruments were subjected to detailed scrutiny:

- The Stanford-Binet Intelligence Scale, suitable for ages 2–18 years: individually administered measure of mental abilities based on a series of varied tasks. This edition was first published USA, Houghton Mifflin, 1960⁷¹.
- The Wechsler Pre-school and Primary Scale of Intelligence; suitable for ages 0–5 years, and the Revised Wechsler Intelligence Test for Children; suitable for children aged 6–16 years, 6 months: developed to meet the demands for a short and reliable measure of intelligence in clinical, psycho-educational and research settings and individually administered, this yields three traditional verbal, performance and IQ scores. Linked to Wechsler Intelligence Scale for Children (WISC III) and Wechsler Abbreviated Scale of Intelligence (WASI III). Four sub-tests – Vocabulary, Block Design, Similarities and Matrix Reasoning. Contains British amendments to the administration and scoring criteria sections. This was first published USA, 1974⁷².
- The British Ability Scales II (BAS II): comprising several subscales suitable for children aged 2 years, 6 months–17 years, 11 months⁷³.
- The Snijders-Oomen Non-verbal Intelligence Scales: suitable for children aged 2 years, 6 months–7 years old and for children aged 5 years, 6 months–17 years old⁷⁴.
- The Peabody Individual Achievement Test (PIAT): Maths, Reading Recognition, and Reading Comprehension Subscales, and the Peabody Picture Vocabulary Test – Revised (PPVT-R)⁷⁵.
- The Bracken Test: ages 2 years, 6 months–7 years, 11 months: measure of children's basic concept acquisition and receptive language skills. Used to measure comprehension of 308 foundational and functionally relevant educational concepts in 11 subjects or concept categories: colours, letters, numbers/counting, sizes, comparisons, shapes, direction/position, self-/social awareness, texture/material, quantity, and time/sequence. Test is individually administered and concepts presented orally within the context of complete sentences and visually in a multi-choice format⁷⁶.

71. Terman, L. M and Merrill, M. A (1961). *Stanford-Binet Intelligence Scale*, 3rd edition. IL, USA: The Riverside Publishing Co.

72. Wechsler, D (1999). **Wechsler Abbreviated Scale of Intelligence (WASI)**. UK: Psychological Corporation Wechsler, D (1976). **Wechsler Intelligence Scale for Children – Revised (WISC-R)**. NFER-Nelson, 2nd (British) edition.

73. Elliot, C. D (1983, 1996). **British Ability Scales II: Core Scale 2**. Berkshire: The NFER-NELSON Publishing Company Ltd. Elliot, C. D, Smith, P and McCulloch, K (1996). **British Ability Scales II: Administration and Scoring Manual**. Berkshire: The NFER-NELSON Publishing Company Ltd. Elliot, C. D, Smith, P and McCulloch, K (1997). **British Ability Scales II: Technical Manual**. London: The NFER-NELSON Publishing Company Ltd.

74. Snijders, J. T and Snijders-Oomen, N (c 1987). **Snijders-Oomen Non-Verbal Intelligence Scale**. Netherlands: Wolters-Noordhoff. Ages 2.6 – 7 years. Snijders, J. Th, Tellegen, P. J and Laros, J. A (1989, 1996). **Snijders-Oomen Non-Verbal Intelligence Scale (SON-R)**. Netherlands: Wolters-Noordhoff (Manual) and Swets and Zeitlinger. Ages: 5.6 years to 17 years. These tests were not found appropriate, as there was no specific literacy and numeracy element.

75. Dunn, L. M., & Dunn, L. M. (1981). **Peabody Picture Vocabulary Test-Revised**. Circle Pines, MN: AGS Publishing. Dunn, L. M., & Dunn, L. M. (1997). **Peabody Picture Vocabulary Test-Third Edition**. Circle Pines, MN: AGS Publishing. Dunn, L. M and Markwardt, J. C (1970). **Peabody Individual Achievement Test Manual**. Circle Pines, MN: American Guidance Service.

76. Bracken, B. A (1998). **Bracken Basic Concept Scale – Revised (BBCS-R)**. London: The Psychological Corporation.

The BAS II was found the most appropriate to meet the survey's purposes and was adopted. The main reasons were:

- Using the BAS II would offer intergenerational comparison opportunities as BCS70 cohort members were assessed using aspects of the BAS in 1980, when aged 10.
- MCS cohort members were assessed with an individual BAS II scale when three years old.
- BAS II contains modules designed to capture a measure of a child's literacy and numeracy development. By using such subscales, the extent to which education and skills problems and attainments are repeated across the generations within families and the big influences on them could be investigated, in line with the NRDC basic skills enquiry.
- BAS II was among the few major tests available that offered assessment of children aged 3–16 years old. Each assessment was age adaptable.
- Appropriate BAS II scales were estimated to take 20 minutes (on average) to complete. This was in line with the project requirements to minimise burden on the children and the overall time the interviewer had to spend in the household.

5.2 Introduction to the British Ability Scales II

The British Ability Scales Second Edition (BAS II) is a battery of individually administered tests of cognitive abilities and educational achievement, published by the NFER-NELSON Publishing Company Ltd. The initial research that eventually led to the publication of the original BAS in 1979 started in 1965, and has been developed fairly continuously since. A revised version, the BAS-R was published in 1983. The battery of individual scales that make up the BAS II, published in 1997, therefore has more than 30 years of development behind them.

The BAS was initially developed to provide professionals (in a number of different clinical settings) who assessed children with a wide range of learning and developmental needs, with a tool that gave information at a finer, yet also broader, level of detail than could be attained from an IQ score. As such, various theoretical perspectives have been drawn on and accommodated within the development of BAS II. However, educational application remains the principal goal of BAS II, primarily to evaluate children who demonstrate learning difficulties.

The battery of individual scales that make up the BAS II objectively, reliably and economically measure a child's strengths and weaknesses, providing a comprehensive assessment of their current intellectual functioning and basic educational progress. Generalisation is the key feature upon which all tests are based. Much of human behaviour is not specific to a particular setting and more lasting and general characteristics of a child can therefore be interpreted from an achieved score in an individual test⁷⁷. For example, vocabulary testing is an index of general language skills.

The BAS II consists of two elements: the cognitive element and the achievement element. It is suitable for use with children and adolescents aged from 2 years, 6 months (2:6) to 17 years, 11 months (17:11), and is organised into two age-specific batteries: the Early Years Battery for pre-school children and the School Years Battery for children of school age.

⁷⁷ When administered in clinical settings, additional information about a child's abilities, school performance and behaviour is also drawn on when interpreting the scores.

The Early Years Battery is composed entirely of cognitive scales and is used in general for children under 6:0 years old (but can be used for children from 6:0 to 7:11 years old who will have difficulty with the School Age Battery). Several of the subscales can be used from age 2:6 upwards; others start from age 3:0, 3:6 or 4:0. These scales use appealing artwork and manipulable objects to assess reasoning, perception and memory, together with an understanding of basic quantitative concepts.

The School Years Battery comprises both cognitive and achievement scales which have been normed from 5:0 to 17:11 years (though some of the scales will prove demanding for 5- and 6-year-olds). The cognitive scales have been designed to assess reasoning, perception, processing speed and memory, using verbal, numerical and figural materials. The achievement element comprises scales measuring word reading, spelling and number skills.

5.3 Selection of particular subscales

In line with the NRDC enquiry, it was necessary to use subscales that supplied a measure (direct or indirect) of a child's literacy and numeracy. An additional requirement was that the scales should take no more than 20 minutes of interview time (on average). After consultation with experts from the London Institute of Education and NFER-Nelson, the Naming Vocabulary, Early Number Concepts and Copying⁷⁸ subscales were selected from the Early Years Battery for children aged 3:0–5:11. For children aged 6:0 – 16:11, the achievement element of the School Years Battery was selected, i.e. Word Reading, Spelling and Number Skills subscales. The abilities measured by these scales are detailed in figure 5.1. A general problem to bear in mind with the selected assessments is their datedness. As the BAS II was last revised in 1997, some of the images/pictures included in the Early Years Battery are showing their age. A picture of a telephone looks particularly outmoded. Some of the children in the survey will have only ever seen a mobile phone, not a push button landline. Perhaps of more concern is the inability of such an assessment to keep pace with the (evolving) national curriculum. This was particularly apparent for the Number Skills scale of the School Years Battery (see section 5.9.4). However, a definite plus of using the BAS II scales is that these tests have been widely used and scores have been standardised on large populations. This means that the results obtained in the BCS70 follow-up survey can be benchmarked, and if necessary standardised, against the BAS II test norms.

78. Copying skills are a strong predictor of literacy and numeracy competence in adult life (see Bynner and Steedman, 1994; Parsons and Bynner, 1998).

Figure 5.1. Selected BAS II subscales

Ages 3:0 – 5:11 years (Early Years Battery)	
Scale	Abilities measured
Naming vocabulary	Expressive language; knowledge of names
Early number concepts	Knowledge of, and problem-solving using pre-numerical and numerical concepts
Copying	Visual-perceptual matching and fine-motor coordination in copying line drawings
Ages 6:0 – 16:11 years (School Years Battery)	
Scale	Abilities measured
Number skills	Recognition of printed numbers and performance of arithmetic operations
Spelling	Knowledge and recall of spellings
Word reading	Recognition (decoding) of printed words

5.4 Adapting BAS II for interviewer administration

The standard BAS II is designed to be administered, scored and interpreted by people with a relevant psychology background, with formal training in the individual administration and interpretation of cognitive test batteries for children and adolescents of the age range covered by this test. The goal of the BAS II is to obtain an accurate score by administering a sufficient number of items appropriate for the child's level of developmental ability. Items that are moderately difficult for the child provide the most information about his/her ability; little is learned from administering items that prove extremely easy or extremely difficult. Children of different ages therefore usually start and stop at different points on each scale. These starting and stopping points are flexible rather than fixed, in response to a child's performance. The administration of each scale is therefore not straightforward. To minimise the number of decisions interviewers had to make in response to a child's performance, the 'rules' of each selected scale were programmed into CAPI. The interviewers coded a child's answer as (usually) correct or incorrect and then the CAPI directed the interviewer to the next question suited to the child's level of ability. In this way, the interviewer could concentrate on a child's performance, which made the experience present less like a 'test' to the child, while being assured that the standard BAS II instructions were followed.

5.5 Interviewer materials

As only three scales from the Early Years and School Age Batteries were administered with the aid of CAPI, standard BAS II stimuli and interviewer recording booklets had to be revised:

For young children, new stimulus booklets (also called easels) used for the Naming Vocabulary, Early Number Concepts and Copying scale were produced. Additional material included sets of green tiles for the Early Number Concepts scale and specially produced answer booklets for the Copying scale.

For older children, specially produced answer booklets for all three scales administered were used.

5.6 Sample size

Unlike the adult assessment, which as a newly designed instrument needed to be piloted on a large number of respondents for reliability, the BAS II is an established assessment tool. The main aim of the Child Assessment Pilot was to see how interviewers fared administering the possibly complex set of assessments to children in their own homes. The scores achieved from children taking part in both the Child Assessment Pilot and the dress rehearsal are included in the report, but, because of the small numbers involved for any given age, this is more to illustrate the type of data to be expected in the main survey than as results of interest in their own right.

5.7 General interviewer feedback

The most overwhelming problem encountered by interviewers were routing problems within the CAPI programme which generally meant a child had to struggle on for longer as the program had not always stopped at the appropriate point. These programming points were amended for the dress rehearsal, where no problems were reported. As with adults, more of the children found the scales assessing their number skills the most difficult or unappealing. The Early Number Concepts and Number Skills scales took by far the longest time to complete.

Some interviewers reported feeling uncomfortable when the CAPI programme went back to earlier items if the child's performance was poor. When that happened, the child, particularly an older child, seemed uneasy or realised that they had performed badly. Briefings were revised accordingly and to ease a child's potential discomfort, interviewers could explain that the original set of questions was meant for much older children and encourage the child to continue. Given that many able children (and adults) find working with 'numbers' difficult and/or stressful, interviewers were advised to be particularly encouraging and reassuring during the Early Number Concepts and Number Skills assessment, and to praise their efforts, irrespective of their performance. Finally, interviewers were instructed to stop the exercise if the child was clearly distressed or asked to stop before the CAPI ended the exercise.

5.8 Administering BAS II: the Early Years Battery

The order of administration for all children was initially Naming Vocabulary, Copying and Early Number Concepts. However, whilst children readily engaged with the Naming Vocabulary task, the Early Number Concepts and Copying tasks were not so appealing. Following feedback from the pilot study, the Copying task was replaced with a simpler version and was completed last in the dress rehearsal and main fieldwork in a bid to end the assessment on a more positive note for the children. The final order of administration was:

- Naming Vocabulary;
- Early Number Concepts; and
- Copying.

5.8.1 Timing

32 children completed the three scales from the Early Years Battery in the Child Assessment Pilot; 13 children in the dress rehearsal.

Table 5.1 shows that, in the Child Assessment Pilot, the average time⁷⁹ taken to complete the Naming Vocabulary exercise was 4 minutes and 15 seconds; and that the average time to complete the Early Number Concepts scale was 10 minutes and 49 seconds. The original BAS II Copying scale took an average time of 3 minutes and 6 seconds, but this figure is not as accurate as for the Naming Vocabulary and Early Number Concept scales as the CAPI had a minimal role in this exercise. The 'real' time would be longer as interviewers would have often reached the last CAPI screen relevant to the exercise before a child would have completed the exercise. The average time for completion was therefore under the requisite 20 minutes. However, as interviewers were keen to stress, for many children the time was far longer. After the revisions made to the CAPI programme and the Copying task, the average time taken to complete the three exercises was actually slightly longer at 18 minutes and 46 seconds, but still comfortably within the allocated time.

Table 5.1. Average time taken to complete scales from the Early Years Battery

	Child Assessment Pilot average time	Dress rehearsal average time
Naming Vocabulary	4:15	5.14
Early Number Concepts	10:49	10.04
Copying	3:06	3.28*
Total average time	18:10	18:46

* The copying task was not CAPI-based. To provide reliable estimates, the start time has been calculated as the end of the early number concepts.

5.8.2 Naming Vocabulary

Rules and administration

For this exercise, the child was shown a series of pictures presented in the stimulus booklet and asked to say what it was, e.g. a picture of a shoe, chair or pair of scissors. There were 36 pictures in total, but the number of items a child answered depended on his/her performance. There were different starting and stopping points dependent upon age and performance but, on the whole, the better they did, the more items they were administered (detailed instructions are provided in table A5.1 in the parent and child appendix). Interviewers could not provide anything but neutral encouragement to a child during the task, except for the first two items administered. These were 'teaching' items. The interviewer provided specific feedback, i.e. 'yes, that's right', etc. but also gave the correct response if the child had not answered correctly or had not understood the question.

