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User guide to accompany

The 1970 British Cohort Study 2004 adult literacy and numeracy assessment data

Samantha Parsons

August 2012



Centre for Longitudinal Studies
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The 1970 British Cohort Study
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First published in August 2012 by the
Centre for Longitudinal Studies
Institute of Education, University of London
20 Bedford Way
London WC1H 0AL
www.cls.ioe.ac.uk

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ISBN 978-1-906929-47-3

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Contents

1	Background.....	2
1.1	The age 34 assessments	3
2	Multiple-choice assessment	5
2.1	Literacy multiple-choice assessment.....	5
2.2	Numeracy multiple-choice assessment	6
3	Open-response literacy and numeracy assessment questions.....	13
3.1	Question amendments.....	13
3.2	Literacy: Differences between age 21 and age 34.....	16
3.3	Numeracy: Differences between age 21 and age 34.....	16
3.4	Overall scores from open-response literacy and numeracy assessments	17
	References	20
	APPENDIX.....	21
	Multiple-choice questions	24
	Numeracy assessment items adapted from the <i>SfL</i> Survey	26
	OPEN-RESPONSE QUESTIONS	28
	LITERACY QUESTIONS.....	28
	NUMERACY QUESTIONS.....	33

1 Background

The work reported 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 adult population. Concerns were driven by the growing body of evidence that basic skills difficulties were a major impediment to successful functioning in modern society. The evidence culminated in the work of the UK Government's Moser Committee¹ and the ongoing policy development that arose from it, *Skills for Life (SfL)*. This included defining national standards for adult literacy and numeracy. These map the range of literacy and numeracy skills and capabilities that adults are assumed to need in order to function effectively in the work place, in the family and in the community. The national standards for adult literacy and numeracy as set down in the National Qualifications Framework (NQF) are specified at three levels: Entry Level, Level 1 and Level 2. Entry level is further divided into three sub-levels: Entry 1, Entry 2 and Entry 3 to specify in detail the small steps required for adults to make progress in response to basic skills educational provision. A summary of the skills required to function at a level are given below in Table 1. Full details of the curriculum content expected to be mastered at each level are shown in Table A1 and A2 in the Appendix.

As part of the *SfL* strategy, the National Research and Development Centre for Adult Literacy and Numeracy (NRDC)² was established. In 2004 the latest follow-up surveys of BCS70 funded by the Economic and Social Research Council was due to take place. With additional funding from NRDC, new literacy and numeracy assessments were completed alongside exercises to assess symptoms associated with dyslexia by all BCS70 cohort members at age 34. In addition, funding from the European Social Fund (ESF) supported study of intergenerational continuities in basic skills acquisition, through an assessment of the reading and mathematical skills of all resident natural or adopted children from a randomly selected one in two sample of cohort members³.

¹ *A Fresh Start - Improving Literacy and Numeracy (Department for Education and Employment, 1999)*

² NRDC was established in 2002 by the then Department for Education and Skills (DfES) as part of Skills for Life, the national strategy for improving adult literacy and numeracy skills. It was established as a consortium, and retains close links with a wide range of partners who are specialists in the fields of literacy, numeracy and ESOL. Core government funding ended in March 2008, but NRDC has continued to broaden its remit, working with many different funders in the UK and abroad. For more information, visit www.nrdc.org.uk

³ The details of the assessment instruments were developed for the BCS70 age 34 survey are supplied in an earlier report and an associated journal article. See Parsons, S. and Bynner, J. (2005 and 2006).

1.1 The age 34 assessments

The literacy and numeracy assessments that all BCS70 cohort members participating at age 34 completed, combined two methods of questioning:

- 1 open-response literacy and numeracy questions previously used to assess BCS70 cohort members' functional literacy and numeracy skills at age 21⁴
- 2 multiple-choice questions extracted from the 2002 *Skills for Life (SfL)* Survey⁵.

The aim was that, by retaining some test items that cohort members completed in the age 21 survey and importing items from the *SfL* survey, the new assessment would enable cross-referencing from one survey to another and supply benchmarking to the national standards. Questions from the *SfL* Survey were in multiple-choice format and presented on a computer. Questions from the previous BCS70 age 21 assessment were open-response, paper-based and administered by the interviewer in conversational mode. All questions and accompanying showcard for the open-response part of the assessments are included in the Appendix. A selection of the questions from the *SfL* survey is also included. The complete set of questions could not be included for confidentiality and copyright reasons. The original *SfL* assessments were again used to assess the skills of a representative sample of the working-age population in England in 2011 (BIS, 2011).

Table 1: National standards for adult literacy and numeracy

Level	Literacy (reading)	Numeracy
<i>An adult classified at this level...</i>		
Entry 1	<ul style="list-style-type: none"> • Understands short texts with repeated language patterns on familiar topics • Can obtain information from common signs and symbols 	<ul style="list-style-type: none"> • Understands information given by numbers and symbols in simple graphical, numerical and written material
Entry 2	<ul style="list-style-type: none"> • Understands short straightforward texts on familiar topics • Can obtain information from short documents, familiar sources, and signs and symbols 	<ul style="list-style-type: none"> • Understands information given by numbers, symbols, simple diagrams and charts in graphical, numerical and written material
Entry 3	<ul style="list-style-type: none"> • Understands short straightforward texts on familiar topics accurately and independently • Can obtain information from everyday sources 	<ul style="list-style-type: none"> • Understands information given by numbers, symbols, diagrams and charts used for different purposes and in different ways in graphical, numerical and written material

⁴ When BCS70 cohort members were age 21, a 10 per cent sample had their basic skills assessed (see Ekinsmyth and Bynner, 1992; Bynner and Steedman, 1995). Data is available to download at <http://www.esds.ac.uk/findingData/snDescription.asp?sn=4715>.

⁵ This survey assessed the literacy and numeracy skills of a representative sample of the working age population of England. For further details see Williams et al (2003).

Level	Literacy (reading)	Numeracy
Level 1 (equivalent to GCSE grade D-G)	<ul style="list-style-type: none"> • Understands short straightforward texts of varying length on a variety of topics accurately and independently • Can obtain information from different sources 	<ul style="list-style-type: none"> • Understands straightforward mathematical information used for different purposes and can independently select relevant information from given graphical, numerical and written material
Level 2+ (equivalent to GCSE grade A*-C)	<ul style="list-style-type: none"> • Understands a range of texts of varying complexity accurately and independently • Can obtain information of varying length and detail from different sources 	<ul style="list-style-type: none"> • Understands mathematical information used for different purposes and can independently select and compare relevant information from a variety of graphical, numerical and written material

2 Multiple-choice assessment

2.1 Literacy multiple-choice assessment

The literacy assessment consisted of ‘two tiers’. A total of 20 multiple-choice literacy questions made up the final assessment, of which ten were screening questions (Entry Level 3) (see Figure 1). 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.

The adult literacy core curriculum covers ‘Speaking and Listening’, ‘Reading’ and ‘Writing’. The items in the *SfL* Survey cover aspects of reading and writing only⁶. 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)
- Vocabulary, Word Recognition, Phonics (VWRP)

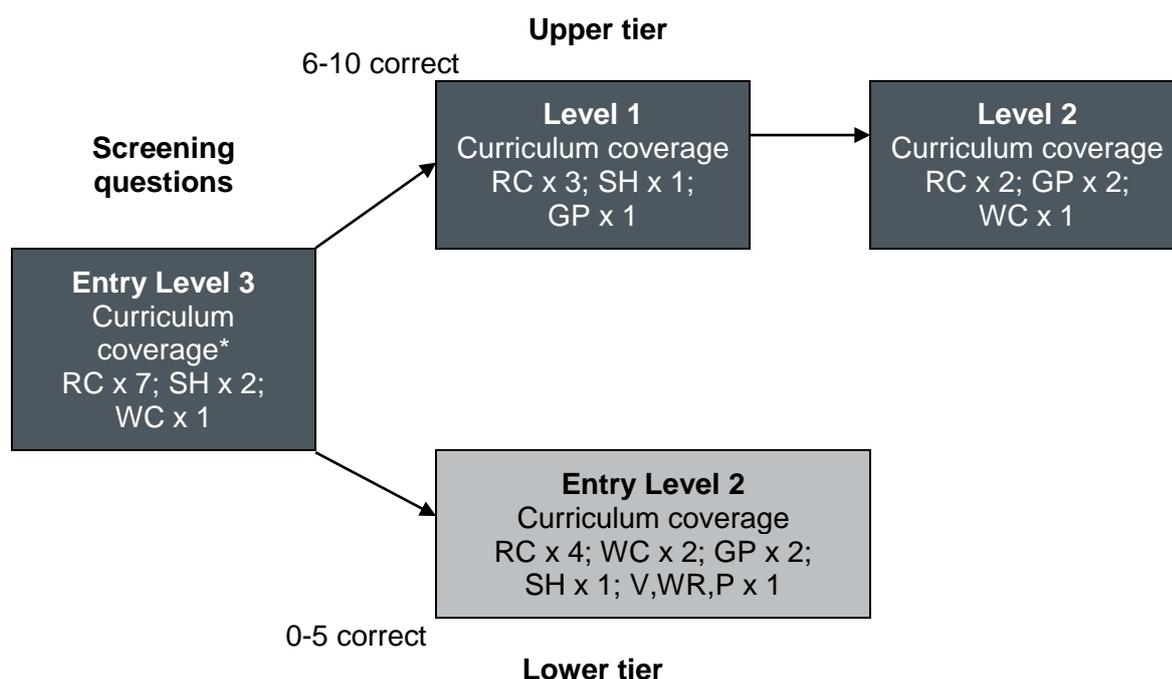
Writing

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

As with the *SfL* Survey, item selection was heavily concentrated on the many aspects of ‘Reading Comprehension’. However, Figure 1 shows that in the BCS70 age 34 assessment, ‘Writing Composition’, ‘Grammar and Punctuation’ and ‘Spelling and Handwriting’ were also covered by items on both the lower and upper tiers.

⁶ The work undertaken by colleagues at the Centre for Developing and Evaluating Lifelong Learning (CDELL) (can you spell out in the first instance?) for the Baseline Survey pre-dated the 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 1: Literacy multiple-choice assessment



*The number of questions covering specific aspects of the literacy core curriculum. Reading: RC = Reading Comprehension, GP – R = Grammar and Punctuation, V,WR,P = Vocabulary, Word Recognition, Phonics. Writing: WC = Writing Composition, GP – W = Grammar and Punctuation, SH = Spelling and Handwriting.

2.2 Numeracy multiple-choice assessment

All respondents attempted all questions in the numeracy multiple-choice assessment. Earlier research, reinforced by the pilot work, has established that a high proportion of men and women in the general population have number difficulties⁷. The widespread and diverse nature of difficulties associated with numeracy suggested 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.

There were 17 questions in the assessment. To obtain as balanced a set of questions as possible in relation to curriculum coverage, difficulty levels and no repeated images⁸, the final instrument was made up of five questions set at Entry Level 2, four at Entry Level 3, five at Level 1 and three at Level 2.

⁷ Parsons, S., and Bynner, J. (1999) *Literacy, leaving school and jobs: The effect of poor basic skills on employment in different age groups*. London: Basic Skills Agency; Bynner, J. and Parsons, S. (1997) *Does numeracy matter?* London: Basic Skills Agency. Parsons, S. and Bynner, J. (2005) *Does numeracy matter more?* London: National Research and Development Centre for Adult Literacy and Numeracy.

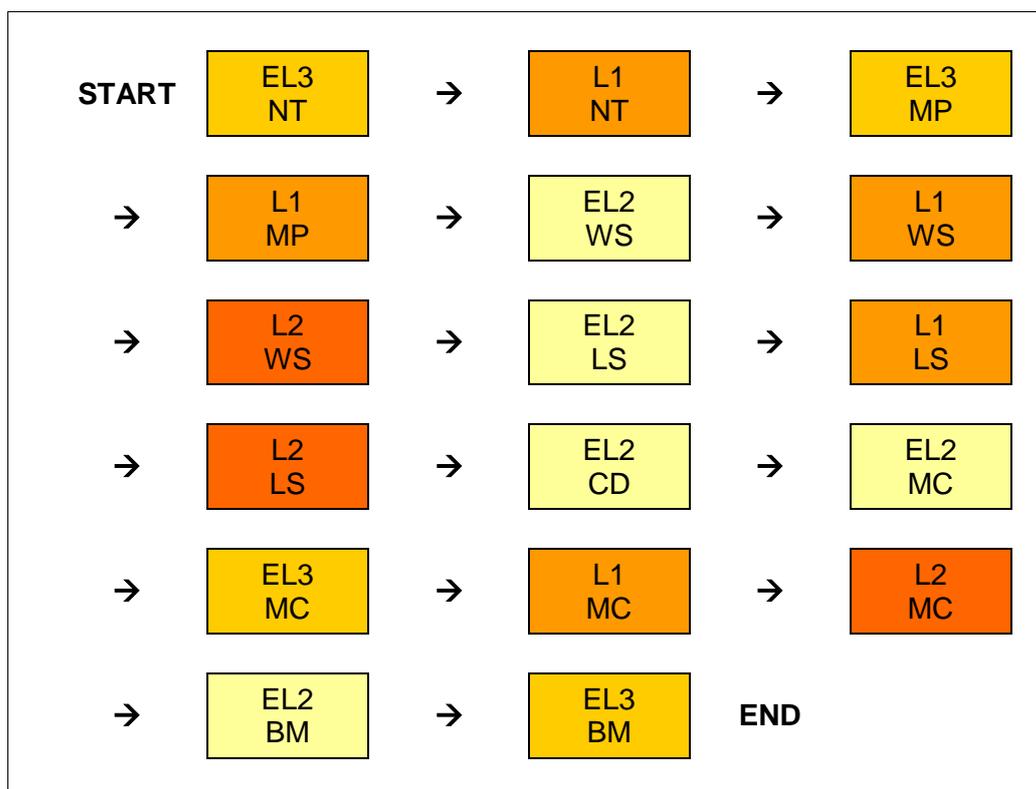
⁸ Repeated images (visual test stimuli to which testees responded) were avoided to stop the confusion felt by respondents who thought they had already answered an individual question. This was a problem particularly in the numeracy assessment as images were not grouped together as they had been for the literacy assessment.

Seven aspects of number skill from the numeracy curriculum were assessed by the items in the original *SfL* 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)

The 17 selected questions were presented in order of difficulty within each curriculum topic. For example, all questions set at different levels of ‘Money Calculations’ were attempted before moving to the next set of questions on ‘Whole Numbers and Time’. This method was adopted because of its potential value for capturing more of the elements of numeracy that an individual respondent could and could not do. The revised assessment started and ended with an Entry Level 3 question, as shown in Figure 2.

Figure 2: Final numeracy assessment: Curriculum coverage and sequence of difficulty of questions



Note 1: Aspects of the numeracy core curriculum: NT = Whole Numbers and Time, MP = Measures and Proportion, WS = Weights and Scales, LS = Length and Scaling, CD = Charts and Data, MC = Money Calculations, BM = Basic Money.

Note 2: In combination, the selected multiple-choice and open-response questions ensured that each aspect of the curriculum was covered by at least three questions at different levels of difficulty.

The whole assessment, comprising both multiple-choice and open-response questions, was administered in the following order:

- 1 introduction to multiple-choice questions as used in the *SfL* Survey (with minor amendments)
- 2 multiple-choice literacy questions
- 3 multiple-choice numeracy questions
- 4 open-response literacy questions
- 5 open-response numeracy questions.

Cohort members had to answer the 20 multiple-choice literacy questions and 17 multiple-choice numeracy questions before answering the seven open-response literacy and six open-response numeracy questions.

2.3 Calculation of overall scores from multiple-choice questions

It is anticipated that most analysts using the new BCS70 assessment data will wish to work with total scores that reflect cohort members' performance relative to that of the whole population across the whole range of performance. Accordingly, 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 had to produce a total score that could be calculated for all cohort members. This assumes a reasonably high level of reliability of the scores, that is differences in test performance between groups will not be missed through large measurement errors. Table 2 shows that the reliability estimates for the multiple-choice literacy and numeracy assessment items surpassed the levels generally considered acceptable for survey analysis purposes, exceeding 0.8 (alpha coefficient) in both cases⁹. The reliability estimates for the assessments comprising only the much smaller number of open-response items were lower but, when these items were combined with the multiple-choice items, in two cases the reliability levels increased.

For numeracy, computation of an overall score was straightforward as all cohort members completed all questions. Any correct answer was given '1' point, any incorrect answer '0' points. The maximum numeracy score available from the multiple-choice questions is within the range 0 to 17 for all cohort members.

For the vast majority of cohort members who progressed along the upper tier of the literacy assessment the identical scoring technique applied: any correct answer was given '1' point, any incorrect answer '0' points. However, to calculate an overall score that included the 4 per cent of cohort members who, because they failed to answer six or more of the screening questions correctly, moved down to the lower tier of the multiple-choice assessment, we have to assume they would not have been able to answer any of the more difficult questions on the upper tier (Level 1 and Level 2). Accordingly, a score of '0' was automatically awarded to this group for the ten questions on the upper tier. Likewise, a score of '1' for each of the ten questions on the lower tier was automatically awarded to the 96 per cent of cohort members who progressed along the upper tier. The maximum literacy score available from

⁹ For further details see Parsons, S. and Bynner J. (2006).

the multiple-choice questions is therefore within the range 16 to 30 for cohort members on the upper tier and 0 to 15 for cohort members who progressed on the lower tier.