All alternative answers a child might give that were included in the BAS II manual were also presented for interviewers on the CAPI screen. In this exercise, a child's answer was either:

- 'correct' – the standard name of the pictured object, e.g. 'shoe';
- 'acceptable' – responses other than the standard name of a pictured object, such as overly specific names, e.g. 'trout' for 'fish'; and
- 'incorrect (probe further)' – such responses included the description of the function, materials

79. Time calculations were provided by the NatCen Research Team.

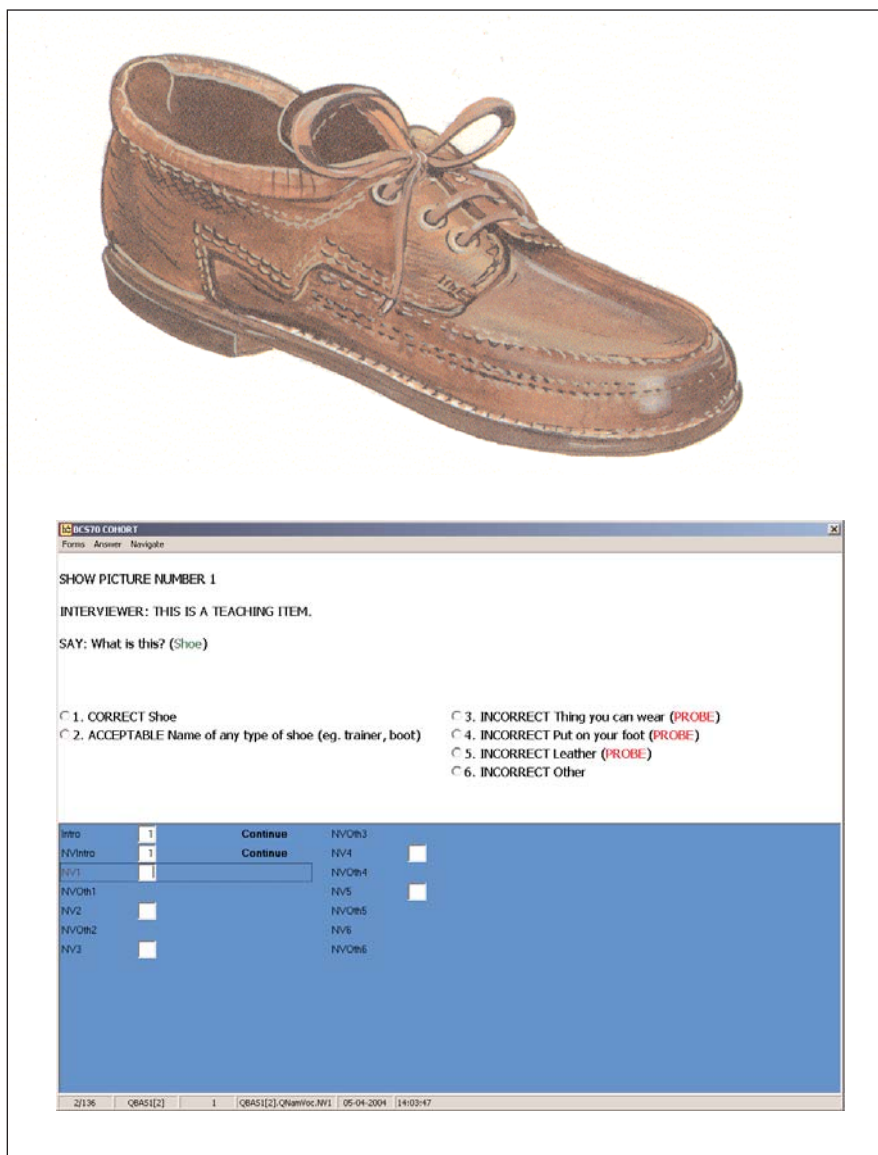
or parts of the object pictured (e.g. 'put on your foot' for 'shoe'), too general responses (e.g. 'animal' for 'horse') and names of related objects (e.g. 'stool' instead of 'chair'); and

- 'Incorrect (other)' – responses that were just plain wrong, e.g. 'tree' for 'shoe'. Interviewers had to write the child's response into the CAPI verbatim.

Feedback and modifications

In general, feedback from the Child Assessment Pilot was very positive. Interviewers reported that the exercise was generally simple to administer and that children enjoyed it. It was necessary for interviewers to be very quick when coding the child's answers, as they responded very quickly. An example of a BAS II image and the CAPI screen is given in figure 5.2. No significant modifications other than a few CAPI amendments were made for the dress rehearsal and main fieldwork. More detailed interviewer feedback is provided in table A5.2 in the parent and child appendix.

Figure 5.2: BAS II Naming Vocabulary Image and CAPI screen ⁸⁰

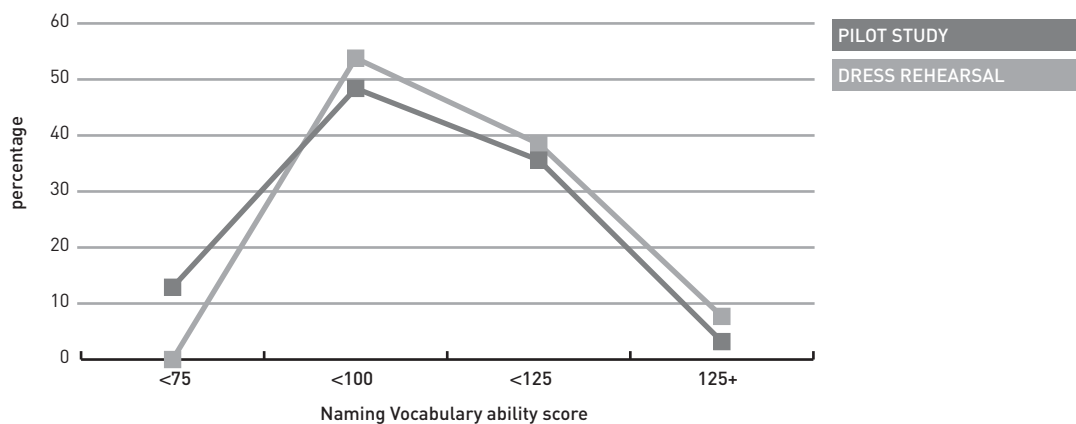


80. ©nferNelson. This example from the BAS II Naming Vocabulary Scale has been reproduced with the kind permission of nferNelson.

Results

Although the number of children in each survey is small, by grouping the ability scores (as derived from their raw scores) the distribution of the children is shown in figure 5.3. Despite the small numbers, the distribution of scores from the Child Assessment Pilot and dress rehearsal are remarkably similar. They also demonstrate exactly the kind of spread of scores required for the main survey.

Figure 5.3. Early Years Battery–Naming Vocabulary ability scores

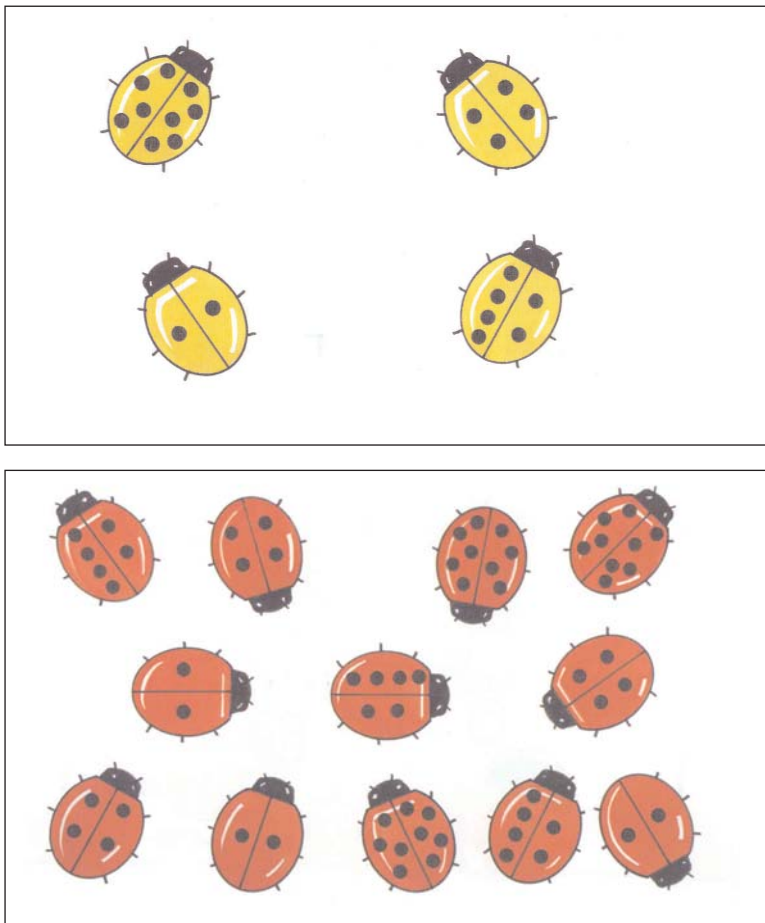


5.8.3 Early Number Concepts

Rules and administration

For this exercise, the child answered questions about number, size, or other numerical concepts. Stimuli used for the exercises included ten green plastic tiles and a series of pictures presented in the same easel as for the Naming Vocabulary scale. There were 30 questions in total, but there was no standard number of items for a child to try and answer. As for Naming Vocabulary, there were different starting and stopping points dependent upon age and performance (see table A5.3 in the parent and child appendix for details). A number of questions were asked for each of the pictures. For example, three questions went with the 'ladybirds' displayed in figure 5.4. The interviewer would indicate the yellow ladybirds, point to one in particular, and then ask the child to point to all of the red ladybirds that had the same number of spots as the particular yellow one, i.e. two, four or six spots. Interviewers could not provide anything but neutral encouragement to a child during the task, except for the designated teaching items where the interviewer provided specific feedback, e.g., 'yes, that's right', etc, but they also gave the correct response if the child had not answered correctly or had not understood the question. For this exercise, interviewers had to code a child's answer as 1 'correct', and 2 'incorrect' on the CAPI screen. (The exception to this was item 3, as detailed in table A5.4 in the parent and child appendix.)

Figure 5.4. BAS II Early Number Concepts image and CAPI screen⁸¹



Feedback and modifications

There was an overall feeling that children were not as engaged with this exercise as they had been for the Naming Vocabulary, and that the children might have tried harder if the tests had been more attractive. For the exercises which involved the green tiles, there was often not enough space in a cohort member's home to lay out the tiles. Many interviewers found it best to sit on the floor with the child.

Younger children often lost interest or got tired quite soon. Some of the illustrations were particularly unappealing to younger children who seemed to lose interest and wander away from the task at hand. However, older children (five plus) battled on, which indicated the particular questions depicted stages of cognitive development. Given the particularly negative feedback on this scale, interviewers were asked to be particularly encouraging, though at the same time without giving specific feedback (other than on teaching items), and to praise the child after the exercise had finished, irrespective of his/her performance.

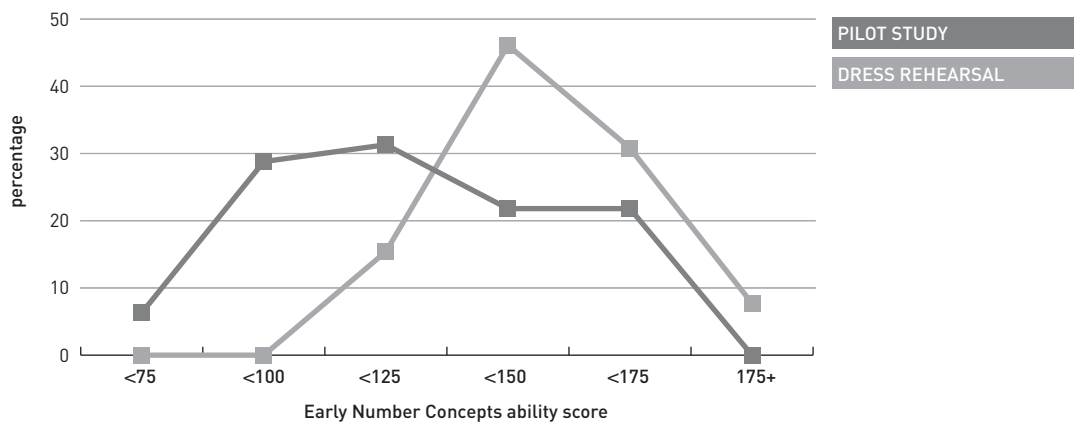
Results

The distribution of ability scores (as derived from their raw scores) from the Child Assessment Pilot and dress rehearsal are shown in figure 5.5. Unlike for the Naming Vocabulary scale, the distributions were rather different, more flattened and with a lower

81. ©nferNelson. This example from the BAS II Early Number Concepts Scale has been reproduced with the kind permission of nferNelson.

mean value for the scores in the pilot than in the dress rehearsal. The wider spread of scores for the much larger pilot sample inspires confidence that a similar wide range of performances will be obtainable in the main survey.

Figure 5.5. Early Years Battery: Early Number Concepts ability scores



5.8.4 Copying

Rules and administration

For this BAS II exercise, the child was asked to copy several drawings of increasing difficulty on a piece of paper⁸². There were 20 drawings in total but, again, there was no standard number of drawings that a child was expected to copy. This scale was not intended for children below 3:6 years old, but children aged 3:0 – 3:5 were included in the Child Assessment Pilot.

Coding children's drawings is a fairly subjective task; one that placed too many demands on the interviewers. As such, despite different starting and stopping rules dependent on age and performance, all children started at item 1 (see table A5.5 in the parent and child appendix for details). Interviewers were instructed to administer the assessment until the child clearly failed five consecutive items or until the child got tired. In this way, the interviewer would not have to mark the children's responses and the children would do as many items as they comfortably could. The ultimate stopping point was item 15 for children aged 3:0 – 4:11 and item 20 for children aged 5:0 – 5:11. Thus, the role of the CAPI was minimal in this exercise⁸³.

Feedback and modifications

Feedback from the pilot study was relatively discouraging. Some interviewers felt quite strongly that this task was too difficult for the youngest children (this is not surprising, as the normal starting age was 3:6). As children soon became tired of the task, as they often had to copy too many items, concentration wavered. Interviewers also found they had to rely on their own judgement to stop the exercise after reading the often obvious negative body language of a child. Interestingly, interviewers found some children were unfamiliar with the word 'copying' – they seemed to want to 'pick-up' or 'drag' the image they had to copy, very much like on a computer screen with a mouse.

82. The section in the booklet for younger children to copy images in consisted of ten pages with two rectangular boxes on each page, one below the other. These were the exact size of the boxes in the standard BAS II material (13.7 cm x 10.7 cm). Additional pages with un-numbered boxes were included at the back of the booklet. However, many of the children did not copy the images in the centre of the box, deciding to draw all over the page instead!

83. This produced problems when trying to estimate the average time children took to complete this exercise.

By dropping the BAS II Copying task, we would lose the opportunity to standardise the BCS70 scores using the BAS II test norms. However, the value of using an easily manageable test, performance on which could also be compared directly with the performance of the cohort members when they were aged 5, outweighed this consideration. Accordingly, it was decided to replace for the dress rehearsal the BAS II Copying Scale with the Copying Designs task that had been used previously in BCS70⁸⁴. These drawings were much simpler than the BAS II drawing. The test required the child to copy eight drawings twice on two consecutive pages of a specially produced booklet. Figure 5.6 shows a completed booklet from the dress rehearsal (the designs that the child had to copy are in the left hand column of each page).

The instructions for this simplified task appeared on the CAPI; the interviewers were directed to point to each design in turn and ask the child 'see if you can make one just like this – here', at the same time pointing to the space beside the design. Therefore the word 'copy', which was found ambiguous, was avoided.

Feedback from the dress rehearsal indicated that the new Copying Designs task was much simpler than the one from the BAS II. Interviewers indicated that both they and parents felt the set of drawings were appropriate for children age 3.0 – 5.11 years. A few children could not be persuaded to make two attempts, and some were tired before they reached the end of the exercise; however, the task worked well in general and was retained for the main stage. As there were no discontinuation rules, interviewers were asked to encourage the child to attempt all eight designs, but should stop if the child was distressed or if he/she stopped attempting to copy.