Table 2: Reliability estimates for items in literacy and numeracy assessments

	Alpha	No. of items	N
Multiple-choice literacy	.82	20	9567
Multiple-choice literacy	.87	30	9567
Multiple-choice numeracy	.82	17	9561
Open-response literacy	.58	7	9520
Open-response numeracy	.62	6	9509
All literacy	.83	27	9520
All literacy	.85	37	9520
All numeracy	.84	23	9509

Figure 3a gives the total score achieved by the cohort members who progressed from the screening questions along the upper tier of the literacy multiple-choice assessment (20 questions) and those who moved down from the screening questions along the easier lower tier of the literacy multiple-choice assessment (20 questions). The diversity of ability among the 4 per cent of lower tier (Entry Level 2) cohort members within a shorter and more accessible scoring range is clear to see, while the upper tier sample shows a good spread of scores with the expected bias towards high performance.

The distribution of cohort members' total literacy score (0 to 30) is shown in Figure 3b. The performance of lower tier cohort members is represented by the long tail towards the low scores, reflecting the relatively low incidence of very poor reading skills in the population. The total numeracy score is displayed in Figure 3c. We can see that, by removing the 'screen' that placed relatively high numbers of respondents on a lower tier (creating a 'bimodal' distribution), the main aim of the test construction – to achieve continuity in the measurement of performance in the population from one level to the next – was achieved.

Figure 3a: Total literacy score from 20 multiple-choice questions on the upper tier and the lower tier

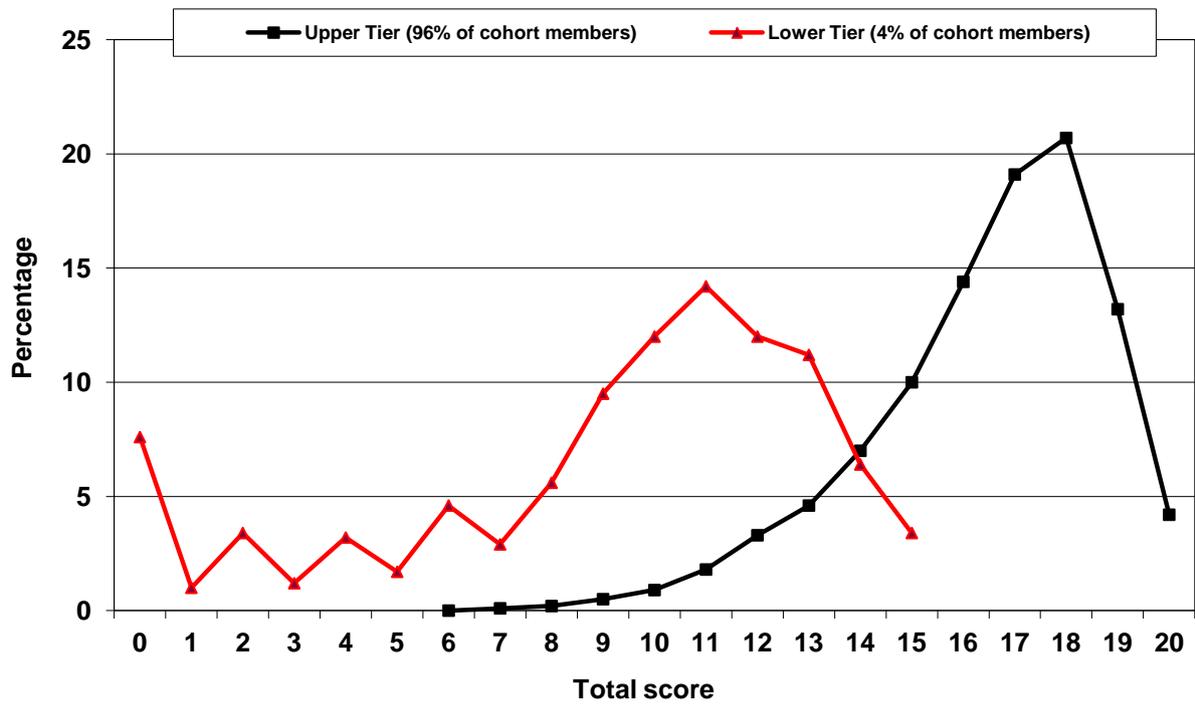


Figure 3b: Total literacy score from multiple-choice questions

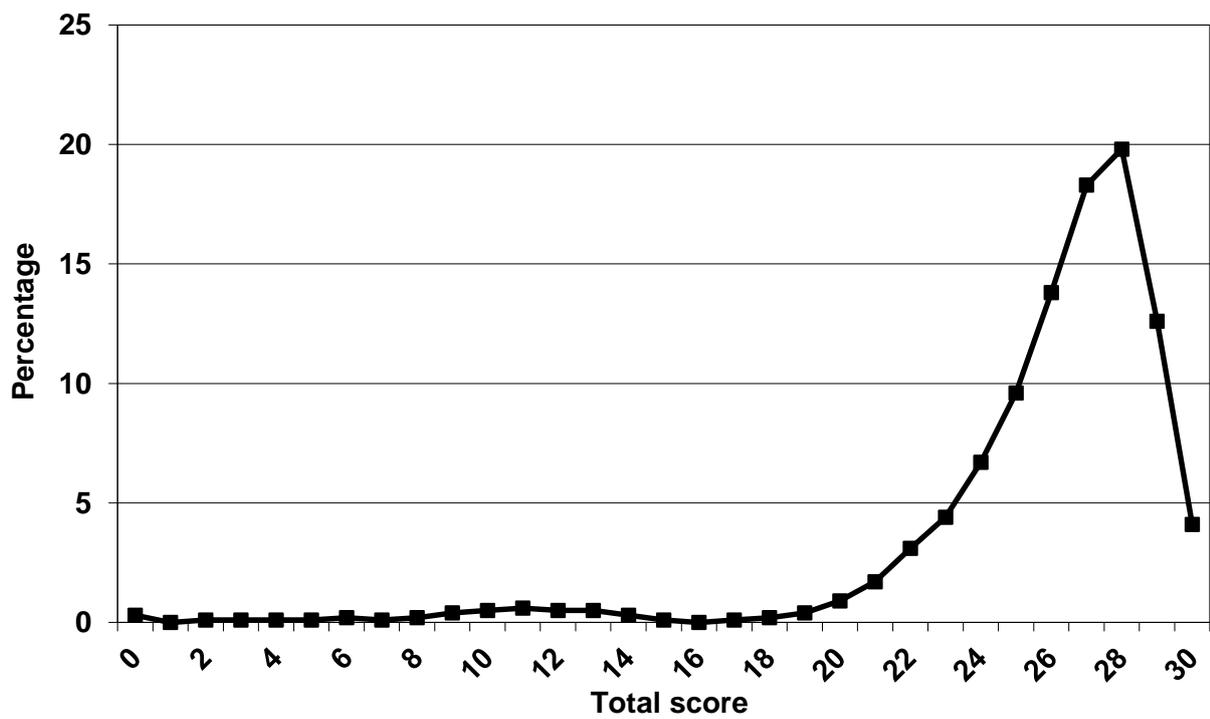
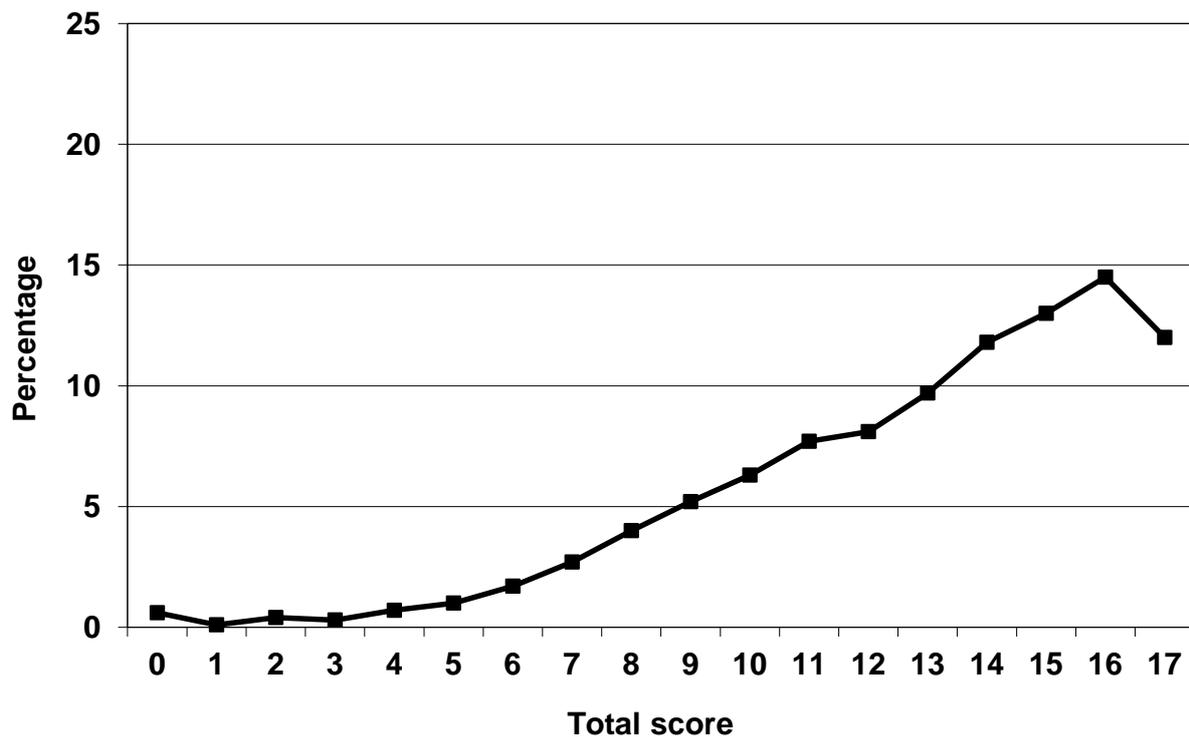


Figure 3c: Total numeracy score from multiple-choice questions



Using all 30 questions to compute the overall literacy score, a strong and highly significant (product moment) correlation of 0.64 ($p < .001$) was recorded between cohort members' performances in the literacy and numeracy multiple-choice assessments (or 0.63, $p < .001$) using all 30 literacy questions. Product moment correlation coefficients range from -1.0 to +1.0. A correlation coefficient of 0 signifies that there is no linear relationship between performance in one test and another. Thus, the larger the correlation coefficient, the stronger the linear relationship. A positive correlation signifies that a high score in one exercise is associated with a high score in the other. A negative correlation signifies that a high score in one test is associated with a low score in the other.

2.4 Converting performance in literacy and numeracy assessments into levels

Another important aim of the survey was to compare the BCS70 performances in terms of the levels in the *SfL* national standards. 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 several were tried. The classification by levels used is based on the principle that, to pass a level, at least half the test questions at the given level had to be answered correctly, as follows.

For Literacy

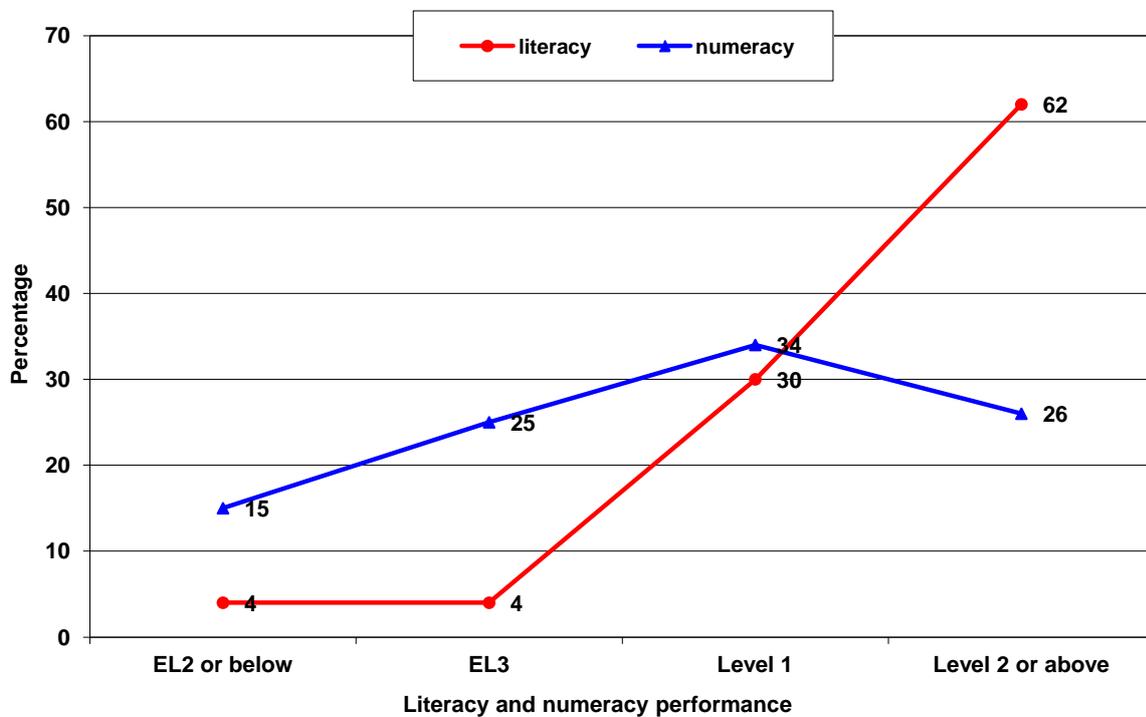
Below Entry Level 2: 0 - 5 correct answers at EL2
Entry Level 2: 6 - 10 correct answers at EL2 and 0 - 5 at EL3
Entry Level 3: 6 - 10 correct answers at EL3 and 0 - 2 at L1
Level 1: 3 - 5 correct answers at L1 and 0 - 2 at L2
Level 2: 3 - 5 correct answers at L1 and 3 at L2

For Numeracy

Below Entry Level 2: 0 - 3 correct answers at EL2
Entry Level 2: 4 - 5 correct answers at EL2 and 0 - 2 at EL3
Entry Level 3: 3 - 4 correct answers at EL3 and 0 - 3 at L1
Level 1: 4 - 5 correct answers at L1 and 0 - 2 at L2
Level 2: 3 correct answers at L2

Figure 4 shows the distribution of cohort members after classifying performance on the number of correct answers to the multiple-choice questions in terms of the literacy and numeracy levels used in the *SfL* Survey (Entry Level 2, Entry Level 3, Level 1 and Level 2). Initial descriptive analyses based on classification of cohort members across these levels are included in Bynner and Parsons (2006).

Figure 4: 'Profiles of competence' based on national standards – literacy and numeracy performance in BCS70 2004



3 Open-response literacy and numeracy assessment questions

The previous BCS70 basic skills assessment was carried out in 1991 on a representative 10 per cent sample of the whole cohort at age 21. Each literacy and numeracy assessment item comprised a visual stimulus presented to the cohort member on a 'showcard', about which they were asked a number of questions. Questions were set at levels of difficulty in accordance with the City & Guilds WordPower / NumberPower standards at the time: Foundation Level, Level 1, Level 2 and Level 3 (for literacy only) and were open response (OR) in format.

From the responses supplied by the 1,627 cohort members who completed the assessments in the 1991 survey, seven literacy and six numeracy questions were selected for the 2004 assessment¹⁰ along with multiple-choice questions from the *SfL* Survey. Inclusion of some of the 1991 questions in the new 2004 basic skills assessment tool offered the opportunity for longitudinal analysis of changes in the skills measured by these test items, that is we can investigate improvement and deterioration over time and what may lie behind them. However, to perform any longitudinal analysis cohort members had to have completed both the 1991 and the 2004 assessments. As the 1991 assessment was completed by just 1,627 cohort members, this was the maximum number available for longitudinal analysis.

3.1 Question amendments

Although in essence the selected questions remained the same, amendments were made to six of the literacy and two of the numeracy questions, largely to bring the images on the showcards up-to-date. These revised showcards and the questions relating to them were extensively piloted before being included in the final assessment. Figure 5 gives an example of original and revised literacy and numeracy showcards. In the case of the literacy showcard 'Yellow Pages', the cohort member was asked to find the address of a particular restaurant. For the numeracy showcard, showing items with prices, the cohort member was asked to work out the change that would be expected from a £20 note. The full set of questions is included in the appendix.

¹⁰ For details of the analysis behind question selection see Parsons, S. and Bynner, J. (2005).

Table 3 compares responses (percentage incorrect) given by cohort members to the seven literacy and six numeracy questions asked at age 21 and age 34. Four sets of results are shown :

- **Age 21:** all cohort members completing the assessments in the original age 21 survey (n=1,627)
- **Age 21 (in 21+34):** cohort members in the original age 21 survey who also completed the assessments in the age 34 survey (n=1,189 literacy; n=1,185 numeracy)
- **Age 34:** all cohort members completing the assessments in the age 34 survey (n=9,529 literacy; n=9,484 numeracy)
- **Age 34 (in 21 +34):** cohort members in the original age 21 survey who also completed the assessments in the age 34 survey (n=1,189 literacy; n=1,185 numeracy)

There is a high level of consistency across the four sets of percentages and, as we might expect, a higher level of incorrect responses for questions at each level of difficulty for numeracy than for literacy.

Table 3: Comparing % incorrect in BCS70 age 21 and age 34

	Level of difficulty	BCS70 age 21	BCS70 age 21 (in 21 + 34)	BCS70 age 34	BCS70 age 34 (in 21 + 34)
LITERACY					
L1a: Yellow Pages – address	FL	5%	4%	2%	2%
L1b: Yellow Pages – phone no.	FL	2%	2%	1%	1%
L2a: Map – quickest route	L1	5%	5%	6%	6%
L2b: Map – East or West	L1	7%	6%	9%	8%
L3a: Bar chart – approx	L1	11%	9%	7%	6%
L3b: Bar chart – Y-axis	L2	25%	22%	27%	26%
L3c: Bar chart – why prefer	L2	21%	19%	19%	17%
	<i>n(100%)</i>	1,627	1,189	9,529	1,189
NUMERACY					
N1a: Video timer – start	FL	14%	12%	10%	10%
N1b: Video timer – finish	FL	17%	16%	12%	10%
N2a: In a shop – How many £ coins?	L1	41%	39%	24%	22%
N3a: Deposit on a car	L1	24%	22%	12%	11%
N4a: Ferry – when can go	L2	27%	24%	22%	21%
N4b: Ferry – return cost	L2	50%	48%	39%	38%
	<i>n(100%)</i>	1,627	1,185	9,484	1,185

Key: FL = Foundation Level; L1 = Level 1; L2 = Level 2

3.2 Literacy: Differences between age 21 and age 34

Overall, the percentages of cohort members incorrectly answering each of the seven literacy questions at age 21 or age 34 were highly consistent. Differences in percentage incorrect at the two ages varied only between zero to four per cent. At both ages, cohort members found that questions L3b and L3c were the most difficult. These required cohort members to extract and interpret information from two graphs. The 'reduced' sample of cohort members who had taken part in the assessments at age 21 and at age 34 had identical or slightly lower percentages answering each of the questions incorrectly, suggesting that their skills were marginally better than those of the 'drop-outs', (non-respondents) at age 34.