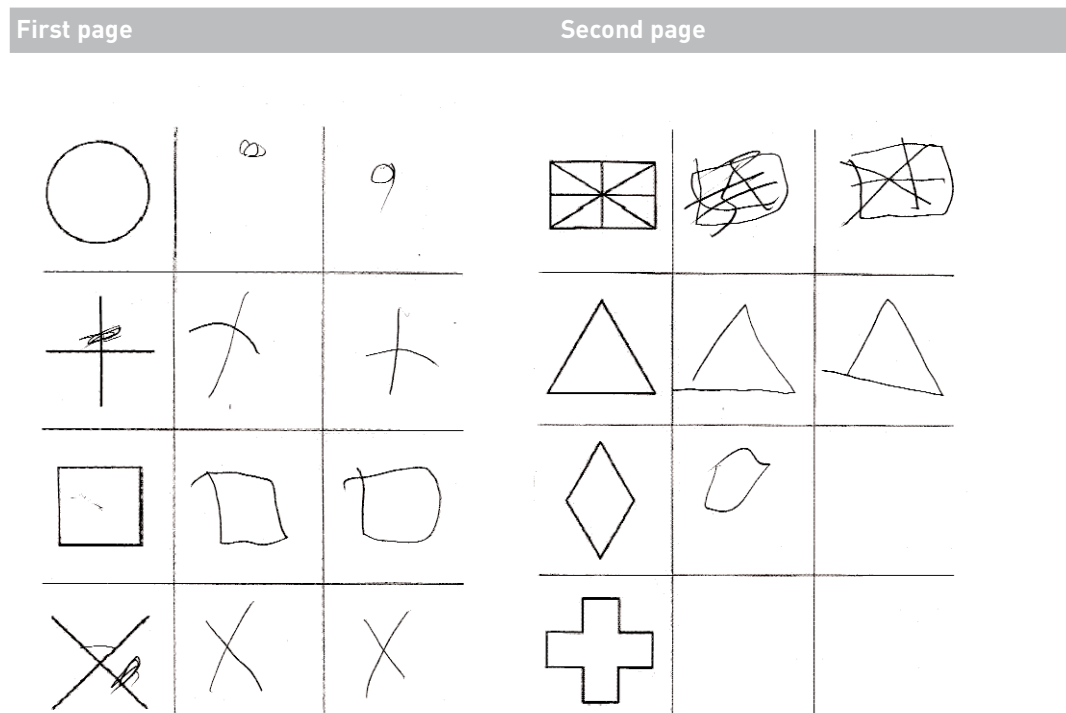
Scoring the Copying Designs task

The child is asked to make two copies of each shape. No time limit is given. For each drawing, a score of 0 or 1 is allocated. As not all children complete two copies, a score of 1 is allocated if at least one good copy is made of a given design. The total score is the sum of the scores for the individual drawings. The test is used to assess the child's ability to reproduce shapes, and the neatness of the drawing is therefore irrelevant. For all of the drawings, the following principles apply:

- the drawings must have the right general shape and look like what they are supposed to be;
- they should be approximately symmetrical;
- angles should not be rotated;
- the drawings should not be rotated, i.e. the point of a triangle should be uppermost;
- angles must be approximately opposite each other (except for the triangle);
- slight bowing or irregularity of lines is allowed;
- as long as the other criteria are met, neatness is not important;
- lines should meet approximately but, as long as other criteria are met, small gaps in junctions are acceptable; and
- slight crossing and overlapping of lines is permitted.

84. Osborn, AF, Butler, NR and Morris, AC (1984). **The Social Life of Britain's Five Year Olds: A report of the Child Health and Education Study**. London: Routledge and Kegan Paul.

Figure 5.6. Example of a completed Copying Designs booklet



5.9 Administering BAS II: the School Age Battery

For the exercises in the School Age Battery for older children, no teaching items were included and no interviewer feedback, other than neutral encouragement, was allowed.

The order in which the three scales were administered was: Word Reading, Spelling and Number Skills. 66 children took part in the Child Assessment Pilot and 26 children completed the revised scales in the ‘dress rehearsal’ for the main fieldwork.

Timing

In The Child Assessment Pilot, the average time taken⁸⁵ to complete the Word Reading exercise was four minutes; the Spelling scale was five minutes and 38 seconds and the Number Skills scale nine minutes and 38 seconds. As for the Early Years Battery, table 5.2 shows the selected scales were completed in less than 20 minutes on average. After the revisions made to the CAPI programme and the Spelling scale, the average time increased to 20 minutes and 19 seconds. However, as the sample size was much smaller, the figures are less robust.

Table 5.2. Average time taken to complete scales from the School Age Battery

	Child Assessment Pilot average time	Dress rehearsal average time
Word Reading	4:00	4:04
Spelling	5:38	4:50
Number Skills	9:38	11:25
Total average time	19:16	20:19

85. Time calculations were provided by the NatCen Research Team.

5.9.2 Word Reading

Rules and administration

In this exercise, the child read aloud a series of words presented on a card. The child had to correctly pronounce words within locally accepted standards, with emphasis on the correct syllable or syllables. There were 90 words on the card, arranged in 9 blocks of 10 words each, but there was no standard number a child had to answer – the total number read out by the child depended on his/her performance. On the whole, the better they did, the more words they read (see table A5.6 in the parent and child appendix for full details of starting and stopping points).

Instead of using a separate show card, the list of words to be read was included in the specially designed booklet. The format of the words to be read, i.e., font type, font size, setting, etc. was as close to the standard BAS II format as possible, as shown in figure 5.7.

Figure 5.7. BAS II Word Reading List ⁸⁶

Word Reading Card					
A	the	up	he	you	box
	at	said	out	jump	fish
	one	cup	wood	bird	clock
	ring	water	window	men	light
B ▶	oil	ship	running	dig	money
	paper	gate	knock	heel	skin
	coat	carpet	brick	thin	building
	tail	travel	babies	writing	climb
C ▶	collect	early	piece	piano	whistle
	invite	guest	electric	enormous	shoulder
D ▶	wreck	favour	supplies	encounter	universal
	ceiling	generation	environment	cough	character
	avenue	experience	radiant	statue	audience
	curiosity	obscure	diameter	chaos	boisterous
	tentative	trauma	jeopardy	silhouette	desultory
	reminiscent	divulge	diplomacy	rheumatism	tyrannical
	catastrophe	regurgitate	meticulous	initiate	tertiary
	criterion	archaic	monosyllabic	mnemonic	facetious

86. ©nferNelson. This example from the BAS II Early Number Concepts Scale has been reproduced with the kind permission of nferNelson.

For the interviewers, the CAPI screen showed each of the words the child was to read out in turn. As in the original BAS II interviewer booklet, the screen included a phonetic pronunciation of the word. The symbol ‘/’ and ‘//’ within words was used to indicate individual phonemes and syllables, respectively, with the accented syllables in bold. For example:

cup k/uh/p	light l/iy/t	chaos k/ay//os
---------------	-----------------	-------------------

Interviewers had the option to code the word as 1 ‘correct’ or 2 ‘incorrect’. As stated, words read with a regional accent or any type of speech impediment, e.g. a lisp, was coded as correct.

Whether the child understood the word or had seen it before did not matter in terms of coding a correct or incorrect pronunciation. However, the word was to be coded as correct only if the child read the word fluently, i.e. it was not just broken down into separate syllables/constituent parts.

Feedback and modifications

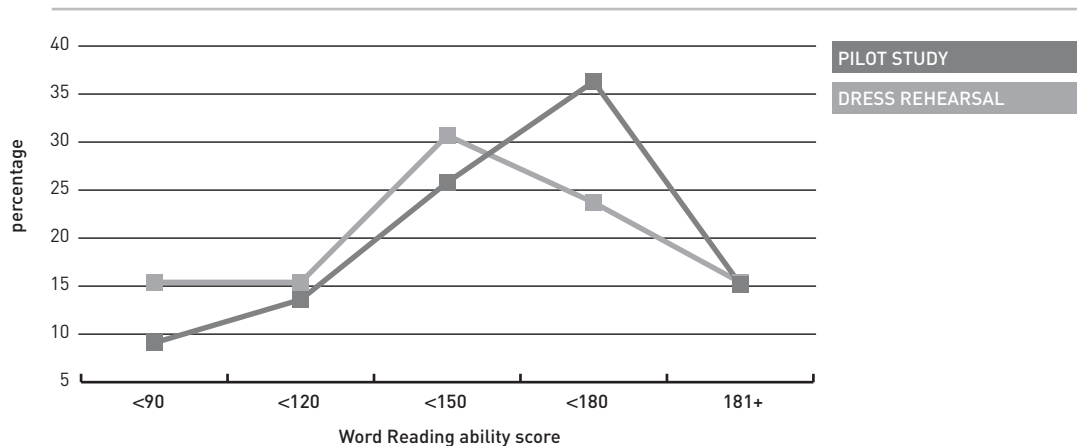
Other than some minor CAPI programme routing problems, interviewer feedback from the pilot study suggested that there were no major problems with the administration of this scale. Their biggest concern was that some children read very quickly and interviewers needed to control the child’s speed in order to be able to mark their answers.

To help combat this, interviewers were encouraged to familiarise themselves with the correct pronunciation of each word before interviewing children. It was suggested that they used a ruler or a piece of paper to underline rows being read, especially for younger children.

Results

As for the scales from the Early Years Battery, to compare scores for children of different ages, the raw score achieved by each child was converted into a BAS II ability score. As shown in figure 5.8, in contrast to results attained for scales in the Early Years Battery, the children recruited from the general population to the Child Assessment Pilot study had a marginally higher mean score than the cohort members’ children involved in the dress rehearsal. However, the range of scores was comparable, which supported the decision to use the test in the main survey.

Figure 5.8. Ability scores in the School Age Word Reading scale



5.9.3 Spelling

Rules and administration

In this exercise, the child wrote down words that were dictated by the interviewer. There were 75 words in total, arranged in eight blocks of ten words and one block of five words; the interviewer administered full blocks to the child. Once again, there was no standard number of blocks for a child to complete – the number of items the child had to answer depended on his/her performance (see table A5.7 in the parent and child appendix for details). The interviewer read the word, then a sentence with the word in it (slightly stressing the target word) and then the word alone for a second time. For example:

“*On*...[pause]...I lie *on* the grass...[pause]...*on*”.

“*Was*...[pause]...It *was* my birthday on Saturday...[pause]...*was*”.

The words to be written by the child appeared on the CAPI one at a time, and there were two coding options for the interviewer, 1 ‘correct’ and 2 ‘incorrect’. The spelling sheet for children to write on in the Child Assessment Pilot was very similar to the standard BAS II spelling sheet. It was spread over two pages, with spaces (boxes) numbered from 1–75 where children had to write the corresponding word to facilitate scoring afterwards. This meant that only the youngest children (aged 6.0–6.11) would start at the top of the sheet, with word 1 in box 1.

Feedback and modifications

Interviewers reported that children who performed poorly and had been directed back to easier words seemed uncomfortable about it as it was obvious they were trying easier words as they had to go back to write in boxes higher up the page. Most interviewers also found it very difficult to assess the children’s spelling right after they had finished writing each word, as children either sat in a way that ‘hid’ the page on which they were writing or their handwriting was illegible. This made the assessment longer as interviewers had to ask the child how they had spelt a word to route the CAPI programme correctly.

After further consultation within the research team, it was decided not to use the BAS II exercise in its standard format. Although, by changing the test, the opportunity would be lost to standardise the BCS70 scores in terms of the BAS II test norms, changing the test was considered preferable to using it in its original format. After reviewing the spelling exercise in the Dyslexia Screening Test (DST), the child version of the DAST⁸⁶, as a possible alternative, it was finally decided to modify the BAS II exercise so that all children within a defined age band received a fixed number of words. The first step involved reducing the total number of words in the revised assessment by half: the first five words within each block of ten were selected; three words from the final block of five. In order to minimise stress and to avoid disappointment if too many words were failed, a stopping rule of five failures in a row was applied. After attempting to spell a word, a child read out their answer to the interviewer who then entered ‘correct’ or ‘incorrect’ into the CAPI and could apply stopping rules when/if necessary. Figure 5.9 displays the revised spelling exercise. The number and range of words children within different age ranges attempted to spell were:

- children aged 6:0–6:11 would be asked to spell 15 words: words 1–15;
- children aged 7:0–8:11 would be asked to spell 20 words: words 6–25;

87. This DST spelling exercise was age adaptable, easier to administer and did not involve complicated routing. Although it would potentially provide interesting comparisons with results from the DAST spelling exercise completed by BCS70 cohort members, the main purpose here was not to identify dyslexia symptoms, but to assess spelling performance. As such, it was decided not to use this approach.

- children aged 9:0–10:11 would be asked to spell 20 words: words 11–30; and
- children aged 11:0–16:11 would be asked to spell 28 words: words 11–38.

Children in the last age band (11:0 – 16:11) began from an earlier starting point than the one suggested by BAS II. The main reason for this was that as the latter age band is relatively wide a wider range of skills would potentially be presented by the children. Even if the first few words were too easy for many of the children, getting them right would only boost their confidence.

Figure 5.9. Revised BAS Spelling exercise⁸⁸

1. *On*...I lie *on* the grass...*on*.
2. *And*...I like apples *and* oranges...*and*.
3. *The*...*The* grass is green...*the*.
4. *Up*...We climb *up* the stairs...*up*.
5. *Go*...I *go* to the park with my dog...*go*.
6. *Was*...It *was* my birthday on Saturday...*was*.
7. *Home*...We stay *at home* to watch television...*home*.
8. *Old*...How *old* is your brother?...*old*.
9. *Do*...I like to *do* my homework...*do*.
10. *Play*...We *play* games at school...*play*.
11. *Are*...What *are* you doing?...*are*.
12. *Well*...I hope she gets *well* soon...*well*.
13. *New*...I bought a *new* book...*new*.
14. *Work*...We *work* at school...*work*.
15. *Bird*...A *bird* sings in the tree...*bird*.
16. *Friend*...My *friend* is called Sally...*friend*.
17. *Know*...I *know* the way to your house...*know*.
18. *Catch*...My dog can *catch* a ball...*catch*.
19. *Leave*...We *leave* the car on the street at night...*leave*.
20. *Flight*...The *flight* took three hours...*flight*.
21. *Laughing*...We were *laughing* in class...*laughing*.
22. *Obtain*...You *obtain* stamps at the post office...*obtain*.
23. *Search*...Doctors *search* for a cure...*search*.
24. *Although*...The group agreed, *although* one member had objected...*although*.
25. *Fault*...I thought it was her *fault*...*fault*.
26. *Technical*...I looked at the *technical* manual...*technical*.
27. *Ceiling*...Our *ceiling* is painted white...*ceiling*.
28. *Occasion*...I saw the mayor on one *occasion*...*occasion*.
29. *Excellent*...The teacher said my work was *excellent*...*excellent*.
30. *Magician*...I saw a *magician* at the circus...*magician*.
31. *Procedure*...They followed the correct *procedure*...*procedure*.
32. *Parallel*...The two lines are *parallel*...*parallel*.
33. *Sincerely*...I was speaking *sincerely*...*sincerely*.
34. *Conceited*...My brother is *conceited*...*conceited*.
35. *Convenient*...It is *convenient* for me to leave now...*convenient*.
36. *Committee*...She was interviewed by the *committee*...*committee*.
37. *Hypochondriac*...A person who worries about his health is a *hypochondriac*...*hypochondriac*.
38. *Disseminates*...A teacher *disseminates* ideas...*disseminates*.

88. ©nferNelson. Words taken from the BAS II Spelling exercise were reproduced with the kind permission of nferNelson.