3.3 Numeracy: Differences between age 21 and age 34

For numeracy, the picture was less straightforward, illustrating the more varied set of skills that are embedded within 'numeracy'. Although the percentage incorrect for each question only varied from one to five per cent across age 21 and age 34 samples for three of the six questions, for the other three questions differences in the percentage incorrect increased to between 11 to 17 per cent. The biggest difference in percentage incorrect was recorded for question N2a (calculating cost of items in a shop). We concluded that the substantial reduction in the percentage of cohort members answering incorrectly in the more recent survey (41 per cent at age 21 down to 24 per cent at age 34) was largely due to a faulty interviewer instruction in the 1991 survey at age 21. Such an anomaly would be a serious problem if the items were used singly to assess individual numeracy performance, but produces only a modest distortion in the test scores as a whole. For all numeracy questions, the percentage incorrect was lower at age 34 than it had been at 21, suggesting that, at the group level at least, there is a small improvement of numerical skills associated with age.

With one exception (N3a: working out the deposit needed for buying a car on hire purchase), the rank order of questions, in terms of which question cohort members found the most difficult, was replicated at the two age points. Despite the greater variation in percentages incorrect, N2a (calculating cost of items in a shop) and N4b (working out the cost of a ferry trip from information on a timetable) were found to be the hardest questions by the highest proportion of cohort members at both ages. As for the literacy questions, the reduced sample of cohort members who had taken part in the assessments at both ages had slightly lower percentages answering each of the questions incorrectly when compared with the full sample at ages 21 and 34.

3.4 Overall scores from open-response literacy and numeracy assessments

As for the multiple-choice items, a total score for the assessment can be obtained by aggregating correct answers across all the test items. Figure 6 compares the total number of correct responses to the seven literacy and six numeracy questions given by cohort members participating in the assessments at age 21, 34, or at both ages. We can see that the distribution of the four total scores from the three groups of cohort members was near identical for literacy. For numeracy, the higher percentage of cohort members who answered question N2a incorrectly at age 21 results in the 'blip' in the distribution; this accounts for the lower percentage answering all six numeracy questions correctly at age 21. For numeracy, we can see that the sub-sample of cohort members who completed the assessments at both ages had the highest overall score at age 21 and age 34, compared to those who only completed the assessment at either the age 21 or age 34 surveys. For literacy, differences in overall scores are barely distinguishable.

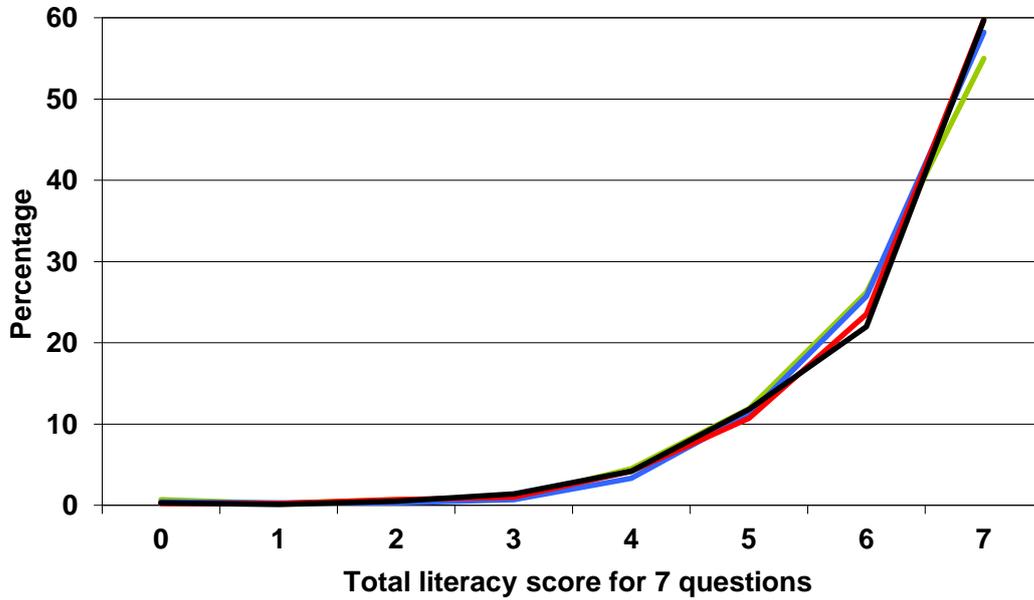
For all cohort members in the age 34 survey who completed the literacy and numeracy open-response assessments (n=9,484), the correlation computed is only for those who did both assessments. A substantial correlation of 0.48 ($p < .001$) was recorded between their performance in the literacy and numeracy open-response assessments. A good performance in one assessment was a reasonably strong indicator of a good performance in the other, as had been the case for performance in the multiple-choice assessments. However, the correlations between the literacy and numeracy scores from the open-response assessment are lower than those found for the comparable correlations between the literacy and numeracy scores from the multiple-choice assessment (see Table 2). This largely reflects the smaller number of items in the open-response tests and consequently the lower reliabilities as can be demonstrated by applying the 'correction for attenuation'¹¹. The corrected correlation for the open-response literacy and numeracy scores increases from 0.48 to 0.80 and for multiple-choice literacy and numeracy from 0.64 to 0.86.

Performance in one mode of assessment was also significantly correlated with performance in the other. An uncorrected correlation of 0.50 ($p < .001$) was recorded between the OR and MC literacy scores and 0.52 ($p < .001$) between the OR and MC numeracy scores.

¹¹ The correction for attenuation is given by the formula:
 $r(\text{corrected}) = r / (\sqrt{\text{Reliability test 1}} \times \sqrt{\text{Reliability test 2}})$, where r is the original uncorrected correlation (Nunnally, J.C. (1978) *Psychometric Theory*, p. 219-220. New York: McGraw Hill).

Figure 6: Comparing total scores by cohort members for identical questions in BCS70 age 21 and age 34 assessments

a) Literacy: % of cohort members by number of questions answered correctly



b) Numeracy: % of cohort members by number of questions answered correctly

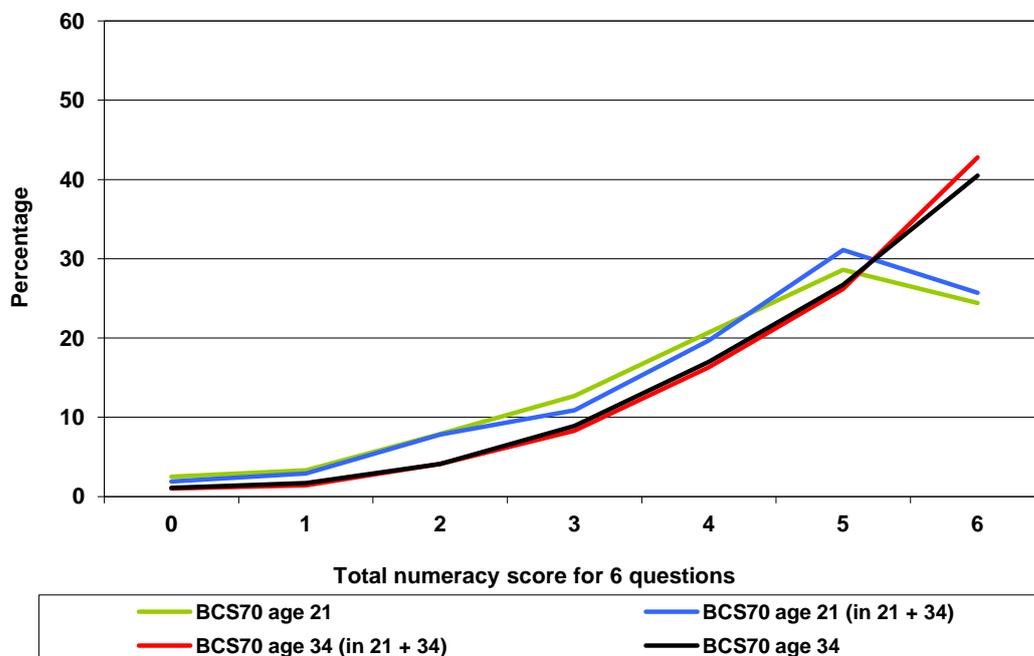


Table 4: List of variables in BCS70 2004 basic skills assessment data file (e.g. SPSS data file bcs_2004_adult_assessment_basic_skills.sav)