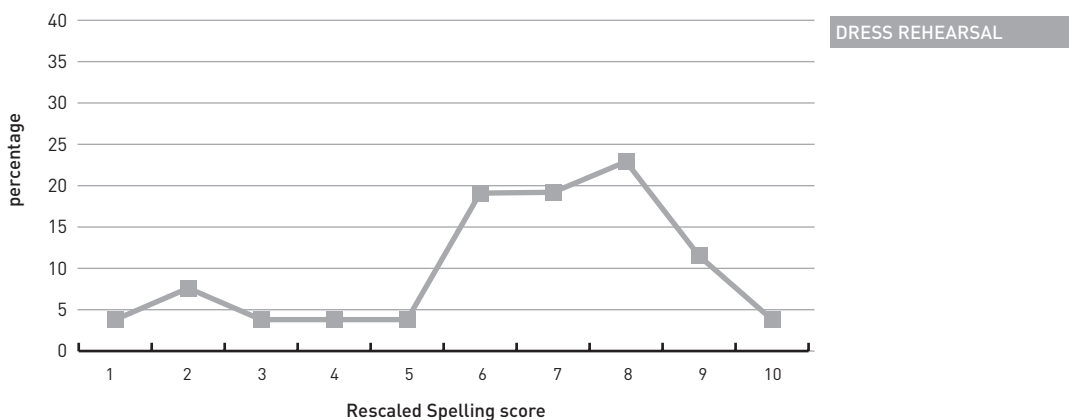
Feedback from the dress rehearsal was quite positive. Interviewers thought that administering the modified exercise was much improved from the previous stage, as children did not have to go back to earlier boxes of the table in order to write words in specific numbered boxes. Also, the modified exercise did not seem to continue for too long, therefore the children did not get unnecessarily stressed. The revised exercise was retained without further modifications for the main stage. Interviewers were told to accept a child's spontaneous correction, but a child could not go back and correct an earlier spelling⁸⁹. Interviewers were instructed to familiarise themselves with the correct pronunciation of each word before they did any interviews, giving particular attention to regional accents.

Interviewers needed to read the child's answers in order to code them, so if children sat in a way which hid what they were writing, or the writing was illegible, the interviewer needed to ask the child how they had spelt each word after they had finished writing.

Results

As the assessment was altered for the dress rehearsal, the scores from the two pilots could not be compared. Standard BAS II ability scores could not be calculated, thus to allow comparison of results of children at different ages who were given different numbers of words to spell, the scores were rescaled to have the same range of 0–10. The distribution is displayed in figure 5.10. This shows more the kind of distribution we expect with adult literacy, i.e. a skewed distribution towards high performances with a longish tail of very poor performers. The overall wide spread of scores again supported the use of the test.

Figure 5.10. Rescaled School Age Spelling scores



5.9.4 Number skills

Rules and administration

In this exercise, the child performed various number-based tasks, such as pointing to orally presented numbers, naming visually presented numbers and written calculations. There were 46 items in total, arranged in six blocks (A to F); the first four blocks consisted of eight items each, and the last two blocks had seven items each. As with the other BAS II scales, the number of blocks a child attempted depended on the child's performance (see table A5.8 in the parent and child appendix for details and the different starting and stopping points for children of different ages).

⁸⁹. If the child insisted on doing this, the interviewers should nevertheless not change their CAPI entry, as this would affect the routing.

The numerical tasks were presented in the specially designed answer booklet. The format (font type, font size, setting, etc.) of the numbers/words used was as close as possible to the standard BAS II format, but blocks A, B, C and D were each presented on a separate page, whereas in the standard BAS II version, blocks A and B were on the same page, as were blocks C and D. The CAPI screen showed the question and the correct answer for each question. Interviewers had the option to code the child's answer as 1 'correct' or 2 'incorrect'.

Feedback and modifications

Several problems with the CAPI routing were highlighted by interviewers. This led to a general feeling that the assessment went on too long. Many interviewers asked whether they could stop the children early if they were getting frustrated or tired (having clearly reached their limit). Many children also struggled to fit all of their working out into the space provided in the booklet. Interviewers reported several problems with the mathematical symbols. Some children were not familiar with the way some of the sums were written, and they wanted to have them written out in a different way. For example, younger children often learn to do sums in a 'horizontal format', but in the BAS II they were written out in 'vertical format'. Older children had similar problems with the long division sign. Following the feedback, education professionals were approached in order to clarify why children were not familiar with the ways several of the items were written. It was found that the curriculum had changed since the latest version of the BAS II had been produced. To fairly assess what the children actually knew, the symbols and layout were changed, as detailed in figure 5.11.

Figure 5.11. Examples of modified BAS II formats⁹⁰

BAS II format	BCS70 survey format
$\begin{array}{r} 14 \\ +2 \\ \hline \end{array}$	$14 + 2 =$
$\begin{array}{r} 17 \\ -3 \\ \hline \end{array}$	$17 - 3 =$
$\begin{array}{r} 3 \\ \times 5 \\ \hline \end{array}$	$3 \times 5 =$
$7/84$	$84 \div 7 =$
$4(1.3 + 5.7) =$	$4 \times (1.3 + 5.7) =$

90. Not original BAS items.

Interviewers could also ask children in advance whether they recognised the way the sums were written. If they didn't, they either invited the child to write them as they were taught at school, or they offered to write them instead. When interviewers saw a child was struggling, they asked the child if they had done the sums at school; if they hadn't, they then moved them to the next item, and this was a more sympathetic way of legitimising their failure.

To allow space for calculations on the booklet pages, the questions were further spaced out in the dress rehearsal and again for the main stage.

As with the Spelling exercise, interviewers highlighted that for children who failed items appropriate for their age group, the process of turning back to earlier questions felt clumsy as the children realised that earlier questions were easier. However, the diversity of the number/maths skills contained within each of the six individual blocks (A to F) made it very complex to select items for simpler administration, as undertaken for the revised Spelling scale. Figure 5.12 provides some examples of diversity of BAS II questions from each block. As such, although the amendments to the Number Skills scale made the burden on interviewer and child less, this exercise remained the longest of the three exercises to complete in the dress rehearsal, especially for children whose performance was poor.

Figure 5.12: examples of diversity of BAS II Number Skills questions from each block⁹¹

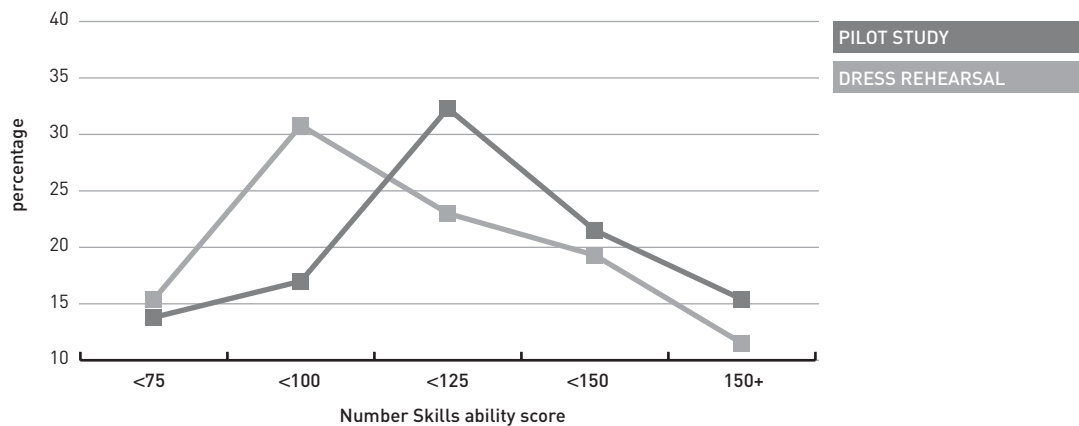
<p>A</p> $2 + 3 =$ $4 - 1 =$	<p>B</p> $2 \times 4 =$ $\begin{array}{r} 38 \\ +57 \\ \hline \end{array}$
<p>C</p> $12 \times 3 =$ $\begin{array}{r} 45.01 \\ +57.89 \\ \hline \end{array}$ $96 \div 3 =$	<p>D</p> <p>Write as a percentage:</p> $\frac{3}{4} = \text{ _____ } \%$ $\frac{77}{15} \quad \frac{2}{3} - \frac{1}{3} =$
<p>E</p> <p>Write as a decimal:</p> $2\frac{2}{5} =$ <p>Estimate the answer to the following calculation, to the nearest whole number. Do not work out the exact sum.</p> <p>351.892 \div 69.871 is approximately _____</p> $10^3 \div 2^2 =$	<p>F</p> <p>The price of a chair is £160. If you get a discount of 12 1/2 %, how much would you pay? £ _____</p> $\frac{1}{2} \times \frac{2}{3} =$ $\begin{array}{r} 13.9 \\ \times 1.2 \\ \hline \end{array}$

91. ©nferNelson. Examples from the BAS II Number Skills exercise were reproduced with the kind permission of nferNelson.

Results

As for results from the Word Reading scale, the children in the general population sample who participated in the Child Assessment Pilot study had a higher average score on the Number Skills scale than the cohort members children involved in the dress rehearsal (See figure 5.13). Again, however, the spread of scores is substantial in both pilot surveys, which adds confidence in the use of the test.

Figure 5.13. Ability scores in the School Age Number Skills scale



5.10 Overview of other components of the Parent and Child Interview

The Parent and Child Interview had numerous components. Apart from assessing the cognitive skills of cohort members' children, for the cohort members involved in the Parent and Child Interview, there was an additional set of interview questions to answer about each of their children, and a paper-based self-completion questionnaire to fill in for each child. In addition to this, each eligible child aged 10 and above was also asked to complete a paper-based self-completion questionnaire. These additional components went through the same rigorous piloting procedures as the adult and child assessments.

5.10.1 Additional interviewer (CAPI) questions

These questions concentrated on the health, current or previous childcare arrangements and education experiences of each of the cohort member's children. These were expected to last 10 minutes per child, shorter if the child had not yet started school.

General health of child

- Long-standing illness disability or infirmity – whether they had any, what it was, when it started.
- Whether the long-standing illness, disability or infirmity limited childhood activities – play, games, sport.
- Registered disabled?
- Number of accidents, details of the most severe accident, age accident happened.
- Number of hospital admissions, details of the most severe accident, age accident happened.
- Immunisations.
- Details of specific health problems: asthma, eczema, hayfever, diabetes, convulsions/seizures, cancer, sight, hearing, speech problems, congenital abnormalities,

kidney or bladder disease, bone/joint problems, cerebral palsy, ADHD, Autism, dyslexia, anxiety or aggression, eating disorders, any other problems.

Health behaviour of mother

- Smoking, drinking and Cannabis practices when pregnant.
- Whether mother breastfed child and for how long.

Family disruption

- Experience of separation from parent before child age 7: where child was, for how long and at what age.
- Experience of Local Authority Care: where child was, for how long and at what age.

Education

- Age child started school, type of school.
- Type of early years education or childcare child currently has or had before starting school.
- Name and address of current school.
- How parent/cohort member selected school – was it first choice, did they visit the school, reasons sent child to this school.
- How parent/cohort member views teaching in this school.
- How satisfied parent/cohort member is with child's progress in school.
- If parent/cohort member attends parents evening, reads school reports.
- Whether parent/cohort member is involved with activities in child's school.
- If child has extra/private lessons or classes and if so, what subject.
- If child has any Special Education Needs (SEN), the type of SEN and if they have received a Statement of Needs.
- What parent/cohort member thinks child will do when they reach 16, how likely it is the child will go to university.

5.10.2 Paper self-completions

The parent paper self-completion questionnaires covered parenting styles and the development of children. One was completed for each of the cohort member's resident natural or adopted children. In addition to this, any of these children aged between 10 years and 16 years, 11 months inclusive were asked to complete a questionnaire about their activities at home and school, attitudes, self-esteem and educational aspirations.

5.10.3 Parent self-completions

There were four different questionnaires as questions were necessarily specific to reflect the age of a child. Some minor routing was also necessary within the questionnaires about the younger children, as a child's development during the first few years is very rapid. The questionnaires were also in different colours to help ensure the interviewers always gave the parent the appropriate questionnaire.

- 0–11 months (pink).
- 1–2 years 11 months (blue).
- 3–5 years 11 months (green).
- 6–16 years 11 months (lilac).

All questionnaires included questions on the child's behaviour, the relationship between the parent (cohort member) and child, the parenting style of the cohort member in relation to rules and discipline, and reading and learning activities. In addition to these, if a child was

under 3 years, parents answered questions on the child's cognitive development. This was not included for children aged 3 and over as these children completed the assessments (detailed earlier in this chapter).

Although questions selected were established questions that had been previously used in either cohort or other survey questionnaires, it was still necessary to pilot the questionnaires to find out:

- how long the parent/cohort member took to complete each questionnaire;
- whether parents/cohort members knew how to answer the questions – were the instructions easy to follow, did the questions make sense?
- if the parent/cohort member enjoyed completing the questionnaire; and
- if the questions complemented each other.

Interviewer feedback and modifications

The overall feedback from the pilot was that parents generally enjoyed the reflective process of filling out the questionnaires. It allowed them time to contemplate their relationship with their children and, in some instances, how different their children were from each other. Most households reported that they had learnt something about their own family as a result of completing the questionnaires. The overall view from parents was that the majority of questions were straightforward to answer, and the routing was simple to follow.

Very few questions were dropped following feedback from parents and further consultation within the research team, but some were not asked for certain age groups as they were not appropriate. This was usually because a question was asking about a behaviour that was deemed 'too young' or 'too old' for a child within a particular age band. For example, parents were not asked 'How often have you taken away your child's pocket money or allowance?' if their child was under age 3. Very minimal changes to question wording were undertaken between the pilot and the dress rehearsal as the questions were established questions. However, the layout of the questions and corresponding answer categories in the booklets was improved.

Content of the final parent self-completion questionnaires

- Cognitive development: these questions were used in the similar NCDS Mother and Child Survey in 1991. There are 15 questions for parents to answer. Questions are age-specific, but there is a lot of overlap between the different age groups which are split into 3 month intervals, i.e. 0–3 months, 4–6 months, 7–9 months, etc. up to 21 months. From 22 months to 35 months, the 15 questions are the same. Response options are 'yes', 'no', 'not sure'.

Examples of questions:

- age 0–3 months: "Have your child's eyes ever followed a moving object?"
- age 0–3 months and 7–9 months: "Has your child ever seemed to enjoy looking in the mirror at him or herself?"; and
- age 19–21 months: "Has your child ever run?"

- Behaviour: these questions were taken from two sources. Parents of children up to age 3

92. Fullard, W, McDevitt, S, and Carey, W (1968) first developed **The Carey Temperament Scales (1968)**. Arizona: Behavioral-Development Initiatives.

were asked 20 questions from The Carey Temperament Scales⁹²; parents of children between age 3 and 16 years, 11 months were asked to complete the Strengths and Difficulties Questionnaire⁹³. This contains 26 questions, with an additional seven questions for parents who feel their child has some level of emotional, concentration or behaviour difficulty.

The Carey Temperament Scales

The scales are appropriate for children up to age 3. There are three different scales depending on the age of the child. The scales contain between 76 and 97 questions. There are six response options ranging from 'almost never' to 'almost always', including 'don't know/not applicable'.

- Early Infant Temperament Scale (0–3 months): 76 questions;
- Revised Infant Temperament Scale (4–11 months): 95 questions; and
- Toddler Temperament Scale (1 year–2 years, 11 months): 97 questions.

Within each scale, nine aspects of a child's behaviour are measured by between 8 to 13 questions. Some questions from the Revised Infant Temperament Scale were included in the second sweep of the MCS in 2003–04, and measured adaptability, mood, approach and rhythmicity. The same questions were used in this survey to maintain some consistency between cohorts, with additional questions selected to make 20 in total. The same four aspects of behaviour were covered by these questions; five questions related to each aspect. The questions were selected to be as similar as possible for the three age groups.