Name	Label
bcsid	Research case identifier
DMSex	Cohort Member's sex
litmc20	BCS70 2004: Literacy MC assessment: total score for all CMs - assume lower tier would answer upper tier incorrect
litmc30	BCS70 2004: Literacy MC assessment: total score for all CMs over 30 questions - assume lit answer ut incorrect, ut answer lit correct
litor01a	BCS70 2004: Literacy OR Assessment: question 01a (FL)
litor01b	BCS70 2004: Literacy OR Assessment: question 01b (FL)
litor02a	BCS70 2004: Literacy OR Assessment: question 02a (L1)
litor02b	BCS70 2004: Literacy OR Assessment: question 02b (L1)
litor03a	BCS70 2004: Literacy OR Assessment: question 03a (L1)
litor03b	BCS70 2004: Literacy OR Assessment: question 03b (L2)
litor03c	BCS70 2004: Literacy OR Assessment: question 03c (L2)
litort	BCS70 2004: Literacy OR Assessment: total score for all CMs on 7 literacy questions
litall27	BCS70 2004: Literacy assessment - total score for MC and OR questions litmc20 + litort - max 27
litall37	BCS70 2004: Literacy assessment - total score for MC and OR questions litmc30 + litort - max 37
litlev	BCS70 2004: Literacy MC Assessment - CMs performance assessed by Level
litlevg	BCS70 2004: Literacy MC Assessment - CMs performance assessed by Level
nummct	BCS70 2004: Numeracy MC Assessment - total score for 17 MC questions
numor01a	BCS70 2004: Numeracy OR Assessment - question 01a (FL)
numor01b	BCS70 2004: Numeracy OR Assessment - question 01b (FL)
numor02a	BCS70 2004: Numeracy OR Assessment - question 02a (L1)
numor03a	BCS70 2004: Numeracy OR Assessment - question 03a (L1)
numor04a	BCS70 2004: Numeracy OR Assessment - question 04a (L2)
numor04b	BCS70 2004: Numeracy OR Assessment - question 04b (L2)
numort	BCS70 2004: Numeracy OR Assessment - total score for 6 questions
numall	BCS70 2004: Numeracy MC and OR assessment - total score for all 23 questions
numlev	BCS70 2004: Numeracy MC assessment - CM performance assessed by level
numlevg	BCS70 2004: Numeracy MC assessment - CM performance assessed by level

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APPENDIX

Table A1: aspects covered by the adult literacy curriculum

ADULT LITERACY CURRICULUM	
Speaking and Listening: Listen and respond	
Entry Level 2	Listen and respond to spoken language, including straightforward information, short narratives, explanations and instructions
Entry Level 3	Listen and respond to spoken language, including straightforward information and narratives, and follow straightforward explanations and instructions, both face-to-face and on the telephone
Level 1	Listen and respond to spoken language, including information and narratives, and follow explanations and instructions of varying lengths, adapting response to speaker, medium and context
Level 2	Listen and respond to spoken language, including extended information and narratives, and follow detailed explanations and multi-step instructions of varying length, adapting response to speaker, medium and context
Speaking and Listening: Speak to communicate	
Entry Level 2	Speak to communicate information, feelings and opinions on familiar topics
Entry Level 3	Speak to communicate information, feelings and opinions on familiar topics, using appropriate formality, both face-to-face and on the telephone
Level 1	Speak to communicate information, ideas and opinions, adapting speech and content to take account of the listener(s) and medium
Level 2	Speak to communicate straightforward and detailed information, ideas and opinions clearly, adapting speech and content to take account of the listener(s), medium, purpose and situation
Speaking and Listening: Engage in discussion	
Entry Level 2	Engage in discussion with one or more people in a familiar situation to establish shared understanding about familiar topics
Entry Level 3	Engage in discussion with one or more people in a familiar situation, making relevant points and responding to what others say to reach a shared understanding about familiar topics
Level 1	Engage in discussion with one or more people in familiar and unfamiliar situations, making clear and relevant contributions that respond to what others say and produce a shared understanding about different topics
Level 2	Engage in discussion with one or more people in a variety of different situations, making clear and effective contributions that produce outcomes appropriate to purpose and topic
Reading: Read and understand	
Entry Level 2	Read and understand short, straightforward texts on familiar topics
Entry Level 3	Read and understand short, straightforward texts on familiar topics accurately and independently

Level 1	Read and understand straightforward texts of varying length on a variety of topics accurately and independently
Level 2	Read and understand a range of texts of varying complexity accurately and independently
Reading: Read and obtain information	
Entry Level 2	Read and obtain information from short documents, familiar sources and signs and symbols
Entry Level 3	Read and obtain information from everyday sources
Level 1	Read and obtain information from different sources
Level 2	Read and obtain information of varying length and detail from different sources
Writing: Write to communicate	
Entry Level 2	Write to communicate information with some awareness of the intended audience
Entry Level 3	Write to communicate information and opinions with some adaptation to the intended audience
Level 1	Write to communicate information, ideas and opinions clearly using length, format and style appropriate to purpose and audience
Level 2	Write to communicate information, ideas and opinions clearly and effectively, using length, format and style appropriate to purpose, content and audience

Table A2: aspects covered by the adult numeracy curriculum

ADULT NUMERACY CURRICULUM	
Understanding and using mathematical information: Read and understand	
Entry Level 2	Read and understand information given by numbers, symbols, simple diagrams and charts in graphical, numerical and written material
Entry Level 3	Read and understand information given by numbers, symbols, diagrams and charts used for different purposes and in different ways in graphical, numerical and written material
Level 1	Read and understand straightforward mathematical information used for different purposes and independently select relevant information from given graphical, numerical and written material
	Read and understand mathematical information used for different purposes and independently select and compare relevant information from a variety of graphical, numerical and written material
Understanding and using mathematical information: Specify and describe	
Entry Level 2	Specify and describe a practical problem or task using numbers, measures and simple shapes to record essential information
Entry Level 3	Specify and describe a practical problem or task using numbers, measures and diagrams to collect and record relevant information
Level 1	Specify and describe a practical activity, problem or task using mathematical information and language to make accurate observations and identify suitable calculations to achieve an appropriate outcome
Level 2	Specify and describe a practical activity, problem or task using mathematical information and language to increase understanding and select appropriate methods for carrying through a substantial activity
Calculating and manipulating mathematical information: Generate results	
Entry Level 2	Generate results to a given level of accuracy using given methods and given checking procedures appropriate to the specified purpose
Entry Level 3	Generate results to a given level of accuracy using given methods, measures and checking procedures appropriate to the specified purpose
Level 1	Generate results to a given level of accuracy using methods, measures and checking procedures appropriate to the specified purpose
Level 2	Generate results to an appropriate level of accuracy using methods, measures and checking procedures appropriate to the specified purpose
Interpreting results and communicating mathematical information: Present and explain results	
Entry Level 2	Present and explain results that meet the intended purpose using appropriate numbers, simple diagrams and symbols
Entry Level 3	Present and explain results that meet the intended purpose using appropriate numbers, diagrams, charts and symbols
Level 1	Present and explain results that meet the intended purpose using an appropriate format to a given level of accuracy
Level 2	Present and explain results clearly and accurately using numerical, graphical and written formats appropriate to purpose, findings and audience

Multiple-choice questions

Literacy assessment items adapted from the *SfL* Survey

Entry Level 2

Jobs vacant

BRISTOL FRUIT SALES
MARKET FRUIT CENTRE
ALBERT ROAD
BRISTOL
requires
Order pickers: 8am - 5pm Monday - Friday
Fruit packers: 8am - 1pm Monday - Wednesday

Which company is offering a job?

- A.Bristol Packers
- B.Albert Fruit Sales
- C.Bristol Fruit Sales
- D.Order Pickers

Entry Level 3

TO LET

This lovely flat is tucked away in Warwick Court close to London Road. Bristol city centre is within easy walking . The flat has a large sitting room with a bay window looking out into the park nearby. There is a newly fitted kitchen. There is a one master bedroom and a luxury bathroom. Limited off-road parking is available.

To view, contact
Smith's Letting Agency, School Lane,
Bath.



The flat is in the city of

- A.Warwick
- B.Bath
- C.London
- D.Bristol

Level 1

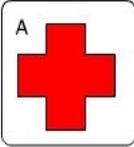
Driving and Drugs in Britain

Despite calls by some politicians to legalise "soft" drugs, summer 2000 saw the introduction of drug testing for drivers. If you are stopped by the police while you are driving and suspected of being under the influence of drugs, you could be breaking the law. Here is what will happen to you:

- First the police will ask you to take a test.
- If the test is negative but you are still suspected, the officers will use their Drugs Recognition Training.
- Next, the police can ask you to take a Field Impairment Test (FIT).
- If you agree, you have to carry out another test. If you fail, you will be arrested on suspicion of being "unfit to drive through drugs".
- However, if you say no to taking the FIT, you will be arrested on suspicion of driving under the influence of drugs.