Examples of questions:

- age 0–3 months: "Your child objects (cries/frets) if someone other than the mother or main caregiver gives care."; and
- age 4–11 months and 1 year–2 years, 11 months: "Your child's initial reaction to a new babysitter is rejection (crying/clinging to mother or main caregiver)."

Strengths and difficulties questionnaire

This set of 26 questions (25 basic questions and one impact question) is appropriate for children between age 3 and 16 years. There are two versions, although only two questions differ between them. One version is for children between age 3 and 3 years, 11 months, the other for children age 4 and over. The questions that differ are detailed below. The response options are 'not true', 'somewhat true', and 'certainly true'.

Examples of questions:

- age 3 years–3 years, 11 months: "Often argumentative with adults", "Spiteful to others"; and
- age 4 years–16 years, 11 months: "Often lied or cheated", "Stole from home, school or elsewhere."

Relationship between parent and child: the Child-Parent Relationship Scale (Pianta: Short

93. Goodman, R (1997). 'The Strengths and Difficulties Questionnaire: A Research Note'. *Journal of Child Psychology and Psychiatry*, 38, pp 581–586.

94. It was adapted from the Student-Teacher Relationship Scale (STRS, Pianta, 1992). The Child-Parent Relationship Scale (CPRS: Short Form) is a 15-item self-administered rating scale, with responses on a five-point Likert scale. It is the shortened version of the 30-item CPRS. Items were derived from attachment theory and the attachment Q-set (Waters and Dean, 1985) as well as a review of the literature on mother-child interactions.

Form) measures the parent's report of the child's relationship with the said parent⁹⁴. These questions were used in the second sweep of the MCS in 2003–2004, though some were adapted by the research team to be more age specific. Some questions were appropriate for all children. Parents answered between 10–13 questions. There were five response options ranging from 'definitely does not apply' to 'definitely applies'.

Examples of questions:

- age 0 months–16 years, 11 months (i.e. all children): "Dealing with my child drains my energy", "My child will seek comfort from me"; and
 - age 6 years–16 years, 11 months: "My child shares his or her feelings with me."
- Parenting style (discipline): these questions were included in MCS, second sweep. Some were adapted by the research team to be more age-specific. Parents answered between five and ten questions, depending on the age of their child. As previously, some questions were appropriate for all children, some were age-specific. Parents have to think back over the last three months and select one of the six response options ranging from 'never' to 'always', including 'not applicable'.

Examples of questions:

- age 0 months–16 years, 11 months (i.e. all children): "How often have you ignored your child?", "How often have you shouted at your child?"; and
 - age 3 years–16 years, 11 months: "How often have you had to take away TV privileges or other treats?"
- Reading and learning: most of these questions were asked in the NCDS Mother and Child Survey in 1991. These questions covered parents reading to or with their child, how many books a child had (or shared with their siblings), and what building blocks to learning had a parent helped their child with (numbers, the alphabet, colours, shapes and sizes). A few additional questions regarding homework were asked for children age 6 years and older.

Child self-completion

This questionnaire was for children aged 10 years and older. It was originally designed as a CASI but was revised to a paper self-completion for the dress rehearsal and main fieldwork. The questionnaire essentially asked about their activities at school and home, their attitudes, self-esteem and educational aspirations⁹⁵, but some questions were not presented to children aged between 10–11 years, 11 months, as they were not appropriate⁹⁶. These questions came at the end of the questionnaire on a perforated page that interviewers tore out before handing the questionnaire over to the child if they were between 10–11 years, 11 months. Children age 12 years and older answered all questions. Verbal parental consent was gained before the child was asked if they would complete the questionnaire.

95. Questions were taken and developed from a variety of sources. These included: British Household Panel Study (BHPS), Department for Education and Skills (DfES), Department of Health (DOH), Education Maintenance Allowance Study (EMA), National Child Development Study (NCDS), Scottish School Leavers Study (SSLS), You and Your School (NFER study), Youth Lifestyles Survey (YLS).

96. A primary concern was not to offend or upset the cohort member or their child in any way. Questions on alcohol, tobacco, drug use, stealing and bullying were not put to younger children.

Interviewer feedback and modifications

Forty children between ages 10 and 16 completed the CASI in the pilot study. There were no difficulties getting parental consent, although some parents had wanted to see a transcript of the questionnaire before giving their consent. In the dress rehearsal and main fieldwork. Interviewers had a 'spare' copy of the child self-completion questionnaire to show parents wary of the questions it contained. However, parents could not see the questionnaire once it had been completed by their child.

Some children had difficulty understanding what some of the questions were getting at, particularly the younger ones. This was particularly so for questions capturing self-esteem. The younger ones took the longest to complete the questionnaire, and there was a general feeling that the questionnaire took too long. It took an average of 15 minutes, 5 minutes too long, but at least one child took 35 minutes.

Many questions were dropped, replaced or refined for the dress rehearsal. The initial 58 questions (with an additional 14 routed questions) were reduced to 25 questions (with an additional 19 routed questions) in the dress rehearsal. For the main fieldwork, additional amendments left no routing instructions as such to follow. Children age 10–11 years 11 months had 30 questions to answer, children age 12–16 years 11 months had 37 questions to answer. To give the interviewer more flexibility and allow different activities to be conducted in parallel, the revised child self-completion was produced in both a CASI and paper version for the dress rehearsal. Interviewers were asked to use the paper version, with the CASI being on their computer as a back up, to be used to interest children reluctant to use 'pen and paper'. No interviewers used the CASI and it was dropped altogether for the main fieldwork. The additional seven questions for older children were on a perforated page at the back of the questionnaire, which the interviewer removed before handing the questionnaire over to the younger children.

Content of the final child self-completion questionnaire

The origins of the questions included in the questionnaire are indicated in parentheses, (for details see footnote 95, page 95).

Home life – this section included questions on:

- time spent watching TV, DVDs and Videos (BHPS);
- time spent playing computer games (DfES);
- how often the child read a book for pleasure (DfES);
- how often they went to youth clubs, sports clubs/lessons, scouts/guides parties/nightclubs (BHPS and ESRC 14–19 Initiative);
- who they like to spend their free time with (BHPS);
- amount of spending/pocket money (EMA);
- if parents ask where they are going when go out on their own (EMA);
- how often they help around the house (EMA);
- how often they talk to their mum (or dad) about what they do at school (EMA);
- how often they talk to their mum (or dad) about other things – friends, going out, etc. and (EMA).

School life – this section included questions on:

- how they feel about teachers at school (You and Your School);

- how they feel about time spent at school (You and Your School);
- how important it is to get good marks for school work and/or exams (You and Your School);
- what they want to do when they reach 16 (DfES and NCDS);
- how likely it is that they will go to university (SSLS); and
- if they truant (DfES and EMA).

Self-esteem - this section consisted of 12 questions taken from the Harter Scale⁹⁷. The questions covered both self-esteem and scholastic achievement and had been answered by children age 8 years and above in the NCDS Mother and Child Survey in 1991. As the questions were now part of the self-completion questionnaire, the wording of some questions was altered after consultation with Susan Harter. In addition, the research team spent a lot of time making the instructions and layout of the questions as clear as possible. The child was taken through an example by the interviewer to make sure they were clear what they had to do. They could also ask the interviewer for guidance at any time.

Example of final question layout:

Some young people **never worry** about whether they can do the school work given to them **OR** Some young people **worry** about whether they can do the school work given to them

Tick one box

Really true for me	Sort of true for me	Really true for me	Sort of true for me
<input style="width: 60px; height: 30px;" type="checkbox"/>	<input style="width: 60px; height: 30px;" type="checkbox"/>	<input style="width: 60px; height: 30px;" type="checkbox"/>	<input style="width: 60px; height: 30px;" type="checkbox"/>

Recreation- this section was only for children between age 12 and 16 years and 11 months. Questions in this section included:

- smoking and drinking alcohol (DOH);
- use of cannabis and glue/solvent abuse (DOH);
- theft from shops (YLS); and
- bullying – ever been bullied or ever bullied someone else (DfES and EMA).

97. Harter, S (1984). "The perceived competence scale for children". *Child Development*, vol 53, pp 87-97.

6 Summary and conclusions

The work that is the subject matter of this report took place against the background of a major new initiative in Britain, both to understand and to tackle the problem of poor basic skills in a substantial minority of the population. As was pointed out in chapter 1, concerns were driven by the growing body of evidence that basic skills difficulties were a major impediment to successful functioning in modern society. This culminated in the work of the Moser Committee and the ongoing policy development that flowed from it, *Skills for Life*. Although the prime driver of this development was especially the damage to economic competitiveness caused by basic skills deficits, there was also a social dimension in the acknowledgement that poor basic skills was one of the factors in the growing marginalisation and social exclusion of some sections of the adult population. Such problems tended to be repeated across the generations.

The Moser Committee also saw the need for the continuing collection of evidence both to identify what worked in terms of improved teaching of basic skills to adults and better methods of assessment to monitor the effectiveness of new practice. There was also the need to model further the socio-economic consequences of poor basic skills and for further investigation of the likely long-term economic and social returns to investment in basic skills acquisition throughout the education system from pre-school through primary to secondary school and beyond. The 1958 and 1970 cohort studies were an important source of evidence that needed expanding and updating because of the relatively small sub-samples from which the original basic skills data were collected. The *Skills for Life* strategy, and the research programme that NRDC set up to support it, offered the opportunity to extend measurement to the whole of one of the birth cohorts, the 1970 cohort, at the age of 34, for which funding was already available for a follow-up.

6.1 Aims of the assessments

6.1.1 Literacy and Numeracy

Work by Greg Brooks and colleagues concluded that no one instrument would satisfy all measurement requirements in the NRDC programme. There was a need for fine-tuned tests to assess micro improvements among learners in responses to teaching. However, for the purpose of describing and explaining processes in the population at large, much 'broader brush' instruments were needed along the lines of those in the earlier studies. These tests should measure adult literacy and numeracy at the levels established by Qualifications Curriculum Authority (QCA) for the new adult basic skills curriculum and qualifications framework. For this reason, the literacy and numeracy tests needed to be able to map onto the national 'baseline' basic skills needs assessment that was carried out in 2002–2003 on a large representative sample of the British population, while at the same time maintaining continuity with the earlier measures.

6.1.2 Dyslexia

The new survey offered the opportunity for further extension of measurement. At age 10, the cohort had undertaken a dyslexia assessment. In view of the controversial role of dyslexia, especially whether there were special curricular needs for adult dyslexics, it was decided to include a dyslexia assessment in the new survey.

6.1.3 Intergenerational comparisons

As BCS70 cohort members would be 34 at the time of the new survey, the other major task of the design was to mirror the intergenerational study that was used with a sub-sample of the 33-year-old follow-up in the older 1958 NCDS cohort study and assess a sample of cohort members' children. The selected tests needed to offer comparability with those used in the NCDS survey while also providing intergenerational continuity with the assessments the cohort members had undertaken during childhood and as adults.

Designing new measurements and selecting from existing ones for particular purposes needed to meet certain standards to ensure maximum utility for analysis. These included:

- validity, i.e. that the test met the particular research requirement specified for it;
- reliability, i.e. consistency in measurement across time and across test administrators; in this case, survey interviewers; and
- feasibility, in the sense that, with adequate training, the administration could be handled in the context of a 90-minute interview taking place in cohort members' homes.

This last requirement is particularly important in the context of a cohort study. Although the assessment data might be expected to enrich hugely the large and complex information resource that constitutes BCS70, this must not be bought at the expense of cohort members' willingness to continue to participate in the study. Thus, undue complexity and potential respondent burden had to be kept to a minimum.

We summarise briefly below the operations undertaken to meet these design aims. We also give an appraisal of the extent to which the aims were achieved.

6.2 Operations

The average time available for the Core BCS70 interview was 1 hour and 30 minutes, of which 40 minutes were given over to the adult assessments: 30 minutes for the literacy and numeracy assessments, and 10 minutes for the dyslexia exercises. The new literacy and numeracy assessments were designed from items previously used to assess BCS70 cohort members and items from the Baseline Survey⁹⁸. Symptoms associated with dyslexia were measured from exercises from the Dyslexia Adult Screening Test (DAST)⁹⁹.

In the intergenerational Parent and Child Interview, cohort members had an additional 20 minutes of interviewer and self-completion questions. An additional 20 minutes were available to assess the cognitive skills of cohort members' children with a number of scales selected from the British Ability Scales, BAS II¹⁰⁰. Eligible children (age 10+) also had a 10-minute self-completion questionnaire.

Once the extensive research and literature reviews had been completed and the assessment tools had been selected, the standard design protocol for a cohort study follow-up survey was put into practice (see chapter 1). This encompassed a substantial developmental stage as a new

98. Williams, J, Clemens, S, Oleinikova, K and Tarvin, K (2003). **The Skills for Life survey: A National Needs and Impact Survey of Literacy, Numeracy and ICT Skills**. Department for Education and Skills Research Report 490. Crown copyright.

99. Fawcett, A. J. and Nicolson, R. I. (1998). **The Manual of Dyslexia Adult Screening Test (DAST)**. London: The Psychological Corporation.

100. Elliot, C D (1983, 1996). **British Ability Scales II: Core Scale 2**. Berkshire: The NFER-NELSON Publishing Company Ltd.

adult literacy and numeracy assessment was developed and the feasibility of the dyslexia and child assessments needed to be assessed.

Three ways of measuring basic skills were adopted in the 2004 survey. Cohort members answered questions on self-reported difficulties before attempting multiple-choice and open-response literacy and numeracy assessment items. Development work to establish robust survey instruments, with special emphasis on the new literacy and numeracy assessments, began in 2002.

6.2.1 Self-reported difficulties

As reported in chapter 3, in previous surveys, only cohort members who reported difficulties to an initial general question were asked about more specific difficulties. In 2004, all but one of the basic skills questions included in the 1999/2000 survey of BCS70 cohort members were, for the first time, put to all BCS70 cohort members.

Results from the pilot and dress rehearsal were encouraging. For the questions previously asked to cohort members, the percentages of cohort members who reported difficulties in previous sweeps were very similar to the percentages reporting difficulties in the dress rehearsal. For the questions not previously asked to all cohort members in previous sweeps, many of the respondents in the Basic Skills Pilot and dress rehearsal reported difficulties with at least one aspect of reading, writing or number work.

6.2.2 The adult assessments

The new literacy and numeracy assessment was designed from the two identified best candidate instruments:

- tests previously used in the 1958 and 1970 cohort studies: paper-based, open-response questions; and
- the *Skills for Life* Survey (also known as the National Survey of Adult Basic Skills Needs and as the Adult Basic Skills Baseline Survey): computer-based, multiple-choice questions.

Some tasks that cohort members completed in the earlier surveys were retained and new tasks were imported from the national baseline needs survey. The basic skills pilot was used to gain the information required to design an assessment instrument based on the best combination of multiple-choice questions that, in conjunction with the open-response questions, would take an average of 30 minutes to administer.

A rigorous selection criterion was applied to the open-response questions that 10 per cent of the cohort had answered when age 21. Seven literacy and six numeracy questions were selected. Although, in essence, the questions remained the same, amendments were made to bring some questions up to date. Comparisons of the overall percentage incorrect figures from the original representative 10 per cent BCS70 survey, the basic skills pilot study and the dress rehearsal, itself made up of BCS70 cohort members, revealed a high level of consistency. The same patterns of difficulty were replicated by the three different sets of data, and the percentage of respondents scoring between 0–7 for literacy and 0–6 for numeracy was strikingly similar for the three sets of respondents, with generally lower numbers gaining high scores for numeracy than for literacy.

More multiple-choice questions were piloted than were used in the final assessment to facilitate selection of the questions that would provide as comprehensive coverage as possible

of the Adult Literacy and Numeracy Core Curricula for England within the time constraints. A simple method of adaptive testing that involved two tiers was adopted for the pilot study. Essentially, all respondents answered an initial set of questions. Depending on the number of correct answers a respondent gave to these initial questions, they either progressed to:

- a set of harder questions – the ‘upper tier’; or
- a set of easier questions – the ‘lower tier’.

This approach would permit an overall score based on all respondents to be calculated, along with allowing a ‘spiky profile’ to be built for those with the poorest grasp of the basic skills (those on the lower tier).

The literacy assessment produced a good spread of scores with, as we might expect, a bias towards high performance. This reflects the relatively low incidence in the population of very poor reading skills. The two-tiered assessment was retained. The screening questions were able to accurately identify a group of adults with the most severe literacy difficulties, between 5 per cent–6 per cent, translating in BCS70 terms into a substantial sample of 500–600 BCS70 adults with a very poor grasp of literacy.

Pilot results for the numeracy assessment showed that an overall score could not successfully be interpreted from results of the two-tiered numeracy assessment. The basic design of the numeracy assessment was therefore revised. Given the wide spread and diverse nature of difficulties associated with numeracy in the general population, the revised assessment aimed to create a ‘spiky profile’ of number skills at the population level rather than restricting this examination to the 1 in 4 or 1 in 3 with the poorest grasp of numeracy. Results from the revised numeracy assessment used in the dress rehearsal were encouraging. By removing the ‘screen’ that placed relatively high numbers of respondents on a lower tier, more continuity in the measurement of performance from one level to the next was achieved. Further encouragement for the validity of the design of the literacy and numeracy multiple-choice part of the assessment was obtained from the distribution of cohort members’ performance across levels. This closely reflected the distribution of the population obtained in the National Survey of Adult Basic Skills Needs.

6.2.3 Dyslexia

The final part of the adult assessment was to measure the prevalence of some of the symptoms associated with dyslexia using DAST, though time restrictions would limit the final assessment to four exercises (see chapter 4). The Reading and Spelling exercises were particularly strong candidates for selection, given their obvious relationship with basic literacy skills. The other two selected exercises were Spoonerisms and a Nonsense Reading exercise.

Evidence in support of the validity of the measures comes from the Vinegrad Checklist¹⁰¹. This short questionnaire consists of 20 ‘yes-no’ questions and can identify two groups of adults: ‘non-dyslexics’ (a score between 0–7) and ‘dyslexics’ (a score of 8 plus). Respondents with a score of 8 plus on the Vinegrad Checklist (dyslexic) performed consistently worse than respondents with a score between 0–7 (non-dyslexic) in all the DAST exercises. Using the pilot

101. Although this originated in the Dyslexia Institute, it was later revised by Michael Vinegrad and since became known as the Vinegrad Checklist. Vinegrad, M (1994). ‘A Revised Adult Dyslexia Checklist’. *Educare*, vol 48, pp 21–23.

data as a guide, the average time it would take a cohort member to complete the four selected DAST exercises was still too long. After further consultation, the spelling exercise was reduced by half, bringing the estimated average time to under the required 10 minutes.

6.2.4 The child assessments

The battery of individual scales that make up the BAS II objectively, reliably and economically measure a child's strengths and weaknesses, providing a comprehensive assessment of their current intellectual functioning and basic educational progress. Each individual scale selected had its own rules of administration, which were programmed into the computer to minimise burden and error on the part of the interviewer. After encountering minor programming errors in the Parent and Child Pilot, this innovation has proved to be very successful in the BAS II scales retained for the main fieldwork. After piloting, the Spelling exercise for school-age children was revised following interviewer feedback, which does restrict comparison with standardised scores. However, the step was necessary to reduce burden on the children. The BAS II Copying scale administered to younger children was replaced with a similar, simpler, alternative that BCS70 cohort members themselves had completed at age 5. Again, comparisons with standardised BAS II norms have been lost, but very interesting intergenerational comparisons between parent and child have been gained.

Although based on small numbers of children, the spread of their scores in each of the individual exercises, although different in each exercise, resembled the spread of scores required for the main survey.

6.3 Overall appraisal

Despite the tight time and administrative constraints on the wide range of assessments to be used in the survey, we believe that overall the goals set for them have been achieved. We now have a battery of reliable instruments that we know can be effectively administered in people's homes by appropriately trained interviewers. The assessments have validity in tapping the core dimensions of literacy and numeracy at the requisite levels with which the survey is concerned. They can also be used to assess the presence of dyslexia as a factor in poor reading. Reliable children's assessments of basic skills and broader cognitive measures spanning a wide age range are also available. Well developed questionnaires to tap family functioning and child development can be employed to unpack further the family factors involved in children's cognitive development and basic skills acquisition.

The prime purposes of the report have been to demonstrate 'fitness for purpose' in the research to be undertaken to support the *Skills for Life* strategy and supply the details of design that will be of help in interpreting the research results. The report also serves as a source book enabling others to replicate the approach to assessment design on new samples of adults or children¹⁰². Overall, the development work has provided the basis for a substantial contribution to the knowledge base on which the success of *Skills for Life* ultimately depends.

102. Permission must be sought from nferNelson to use any of the scales from the BAS II detailed.

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Appendices

BASIC SKILLS APPENDIX

Table A3.1a. General Reading Practice Questions in 2004 Survey

Table A3.1b. Questions on Self-Reported Difficulties in 2004 Survey

Table A3.1c. Questions on skills courses and improvement of skills in 2004 Survey

Table A3.2a. Selection of items for the literacy multiple-choice assessment

Table A3.2b. Selection of items for the numeracy multiple-choice assessment

All open-response questions and corresponding showcards in 2004 survey.

Table A3.3. Open-response literacy and numeracy questions: additional Issues raised by interviewers at the Interviewer de-briefing following the Basic Skills Pilot

DYSLEXIA APPENDIX

Table A4.1. Why DAST needed to be completely administered on paper

Table A4.2. Further details of scores in the One-Minute Reading exercise

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Table A4.4. Further details of scores in the Phonemic Segmentation and Spoonerism exercise

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PARENT & CHILD APPENDIX

Table A5.1. Naming vocabulary: starting and stopping points for children of different ages.

Table A5.2. Naming vocabulary - additional interviewer comments

Table A5.3. Early Number Concepts: starting and stopping points for children of different ages

Table A5.4. Early Number Concepts - additional interviewer comments

Table A5.5. Specific administration rules for Item 3

Table A5.6. Copying Designs- starting and stopping points for children of different ages

Table A5.7. Word Reading - starting and stopping points for children of different ages

Table A5.8. Spelling - starting and stopping points for children of different ages

Table A5.9. Revised Spelling - starting and stopping points for children of different ages

Table A5.10. Number Skills - starting and stopping points for children of different ages

BASIC SKILLS APPENDIX

Self-reported difficulties

The self-reported basic skills questions were part of the main CAPI interview, and as such had to compete for space given the time restrictions. After the dress rehearsal, the main interview was still too long and questions had to be cut. To best accommodate these needs, all the questions on basic skills difficulties were still asked but the format was changed to that of a multi-code. This meant that the additional response options introduced to some questions for the dress rehearsal were removed and cohort members just had to answer 'yes' or 'no' to each aspect of skills difficulty questioned by the interviewer. This reduced time as the interviewer would not need to repeat introductions to similar questions and to a certain extent interviewer and cohort member burdens were also reduced as the number of questions on basic skills appeared to be less.

A similar format was adopted for asking if a cohort member had been on a course to help improve their reading, writing, maths or number skills, or if they wanted to improve any of these skills. Two additional questions on general reading practices completed this set of questions. All the questions on basic skills included in the 2004 BCS70 survey are detailed in tables A3.1a, A3.1b and A3.1c below. It should be noted that the questions on reading and writing difficulties are only put to cohort members who do not report sight difficulties.

Table A3.1a. General Reading Practice questions in 2004 survey

About how often, if at all, would you say you read magazines or newspapers for enjoyment?

1. ...every day
2. most days (4 or 5 days each week)
3. at least once a week
4. at least once a month
5. less often than that or
6. never?

About how often, if at all, would you say you read books for enjoyment?

1. ...every day
2. "most days (4 or 5 days each week)
3. at least once a week
4. at least once a month
5. less often than that or
6. never?

Table A3.1b. Questions on self-reported difficulties in 2004 survey**How about reading? Do you ever have any difficulties with any of these?**

1. Understanding what is written in a magazine or newspaper
2. Reading aloud from a child's storybook
3. Reading or understanding paperwork or forms
4. None of these

How about writing and spelling? Do you ever have any difficulties with any of these?

1. Writing a letter to a friend to thank them for something
2. Spelling words correctly
3. Making your handwriting easy to read
4. Putting down in words what you want to say
5. None of these

How about maths and number skills? Do you ever have any difficulties with any of these?

1. Telling the right change from a £5 or £10 note
2. Recognising numbers
3. Addition
4. Subtraction
5. Multiplication
6. Division
7. None of these

Table A3.1c. Questions on skills courses and improvement of skills in 2004 survey**Have you ever been on a course to help improve any of these?**

1. Reading skills
2. Writing skills
3. Maths or numberwork skills
4. None of these

Would you like to improve any of these skills?

1. Reading skills
2. Writing skills
3. Maths or numberwork skills
4. None of these

Multiple-choice questions

Table A3.2a. Selection of items for the literacy multiple-choice assessment

Item number	Level	Description	Aspect of curriculum	Time	% incorrect*	% Men - Women
3	EL2	Weather forecast details	RC	0.44	50	
4	EL2	Weather forecast details	SH	0.25	80	
Examp1	EL2	Weather forecast details	V, WR, P	#		
14	EL2	Job Advert	RC	0.27	20	
15	EL2	Job Advert	RC	0.30	30	
16	EL2	Job Advert	RC	0.16	10	
17a	EL2	Absence note to school	WC		30	
17b	EL2	Absence note to school	WC		30	
17c	EL2	Absence note to school	WC	0.49♦	20	
17d	EL2	Absence note to school	WC		30	
48a	EL2	Completing a sentence	GP		30	
48b	EL2	Completing a sentence	GP		20	
48c	EL2	Completing a sentence	GP	0.55	30	
48d	EL2	Completing a sentence	GP		0	
5	EL3	Property to Let	RC	0.40	22	-15
6	EL3	Property to Let	SH	0.18	6	+4
7	EL3	Property to Let	SH	0.19	17	+8
8	EL3	Property to Let	RC	0.29	16	-2
21	EL3	RSPCA leaflet	RC	0.39	40	
22	EL3	RSPCA leaflet	RC	0.18	20	
23	EL3	RSPCA leaflet	RC	0.17	20	
24	EL3	RSPCA leaflet	SH	0.22	39	+9
25	EL3	RSPCA leaflet	SH	0.15	1	+1
26	EL3	How TV was invented	WC	0.44	24	-4
50	EL3	Stop Thief! Smoking leaflet	RC	1.05	70	
51	EL3	Stop Thief! Smoking leaflet	RC	0.18	50	
52	EL3	Stop Thief! Smoking leaflet	RC	0.20	20	
27	L1	Fire in the home: information	GP	0.36	10	-2
28	L1	Fire in the home: information	GP	0.23	19	0
29	L1	Fire in the home: information	GP	0.17	8	+4
30	L1	Fire in the home: information	RC	0.37	32	+9
31	L1	Fire in the home: information	RC	0.30	10	+2
58	L1	Driving and Drugs leaflet	RC	0.54	19	-6
59	L1	Driving and Drugs leaflet	RC	0.20	7	+1
60	L1	Driving and Drugs leaflet	SH	0.16	21	-1
61	L1	Driving and Drugs leaflet	RC	0.18	10	+5
42	L2	Film reviews	RC	0.36	20	+2
43	L2	Film reviews	RC	0.27	44	+3
44a	L2	Completing a draft letter	GP		37	+3
44b	L2	Completing a draft letter	GP		71	+5
44c	L2	Completing a draft letter	GP	1.07	97	-7
44d	L2	Completing a draft letter	GP		59	+11
45	L2	Spoken English	WC	0.38	18	+10
64	L2	Train timetable	RC	0.56	34	+7
65	L2	Train timetable	RC	0.56	27	-4

*Percentages in BOLD indicate questions included on the lower tier, which only 10 respondents completed. As such percentages could not be used as indicators of real failure rates and 'gender bias', % men incorrect - % women incorrect, could not reliably be calculated.

#examp1 was the practice screen used in the basic skills pilot. Time taken was recorded. Information on pass/failure was not available.

♦Time for all four items was grouped. This had been a single item in the Baseline Survey, but was changed to 4 separate items as 'drop down' screens could not be accommodated within the Blaise CAPI programme.

As detailed in table A3.2a, after considering all selection criteria, just one selected item (where information available) had a gender bias higher than 10 per cent. The items were included as they were provided the 'best balance' for the overall assessment within the time restrictions. Selected Items are highlighted.

Table A3.2b. Selection of items for the numeracy multiple-choice assessment

Item number	Level	Description	Aspect of curriculum	Time	% incorrect*	% Men – Women
13	EL2	2 jars of jam	BM	0.25	14	-10
24	EL2	Shelf brackets	NT	0.19	7	-5
33	EL2	Not sugars	MP	0.33	44	+11
53	EL2	Path length	LS	0.28	58	-21
63	EL2	Calls on Saturdays	CD	0.18	35	-3
73	EL2	Coins adding up to?	MC	0.24	14	-3
14	EL3	Cost of 'this lot'	BM	0.37	31	-9
25	EL3	Robot wars	NT	0.19	11	0
26	EL3	Screws in packets	NT	0.37	21	+3
34	EL3	Weight of Kit-Kat	MP	0.42	54	0
44	EL3	Correct weights	WS	1.08	28	-1
54	EL3	Correct units	LS	1.25	2	
64	EL3	True statements for days of the week	CD	1.20	50	-2
74	EL3	Family allowance	MC	0.39	14	-3
27	L1	Bowls	NT	0.20	1	-1
28	L1	48 screws	NT	0.33	17	+5
35	L1	Bleach for work surfaces	MP	0.51	34	0
45	L1	Losing weight	WS	0.39	8	-10
55	L1	Gaps for TV	LS	0.55	27	-19
65	L1	Weekend calls	CD	1.03	30	+6
75	L1	Investment rates	MC	0.42	25	-13
37	L2	Bleach whites	MP	0.33	19	+2
47	L2	Weight of chicken	WS	0.54	18	0
56	L2	Gap for fridge freezer	LS	1.39	47	-8
66	L2	True statements for %s and means	CD	1.51	25	-17
76	L2	Part-time job	MC	2.18	40	0

As detailed in table A3.2b, after considering all selection criteria, two of the selected items, 53 and 55, have a gender bias higher than 10 per cent. The items were included as they were provided the 'best balance' for the overall assessment. Selected Items are highlighted.

Open-response questions

Open-response questions and corresponding showcards in 2004 survey

Questions and/or showcards updated for the 2004 survey are indicated with an *. For the original showcards and questions see Ekinsmyth, C. & Bynner, J. (1994) *The Basic Skills of Young Adults*. London: The Basic Skills Agency. Although not shown, all showcards were produced in colour and were A4 in size.