Which of the following images would be most appropriate for this document?

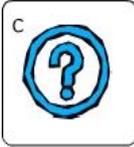
A



B



C



D



- A....A
- B....B
- C....C
- D....D

Level 2

Which of the extracts relies on hyperbole - that is a very exaggerated style of writing to describe the film?




- A 'This is the story of a professional soldier who turns gladiator to survive.'
- B 'Miss this film and you risk missing the film of the decade.'
- C 'How brave are you? Would you dare sit through this film alone?'
- D 'An example of the epic genre; all the traditional ingredients are there.'
- E 'A wonderful, wild, whirlwind tale of love, lust and death in the sand.'

- A....A
- B....B
- C....C
- D....D
- E....E

Numeracy assessment items adapted from the SfL Survey

Entry Level 2

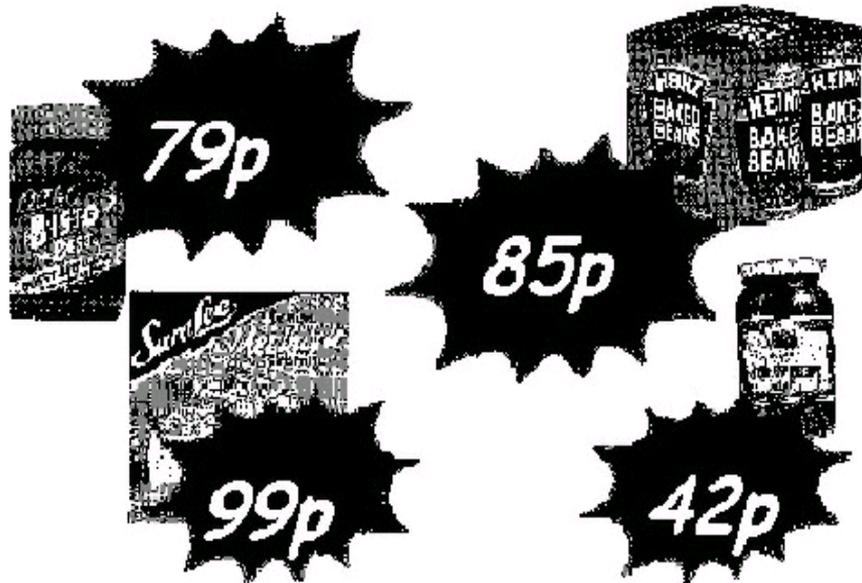
If I buy 2 jars of jam, how much change will I get from £ 2.00 ?



- A....£1.18
- B....£0.82
- C....£0.80
- D....£0.59

Entry Level 3

Roughly how much will all these cost?

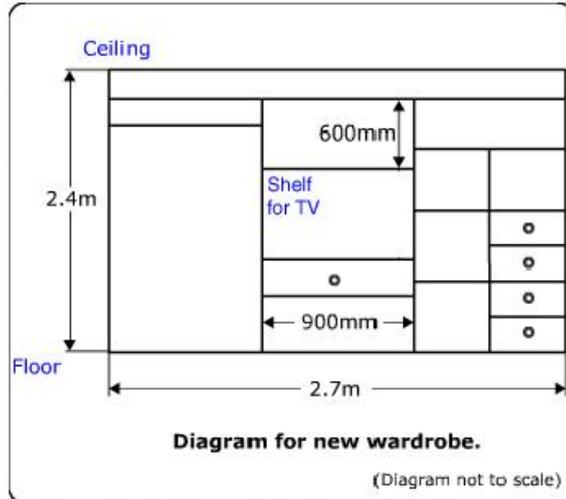


- A....Roughly £2.50
- B....Roughly £3.00
- C....Roughly £3.50
- D....Roughly £4.00

Level 1

Hasran has planned a new wardrobe. A TV is 40 centimetres wide and will go in the middle of the TV shelf.

How wide is the gap on each side of the TV?



- A....10 cm
- B....25 cm
- C....43 cm
- D....50 cm

Level 2

Julie has a part-time job in a restaurant

<p>Julie's pay</p> <p>Basic Pay=£4.80 per hour Sundays=1.5 times basic pay Bank Holidays=2 times basic</p>	<p>Julie's hours</p> <p>Saturday.....5 hours Sunday.....3 hours Bank Holiday Monday 4 hours</p>	
---	--	--

How much is she paid altogether?

- A....£57.60
- B....£74.40
- C....£81.50
- D....£84.00

OPEN-RESPONSE QUESTIONS

Open-response questions and corresponding showcards

Questions and/or showcards updated for the 2004 survey are indicated with an *. For the original showcards and questions see Ekinsmyth, C. and Bynner, J. (1994) *The Basic Skills of Young Adults*. London: The Basic Skills Agency. (<http://www.cls.ioe.ac.uk/shared/get-file.ashx?id=921&itemtype=document>)

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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Georgetown Restaurant, 23 Sheep St. Stratford on A (01789)	204445
Gerry's Diner, 34 Church St. Nuneaton (024)	7632 8786
Giovanni's Restaurant, 15 Smith St. Warwick (01926)	494904
Golden Cross The, Wilford Rd. Bidford on Avon (01789)	772420
Golden Dragon, 11 Euston Place. Leamington Spa (01926)	424479
Grand Union The, 66 Clement St. Leamington Spa (01926)	421323

KEY QUOTES See the Insurance Guide

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Haywagon The, The Green, Churchover, Rugby (01788)	832307
Herb & Spice Royal Thai Cuisine, 10 Henry St., Rugby (01788)	537735
Hoor Park Tea Rooms, Hoor Park Craft & Antique Centre, Assley, Nuneaton, Chapel End (024)	7639 7733
Hollybush The, 270 Holbrook Lane, Holbrook, Coventry (024)	7668 6923

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



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

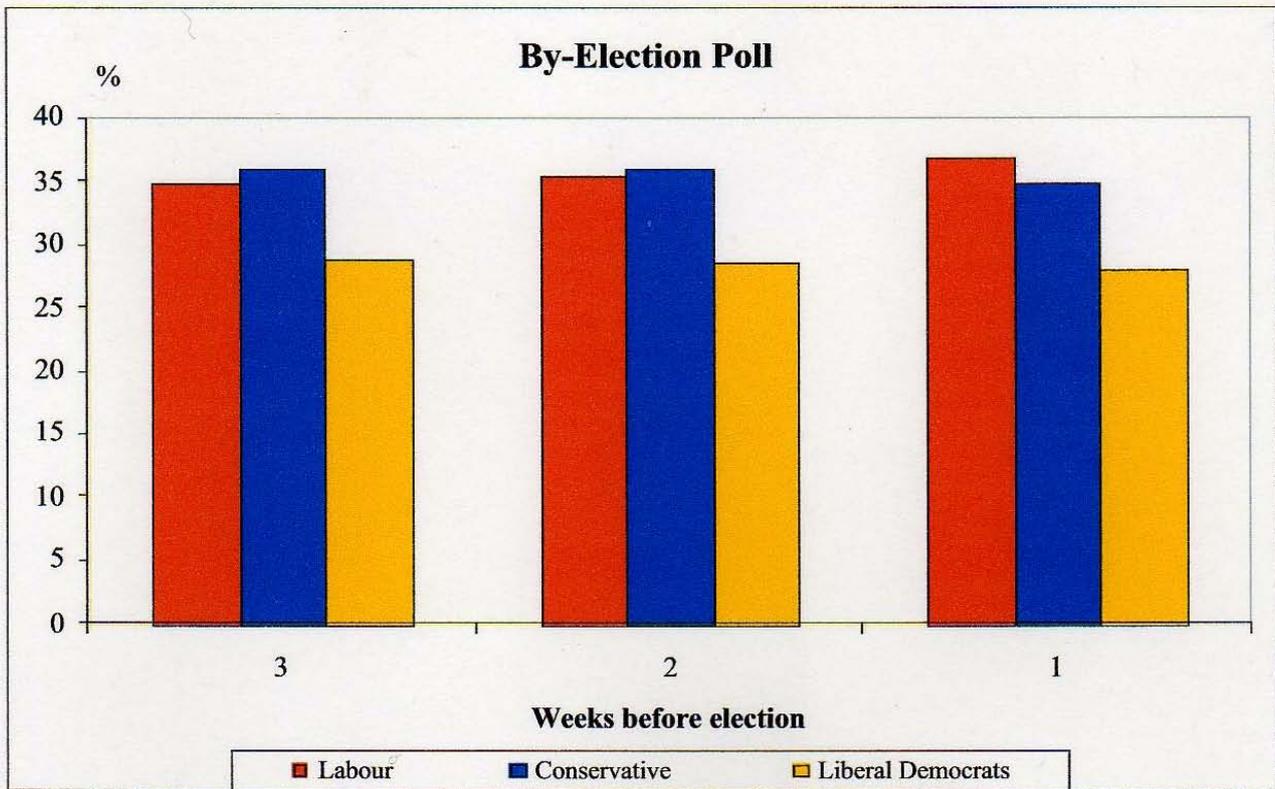
L3b: Both graphs show the same results. Why do they look so different?