For most of these questions, the interviewer showed the cohort member a visual stimulus on a showcard, for example, a map or a page from the Yellow Pages. Interviewer instructions were shown on the screen along with the question. The cohort member kept the showcard to

refer to while the interviewer asked them one, two or three questions about it. The correct answer for each question appeared on the screen. When the cohort member gave their answer, the interviewer entered 'correct answer' (1), 'incorrect answer' (2) into the computer. Two questions had an additional category 'interviewer unsure of CM answer' (3). Responses in this category were coded as 'correct answer' (1), 'incorrect answer' (2) by the research team when fieldwork had been completed.

Literacy questions

Showcard BS1* and Questions L1a*, L1b*

INTERVIEWER INTRODUCTORY SCRIPT: I would like you to do some more reading. There is nothing to write. Look at the page then I'm going to ask you a couple of questions. You can look at the page any time. It isn't a test of memory.

L1a: What is the address for the Golden Dragon?

1 '11 Euston Place, Leamington Spa' OR '11 Euston Place'

2 Different answer

L1b: What is the phone number for Harrington's on the Hill?

1 '01926 852074'

2 Different answer

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Honeycomb, 11, High St., Stratford on A CV37 9PQ 292804
Hollyhock The 700 Wellesbourne Lane, Leamington, Coventry CV34 7JL 7668 6923

BS1

Showcard BS2 and Questions L2a,* L2b**

INTERVIEWER INTRODUCTORY SCRIPT: This time you have a map to look at. Again there is nothing to write. Have a look at it and I shall ask you a couple of questions.

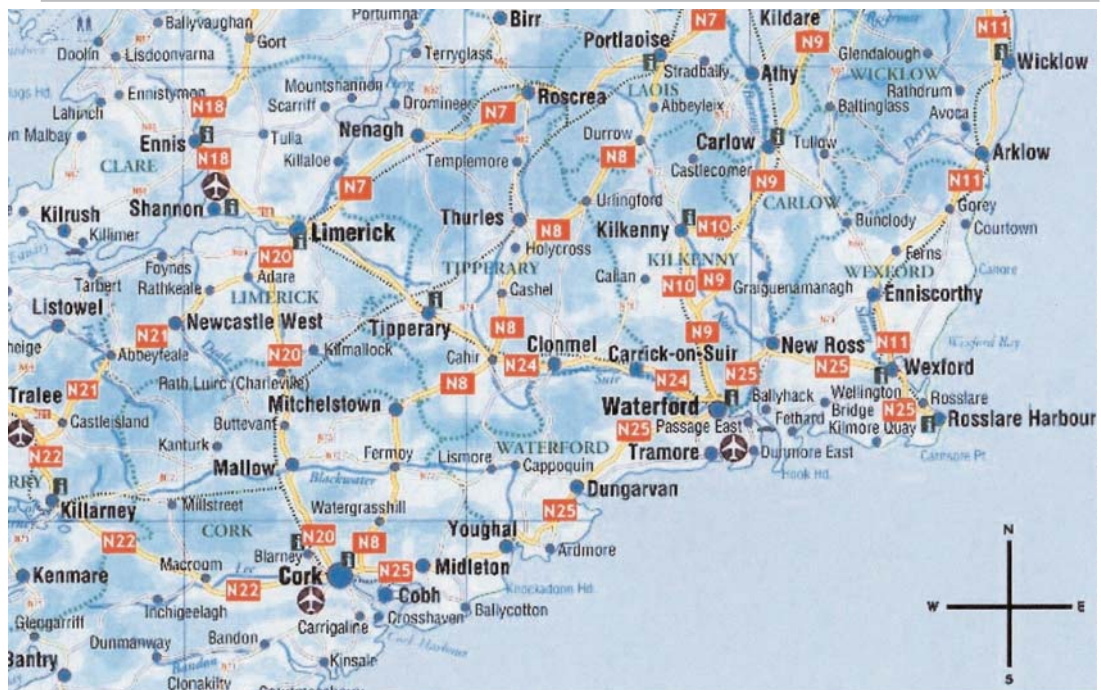
L2a: Please tell me the quickest route from Cork to Durrow?

- 1 'The best route follows the N8 all the way' or 'Along the N8'
- 2 Different answer

L2b: Is Tipperary East or West of Wexford?

- 1 'West' or 'West of Wexford'
- 2 Different answer

BS2



Showcard BS3 and Questions L3a, L3b*, L3c*

INTERVIEWER INTRODUCTORY SCRIPT: Please have a look at the graphs, which both show the results of the same by-election poll. Again there is no writing involved, simply answer my questions when you are ready.

L3a: Using graph B, what percentage of the poll did Labour get three weeks before the by-election?

1 '35%'

2 Different answer

L3b: Both graphs show the same results. Why do they look so different?

1 'The vertical (Y) axis is different – the scales are differently spaced' OR 'the scales start and finish on different numbers' OR 'the scale is wider on graph A/narrower on graph B'

2 Different answer

3 Interviewer cannot code (cohort member's response was written in verbatim)

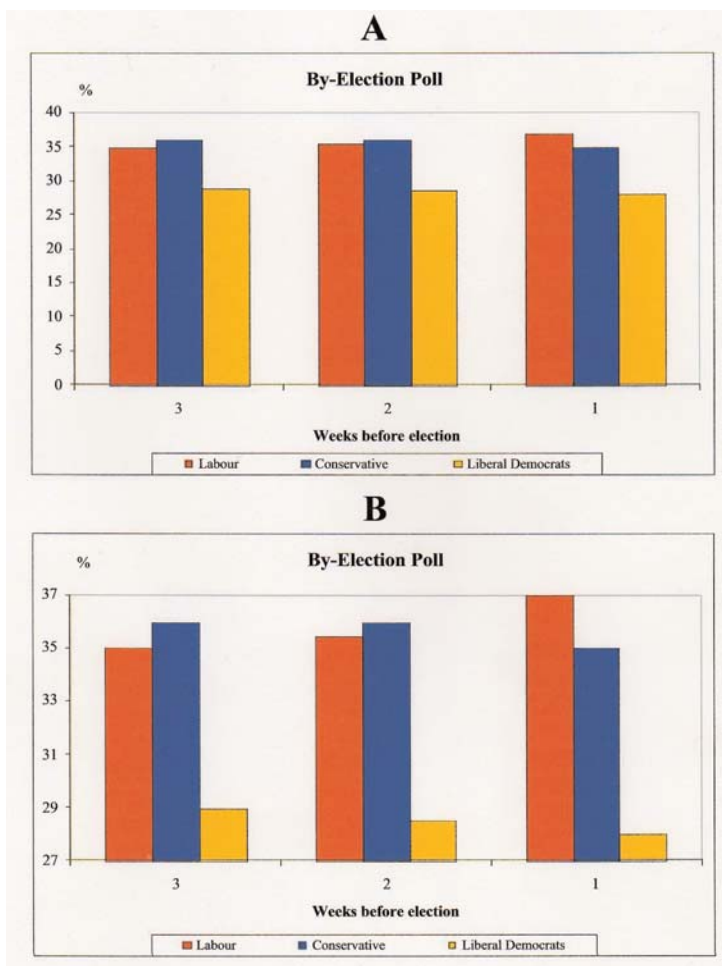
L3c: Why would the Labour Party prefer to use graph B rather than graph A in an article about their chances of winning the by-election?

1 'Labour looks further ahead in B' OR 'the difference between the two parties seems/looks smaller in A/bigger in B' OR 'Labour's support seems to be growing faster in B/slower in A'

2 Different answer

3 Interviewer cannot code (cohort member's response was written in verbatim)

BS3



Numeracy questions*Questions N1a, N1b (no showcard)*

INTERVIEWER INTRODUCTORY SCRIPT: The next questions are to do with time. You can write anything down if you want to.

N1a: You want to video a concert which is being shown tonight at a quarter to twelve and finishes at twenty past three in the morning. Using the 24 hour clock, what time would you program the video to begin recording?

1 '23.45'

2 'Different answer' (answer is incorrect if CM mentions P.M.)

N1b: (You want to video a concert which is being shown tonight at a quarter to twelve and finishes at twenty past three in the morning). And when would you program it to finish, again using the 24 hour clock?

1 '03.20' OR '3:20'

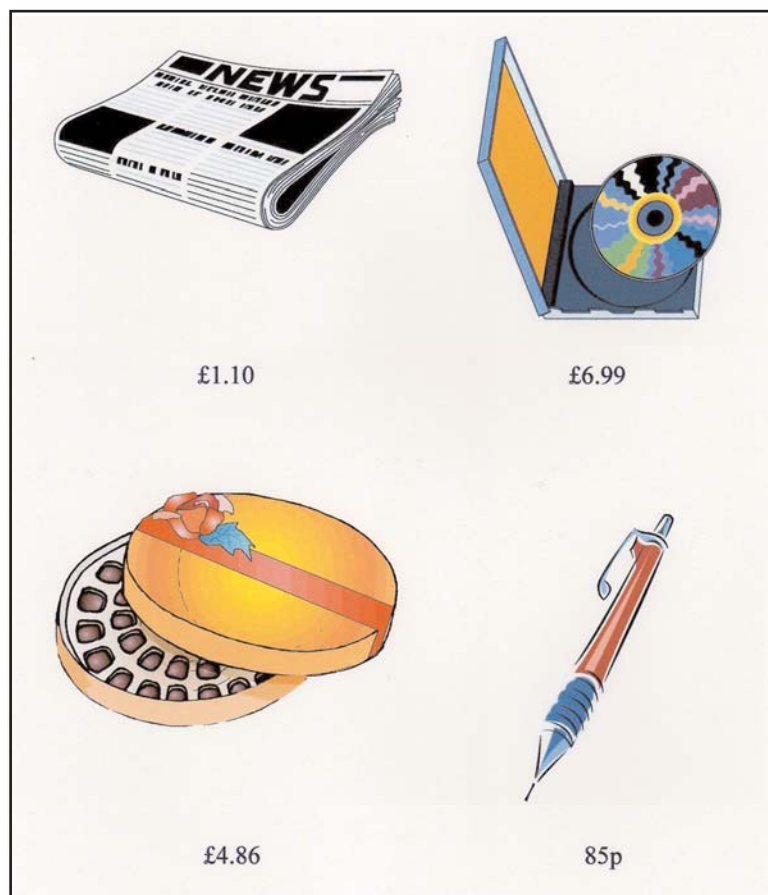
2 'Different answer' (answer is incorrect if CM mentions A.M.)

*Showcard BS4 * and Question N2a*

N2a: You are in a shop and are going to buy four items. You need to add them up and make sure that you have enough money. You have a pocketful of pound coins and no other change. How many coins will you hand over to the shop keeper?

1 '14 pound coins' OR '14 without mentioning pounds'

2 'Different answer'

BS4

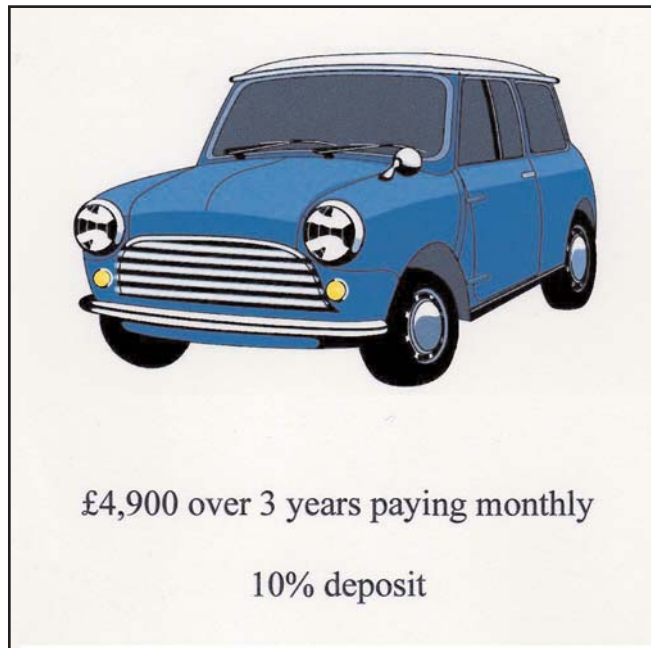
Showcard BS5 * and Question N3a

N3a: You have decided to buy a car on Hire Purchase. The car costs £4,900. You must pay a 10% deposit. What is the deposit?

1 'Deposit is £490'

2 'Different answer'

BS5



Showcard BS6* and Questions N4a and N4b

INTERVIEWER INTRODUCTORY SCRIPT: This time we would like you to use some charts. You and a friend have decided to go on holiday to Ireland, and you are going to sail from Holyhead. You have to go in August but want the cheapest fare possible for that month.

N4a: When could you go?

- 1 '19-22 August' OR '26-29 August' (either or both dates are acceptable),
- 2 'Different answer'

N4b: What would be the total return cost for you both to go in your car?

- 1 '£230'
- 2 'Different answer'

BS6

HOLYHEAD – DUN LAOGHAIRE
 Ships: Stena Hibernia / Stena Cambria
 Check-in time: 1 hour Crossing time: 3 hour 30 minutes

40

YOUR ROUTES AND TIMETABLES

PRICES					
	STANDARD SINGLE FARE				
	A	B	C	D	E
CAR AND DRIVER and up to 3 additional adults (2 children = 1 adult)	85.00	95.00	115.00	140.00	165.00
MOTORISED CARAVAN / MINIBUS / VAN AND DRIVER Up to 6.00 metres in length and up to 3 additional adults (2 children = 1 adult)	85.00	95.00	115.00	140.00	165.00
Over 6.00 metres, each additional metre or part metre	10.00	10.00	15.00	20.00	25.00
TOWED TRAILER / CARAVAN Up to 3.00 metres in length Up to 6.00 metres in length	30.00 60.00	30.00 60.00	45.00 80.00	60.00 100.00	75.00 120.00
Over 6.00 metres each additional metre or part metre	10.00	10.00	15.00	20.00	25.00
FOOT PASSENGERS / ADDITIONAL MOTORIST PASSENGERS (including car passengers not confirmed at time of booking)					
Adult	16.00	16.00	20.00	22.00	22.00
Child (4 but under 14 years)	8.00	8.00	10.00	11.00	11.00
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SOLO MOTORCYCLE / SCOOTER AND RIDER	34.00	34.00	38.00	43.00	43.00
BICYCLE / TANDEM (rider charged as a foot passenger)	FREE	FREE	FREE	FREE	FREE
DOGS (for domestic purposes)					
In vehicle	FREE	FREE	FREE	FREE	FREE
In kennels	7.00	7.00	7.00	7.00	7.00

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TIMETABLE **HOLYHEAD – DUN LAOGHAIRE**

JAN			FEB			MAR			APR		
	0315	1445		0315	1445		0315	1445		0315	1445
1-31	A	A	1-28	A	A	1-25	A	A	1	C	C
						26-31	C	C	2-30	A	A

MAY			JUN				JUL				
	0315	1445	0045	0315	0400	1445	1745	0045	0400	1445	1745
1-22	A	A	1-20	-	B	-	B	1-11	C	*C	C
23-26	C	C	21-26	-	C	-	C	Fri-Sun 12-14	E	*E	E
27-31	B	B	27-30	C	-	C	C	Mon-Thu 15-18	D	D	D
								Fri-Sun 19-21	E	E	E
								Mon-Thu 22-25	D	D	D
								Fri-Sun 26-28	E	E	E
								Mon-Wed 29-31	D	D	D

AUG					SEP				OCT				NOV				DEC			
	0045	0400	1445	a1745	Sun 1	0400	1445	b1745	1-27	0400	1445	1-30	0400	1445	1-18	0400	1445	1745		
Thu 1	D	D	D	D	Sun 1	D	D	D	1-27	B	B	1-30	A	A	1-18	A	A	A		
Fri-Sun 2-4	E	E	E	E	2-30	B	B	B	28-31	A	A	A	1-23	C	C	19-23	C	C	C	
Mon-Thu 5-8	D	D	D	D									24	C	C	24	C	C	C	
Fri-Sun 9-11	E	*E	E	E									25-26	-	-	25-26	-	-	-	
Mon-Thu 12-15	D	D	D	D									27	-	-	27	-	-	-	
Fri-Sun 16-18	E	E	E	E									28-31	B	-	28-31	B	-	-	
Mon-Thu 19-22	C	C	C	C																
Fri-Sun 23-25	D	D	D	D																
Mon-Thu 26-29	C	C	C	C																
Fri-Sat 30-31	D	D	D	D																

a = No sailings 11 August
 b = No sailings 8 September
 * = See note 5 opposite for altered sailing times on certain dates

Table A3.3. Open-response literacy and numeracy questions: additional issues raised by interviewers at the interviewer de-briefing following the Basic Skills Pilot

Interviewers were concerned with the content and presentation of some questions as they contained complex information. Interviewers needed to read them carefully and repeat the questions. Further details included:

- L2a and L2b: some respondents and interviewers found the place names on the Map hard to pick out. Although 'Kildare' was written on the map, the town is not marked with the appropriate symbol ■ (i.e. it is off the top edge of the map).
- L3b and L3c: the correct response was not clearly defined. Interviewers felt the guidelines provided were somewhat ambiguous.
 - L3b: the correct answer was defined as "Differently scaled Y axis on each bar chart (or similar answer)". Mention of the y axis was seen as over-technical. Many respondents had difficulty with this question, and initial answers were not always sufficiently specific. They came up with various answers which the interviewers then had to interpret as 'correct' or 'incorrect', something few of them felt confident to do in all cases.
 - L3c: the correct answer was defined as "Their support seems to be growing faster in bar chart B, OR it looks as if they are further ahead than the Conservatives in bar chart B (or similar answer)." This was felt to be unhelpfully broad.
- N1a to N1c were not based on a showcard, and respondents needed the question read out to them several times as they could not remember it.
 - N1b: interviewers asked for extra clarification of what counts as an acceptable answer. Some were unclear of the correct way of expressing time using the 24 hour clock.
- N2a: the structure of the question seemed to encourage respondents to focus on the amount of money needed to buy the goods, and to ignore the actual question ("How many pound coins were needed ..."). As such, interviewers felt many respondents gave an incorrect answer due to poor question format.
- N3a: there is a lot of extraneous information in the question and on the showcard, which originally informed subsequent linked questions in 1991, but were not asked in 2004.
- N4a and N4b: the showcard contains a lot of information, and distracted respondents from the questions being asked.
 - N4a would be clearer if the wording was changed to "On what dates could you go?" Two possible responses may be confusing to some respondents.
 - N4b should be re-worded to include the words "on those dates".

DYSLEXIA APPENDIX

The following set of tables provides more detailed feedback by interviewers administering the DAST exercises in the Basic Skills Pilot and the scoring particular to each DAST exercise.

Table A4.1. Why DAST needed to be completely administered on paper

The preference for paper-based administration was rooted in the physical demands of the different exercises. For most of the exercises the interviewer had to:

- operate an electronic timer;
- read something out or evaluate the what the respondent was saying; and
- monitor the respondent's progress or code responses on paper.

Managing each of these and maintaining rapport with the respondent was sufficiently challenging without having to enter information into the computer as well. There was also the way the interviewer and respondent sat in relation to each other to consider. The interviewer needed to overlook what the respondent wrote down in the spelling task, and this arrangement did not always allow the interviewer to keep the laptop within reach.

Table A4.2. Further details of scores in the One-Minute Reading exercise

Pilot study

- 167 of the 177 respondents had complete information recorded for the One-Minute Reading task.
- Five respondents managed to read all 120 words in less than 1 minute (range between 54–59 seconds).
- Seven respondents performed below two standard deviations (sd) from the mean. These respondents read between 21–48 words correctly in 1 minute.
- The exercise was not stopped early (due to errors or distress) for any respondents.

Dress rehearsal

- All 64 cohort members had complete information recorded for the One-Minute Reading task.
- Nine cohort members managed to read all 120 words, six in less than 1 minute (range between 50–59 seconds).
- Three cohort members performed below two standard deviations (sd) from the mean. These respondents read between 39–58 words correctly in 1 minute.
- The exercise was stopped early (due to error or distress) for 1 cohort member.

Table A4.3. Further details of scores in the Two/One-Minute Spelling exercise

Pilot study

- 174 respondents had information recorded for the Two-Minute Spelling task, but some interviewer recording or coding errors reduced the sample to 166.
- Of these, 29 (17 per cent) finished the task before the two minutes were up.
- Of these, 27 attempted all 32 words, two completed 31 words and 1 pass.
- Ten respondents performed below 2 standard deviations (sd) from the mean, spelling between 3–13 words correctly in two minutes.
- The exercise was not stopped early (due to errors or distress) for any respondent.

Dress rehearsal

- 62 cohort members had information recorded for the One-Minute Spelling task.
- Of these, 27 (44 per cent) finished the task before the minute was up.
- Of these, 23 attempted all 16 words, two completed 15 words with 1 pass.
- Four cohort members performed below two standard deviations (sd) from the mean, spelling 8 – 9 words correctly in one minute.
- The exercise was not stopped early (due to errors or distress) for any cohort members.

Table A4.4. Further details of scores in the Phonemic Segmentation and Spoonerism exercise

Pilot study

- 175 respondents had complete information recorded for both exercises.
- In the Phonemic Segmentation exercise five respondents performed below two standard deviations (sd) from the mean, managing between three–five words correctly.
- Two-thirds of respondents scored three in the Spoonerisms exercise.

Dress rehearsal

- 63 cohort members had complete information for the Spoonerisms exercise.
- Six of these did not attempt all three of the Spoonerisms.
- Under half of cohort members scored three in the Spoonerisms exercise.

Table A4.5. Further details of scores in the Nonsense Reading Passage exercise.

Pilot study

- 166 respondents had complete and accurate information recorded for the Nonsense Reading Passage. i.e. number of normal words, correct or semi correct nonsense words read out. The maximum score from reading all words is 89.
- Five respondents read for the full three minutes.
- One respondent made five consecutive errors and the task was stopped.
- Seven respondents performed below two standard deviations from the mean, managing to read between 14–63 words correctly.

Dress rehearsal

- 61 cohort members respondents had complete and accurate information recorded for the Nonsense Reading Passage.
- No-one read for the full three minutes,
- One cohort member made five consecutive errors and the task was stopped early.
- Three cohort members performed below two standard deviations from the mean, managing to read between 36–65 words correctly.

PARENT & CHILD APPENDIX

The following set of tables provides summaries of the administration rules for each of the BAS II scales piloted. They show the 'starting' and 'stopping' points for children of different ages, which are dependent on their performance. All of these 'rules' were programmed into the computer to minimise the decisions interviewers had to make on the spot.

Table A5.1. Naming Vocabulary – starting and stopping points for children of different ages.

- Children aged 3:0–4:5 start at item number 1.
 - When they reach item 16, there are two options:
 - (a) If they have failed three or more items, the exercise is stopped.
 - (b) If they have failed fewer than three items, they continue to item 30. At that point, there are two options again:
 - (a) If they have failed three or more items in total, the exercise is stopped.
 - (b) If they have failed fewer than three items in total, they continue to item 36.
 - The exercise is stopped at any point where the child has made five consecutive errors.
- Children aged 4:6–5:11 start at item number 12.
 - When they reach item 30, there are two options:
 - (a) If they have failed three or more items, they then go back to item 1
 - (b) If they have failed fewer than three items, they continue to item 36.
 - If at any point the child makes five consecutive errors, there are two options:
 - (a) If at least three items have been passed on the scale, the exercise is stopped.
 - (b) If fewer than three items have been passed on the scale, then the child goes back to Item 1.

Table A5.2 Naming Vocabulary – additional interviewer comments

Interviewers generally commented on the poor quality of the paper used for the stimulus booklet; some children wanted to turn the pages themselves in their eagerness, and the pages often stuck to each other.

Feedback from both pilots had indicated that some of the images used in the stimulus booklet were not very appropriate, as they pictured objects that many children of this age would rarely see nowadays¹, or they pictured objects in a different way than most children would have seen². For standardisation purposes, interviewers were not asked to further probe on such items. Moreover, some items were considered to be problematic, as children often commented on the way pictures looked³. Interviewers were directed to further probe on such items, and were given specific instructions on how to deal with children's comments. The importance of teaching items was also highlighted.

1. An example of such items is a very traditional picture of a telephone (item no 9).

2. An example of such items is a picture of a chain (item no 23) which could be mistaken for a bracelet.

Table A5.3. Early Number Concepts – starting and stopping points for children of different ages

-
- Children aged 3:0–3:5 start at item number 1.
 - When they reach item 8, there are two options:
 - (a) If they have failed three or more items, the exercise is stopped
 - (b) If they have failed fewer than three items, they continue to item 17. At that point, there are two options again:
 - (a) If they have failed three or more items in total, the exercise is stopped
 - (b) If they have failed fewer than three items in total, they continue to item 24. At that point, there are two options again:
 - (a) If they have failed three or more items in total, the exercise is stopped
 - (b) If they have failed fewer than three items in total, they continue to item 30.
 - In addition, the exercise is stopped at any point where the child has made five consecutive errors.
 - Children aged 3:6–4:5 also start at item number 1.
 - When they reach item 17, there are two options:
 - (a) If they have failed three or more items, the exercise is stopped
 - (b) If they have failed fewer than three items, they continue to item 24. At that point, there are two options again:
 - (a) If they have failed three or more items in total, the exercise is stopped
 - (b) If they have failed fewer than three items in total, they continue to item 30.
 - In addition, the exercise is stopped at any point where the child has made five consecutive errors.
 - Children aged 4:5–5:11 start at item number 4.
 - When they reach item 24, there are two options:
 - (a) If they have failed three or more items, they then go back to item 1
 - (b) If they have failed fewer than three items, they continue to item 30
 - If the child makes five consecutive errors, there are two options:
 - (a) If at least three items have been passed on the scale, the exercise is stopped.
 - (b) If fewer than three items have been passed on the scale, then the child goes back to item 1.

Table A5.4. Specific Administration rules for item 3

For item 3, the child is asked to count out loud a row of ten green tiles while simultaneously pointing to them. A score of 0 to 3 points is given for reciting numbers in correct sequence, and a score of 0 to 3 points is given for pointing to the squares in one-to-one correspondence with reciting. Thus, the total item score ranges from 0 to 6 points. Points are awarded as follows:

Child recites to number	1-3	4-6	7-9	10
Child recites and points to number	1-3	4-6	7-9	10
Score	0	1	2	3

For example, if the child says 'one, two, three, four, five, six, seven, nine, twelve, two' and points to the first four squares in one-to-one correspondence with saying their numbers, he / she receives a total of 3 points, made up as follows: for recitation only, the child receives 2 points for reciting correctly up to seven; for coordinated recitation and pointing to the first four squares the child receives 1 point.

If the score on the first attempt is less than a perfect score of 6, a second attempt is given. The final item score is the better of the two scores for reciting plus the better of the scores for pointing in correspondence with reciting.

Table A5.5. Copying Designs – starting and stopping points for children of different ages

There are different starting and stopping points for children of different ages.

- Children aged 3:6–4:11 start at item number 1.
 - When they reach item 12, there are two options:
 - (a) The exercise is stopped if they have not earned maximum scores* on most items.
 - (b) If only one or two items apparently have less than maximum scores, they continue to item 15. At that point, there are two options again:
 - (a) The exercise is stopped if they have not earned maximum scores on most items.
 - (b) If only one or two items apparently have less than maximum scores, they continue to item 20.
 - The exercise is also stopped at any point where the child has clearly failed 5 consecutive items.
- Children aged 5:0–5:11 start at item number 5.
 - When they reach item 15, there are two options:
 - (a) If fewer than three apparent passes have been made on all items, children are directed to item 1.
 - (b) If only one or two items apparently have less than maximum scores, they continue to item 20.
 - If the child makes five consecutive apparent failures, there are two options:
 - (a) If at least three apparent passes have been made on all items given, then the exercise is stopped.
 - (b) If fewer than three apparent passes have been made on all items given, then the child is directed back to item 1.

*Item responses may earn from 0 to 3 points in final scoring. The administrator can refer to the scoring rules specific for each item in order to judge whether the exercise should be continued or terminated.

Table A5.6. Word Reading – starting and stopping points for children of different ages**The different starting and stopping points for children of different ages.**

- Children aged 5:0–7:11 start at Item 1. If they fail eight or more words in a block of ten words, then the exercise is stopped.
- Children aged 8:0–10:11 start at Item 21. If they fail eight or more words in a block of ten words, there are two options:
 - (a) If they have passed at least three items on the scale, the exercise is stopped.
 - (b) If they have passed less than three items on the scale, they go back to Item 1.
- Children aged 11:0–13:11 start at Item 41. If they fail eight or more words in a block of ten words, there are two options:
 - (a) If they have passed at least three items on the scale, the exercise is stopped.
 - (b) If they have passed less than three items on the scale, they go back to Item 21. They can be directed as far back as item 1 if they still haven't passed at least three items on the scale.
- Children aged 14:0–17:11 start at Item 51. If they fail eight or more words in a block of ten words, there are two options:
 - (a) If they have passed at least three items on the scale, the exercise is stopped.
 - (b) If they have passed less than three items on the scale, they go back to Item 41. They can be directed as far back as item 1 if they still haven't passed at least three items on the scale.

Table A5.7. Spelling – starting and stopping points for children of different ages**The different starting and stopping points for children of different ages**

- Children aged 5:0–6:11 start at Items 1 and 2.
- Children aged 7:0–8:11 start at Items 11 and 12.
- Children aged 9:0–10:11 start at Items 21 and 22.
- Children aged 11:0–17:11 start at Items 31 and 32.

The interviewer administers the first two items specified for the child's age.

- If the child passes both items, the interviewer administers the first two items of each next block, until the child fails an item. At that point, the interviewer administers all items in the previous block.
- If the child fails one or both of the first two items, the interviewer administers the first two items in each previous block, until the child passes both of them. At that point, the interviewer administers all items in that block.
- The interviewer has to administer entire blocks of items in order to establish the basal (a block with at least eight passes) and the ceiling (a block with two or fewer passes).
- If a child of the earliest age band (6:0–7:11) fails either or both of items 1 and 2, the interviewer continues with Item 3. Also, if a child passes the first two items of all blocks up to Items 61 and 62, the interviewer continues with Item 63 (not 71 and 72).

Table A5.8. Number Skills – starting and stopping points for children of different ages

Number Skills: different starting and stopping points for children of different ages

- Children aged 5:0–7:11 start at Block A (Items 1–8)
- Children aged 8:0–9:11 start at Block B (Items 9–16)
- Children aged 10:0–11:11 start at Block C (Items 17–24)
- Children aged 12:0–17:11 start at Block D (Items 25–32)

The child begins at the starting block for his / her age and attempts all the items in that block. If the child passes fewer than five items, the interviewer administers the next easier block, until five or more items in a block are passed or until Block A (the easiest block) is completed. Blocks are then administered in a forward sequence until three or fewer items in a block are passed or until Block F (the most difficult block) is completed.



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www.nrdc.org.uk

NRDC
Institute of Education
University of London
20 Bedford Way
London WC1H 0AL
Telephone: +44 (0)20 7612 6476
Fax: +44 (0)20 7612 6671
email: info@nrdc.org.uk
website: www.nrdc.org.uk

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