- 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)

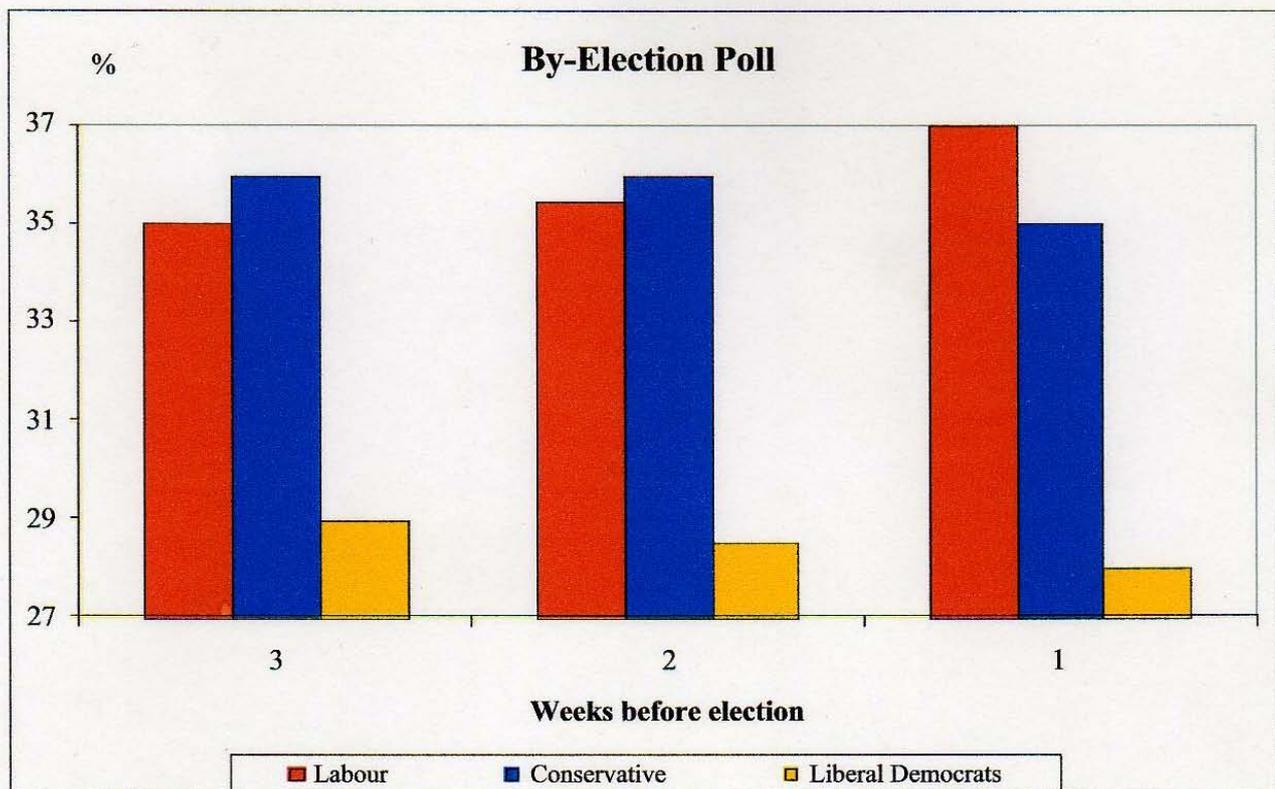
L3c: Why would the Labour Party prefer to use graph B rather than graph A in an article about their chances of winning the by-election?

- 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)

A



B



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?

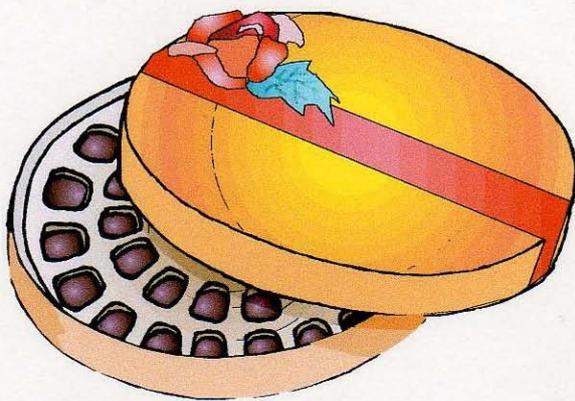
- 1 '14 pound coins' OR '14 without mentioning pounds'
- 2 Different answer



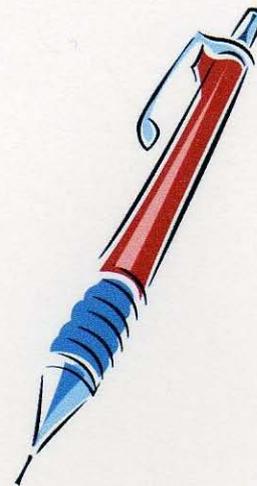
£1.10



£6.99



£4.86



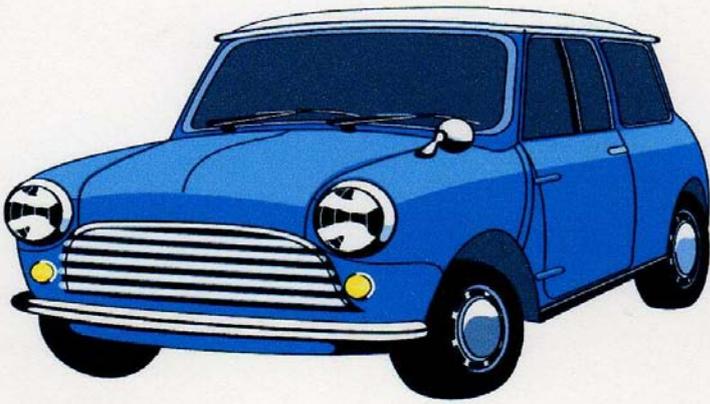
85p

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

BS 5



£4,900 over 3 years paying monthly
10% deposit

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

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) Over 6.00 metres, each additional metre or part metre	85.00 10.00	95.00 10.00	115.00 15.00	140.00 20.00	165.00 25.00
	TOWED TRAILER / CARAVAN Up to 3.00 metres in length Up to 6.00 metres in length Over 6.00 metres each additional metre or part metre	30.00 60.00 10.00	30.00 60.00 10.00	45.00 80.00 15.00	60.00 100.00 20.00	75.00 120.00 25.00
	FOOT PASSENGERS / ADDITIONAL MOTORIST PASSENGERS (including car passengers not confirmed at time of booking) Adult Child (4 but under 14 years) Infant (under 4 years)	16.00 8.00 FREE	16.00 8.00 FREE	20.00 10.00 FREE	22.00 11.00 FREE	22.00 11.00 FREE
	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 In kennels	FREE 7.00	FREE 7.00	FREE 7.00	FREE 7.00	FREE 7.00	

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Please make sure you make a reservation for your journeys to avoid the disappointment of arriving at the port to find the ship full.

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Just add the two Standard Single Fares together for the Standard Return Fare.

CHOICE OF RETURN CROSSING
To travel out one route and return another add the respective fares for each route to arrive at the return fare.

TIMETABLE HOLYHEAD – DUN LAOGHAIRE

JAN	0315	1445	FEB	0315	1445	MAR	0315	1445	APR	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	0315	1445	JUN	0045	0315	0400	1445	1745	JUL	0045	0400	1445	1745	
1-22	A	A	1-20	-	B	-	B	-	1-11	C	*C	C	C	
23-26	C	C	21-26	-	C	-	C	-	Fri-Sun 12-14	E	*E	E	E	
27-31	B	B	27-30	C	-	C	C	C	Mon-Thu 15-18	D	D	D	D	
									Fri-Sun 19-21	E	E	E	E	
									Mon-Thu 22-25	D	D	D	D	
									Fri-Sun 26-28	E	E	E	E	
									Mon-Wed 29-31	D	D	D	D	
AUG	0045	0400	1445	a1745	SEP	0045	0400	1445	b1745	DEC	0045	0400	1445	1745
Thu 1	D	D	D	D	Sun 1	D	D	D	D	1-18	A	A	A	-
Fri-Sun 2-4	E	E	E	E	2-30	B	B	B	*B	19-23	C	C	C	C
Mon-Thu 5-8	D	D	D	D						24	C	C	C	-
Fri-Sun 9-11	E	*E	E	E	OCT	0045	0400	1445		25-26	NO SERVICE			
Mon-Thu 12-15	D	D	D	D	1-27	B	B	B		27	-	-	B	-
Fri-Sun 16-18	E	E	E	E	28-31	A	A	A		28-31	B	-	B	-
Mon-Thu 19-22	C	C	C	C	NOV	0045	0400	1445						
Fri-Sun 23-25	D	D	D	D	1-30	A	A	A	JAN	0045	0400	1445	1745	
Mon-Thu 26-29	C	C	C	C					1	A	-	A	-	
Fri-Sat 30-31	D	D	D	D					2-8	A	A	A	A	

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

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